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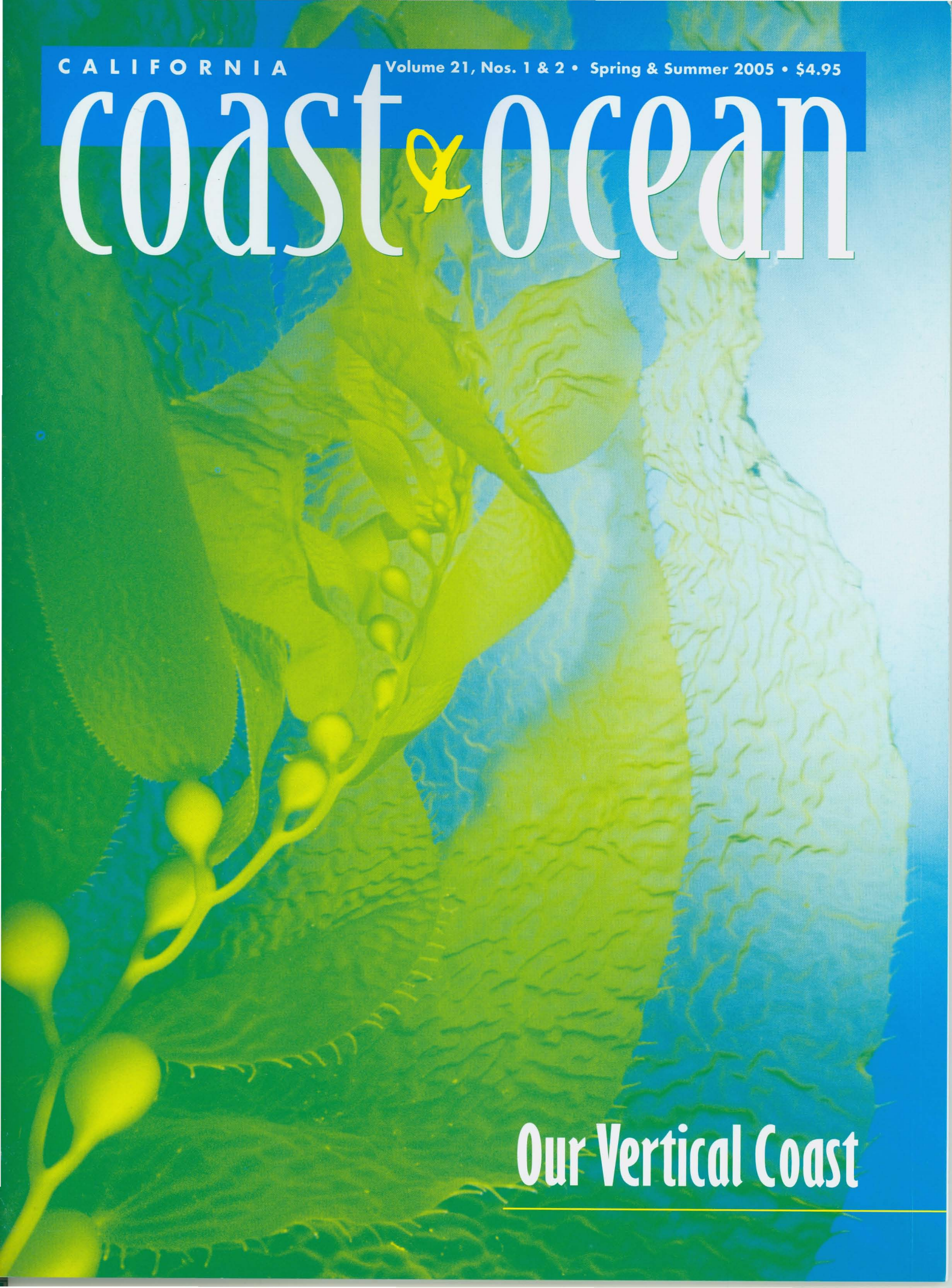
coast & ocean



Our Vertical Coast

NEW C&O WEB SITE

The new *Coast & Ocean* web site is up and running at **www.coastandocean.org**. It will be under construction for a while as we add features and tweak the design.

Our web edition includes most articles from the current print edition (some abridged), some color images, back issues, and other information.

To subscribe to *California Coast & Ocean* for one year (four issues), $18 ($15 for teachers); for two years (eight issues), $33 ($30 for teachers), send a check payable to "Coastal Conservancy" to:

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The current issue was delayed for so long by a family emergency that we've decided to merge it with the Summer issue rather than send you Spring in July. We've added eight pages so we could include additional articles. This allows us to catch up with the calendar—you'll get the Autumn issue early rather than late in the season—and to attend to building a better web site. Current subscriptions will be extended by one issue.

—The editors

Cover photo: Giant kelp. Phillip Colla is a photographer and natural history writer who focuses on California kelp forests, marine mammals, the American West, and eastern Pacific islanders.

Back cover: Giant kelp by Tom Ford

CALIFORNIA COAST & OCEAN

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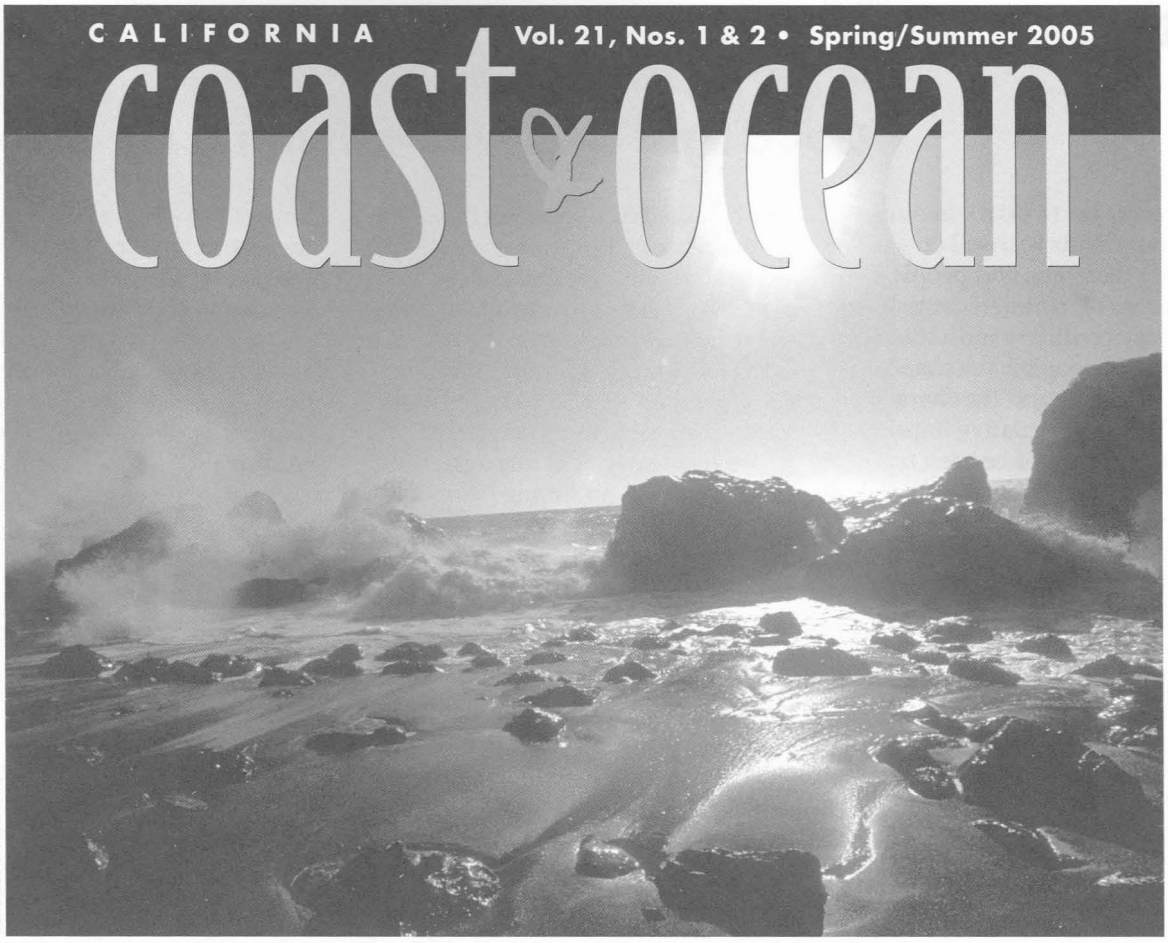

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Good and Bad News from a Border Zone

HISTORY AS TAUGHT in our schools tends to dwell on wars, major disasters, and people in power. Seldom do children get to learn about the ways ordinary individuals or small groups of people have shaped the course of events and the character of places. Yet the cumulative impacts of local citizen activism have been far-reaching, especially in saving cherished natural landscapes from destruction.

In just about any coastal town that has maintained its own special character, you can find people who stood up against some development proposal that would have run roughshod over places they love. They took action when most were resigned to what seemed inevitable and, working patiently and from the heart, drew others into their vision. The odds they faced were often enormous, yet often they prevailed.

Were today's schoolchildren to learn some of these stories, there would be new hope for democracy. I like to tell these stories in *Coast & Ocean*. They give me courage. I especially like the one that began more than 30 years ago in the small city of Imperial Beach, three miles from the Mexican border, when a few people resisted a land developer's plan to build a housing complex and marina in a marsh. Instead, in 1980, these few people won protection for the marsh as the Tijuana Slough National Wildlife Refuge. That 550-acre wetland is now part of the 2,500-acre Tijuana River National Estuarine Research Reserve, which was established in 1982.

One conservation victory led to others as the citizens, encouraged, moved on to further goals. This year on Earth Day, April 22, they celebrated their latest and grandest accomplishment: The Estuary has been designated a Ramsar site—a Wetland of International Importance under the Convention on Wetlands signed in Ramsar, Iran, in 1971 to provide a framework for national action and international cooperation for the conservation and wise use of wetlands. A country that chooses to name a site to this list commits itself to ensuring that proper steps are taken to maintain that site's ecological character. More than 1,435 sites in 120 nations are on the prestigious Ramsar list.

"We have arrived at this remarkable juncture in the continuing story of this marvelous place at land's edge because many of you shared a vision, kept hope alive, and took action," keynote speaker Peter Douglas, executive director of the Coastal Commission, told the gathering at the Reserve's visitor center. Behind the speaker's platform, the marsh bloomed brilliant gold and green, extending toward the border highlands. Guests had come from both sides of the border and from as far as Washington, D.C.

"Twenty-five years ago," said Diane Rose, the mayor of Imperial Beach, "the vision and dedication of two citizens in this community made this possible."

At that time, the Tijuana Estuary was known mostly as a no man's land strewn with old tires and other junk washed down from Tijuana by stormwaters. Among those who recognized its ecological importance were Michael and Patricia McCoy, who settled in Imperial Beach in 1971 because they liked the marshes, the beaches, and the culture of the border zone. Michael, a veterinarian, set up a practice in town. Patricia taught English and walked a lot. When the saltmarsh within the city was threatened, they went into action. Convinced that the key to the future lies in education and mutual understanding, the McCoys and their allies founded the nonprofit Southwest Wetlands Interpretive Association in 1980, led nature walks, and campaigned in every way they could to protect the threatened marsh. In 1990, SWIA built the visitor center, where 17,000 schoolchildren now come each year to learn why the saltmarsh is important, why so many birds are there, and why it's "the breadbasket for the ocean," said Paul Romero, deputy director of California State Parks.

During the past two decades, the Estuary has had a lot of help. A consortium of agencies from all levels of government, together with nonprofit organizations, has spent countless hours and many millions of dollars on efforts toward habitat recovery. The Coastal Conservancy alone has invested nearly $19 million, according to executive officer Sam Schuchat. Because the upper two-thirds of the Tijuana River watershed is in Mexico, there has been much cross-border cooperation.

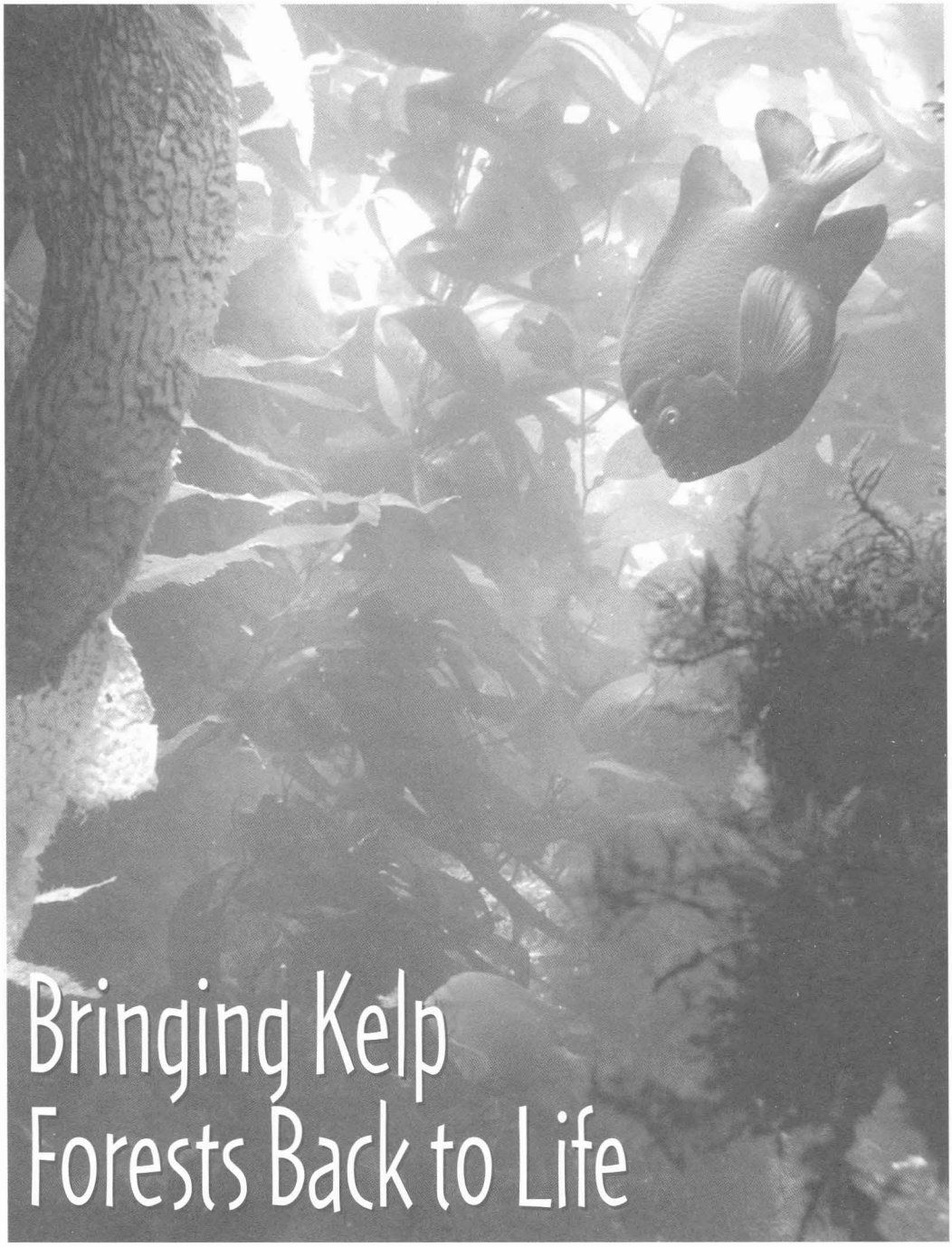
The Ramsar designation raises all that has been done here to a new level. Its timing, however, is ironic: A massive border fortification project, exempted from the Endangered Species Act under legislation rammed through Congress in the name of national security, threatens what has been accomplished and flouts the meaning of the Ramsar listing.

"If built as planned, this wall of division will be a lasting memorial to the politics of fear and will, invariably, cast an ominous dark shadow over our cross-border collaborations in environmental stewardship," Douglas told the gathering. "We would do well, especially these days, to focus our activism at the local level," he suggested. "That is where, for many, the greatest difference can be made. Eventually, there will arise a collective intelligence and the societal will for broader positive action from the synergy of many community-based initiatives like what is happening here at this estuary." For the citizens of Imperial Beach, "the local level" extends across the border.

—*Rasa Gustaitis*

Imperial Beach views its natural environment as a platform for nature-friendly economic development. *(See page 36.)*

TOM FORD



Bringing Kelp Forests Back to Life

Garibaldis in a kelp forest

ANNE CANRIGHT

MACROCYSTIS PYRIFERA: the syllables roll off the tongue—much more elegantly than the thin words "giant kelp." Both names, though, apply to the same amazing plant, one that we are fortunate to have growing along the California shore. Vast forests of it provide shelter and sustenance to an amazing abundance and diversity of animal life, from lumbering black sea bass, which reach weights of over 500 pounds, to gliding bat rays, to feather-duster worms, jeweled top snails, brittle stars, and myriad other members of the invertebrate orders, right down to the lowliest encrusting sponge.

The animals this plant houses (a single holdfast may provide shelter to more than 150 species) are fascinating enough, but *Macrocystis pyrifera* is itself just as fascinating—if not more so. For one thing, it has evolved a two-stage life cycle, alternating between sexual reproduction (when the plant, in its incarnation as a tiny sperm- or egg-releasing gametophyte, is best seen

under a microscope) and asexual reproduction (the ropy golden-brown plant we think of when we imagine kelp is in fact the sporophyte, or spore-producing phase). From microscopic teeniness, giant kelp can grow more than a foot a day, to lengths of more than 200 feet. "Forests" form over hard substrate (usually rocks) in ocean depths to 120 feet, but typically between 20 and 70 feet, and may vary in extent from several hundred feet to a mile wide and several miles long.

A land-bound eye might identify a kelp forest from its gentle riffle on the surface of the sea; the canopy of topmost fronds stretch out over the water, rolling with the swell and flapping lightly in the breeze. When seen from below, however, the kelp forest is majestic and imposing—another world entirely. It is often likened to a redwood forest, and in its verticality there is a certain similarity. On a sunny day in a calm ocean the kelp forest becomes an ethereal place in which long beams of light dance among undulating algal stipes and fronds. Rockfish hover big-eyed and Zen-like, little orange señoritas flit about like birds, and spotted harbor seals swoop in for a close look at you, an awkward, bubbling, wetsuited creature clearly not of their realm.

It is also an environment at the mercy of tides, currents, and swells—oceanographic and meteorological forces that can be far from benign. When wintertime waves come crashing onto California's shores driven by low-pressure systems far to the south or north, the kelp forest becomes a place, if not quite of lashing fury (water being thicker than hurricane-driven air), at least of intense agitation. These natural forces can rip up weak holdfasts in a kelp forest and then fling the 100-plus-foot plants ashore among pounding waves.

Death, however, feeds life, as shorebirds come to pick at the bounty of tiny animals tucked within the holdfasts' snaking haptera, which a short time before glued plant to rock. Soon, too, kelp-fly and beach-hopper eggs laid in the decomposing vegetal mounds begin to hatch by the thousands, becoming more food for more birds. Death becomes life: that is the way of things, and when caused by natural forces we welcome it. But what about when humans upset the balance? Do we just let things be?

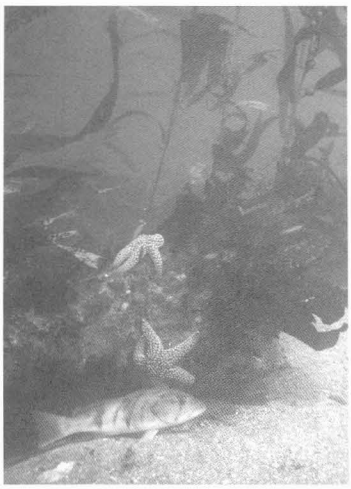
Some marine biologists studying the Southern California Bight—where human disturbances along the heavily settled coast have been especially high—say the answer is no. For the past 15 years, they have been exploring means to mitigate past wrongs. One potent response is reforestation (planting kelp beds where kelp used to be), something that four Southern California "Keeper" organizations have been hard at work on since the mid-1990s.

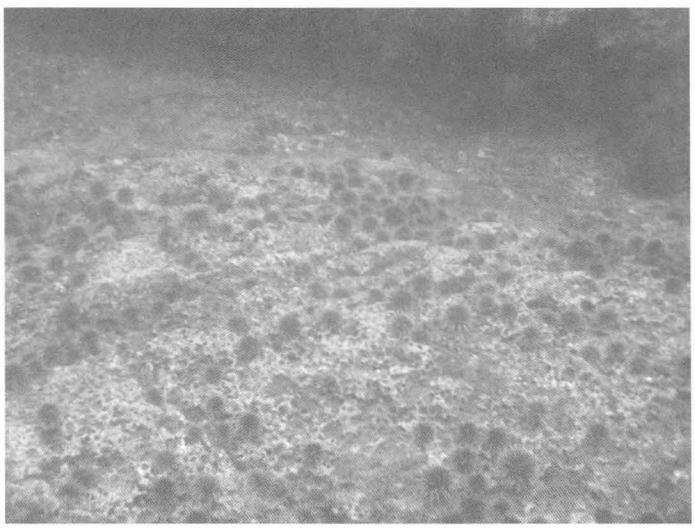
Tom Ford, biologist with Santa Monica BayKeeper, explained that in the Los Angeles area a good 60 to 70 percent of kelp beds that once thrived over the Palos Verdes Shelf and along the Malibu coast west to Point Dume have vanished over the past 75 years. The reasons are complex, but major culprits have been wastewater discharge and erosion from hillside development that puts enough dirt into the ocean to bury the substrate—and tiny new kelp plants. Another cause is ecosystem imbalance. The extirpation of the southern sea otter during the late 1800s and, more recently, heavy fishing of spiny lobster and sheephead—all major predators on sea urchins—have let

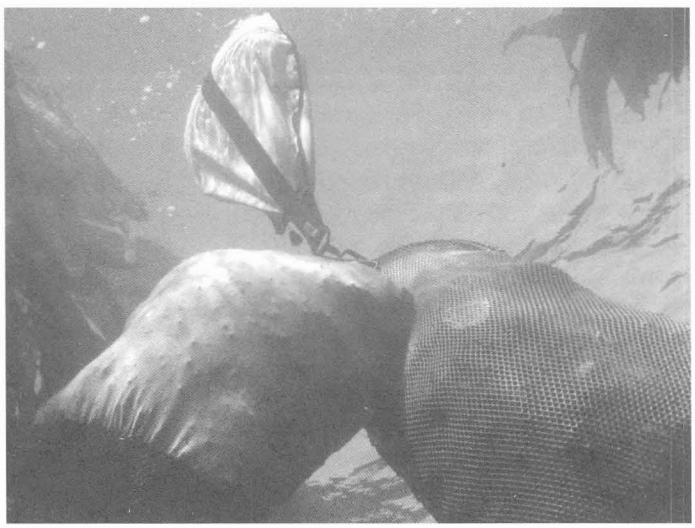
Bottom left: Voracious sea urchins destroyed kelp at this spot, leaving it barren.

Bottom right: BayKeeper divers gathered urchins and hauled them to the surface in mesh bags.

Below: What was once an urchin barren is healthy kelp habitat again, full of life and diversity.







PHOTOS THIS SPREAD: TOM FORD

urchin populations blossom. These spiky echinoderms love kelp, although in a pinch they feed quite happily on sewage and, if necessary, can wait months to get a balanced meal. Once they have created "urchin barrens" by scouring rocky reefs clean of kelp, they never go away long enough to allow new plants to become reestablished.

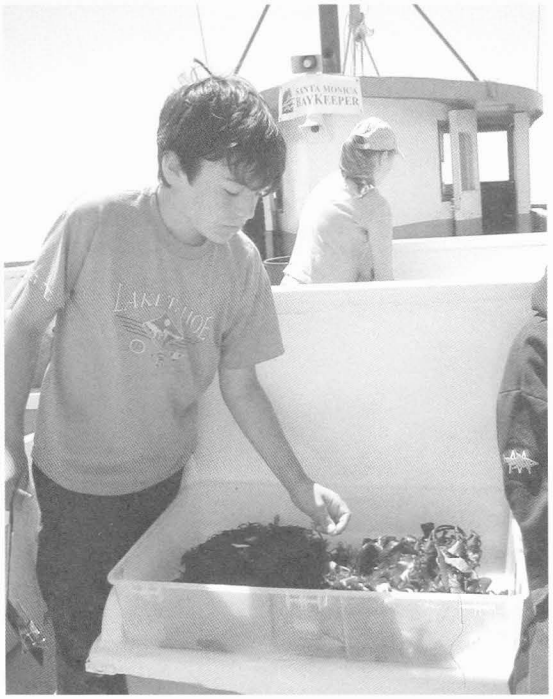
Because the change is hidden from view, Ford said, "The average beachgoer goes down, looks out over the water, and everything looks fine. If we went out and chopped down 70 percent of the chaparral community in Malibu, people would lose their minds."

Students Give Nature a Hand

IN THE EARLY 1990s, Santa Monica BayKeeper decided to take action. With funding from the National Oceanic and Atmospheric Association, Coastal Conservancy, and Santa Monica Bay Restoration Project, BayKeeper began by monitoring 11 sites: three on the Palos Verdes Peninsula and eight along Malibu. The goal was to determine where healthy kelp was growing, what was living among the plants' fronds, stipes, and holdfasts, and whether the forests were expanding. These surveys contributed to the identification in 1996 of three prime locales for attempting kelp reforestation—one north of Rocky Point, Palos Verdes, and two near Malibu's Escondido Beach and Paradise Cove.

To get going, BayKeeper biologists needed large numbers of young kelp plants, and they saw an immediate opportunity: Get schoolchildren involved. While working as kelp "farmers," students would learn about kelp forest ecology, plant biology, and scientific methods, and would gain a personal stake in their local ecosystem.

For three years, sixth-graders at Lincoln Middle School in Santa Monica rolled up their sleeves and became part-time biologists. Each fall, BayKeeper scientists went to the school and presented basic information on kelp and the interdependency of kelp forest animals and plants. Then students designed and carried out

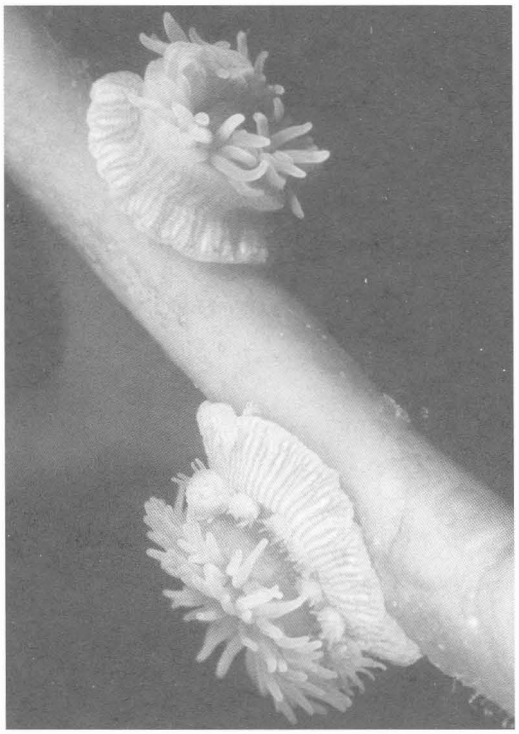


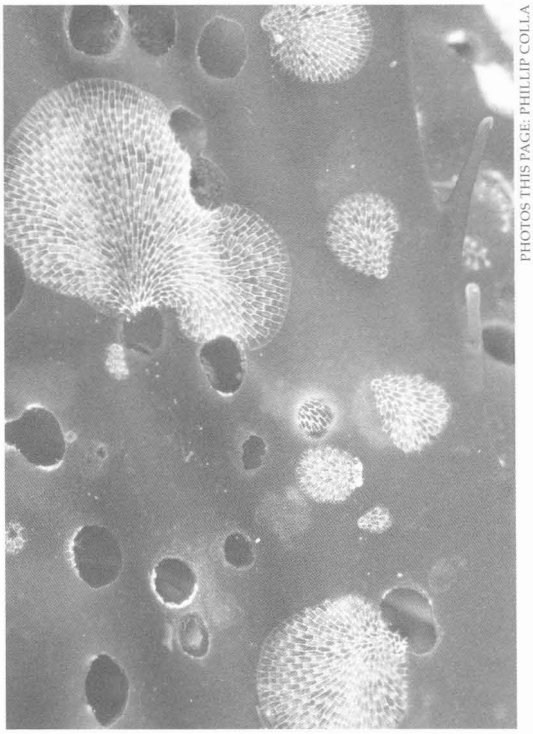
Top: BayKeeper's Tom Ford (Captain Kelp), left, with volunteer divers Heather Coleman and Joe Couce

Above: Schoolchildren got to take boat trips to see kelp forests and examine bits of kelp scooped from the sea.

Right: Anemones on a kelp stipe

Far right: Bryozoans on a kelp frond





PHOTOS THIS PAGE: PHILLIP COLLA

various experiments to understand kelp herbivores better. How much do urchins really eat? Which kelps do they prefer? By observing sea urchins in the classroom, they arrived at some hard answers, which they could pass on to BayKeeper biologists. Urchins' love of *Macrocystis pyrifera* proved to be deep and abiding, their appetite prodigious—no big surprise perhaps, but for the students to see this themselves was an invaluable experience, Ken Vanderveen, a Lincoln teacher, said.

Come January, actual kelp cultivation joined the curriculum. First, volunteer divers in the bay collected sporophylls (specialized blades at the base of the giant kelp plant). As Vanderveen explained, "Students then photo-shocked the sporophylls, tricking them into releasing their spores." This was done by subjecting the reproductive blades to controlled changes in temperature and light. The students then (after counting the swimming spores under the microscope to ensure proper concentrations) inoculated 10 gallons of seawater in specially designed "ecocart" aquariums that allowed water at a regulated temperature to circulate over 100 small unglazed tiles onto which kelp spores could settle. Each day for seven weeks, students checked water temperature and salinity and, as needed, cleaned out brown diatoms, which can smother the young kelp. After two months, if all went well, they would see thousands of tiny kelp plants appearing as "brown peach fuzz" on the tiles. At that point, the tiles would be transferred to a lab on Terminal Island in Los Angeles Harbor, to be grown into inch-long plants and readied for transfer to the sea.

In practice, all did not always go well, so now the kelp raising is restricted to the more controlled environment of the Terminal Island lab. The students, nonetheless, learned some key lessons about science—including the possibility of failure and the importance of being ready to "try, try again."

The overall experiment has proven very successful ever since it left the lab and entered the waters of Santa Monica Bay beginning in 2000. Inflows of cool, nutrient-rich water have contributed to this success story. "When we started, the area was completely wiped out," he noted. "But conditions started to change just as we got going, and the whole area exploded."

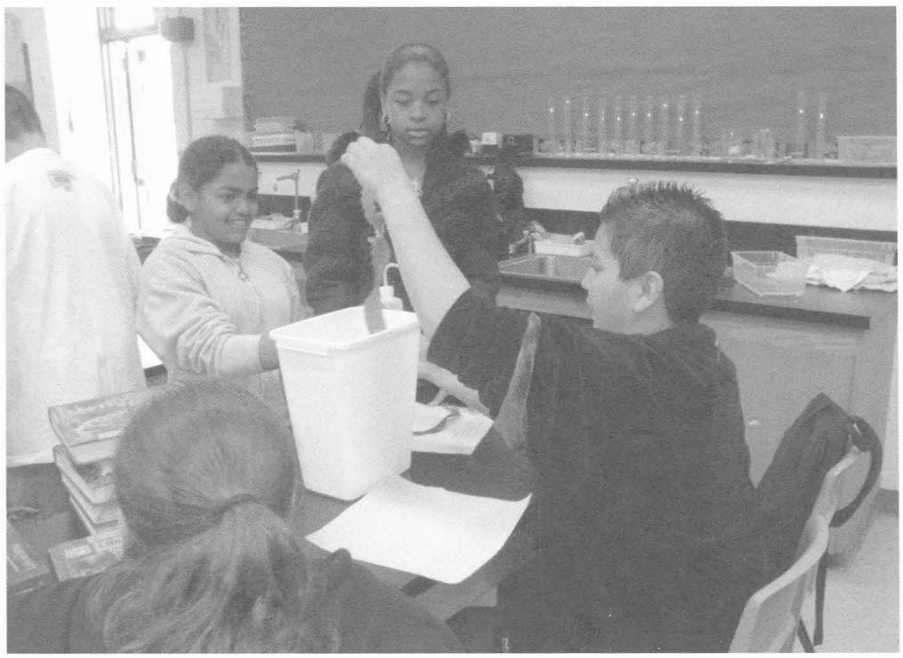
Baykeeper personnel and volunteers transport seeded tiles (or sometimes pieces of rope) to reefs 25 to 45 feet deep and attach them with rubber bands. Sprouts that "take" grow about three feet in a few months, at which point the tiles and rubber bands are removed. The BayKeeper biologists have also tried transplanting established kelp plants, but this technique has met with little success. Another technique is to fill mesh bags with sporophylls collected from neighboring beds and float them a few feet above the surface of the reef; spores then settle out naturally.

First, however, any urchins in the vicinity must be relocated. The Malibu reef is fairly near an area that still hosts a thriving kelp forest, where natural "recruitment" has occurred during the past few years, perhaps because of improved water conditions. "So people are looking at this and saying, 'That's all right, Tom; we don't need you. It'll fix itself,'" Ford said. "But I say, hey, we've still got 70 urchins in a square meter. I don't care if everything else is ideal, there's no way the kelp is going to be able to expand back into its former range if we don't restore the balance of that ecosystem. Either I'm going to do it, or you set up a marine protected area and you let the lobsters and the fish come back and do their thing, and regulate that urchin population. That's what I would prefer, because I don't pretend to be able to do what Mother Nature does."

In the meantime, however, there's nothing wrong with giving mother a hand. The reforestation project will restore many thousands of square meters of kelp beds, and once the planting is complete, monitoring will continue for up to seven years. Biologists will compare restored areas to nearby kelp beds that remain intact, and to now-destroyed kelp beds. Relative change in species abundance and diversity will be tracked in each environment, and those data compared with similar monitoring projects in Santa Barbara, San Diego, and Orange Counties.

Kelp forests are nurseries for larvae and juvenile fish, and to restore some of this habitat will benefit sport and commercial fishers. The tourist-trade benefits of enhancing this scuba-diving paradise cannot be discounted either. But just in terms of natural habitat—never mind its "uses" for humankind—restoring the kelp forests seems a worthwhile task. "They protect our coastlines, they dampen wave energy, they interrupt longshore currents—the current that goes ripping along our coast and keeps scything sand away," said Tom Ford. They are an all-important part of our coastal ecosystem.

Return to the picture I painted above, of long shafts of light and gently moving creatures. And now consider what Charles Darwin wrote in 1860, on his *Beagle* voyage in South Pacific waters: "There is one marine production, which from its importance is worthy of a particular history. It is the kelp, *Macrocystis pyrifera*. This plant grows on every rock, from low-water mark to a great depth, both on the outer coast and within the channels. . . . The number of living creatures of all Orders, whose existence intimately depends on the kelp, is wonderful. A great volume might be written, describing the inhabitants of one of these beds of seaweed. . . . I can only compare these great aquatic forests of the southern hemisphere, with the terrestrial ones in the intertropical regions. Yet if in any country a forest was destroyed, I do not believe nearly so many species of animals would perish as would here, from the destruction of the kelp." ■

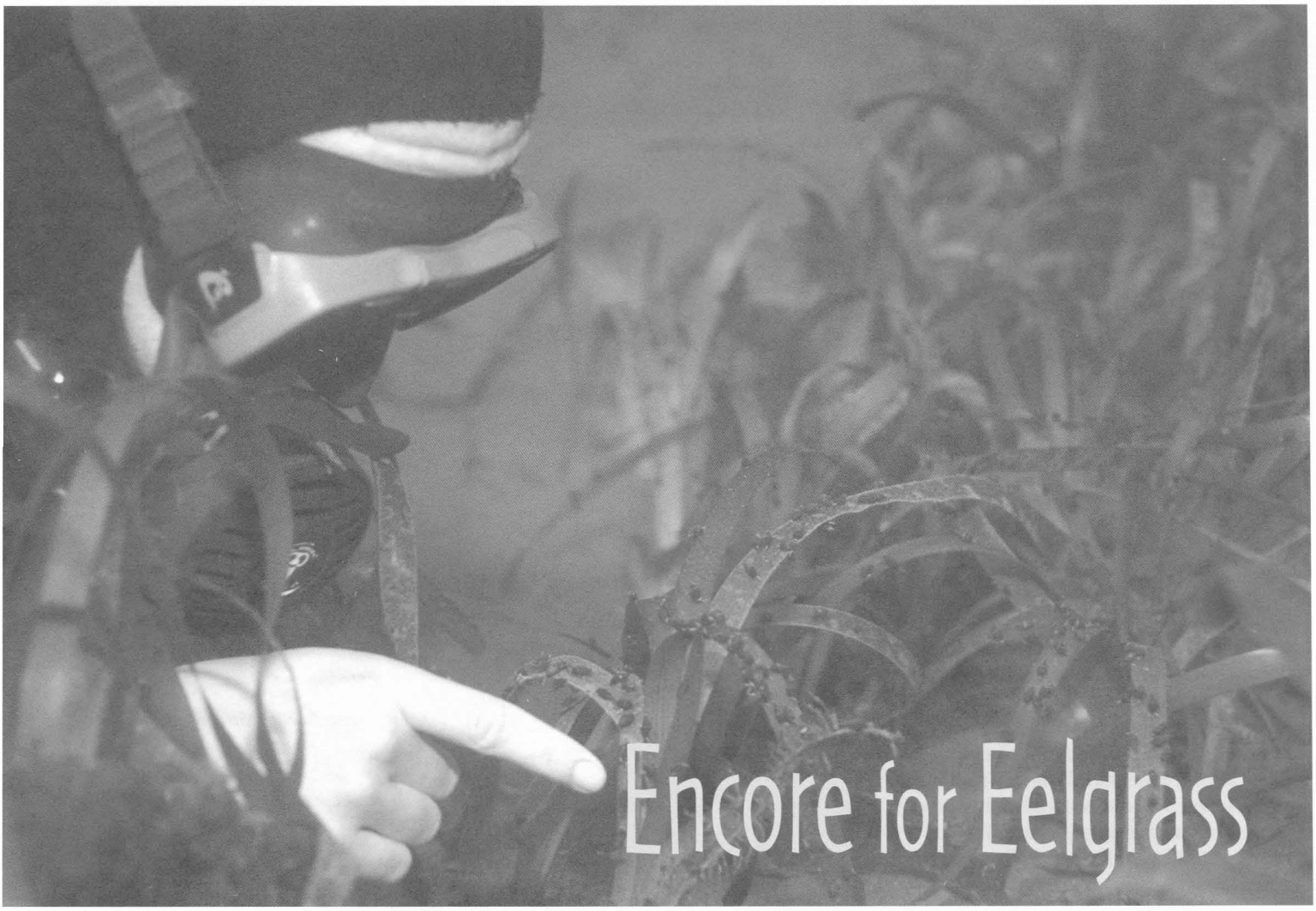


TOM FORD

PHILLIP COLLA

Top: Students at John Adams Middle School in Santa Monica took part in BayKeeper's kelp studies.

Left: Sunlight in a kelp forest



SANTA BARBARA CHANNELKEEPER

Encore for Eelgrass

HAL HUGHES

An eelgrass bed off Anacapa Island teems with tiny snails.

As we learn more and more about how various pieces of the planet and its life forms fit together, it becomes clear that inconspicuous species often play key roles in maintaining the fabric of existence. One such species is eelgrass, *Zostera marina,* which grows mostly underwater near shorelines in the northern hemisphere, yet slips as easily beneath people's attention as it does beneath the tides.

Eelgrass is most likely to be noticed only from small, slow boats, as an underwater meadow with green blades moving gently with tides and currents. Boaters know it best as long strands of green that foul mooring lines and propellers. In recent decades, scientists have begun to pay serious attention to the role it plays in nearshore ecosystems.

Eelgrass is not a seaweed or alga but a flowering plant. It roots in soft-bottomed bays, estuaries, and tidelands, where it supports food webs that extend far beyond its undulating beds. Its leaves slow and diffuse wave action, allowing mineral and organic sediments to settle to the bottom, where its roots and rhizomes help to hold sediments in place. Fertilized by detritus from the eelgrass canopy, this rich sediment allows the eelgrass to expand and provides habitat for many burrowing creatures. The process also improves water clarity by decreasing turbidity, which in turn makes the water column still more suitable both for animals and for the plant itself.

As often happens with inconspicuous and little-understood species, eelgrass has suffered greatly from human impacts. Yet as understanding of the plant's many and diverse functions has grown, efforts to protect and restore it have begun. On the West Coast, the earliest restoration effort dates back to the 1970s, in San Diego. Other early

projects were undertaken in Puget Sound, British Columbia, and Alaska. Elsewhere in California, numerous restoration projects are being planned to mitigate impacts of development, but most have not yet been implemented. New construction on the Oakland–San Francisco Bay Bridge has brought increased attention to eelgrass in San Francisco Bay, and has sparked active interest in bringing it back to health there.

Home for Dinner

"WHEN A DIVER IS swimming over bare, featureless bottom and comes to an eelgrass bed," said Coastal Conservancy project manager Abe Doherty, who did his graduate study on eelgrass, "it's like finding Las Vegas in the desert—suddenly there's color and life everywhere."

"Eelgrass provides vertical structure to an otherwise unstructured environment," said Keith Merkel, whose company, Merkel & Associates, has pioneered in developing *Zostera marina* restoration techniques in California. Unlike a featureless sand or mud bottom, eelgrass creates the equivalent of an island or forest, where an abundance of creatures can live, breed, and feed.

The rich, soft bottom is an ideal home for various worms, sea pens, and other benthic (bottom-dwelling) creatures, and the long waving blades make perfect habitat for all sorts of invertebrates. Herring particularly favor eelgrass beds for spawning, and a plethora of marine species—including snails, nudibranchs, stalked jellies, and colonial bryozoans, not to mention various algae—lay eggs or make their homes on the green blades. On a recent visit to an eelgrass bed in the Seal Beach National Wildlife Refuge, Orange County naturalist Tim Anderson spotted eggs of *Navanax inermis,* a large carnivorous sea slug; California sea hare *(Aplysia californica);* and opalescent nudibranch *(Hermissenda crassicornis);* as well as lacelike bryozoans, calcareous tubeworms, sea stalks, and sea squirts. Eelgrass meadows provide feasts of sea stars, urchins, worms, and snails for Dungeness and other crabs, while surfperch, sculpins, and other predacious fish seek prey that hide among the leaves. Some birds feed by scraping off the many creatures and plants that make their homes on the leaf blades. Christopher Kitting, professor of biological sciences at California State University East Bay, said he and his colleagues have shown that "the tiny epiphytic algae that grow on eelgrass are the basis for eelgrass community food webs. Many of the small crawlers feed on the algae, and they in turn are eaten by larger creatures." Other animals, from tiny snails to black brant geese, graze on eelgrass leaves. Eventually, spent eelgrass blades wash offshore, where they become food for detritivores and eventually decay and enrich the sea bottom. "We're not sure why," Kitting added, "but eelgrass communities in southern California bays are surprisingly rich, much more so than in San Francisco Bay."

Forgotten Losses

IT MAY BE THAT the growing popularity of recreational diving in southern California in the 1980s drew more attention to this important but unappreciated plant, according to Merkel. Before "people started putting their heads under water and seeing the complex communities in the beds," he said, "eelgrass was the orphan stepchild of marine resources." Increased appreciation led to policy changes that have raised the priority of eelgrass protection and restoration.

It's difficult to say how much eelgrass there is in California. Merkel estimates there are at least 12,000 acres, and possibly

An egg mass of the nudibranch *Melibe leonine* attached to a blade of eelgrass

DAVID BEHRENS

more than twice that much. Surveys have not been comprehensive enough to provide more reliable data, and eelgrass coverage fluctuates by at least hundreds of acres annually, in response to weather patterns, variations in water temperature and salinity, and other conditions.

Extreme weather events such as El Niño may raise sea level sufficiently to cut off the sunlight that the plant needs for photosynthesis, as can excessive turbidity. With sea level rise, many eelgrass beds will be extinguished unless they can expand into adjacent shallower areas. Increases in agricultural runoff or sewage flows can kill eelgrass by eutrophication (i.e., excess nutrients induce excessive algal growth that deprives the leaves of sunlight). Variations in temperature and salinity can also have harmful results: high salinity may turn a slime mold, *Labyrinthula zosterae,* that normally causes little damage, into an eelgrass killer. (The pathogen has also been described as a fungus, *Labyrinthula macrocystis.*) The wasting disease it causes led to a collapse of eelgrass populations in the North Atlantic in 1930–33.

Even in relatively stable conditions, eelgrass beds will change in size with the seasons and the plant's life cycle. As a flowering plant, it produces seeds and spreads through sexual reproduction, but it

Bottom: Christine Addison and Mark Fonseca of NOAA survey an eelgrass bed at Bay Farm Island in San Francisco Bay. Sandy Wyllie-Echeverria is in the distance.

Right: In Frenchy's Cove, off Anacapa Island, a Santa Barbara ChannelKeeper diver marks eelgrass plants with plastic spoons for taking a census.

SANTA BARBARA CHANNELKEEPER

TINA WYLLIE-ECHEVERRIA

also reproduces asexually, putting out new plant-forming roots from its rhizomes. Either of these modes may predominate, depending on local conditions. In beds that grow mostly from seed, the plant behaves as an annual, while rhizomal propagation creates perennial colonies. Annual plants flower four or five months after sprouting, but perennials go through a longer cycle, spreading rhizomally before flowering. Perennial beds tend to be more persistent, but because the individual plants are clones, they may lack genetic diversity, which leaves them more susceptible to adverse conditions.

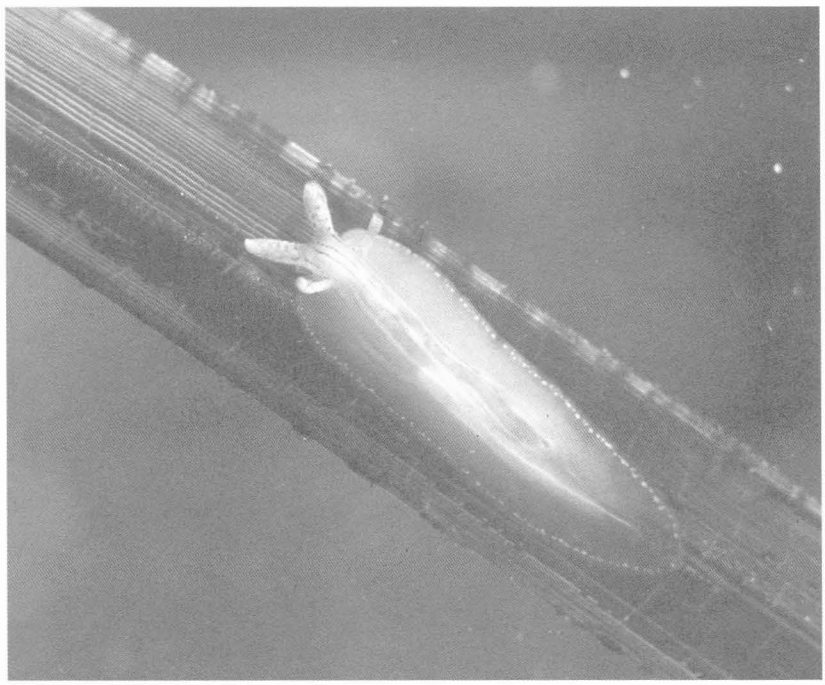
Predictable Patterns

EELGRASS HABITAT has been protected since 1972 by the Clean Water Act, but only since 1991 has mitigation been required as a condition of permitting for projects that cause loss of eelgrass. The first West Coast eelgrass mitigation project was undertaken in San Diego, as an exploratory partnership between the U.S. Navy, the National Marine Fisheries Service, and the California Department of Fish and Game. "Early mitigation efforts," Merkel said, "grew out of increased recognition of the importance of habitat linkages and the significant impacts of development and dredging." Eelgrass not only creates its own habitat; it also improves conditions in surrounding habitats and establishes important connections between them.

Surveys done with side-scan sonar, from the air, and by divers using underwater video can put together a fairly accurate picture of the extent of eelgrass beds. This information, combined with knowledge of conditions suitable for eelgrass, provides a starting point for restoration projects. No reliable record exists of the historical extent of eelgrass in California waters, so scientists try to identify good restoration sites based on conditions that favor success. Eelgrass studies in southern California and the Pacific Northwest have gone on long enough that it is now possible to predict with considerable accuracy how the plant will respond to varying conditions and restoration methods.

Since the '70s, techniques have been refined and developed for greater efficacy at lower costs, with considerable success. In Batiquitos Lagoon, in San Diego County, for example, one-quarter acre of transplants in 1997 have now propagated to cover more than 50 acres. (See www.batiquitos.org.) Merkel said that the projects he has been involved with have been very successful in Mission Bay and elsewhere in Southern California, helping his company to develop improved predictive models and restoration methods.

Eelgrass can either be seeded or planted. Planting requires divers to harvest plants from healthy beds, then transplant them. The less time divers need to be under water, the less the project costs, so planting sparsely is the preferred method. In about three years transplants can begin to function as natural beds—under favorable conditions



PHOTOS THIS PAGE: DAVID BEHRENS

Top: A *Metridium* anemone living on an eelgrass blade is devoured by a nudibranch, *Hermissenda crassicornis*.

Above: *Phyllasplysia taylori* mimics the form and color of eelgrass blades.

they spread fairly rapidly, filling in empty spaces. In places where eelgrass behaves as an annual, seeding is more likely to succeed than transplanting. Several of the more robust beds in San Francisco Bay are annuals, so proposed mitigation and restoration projects there may require using several techniques, depending on specific sites and conditions. Katharyn Boyer, assistant professor of biology at San Francisco State University (SFSU), and team leader for fledgling eelgrass restoration projects in the Bay, hopes that using "seed buoys" will be successful. This method involves harvesting flowering reproductive shoots from a donor bed, rather than taking whole plants. The shoots are put into mesh bags attached to buoys anchored at the target site. When the seeds mature, they fall through the mesh and scatter over the soft bottom.

Restoring eelgrass beds is not always a matter of scattering seeds in good spots. Not only must site-appropriate planting methods be used, but the habitats may need considerable preparation as well. A new eelgrass bed is being planned for Middle Harbor, an obsolete industrial harbor dredged out of shallow baylands in the Oakland Estuary. The Port of Oakland will use six million cubic yards of sediment dredged from active shipping channels to raise the substrate to a level suitable for eelgrass restoration. Such opportunistic efforts are especially helpful in places where eelgrass habitat has been destroyed by dredging or filling. Current plans call for transplanting eelgrass there,

The bay pipefish (*Syngnathus leptorhyncus*) looks like the blades of its eelgrass habitat.

PETER AJTAI

though if seed buoys work well in other Bay sites, said Boyer, they also may be adopted for Middle Harbor.

Sandy Wyllie-Echeverria, a research scientist at the University of Washington, emphasized that "the data we have for the Bay now amounts to snapshots—there's been no sustained or frequent monitoring of eelgrass there." He is working with Boyer's team of scientists from NOAA and SFSU's Romberg Tiburon Center for Environmental Studies to plan a series of eelgrass restoration projects in the Bay that will be funded, in part, by the Coastal Conservancy. Better monitoring would include assessing variations in bed size from year to year, calculating resilience and recovery rates of existing beds, and determining the impacts of, for example, ghost shrimp harvesting, bird use, and bat ray burrowing, in addition to the usual studies of water depth and quality.

First the group will conduct two experimental seed buoy projects, at sites near China Camp and the Marin Rod and Gun Club, in the North Bay. "One strength of this group is that we're getting eelgrass genetics into the project early," said Sarah Cohen of SFSU. "These will be among the first seagrass restoration projects in the U.S. to consider genetic diversity from the beginning. Studies show that eelgrass beds with genetic diversity do better in a whole suite of critical parameters."

The Many Uses of Eelgrass

INCONSPICUOUS AS IT may be, eelgrass has been used for many purposes worldwide, and continues to reveal further potential as a plant of economic significance. In northern Europe, the leaves that wash up on shore in the hottest part of the year traditionally have been gathered and used for insulation, thatching, and as fertilizer. The dried leaves are woven into rugs, mats, and baskets. The first commercial blanket insulation was made from eelgrass, but that business succumbed to the wasting disease epidemic of the 1930s. On the North American West Coast, indigenous people harvested the seed, which has high nutritional value, to grind into flour; some tribes also ate the rhizomes.

Eelgrass beds are now being restored mainly for environmental benefits: stabilization of soft bottom sediments, improved water clarity, and creation of rich habitat for a wide variety of animals foremost among them. The wave-damping effect of eelgrass beds is also drawing attention as a possible alternative to shoreline armoring in places with suitable offshore habitat. At first glance this remarkable plant seems simple and nondescript, yet the more one learns about it, the more fascinating it becomes. ■

EELGRASS RESTORATION OFF SANTA BARBARA

IN ADDITION TO underwater reforestation, a pilot project in meadow restoration is currently enjoying great success in the waters of southern California. The place is Frenchy's Cove, the easternmost end of West Anacapa Island, one of the Channel Islands, where until the early 1990s thick eelgrass beds thrived at depths of 15 to 30 feet. The threats to eelgrass include pollution, anchor use, storms, and sediment movement. The Anacapa beds, however, fell victim to another menace: white sea urchins, which established themselves during the 1982–84 El Niño. Although these urchins typically live at greater depth and at very low densities, the influx of warm water spurred a population boom, creating densities as high as 63 urchins per square meter. And they were hungry, so they went where the food was: upslope, into the eelgrass beds. By 1991, all eelgrass (as well as kelp) in Frenchy's Cove was gone. The urchins then died off from starvation and disease, and although the kelp forest is beginning to reestablish itself at Frenchy's, not a blade of eelgrass returned.

This was a job for Santa Barbara ChannelKeeper. Working with the Channel Islands Research Program and NOAA Fisheries' Community-based Restoration Program, ChannelKeeper launched an 18-month pilot program in 2001 to resurvey Frenchy's Cove, determine where to harvest plants and seeds for replanting, collect and culture seeds in portable aquaria as junior high classroom projects, and plant eelgrass at two different depths and at two different densities. In June and July 2002, divers moved several hundred plants from a healthy eelgrass bed off Santa Cruz Island to the devastated Anacapa bed, at two depths. Brittle stars proved a problem lower down, where they climbed the young transplants, weighting them and making them more accessible to grazers. At shallower depths, in contrast, the eelgrass thrived and was even self-propagating by spring 2003. (The plants reseed, but spreading also occurs by means of rhizomes, tough roots that sprout genetically identical plantlets as they extend beneath the sand.) As of October 2003, there were more shoots than had been transplanted the preceding year.

When I visited the ChannelKeeper offices in March, head biologist Jessie Altstatt didn't even try to contain her delight as she showed me videos of the flourishing eelgrass bed at 20 feet. ChannelKeeper had recently organized a census with the help of volunteer divers and hundreds of plastic spoons. Wherever there was an eelgrass plant, they stuck a spoon in the sand. When the entire patch had been surveyed, the spoons were collected and counted (a low-tech but pretty accurate approach). The results buoyed everyone's spirits: the bed was dense and healthy, with new plants sprouting and no sign of stress. The eelgrass bed of Anacapa—and with it many of the 150 or so animal species that rely on these beds for food and refuge, including pipefish, sarcastic fringehead, kelpfish, and miniature snails that clean the grass blades of encrusting bryozoans—is making a comeback.

—Anne Canright

PHOTOS THIS SPREAD: MENDOCINO REDWOOD COMPANY

Can Forests Be Managed Sustainably?

ARNO HOLSCHUH

ON THE NORTH COAST, there are places where towering groves of redwoods and Douglas firs stretch from the beach where the sand ends way back into the coastal ranges. Their stature, silence, and the exquisite calm that pervades them inspire us with awe. But that's far from the only reason why the temperate rainforests of Del Norte, Humboldt, and Mendocino Counties are valuable. They also provide essential habitat for myriad species, including the endangered marbled murrelet and coho salmon, and they serve our own species in many ways, pulling greenhouse gases out of the air and protecting the health of watersheds that supply clean drinking water downstream.

Great swaths of the northern coastal forest are in public hands now, protected as parkland or national forest, but much of it—43 percent—is privately owned, a working landscape that provides timber. Its owners range in size from publicly traded Pacific Lumber Company (PALCO), with 220,000 acres in Humboldt County, to cattle ranchers with a few hundred acres, harvested as a side business. Their holdings comprise one of the most steadily productive timber regions in the country, yet the future of these timberlands is uncertain.

North Coast timber companies and private landowners complain of being besieged by both government and global market forces. They are confronted with difficult and costly regulations, they say, every time they want to harvest timber—regulations that, despite the hardships they impose, fail to meet the goals of official state policy. These goals are embodied in the 1973 Forest Practices Act, which calls for a sustainable timber industry—and the protection of watersheds, fisheries, wildlife, and recreational opportunities. At the same time, once the wood is out of the forest, the timber producers face a volatile market and growing competition from other nations.

The timberland owners' problems are of public concern. Should they ever get so fed up that they decide to sell their land, the buyers are not likely to continue where they left off. Sooner or later, they are more likely to convert a working landscape into residential development, a phenomenon that is costing the state 24,000 acres of forest a year.

Society cannot afford to ignore the problem, said Connie Best, managing director of the Pacific Forest Trust (PFT). "We're dependent on forests, even if we live in the city." Best is one of a group of like-minded

foresters, landowners, and activists who haven't given up hope that California's private forests can survive in a healthy state, as working landscapes that generate a reasonable income for the landowners while also continuing to provide wildlife habitat, water, and a green lung to put a brake on climate change. For that to happen, they agree that the economic values of the privately owned forests' ecological services need to be considered. They're working to change the way people in the forest industry, conservation groups, and the general public think about forestry and to bring the state's ailing timber industry to a state of economic and ecological sustainability.

As the state's premier forestland trust, the PFT tries to protect private timberland by buying conservation easements that allow timber harvesting to continue while ruling out the option of residential development. Others are exploring possible ways to create a market for the forests' ecosystem services, including the potential sale of carbon credits to polluting industries elsewhere.

Sustainable Clearcuts?

MUCH OF THE controversy surrounding forestry focuses on the silvicultural method being used. Large timber companies defend clearcuts, saying they are the most efficient way to extract timber from a forest and then replace it. Environmental groups denounce the practice, saying it contributes to erosion, destroys wildlife habitat, and violates California state policy. They point out that state law mandates that forestry be practiced in a manner that provides a permanent source of forest products for the industry while at the same time protecting larger values.

But if all one wanted was trees to harvest, one could clearcut one-sixtieth of a property every year in perpetuity, said Jim Able, a Eureka-based independent forestry consultant and registered professional forester. The arithmetic is simple: There'd be a new stock of 60-year-old trees to harvest every year. You would be maximizing your output, as trees grow fastest in a clearcut, because they have the most sunlight. And, Able said, "it makes your trees really easy to keep track of."

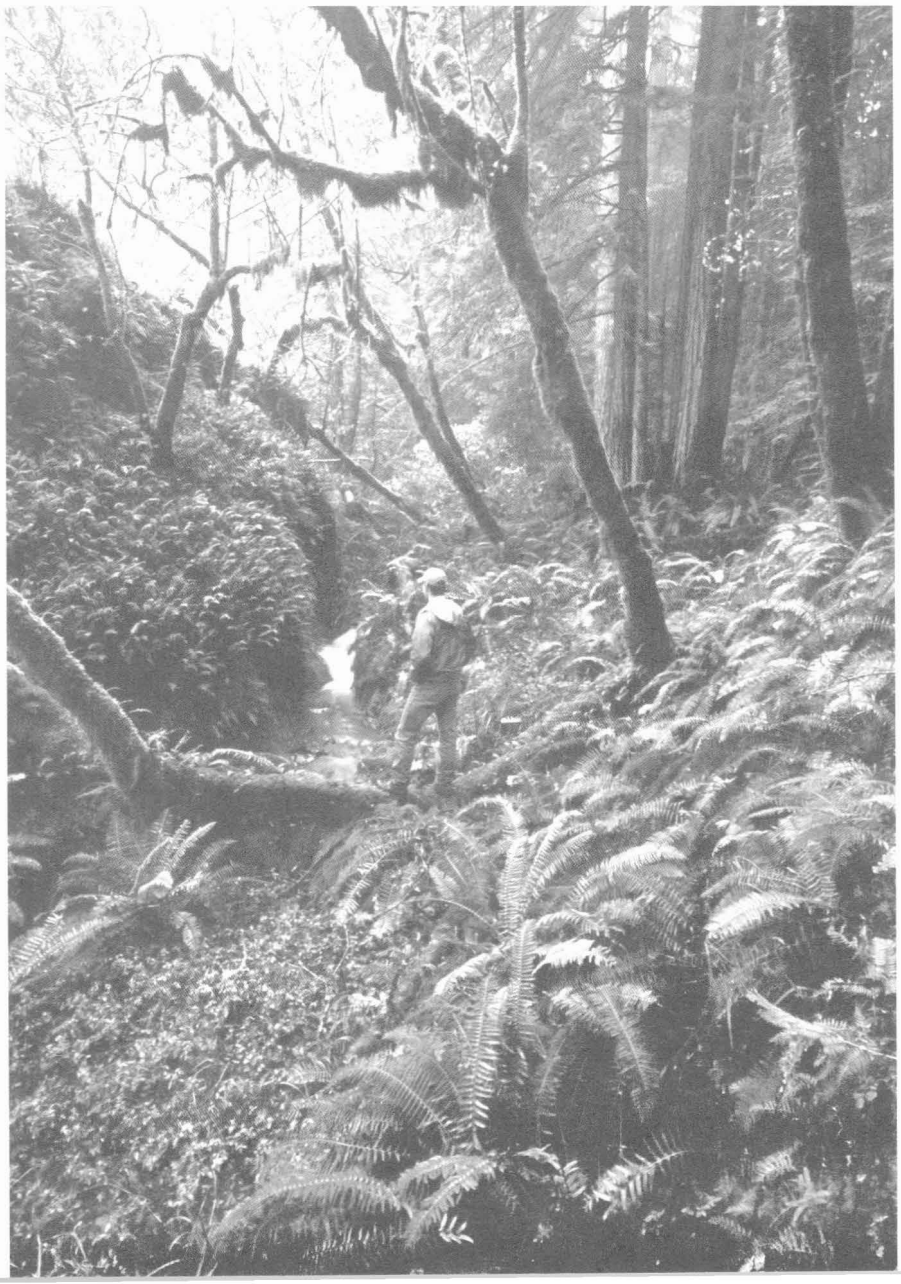
That style of management is known as "even-aged short rotation." It could be called sustainable, because it allows for a sustained yield, but it has serious side effects on natural resources. For example, biologists have found that certain species, most famously the northern spotted owl, need mature forest to flourish, and a stand of redwoods, which can live for more than a millennium, would be little more than a a bunch of toddlers at age 60. Soil erosion, and in extreme cases landslides, can occur as the trees holding together a slope are removed; that, in turn, leads to streams being filled with silt, ruining them for salmon trying to spawn, and damaging water quality.

Even-aged short rotation is also financially risky. Replanting trees after a clearcut is not cheap. The market for logs fluctuates wildly, and a traditional even-aged management system doesn't provide much flexibility. If you're cutting as much as you can, you don't have reserves to sell when the market is hot.

Above and beyond financial considerations, there is a feeling of stewardship among forest owners, Able said. "Most

Opposite page: Dense foliage above the creek helps to maintain cool instream habitat.

Below: Mendocino Redwood Company forester Colby Forrester takes a break from his work by the stream, in cool riparian habitat.



Old-growth redwood forests trap coastal fog, which can supply almost half of the water they use. Fog drip also supplies understory plants. Logging disrupts this process by allowing sunlight to dry the soil, thus altering the microclimate created by the trees.

people who own a piece of forest, they want it to be more than a tree farm."

Regulations Can't Fix Forestry

IN THEORY, managing land as a tree farm devoid of any true forest attributes is illegal. The Z'berg-Nejedly Forest Practice Act of 1973 created rules intended to ensure that California's forests were harvested in a way that would protect "recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment, and aesthetic enjoyment"—while also ensuring that "the goal of maximum sustained yield of high-quality timber products is achieved."

In the 30 years since the Act was passed, however, this system of regulations, as administered and enforced by the California Department of Forestry and Fire Protection (CDF), has failed to live up to either of those promises. CDF draws criticism from both environmental groups and the industry. Rules prohibiting the harvesting of timber along stream banks haven't restored decimated salmon runs, and timber companies complain that the process of getting a timber harvest plan approved has become prohibitively expensive and complicated.

Sharon Duggin, staff attorney at the Garberville-based Environmental Protection Information Center (EPIC), said that while the Forest Practice Act set out the right goals, "nobody is paying attention or keeping track in a meaningful way [as] to whether or not we are achieving those goals." She sees CDF as "myopic," too focused on individual harvest plans to appreciate the big picture.

That assessment is, in part at least, borne out by events on the North Coast. Almost all of the region's old-growth redwood—96 percent—has been logged. Flooding continues to be a problem in watersheds where erosion has filled streambeds with mud, a situation that also makes it impossible for indigenous salmon to spawn. Instead of reviewing the big picture, legislators, state agencies, and the federal government have added new layers of regulation. Until 2004, only CDF approval was required for a harvest plan. Since then, the Regional Water Quality Control Board has had the right to undertake a second, separate inspection to ensure that sediment won't get into streams after harvesting. Hydrologists, archeologists, and wildlife biologists all come out to inspect a harvest site prior to any activity—at the property owner's expense.

The result, according to Jim Able, is a counterproductive system. "If I had a logging road on my property with a washout and wanted to repair it with a culvert, I'd

have to get six permits. That culvert isn't going to be any better after six permits than it would have been after two. And if you think about how much money is being spent on these permits, it's a lot of resources that could be spent on other projects to stop erosion."

Waste isn't even the worst problem, according to Able. The regulations just aren't effective. "We've had these watercourse buffer strips for 30 years, and they're not working. But instead of trying to find the real problem, we slap more regulations on it."

Specific regulations often amount to a series of hoops to be jumped through; they are proscriptive rather than results-oriented, said Donald Gasser, system forester for Pacific Gas and Electric and a former lecturer at UC Berkeley who has studied the effect of regulations on the forest landscape. "The question we need to be asking is: 'Is the water clean following a harvest?' Right now, the question for a landowner is: 'Am I covered?'"

Ironically, the cost of regulations drives some landowners to cut more. Gasser said that landowners offset the cost of the numerous inspections and reports required for even a small timber harvest plan (THP) by increasing the harvest. "Most small landowners just want to do a small cut, but the cost of a THP discourages them from doing that. A lot of paper gets printed that does not contribute very much on the ground."

A Streamlined Failure

IN THEORY, there is a program that can help streamline the regulatory process, improving results while lowering costs. Instead of tackling the habitat issues of each harvest separately, a timber company can enter into a Habitat Conservation Plan (HCP) that covers all of its property. Drawn up by scientists at the owner's expense and approved by state and federal regulators, an HCP specifies how a company is going to avoid and mitigate any harm to an endangered species; in return, the firm is granted an "incidental take permit," which trumps the Endangered Species Act by allowing for accidental killing or harassment of small numbers of a given species. The HCP is designed to be expandable to cover other land use issues, such as water pollution caused by sediment being added to the property's waterways.

With an HCP, a timber producer still has to submit a timber harvest plan for each harvest, but in theory those would be approved more quickly because the most contentious issues would have been dealt with in the HCP. The hope was that the parties involved would find creative ways to save habitat without nitpicking over individual projects, finally soothing the decades-long conflict between timber companies and wildlife advocates.

The HCP program has disappointed both the environmental community and the boardroom. PALCO, for example, completed an HCP as part of the Headwaters deal that transferred 3,000 acres of old-growth redwoods to the federal government and $380 million to PALCO's coffers. Environmentalists decried a host of violations of the plan—325 were documented by EPIC—and the Humboldt County district attorney has filed a fraud lawsuit against the company, claiming that it based its plan on tainted data.

PALCO, meanwhile, publicly threatened to go bankrupt if more of its harvest plans were not approved by the Water Quality Board, which never signed off on the HCP for Headwaters. The company won the right to execute those THPs after lobbying in Sacramento, but still isn't satisfied. "In the first six years of operation under the HCP, we only harvested at our planned, sustainable level one year," said CEO and president Robert Manning. He claims that the violations were "not catastrophic," but rather mere mistakes. The State has broken its promise to review THPs in a timely fashion, Manning said, and to ensure a steady supply of logs to PALCO's mills.

A more positive outcome may evolve for the Mendocino Redwood Company, which is now in the final stages of crafting its HCP. The company was formed in 1998 by a group of investors who bought 232,500 acres of heavily cut-over land in Mendocino County with the idea that they might rebuild the forest, an investment that would pay off in decades rather than years.

"Our investors are thinking about the long term, and part of that is having an HCP that will provide regulatory security," said the company's chief forester, Mike Jani. "We learned from [PALCO] what sort of shortcomings and problems there might be," Jani said. The first lesson was to go out and collect as much data as possible before submitting the HCP. "You have to remember, their HCP was part of the Headwaters deal, there was $380 million in the mix," he said. "They had to do it. And at that time, a lot of it was based on promising to go out there and collect the

BENNETT BARTHELEMY

data." Knowing exactly what the situation is on its property and what needs to be done has helped Mendocino Redwood gain some planning security, Jani said.

The other big difference between the two HCPs is on the issue of water quality. Mendocino Redwood asked the North Coast Regional Water Quality Control Board to be part of the planning process for the HCP, addressing the problems that PALCO is currently facing. If all goes as planned, this HCP will include a property-wide waste discharge program that will allow timber harvests to be approved by the board in an efficient manner, streamlining the regulatory process as the original backers of HCPs intended.

HCPs don't make much sense for small timberland owners, however. They're pricey and are designed to create large-scale solutions; Jani said that his company's investors had already spent $2.4 million on theirs. For small timberland owners (with 2,500 acres or less) another option exists: the Nonindustrial Timber Management Plan (NTMP).

This is an overarching metaplan with two main rules: You have to cut selectively (no clearcutting), and you cannot cut more than you can grow. Each time you harvest, you have to file a plan, called a notice of operations. But such a mini-plan usually costs less than $1,000, a pittance compared to standard timber harvest plans, which can cost up to $12,000 for even a small harvest. The best thing about NTMPs is their longevity. "They last forever, as long as you abide by the terms," Able said.

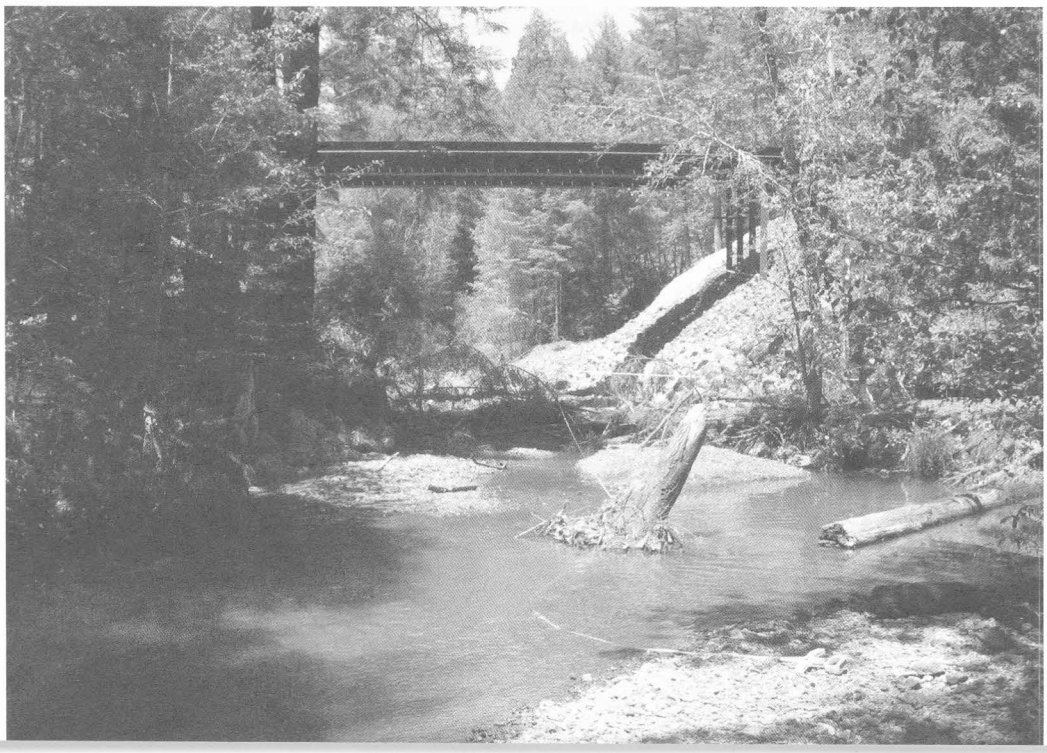
There is one problem, however. Inspecting agencies get to do only one truly intensive inspection of the property when the NTMP is granted, but they can be very zealous. In forestry, zealous agencies translate into large price tags. Able said he'd seen NTMPs cost more than $200,000—a hefty price to pay for the privilege of practicing good, nonindustrial forest stewardship.

Good Forestry as Good Business

THERE IS GROWING concern among sustainable forestry advocates that globalization may drive down demand for North Coast forest products. "There are global price pressures on the viability of the industry," said John Rogers, executive director of the Institute for Sustainable Forestry. "Russia has 22 percent of the remaining world timber reserves, and Canada can produce logs fairly cheaply," he said. The list goes on: The United States has begun importing wood from South America, New Zealand, and Australia. It is a pattern well-known from other commodities: Globalization brings lower prices. "And our prices are not going down," Rogers noted.

Other forest experts believe that the unique properties of the region's prime species, redwood, will keep the North Coast competitive in global markets for years to come. Redwood is rot-resistant, and therefore prized for fencing and decking. So far, timber companies haven't had a problem selling the timber they produce.

But Rogers is adamant that globalization will eventually spell the end of profitable forestry on the North Coast unless all sides of the debate get together to save the local



MENDOCINO REDWOOD COMPANY

A culvert was removed from this stretch of John Smith Creek, in the Navarro River watershed, and replaced by a bridge to improve fish passage. Large boulders have been placed in the stream to create pools and riffles for fish.

industry. "We need to offset expenses for forest management in Northern California," he said. "Part of what we want to focus on is the value of the ecosystem services—services for which there isn't currently a market."

Certification may be one way to make good forestry lucrative. A landowner can ask an independent body to come onto a property and inspect operations. If the land management lives up to the group's "green" standards, the forest products are certified. In theory, those products can then fetch a higher price on the market.

Unfortunately, so far that hasn't been the case. Several timber operators have had their land certified by either the independent Forest Stewardship Council (FSC) or the industry-backed Sustainable Forestry Initiative. But certified lumber hasn't been able to attract much attention from the buying public. Consumers may be willing to pay twice as much for an organic pear as for a conventionally grown one because they believe an organic pear is healthier and more environmentally friendly. But when it comes to paying more to keep forests healthy, there's no sense of urgency. Mike Jani, who has had the entire Mendocino Redwood operation certified by the FSC, said that people just don't care as much about wood. "I don't feel that they're as concerned with what they put in their homes as what they put in their mouths."

Certification has been a (financially) losing proposition up to now, said Jani. "If I ran a company on the ropes, I wouldn't get certified. It requires an investment of time and money to audit your performance and pay the personnel overseeing the program." He said that Mendocino Redwood had its land certified because it helped build trust with local residents.

Another market-based approach to making good forestry good business might be the creation of markets for carbon. Forests sequester carbon that would otherwise be released into the air as carbon dioxide, the largest contributor to global warming. A healthy forest will not only hold carbon but trap more and more, offsetting carbon releases elsewhere on the planet, say carbon market advocates like the PFT. They propose that a market be established enabling a forest owner outside of Willits, for example, to sell "carbon credits" to a coal-powered plant in Texas to mitigate that plant's carbon dioxide emissions.

The first step toward such a market has been taken. The State of California has created a Climate Action Registry that can

BENNETT BARTHELEMY

Biologist Christianna Laughlin, working on a research contract for Pacific Lumber, used mice to track this northern spotted owl to its nest among second-growth redwoods in the Freshwater Creek watershed. She used her special "owl voice" to attract the bird.

California Forest Futures

A DIVERSE GROUP of forest management and conservation professionals met in Sacramento May 24–25 to explore strategies to stop the loss of California forests. The California Forest Futures Conference, sponsored by the Pacific Forest Trust and the University of California Berkeley Center for Forestry, brought together legislators, environmental activists, regulators, forest industry representatives, natural resource managers, and others—some of whom have traditionally been at odds over forest policy.

Among topics addressed were the causes and impacts of forest loss, strategies for making the state's forest industry more competitive in a global market while maintaining ecological values, decreasing the impact of rural development by adapting "smart growth" principles, developing new forest revenue streams such as carbon emissions credits, expanding the use of conservation easements, and finding and developing funding sources for conservation projects.

Not surprisingly, a few issues proved contentious, but conference participants found themselves in agreement on many subjects, and generally the tone was one of cooperation toward the common end of saving California's forests. As Assemblyman Tim Leslie, one of the conference speakers, noted, "Collaboration is the word for the new way to do business."

For more information about the conference and topics discussed, see http://nature.berkeley.edu/forestfutures. This site will be updated.

—Eileen Ecklund

keep track of whether a power plant has reduced its emissions—or if a forest is being managed for increased carbon sequestration. While "the registry itself does not grant credits," it is a first step, said Michelle Passero, director of policy initiatives with the PFT. Forest owners who take good care of their property and sign up with the register would be able to sell that recorded and verified good behavior as a credit, should there ever be an official market.

The key to creating such a market is legislation, according to Passero. "There has to be a demand," she said, and that demand is most likely to be created by an overall cap on how much carbon dioxide can be released. "I think there's a good chance we'll see such a cap in the next ten years," she said. A bill creating a cap-and-trade system for carbon has in fact been introduced several times in the U.S. Senate by John McCain and Joseph Lieberman. "Each time they introduce it, they get a few more votes," Passero said.

Partners in the Forest

RIGHT NOW, the main tool with which public agencies and nonprofit organizations are helping to preserve private forests is the conservation easement. State agencies, notably the Coastal Conservancy, transfer funds to land trusts. The trusts in turn pay forest owners for forestry easements that delineate how the land is to be used. The first rule is that keeping the land in timber production is okay but development is not.

"Low-intensity urban residential development is like rust: It's always eating away at the integrity of the forest ecosystem," said PFT's Connie Best. The crucial first step toward protecting California's forests is to stop the rust, because once land is developed, there is no turning back. Keeping land forested means keeping it as a working landscape, she said.

California's forests can't all be turned into parkland, nor should they be, she said. Parks do not generate property taxes, on which local governments depend, and in Northern California they have not brought jobs to replace those lost when the land goes out of timber production. Easements can give landowners capital they need to keep the land working.

"The people conserving these forests [under easements] are the private forest owners themselves," said Best. "They need to be encouraged to keep their land as high-functioning forest, and one of the ways to do that is through a working forest easement." It is an increasingly popular move: the PFT currently holds easements on approximately 35,000 acres of forestland in Oregon, Washington, and California, and is adding more every year.

Those easements have been placed only on relatively small properties, but Karen Gear, the Coastal Conservancy's North Coast program manager, said she thinks large timber companies may soon find themselves drawn to easements as well. "I think it's the future of large properties on the North Coast," she said. "If people are cutting to service debt, this is one way to get rid of debt issues and harvest at a reasonable rate into the future."

Able, on the other hand, has advised his clients to be very cautious about entering into a binding contract that limits land-use options. "You don't want to be in a position where you have to call San Francisco or Santa Rosa every time you want to do something on your land," he said. Easements can be helpful, he conceded, but only if the landowner has the right attitude.

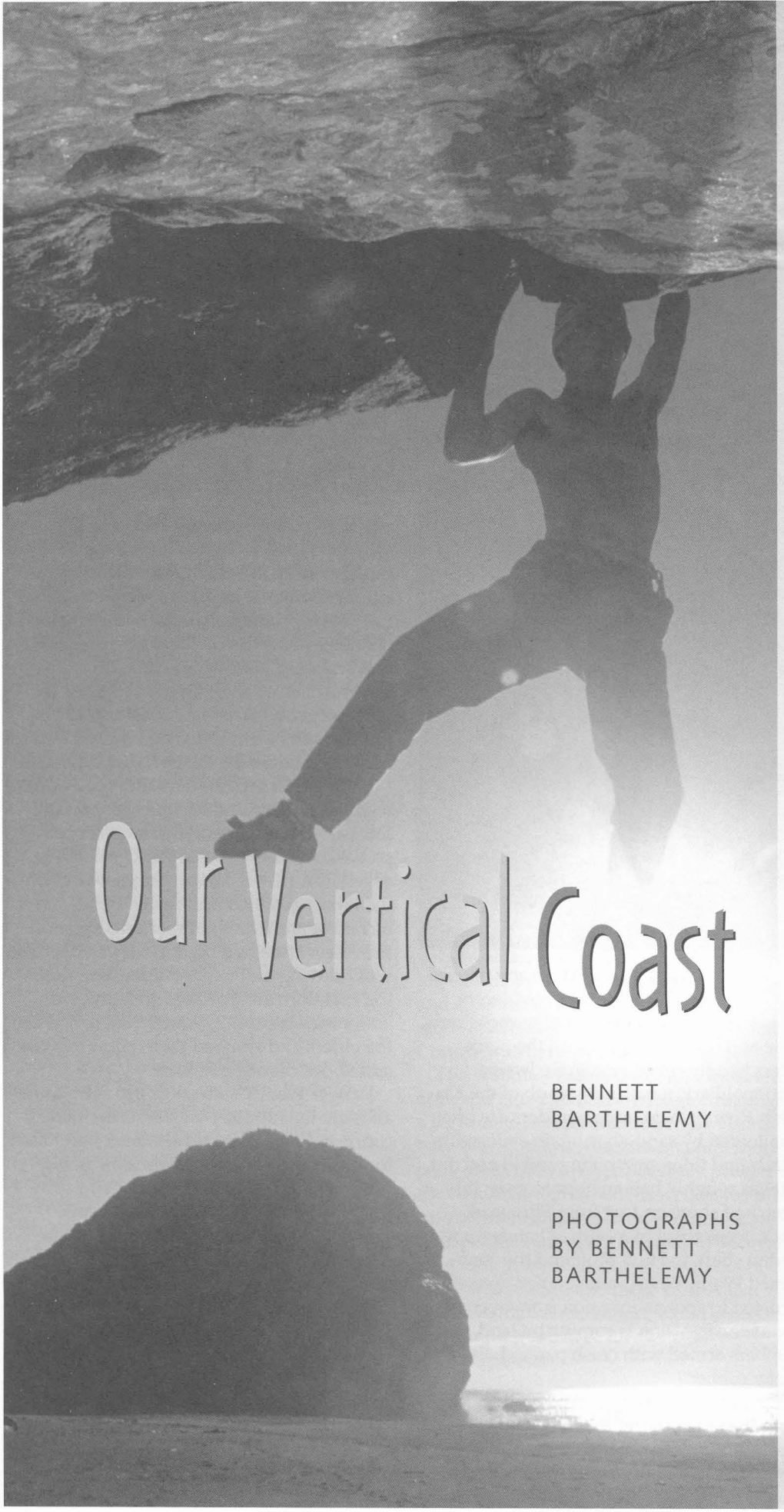
"As soon as you sell an easement, you have a partner. If you like having a partner, that's fine. It just depends on whether you work well with others."

Too Little, Too Late?

THERE IS NO ONE patent remedy for the financial and environmental problems facing California's forests. "We're a long way from sustainability," Rogers said. "I think the path there isn't clear and laid out, and I'm sure it's not going to be easy." But the stakes are high for Californians. We need clean water and air, and there is widespread awareness of the dangers of global warming. We also need our forests for relief and inspiration, for the connection they provide between us and the rest of nature—if we but recognize it.

California residents, concentrated in a narrow band along the coast, need to take a look away from the Pacific and into the green sea behind them. "People spend so little time in or around forests," said Best. "If you don't have people recognizing the contributions forests make to their lives, they won't care about them. That's the biggest threat the forest faces today." ■

Arno Holschuh's last article for Coast & Ocean *was "Living on the Edge."*



Our Vertical Coast

BENNETT BARTHELEMY

PHOTOGRAPHS BY BENNETT BARTHELEMY

The Boulder

Fog drifts in like lazy waves, curling through the jumble of boulders rising from the sand and into the thick stands of redwood and Douglas fir that loom above the seashore. The fog's ethereal fingers caress the jade-green faces of the Lost Rocks, leaving a film of condensed vapor on the smooth stone. Standing on the shoreline, my vision is reduced to some 150 feet as I look northward toward a memory of the Klamath River. These boulders could be the hulls of wrecked ghost-ships, forever stuck in the path of roaring breakers and shifting sands.

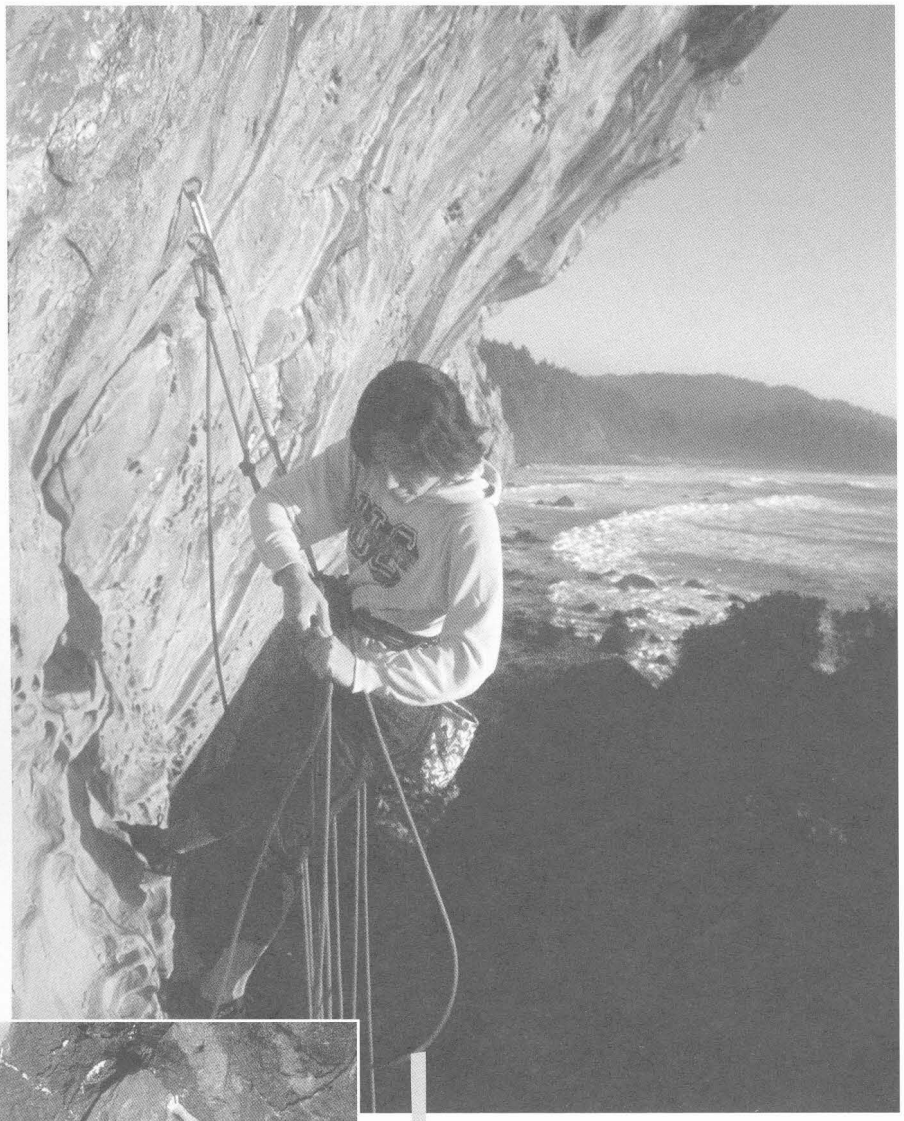
Last time I was here the large boulder before me was hidden under sand. Now it is fully exposed, at high tide. Since summer the beach level has dropped nearly 15 feet. Looking up at the smooth slope of greenish sandstone I wonder: Will mine be the first ascent? No way to know. Any chalk left by other climbers will long since have washed away.

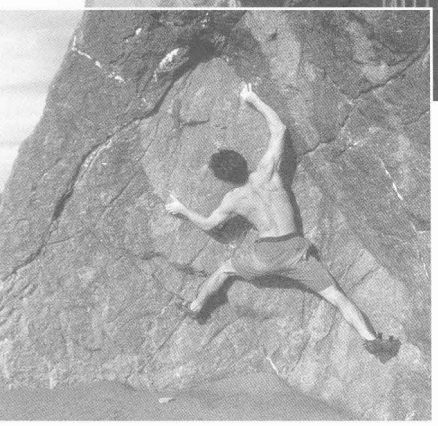
As I step up to the wall of stone, white sea-foam kisses my ankles. Behind me the muffled crashes of ten-foot waves, barely visible through the fog, meet my ear with hypnotic persistence.

I chalk my hands, grab the rounded right edge of the boulder, and raise my left foot to a subtle bump at waist height. I stretch for the two-finger pocket that is tantalizingly just out of reach; arm and leg quiver under the strain of tendon and muscle against gravity. I shuffle feet, exhale, left hand throws for the shallow pocket, arms and legs caught in the vertical dance. Right arm crosses over left to reach the next thin hold, right leg kicks empty space behind me in a desperate attempt to maintain balance.

I fall to the wet sand below—grounded. I stand up, mime the moves to my high point to memorize them, and try again.

Adam Wanden challenges "The Flake" at Lost Rocks.





Top: Dana Ikeda anchored on a rock face at Promontory

Above: Adam Wanden at Lost Rocks

LOST ROCKS IS NOT on any official maps. The name that boulderers (those who climb smaller rocks sans rope and protective gear) call the place refers to a shoreline area in Redwood National Park, a half-mile south of the Klamath River, where huge boulders are often swallowed by sand, then again exposed as winds and tides sweep the sand in and out. It takes roughly half an hour to cross this stretch of shore on foot from Flinthead Rock, a beautiful monolith of banded and folded chert, to High Bluff and the abandoned World War II radar station constructed to spot an invasion from overseas. Today the invasion is coming by land, climbers armed with crash pads, chalk, and sticky rubber.

The easiest approach to the boulders is from the north, along the river's edge, through Yurok dance grounds—a place of ceremonies since time immemorial, now part of Redwood National Park. To get to Lost Rocks from the river you must turn south along the shore and cross private property—among a small maze of very appealing boulders.

Many local climbers know it's better to stick to another, somewhat treacherous, trail a half-mile farther south, which leads from the parking area at Flinthead walk-in campground to Lost Rocks without crossing private land. But most visiting climbers are unaware of this protocol and, without official signs to guide them, have inadvertently trespassed on private land. This has led locals to fear that their access to Lost Rocks might be jeopardized.

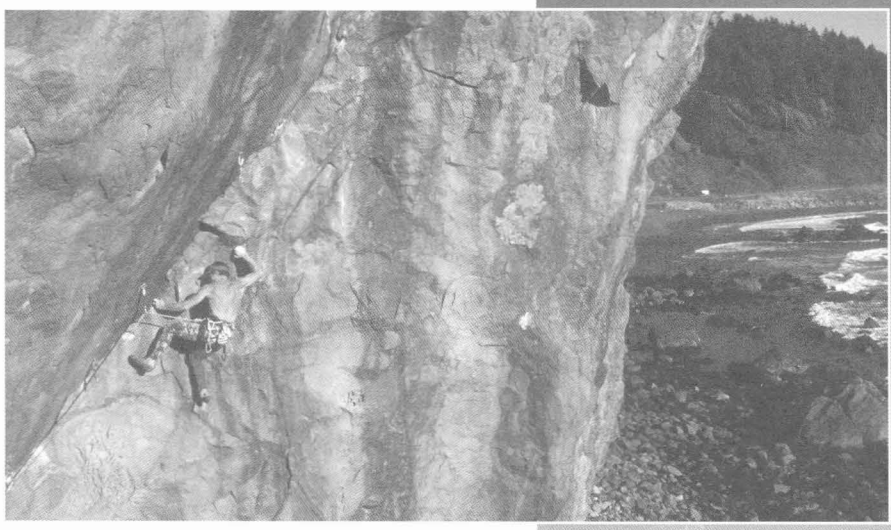
The Boulder Problem

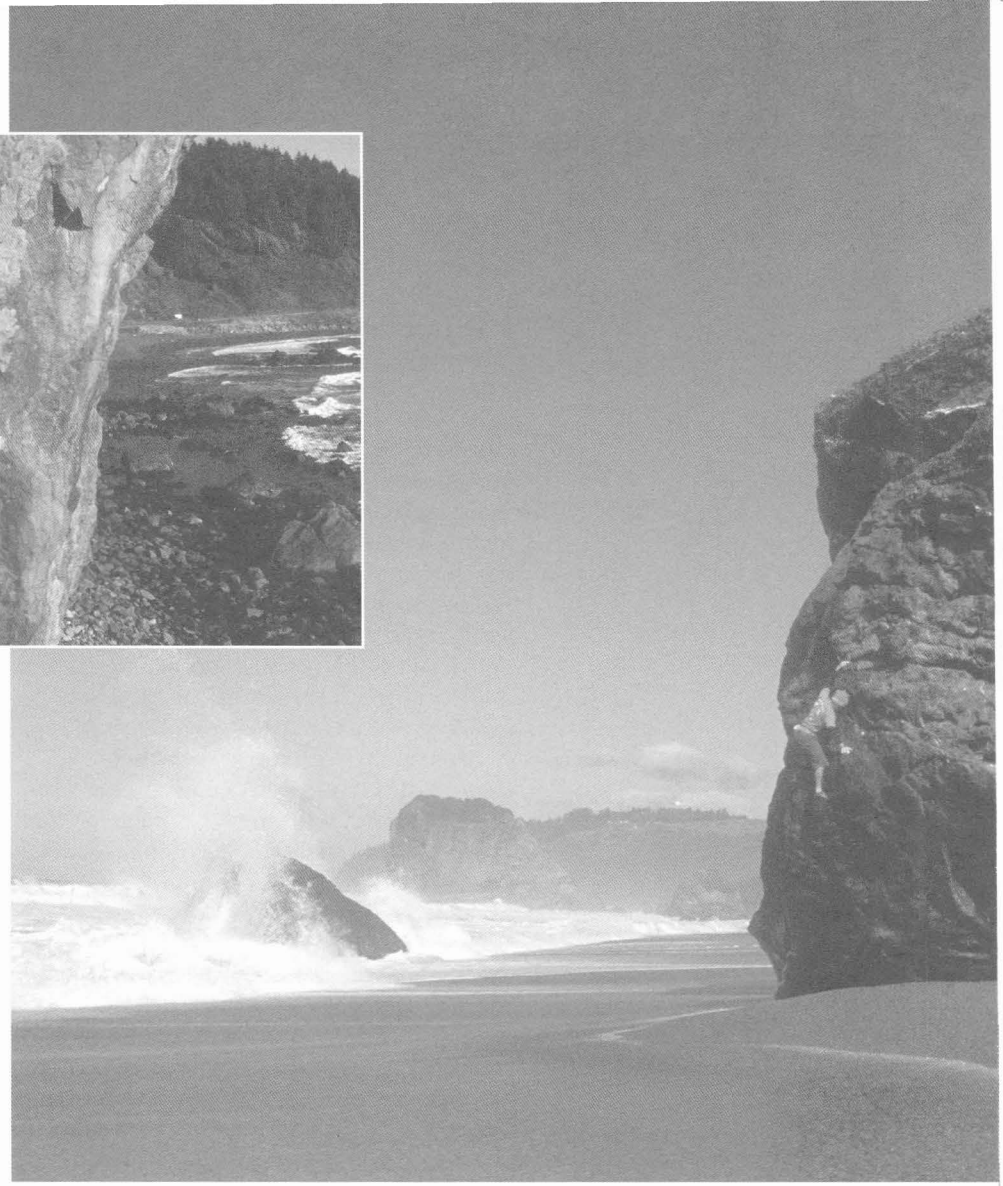
ON A RAINY April night two years ago, I gave a slide show at Adventure's Edge, an outdoor store in Weitchpec, to alert local climbers to what looked to me like a potential access problem. Among some 60 local climbers who attended was Scott Wanek, chief ranger of Redwood National Park, who turned out to be an avid climber. In fact, the good climbing opportunities on California's North Coast had drawn him here from Rocky Mountain National Park.

Wanek told the climbers that they needed to get in touch with the tribes, especially the Yurok, whose ancestral lands encompass Redwood National Park, who had asked him why so many people were using the dance grounds trail lately. He also said he had heard that a climber on a spire on the reservation had been yelled at. Conflict was brewing and needed attending. Realizing that the Yurok needed to know more about rock climbing, Wanek had met with the elders and showed them climbing gear and slides of rock climbing.

Ranger Wanek's message brought home an issue that already was of nationwide concern. Freedoms that climbers had taken for granted on federal lands were being threatened in places of cultural and spiritual importance to Native Americans. There had been court cases, and site closures at Devil's Tower, Wyoming, and Cave Rock, Nevada. It has taken quite a while for climbers to get proactive about such issues. I climbed for nearly a decade all over the western United States before I thought much about the problem of access on potentially sensitive lands.

Rock climbing, for myself and many others, is more of a lifestyle and a means of making a living than a mere sport. In the last decade I have introduced scores of





kids to climbing through my various jobs as an outdoor educator, and have supplemented my meager teacher's income by selling photos and articles about climbing. To me, climbing is not a right, it's a privilege; it also entails certain responsibilities. I strongly believe that some areas should be open to climbing, but others should not be. I also believe that when climbers are given a clear picture of issues that relate to climbing areas, they are likely to be accommodating. For example, local climbers agreed to abide by a voluntary climbing ban at Natural Bridge, near Hayfork, Trinity County, after they realized its significance as the site of a massacre in 1852 and a place of worship for the Nor-Rel-Muk Wintu Tribe. The tribe had hoped for a federal ban on climbing, but that would take a long time to put in place. In the meantime, climbers agreed to avoid the place and got the word out to the national climbing community.

So far there hasn't been enough climbing in Redwood National and State Parks to warrant a Climbing Management Plan, such as those for Joshua Tree National Park and some other popular areas. If this were to become necessary, climbers could work with the Park Service to help define and maintain areas they use. Some local climbers, however, still feel that the wisest course is just to keep quiet. This has worked so far, but no site, no matter how remote, remains secret for long in the climbing world.

Indeed, remoteness has its own appeal. Every year, more people head to the far corners of the globe, putting up new routes in the fjords of Greenland, Queen Maud Land in Antarctica, on Baffin Island—so it's no wonder that climbing on the North Coast is becoming more popular. Young hotshots are even choosing to go to Humboldt State University because there is enough good climbing nearby to keep them inspired, strong, and sponsored. Just ten years ago this would have been inconceivable; Humboldt County was hardly on the radar screen.

The National Park Service and most federal land agencies acknowledge climbing as a legitimate recreational activity, but it is only one of many, sometimes conflicting, park uses. The Park Service must protect the natural environment as well as historical and archeological sites, and accommodate people who come to watch wildlife, hike, camp, and experience the parks in other ways. More and more people use public lands for recreation, while staffing and funding fall ever further behind the growing needs.

Working Out the Moves

RECOGNIZING THESE realities, climbers have begun to weigh in on policy decisions and to take on a stewardship role. Jason

Top left: Eric Chemello scales a rock face at Promontory.

Above: Adam Wanden climbs near Flinthead Rock.

Keith is the policy director for the Access Fund, a national nonprofit organization representing climbers, formed in 1991 in Boulder, Colorado. "To be an advocate does not mean to be adversarial," he pointed out. "You seek to represent your interest and be viewed as a partner, not an opponent—not just aware of but understanding policy—and help park officials help you." He also stresses that it's important to build relationships with native communities as well as land managers. The Fund supports numerous volunteer events, including trail maintenance days and beach cleanups.

At a beach cleanup I organized at Lost Rocks in fall 2003, I invited Bob McConnell, Yurok cultural resources specialist, to speak to volunteers. He talked of the local history and told of the challenges his tribe and others face on the Klamath River, where salmon runs have been decimated because of severe water withdrawals for agriculture upstream, and shared some of the lore attached to the Lost Rocks area. But when we asked if there were some features climbers should avoid, he did not give a specific answer. Later, I visited his tribe's cultural offices with the same question, but, instead of getting an answer, I came away with an invitation to speak at the monthly meeting of the elders who make up the cultural committee. That meeting took place in October, 2003. Nothing was resolved.

Meanwhile, Scott Wanek had moved on to Oakland, as head ranger for the Western U.S. and Guam. In October 2004, I phoned the new acting chief ranger, Rick Nolan, to ask if we could walk through Lost Rocks together and talk about signs and trails. Just past the ceremonial dance grounds we found chalk marks on boulders at the river's edge, on private land that shouldn't have been climbed. Nolan agreed there was a need for signs indicating private land, and for improving the Flinthead Ridge trail so climbers could use it instead of going through the dance grounds. A month later I called Nolan again and learned that various emergencies had delayed the matter.

In the meantime, climbers made some moves toward solving the problem. Brook Sandahl of Metolius, a climbing gear manufacturer out of Bend, Oregon, placed an access alert about Lost Rocks in the company's 2005 international climbing catalog, telling traveling climbers to use the Flinthead trail and not trespass. Then Eric Concannon, who works at Adventure's Edge, handed me a brochure from the Salt Lake Climbers Alliance, available at Utah climbing shops and visitor centers. "Why can't we do something like this?" he asked. The foldout guide, produced with Access Fund money, includes a map to local climbing areas with photos, a description of camping options and other services, a list of access and ethical concerns, and phone numbers for local land agencies. We contacted the local tribes to ask whether such an item might be useful and were invited back for another meeting.

The Sequence

IN FEBRUARY **2005**, we moved another step toward collaboration with the Park Service on maintenance when two carloads of climbers headed out to two prime sea cliffs in Redwood State Park, a 15-minute drive north of Lost Rocks. Nettles and Himalayan blackberry obscured the mile-long trail, which until 2004 was maintained by the California Conservation Corps, but due to budget cuts was now growing wild. We intended to do some climbing on a citadel of stone that rises 150 feet out of the surf, but this time it was not just for fun; we had something else in mind.

The six of us going out to Footsteps and Promontory that day represented the 30 members of the newly formed Bigfoot Country Climbers Association of Northern California (BCCA). Ranger Silver had come along at our request to begin working out details of replacing deteriorating bolts. This time, if climbers were going to place (replace in this case) fixed hardware in the cliff, we wished do it with the consent of park authorities.

Although these two sea cliffs have been climbed for nearly two decades, officials had no idea that 30-odd routes existed until Ranger Wanek climbed there a couple of years ago. As we walked, Silver told us how the two adjacent parks and their joint management system had evolved, and why rangers often wear multiple hats. He asked if the BCCA could come up with an action plan—a couple of pages detailing our proposal to replace bolts, now five to 15 years old, on the pockety greywacke sandstone. He also suggested that BCCA members might be provided with park volunteer status if State Park approval was given to replace the fixed climbing hardware at Footsteps and Promontory. Often misted with salty sea-spray, the bolts, even the stainless steel ones, are quickly rusting

away, making climbing far more exciting than it should be. Often a climber doesn't realize the hazards until it's too late to turn back. More than once I have found myself staring at a bolt head that, though originally rated to hold 5,000 pounds, was now half-eaten with rust and lucky to hold the weight of a sea cucumber.

The Route

HISTORICALLY, climbers have often averted access conflicts by practicing self-regulation and self-reliance. They routinely pick up trash, spray-paint bolts to camouflage them, and try to educate new and visiting climbers about local access concerns. Sometimes the Access Fund provides money when agency budgets cannot, as, for example, at Natural Bridge, for signs to explain the voluntary closure and cultural concerns of the Nor-Rel-Muk Wintu nation.

I believe that when more climbers make the effort to engage in the management and care of areas we use, and see access as a responsibility rather than a right, cooperation among climbers, public land managers, and native communities will become easier. At Lost Rocks, lack of trail work and signs leads boulderers to trespass inadvertently. Some of us now choose to avoid Lost Rocks.

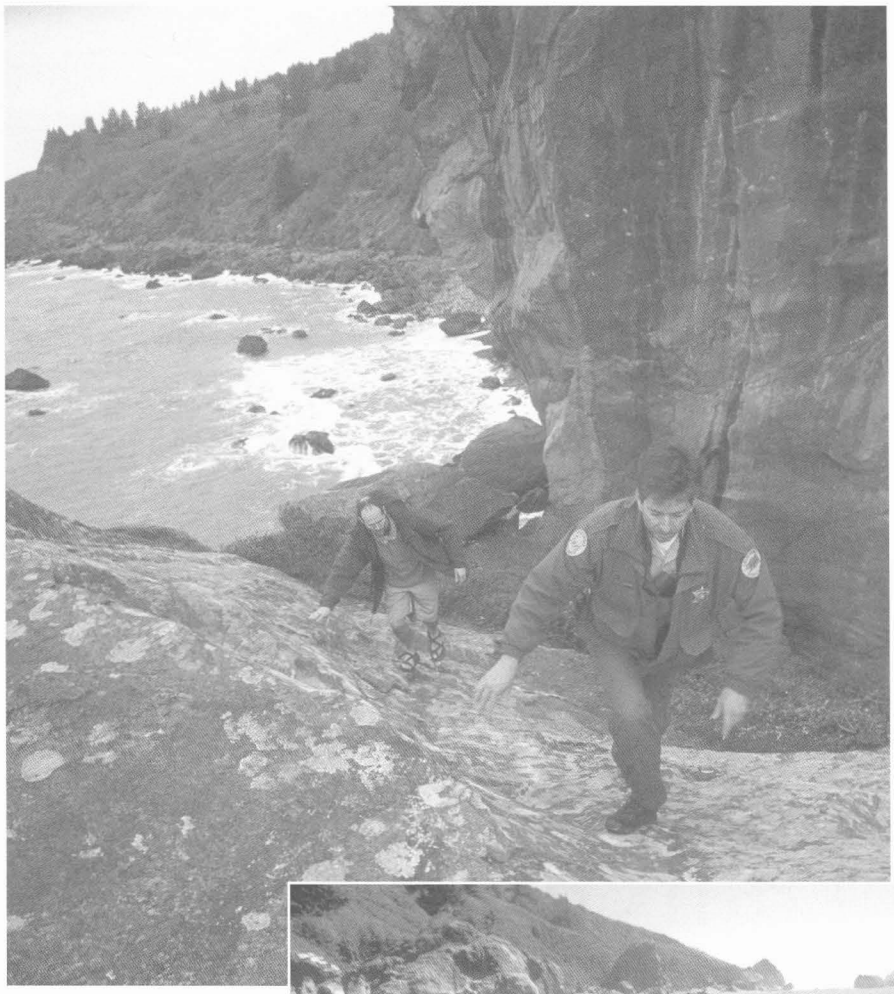
Since the BCCA started meeting with the Yurok we have learned that to many Native Americans, certain rocks are living beings and places of power. Only a few highly trained tribal members ever visit certain rocks and cliffs in Redwood National Park, for very specific cultural reasons. In some cases, only those with years of training as healers may visit these areas, under very controlled conditions, for the collective good of their people.

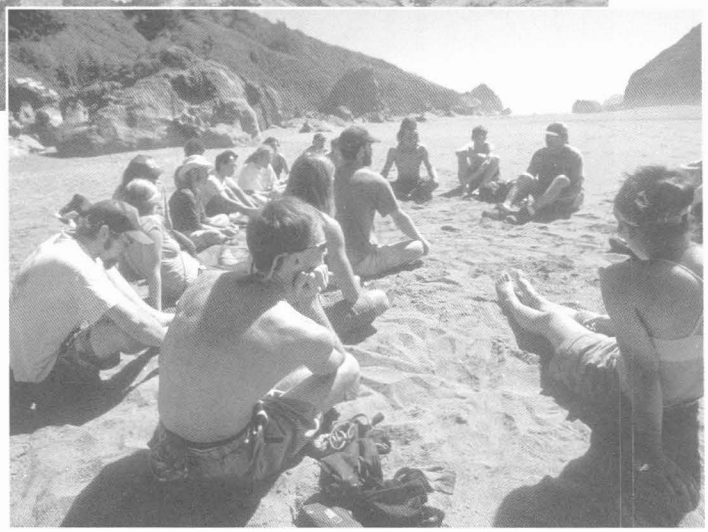
Will being direct and honest about our sport bring increased understanding, or more restrictions? Limitations are likely, but at least everyone will have the opportunity to engage in dialogue and be intelligently informed. As a climber, I feel it is better to agree to certain closures now, rather than have many mandatory closures in the long term because of a lack of communication or understanding.

People will, without a doubt, continue to boulder and climb on established routes and to explore new areas—such as offshore sea stacks, which now lie within the Coastal National Monument and are refuges for seabirds and marine mammals. There are an estimated 1 million climbers in the U.S. now, double the number a decade ago, largely because of the indoor climbing boom and marketing of the climber image. Prime-time commercial slots and recent Hollywood movies are placing rock climbing in the mainstream consciousness of America. The number of climbers continues to grow.

Now that we are working with land managers and tribes, it is important to be open about our activities. I hope that climbers as a community can be patient with the long process of negotiation, and with the fact that some areas will be closed to climbing, so that in the end we can all work as partners taking care of the lands we share. ■

Bennett Barthelemy currently teaches Native American history at College of the Redwoods in Eureka and rock climbing through Humboldt State University Center Activities in Arcata.





Top: Ranger Brett Silver and climber Eric Concannon go to look at old climbing bolts.

Above: Bob McConnell talked to climbers at a 2003 cleanup event.

JACK SHU

FamCamp on Angel Island

HAL HUGHES

Setting up camp

IT HAD BEEN RAINING for days, so we figured that the two-day camping trip to Angel Island would be postponed or cancelled. Surely, we reasoned, nobody would take a bunch of middle-school kids out to sleep on soaked ground for two nights, especially since many of them had never camped out before. But when we called Jack Shu, who directed California State Parks' FamCamp program, and asked, "Are you still going?" He sounded surprised. "Why not?" he said. So the following morning, which turned out to be bright and clear, my son Caleb and I took the ferry from San Francisco to the island to find out how things were going.

FamCamp is a program designed to introduce young people and their families, most of whom live in cities, to the pleasures of parks, camping, and the great outdoors. "Most parks programs are either park-centric or resource-centric," Shu explained. "We prefer to be community-centric."

Working with community organizations, State Parks provides tents, sleeping bags, and other essentials, as well as reserved campgrounds, in a program that helps participants toward a better understanding of how their lives fit into the context of nature and history. This group, for example, was about to visit the Angel Island Immigration Station, often called the "Ellis Island of the West," where in the years between 1910 and 1940 newcomers seeking to immigrate, Chinese in particular, were detained.

The 21 campers on this trip were mostly Chinese-American middle-schoolers, along with two high-school-aged helpers, and had come through the nonprofit Beacon Center in San Francisco's Chinatown, one of eight Beacon Centers based in the city's public schools that provide various programs before and after school, on weekends, and during summer vacation. Angel Island was a particularly meaningful choice for this group.

Caleb and I joined the campers at the Immigration Station, in a large white wood-frame building not far from the water's edge. As we arrived, Park Ranger Casey Lee was showing them poems and drawings carved into the walls by the people who had

been held there, usually for a few weeks, but occasionally for as long as two years. Some of the drawings were quite fine. Here's one of the poems, author unknown:

Imprisoned in the wooden building day after day,
My freedom is withheld; how can I bear to talk about it?
I look to see who is happy but they only sit quietly.
I am anxious and depressed and cannot fall asleep.
The days are long and bottle constantly empty;
My sad mood even so is not dispelled.
Nights are long and the pillow cold; who can pity my loneliness?
After experiencing such loneliness and sorrow,
Why not just return home and learn to plow the fields?

The Chinese Exclusion Act of 1882 had in effect shut the door on Chinese immigrants by setting a quota of only 105 per year. The Act was repealed in 1943, but the quota remained in place until 1965, when U.S. immigration laws were overhauled in a way that offered better protection from racial discrimination to would-be immigrants.

After the tour, Shu held a "debriefing" near the beach, where he explained ways that this history had shaped Chinese-American culture, and pointed out that similar concerns apply to other immigrant groups today. He also noted that the Angel Island Station was a detention center, not a processing station like Ellis Island, so the comparison is misleading. Middle-school students are not known for being garrulous with adults, so there wasn't much comment or discussion. The young people were attentive and respectful, but nonetheless, when Shu finished, some of them were delighted to discover that the nearby beach had lots of good stones for skipping.

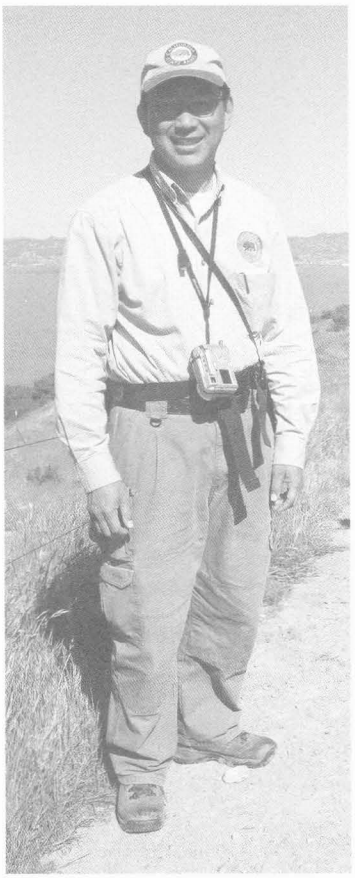
Asking what we had missed the night before, we learned that the rain had stopped just as the campers got off the ferry. After setting up camp and making dinner, they had played games on the beach and taken a night hike to a ridge top from which they could see the lights of cities around the Bay. A few were bleary-eyed from staying up later than usual, but the night had passed peacefully.

Dispelling Myths

FAMCAMP HAS 14 trailers loaded with tents, sleeping bags, lanterns, cooking and eating ware, and other camping gear. They keep the trailers at various locations around the state, mostly at campgrounds that are convenient to urban centers. The program enables community organizations that lack such supplies to incorporate camping and outdoor recreation into their activities.

All of State Parks' programs have suffered from ongoing budget cuts and staff shortages, but FamCamp is solidly in place, with funding from the State Parks Foundation, which is seeking additional grants. Over its ten-year history, FamCamp has hosted as many as 100 outings in a year, although for the past two years the number has been closer to 40. Many organizations that would make good partners just don't have camping on their agendas or in their budgets, and sometimes they worry about risks and liabilities; often they're so focused on urban activities that camping hasn't occurred to them.

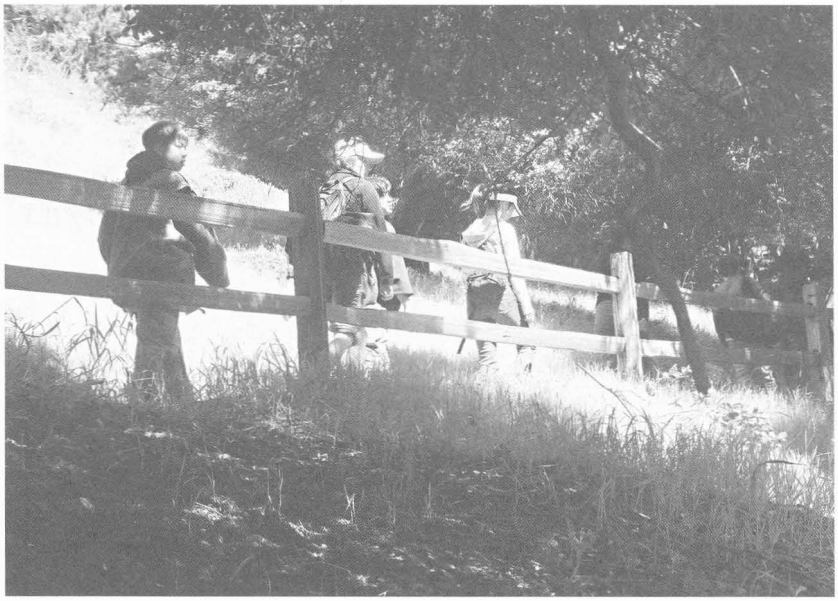
In California the city kid who has never seen the ocean might seem to be a myth, but in fact, there was one 13-year-old in the Beacon Center group whose first glimpse of the Pacific was on this outing. Shu sees FamCamp as a means of presenting parks and camping to parts of society that seldom take advantage of them. Notions that some ethnic groups are not interested in camping, outdoor recreation, or environmental programs are "imaginary," he said. Some FamCamp participants become avid campers once they've gotten a taste. "The State Parks reservation system tends to be dominated by veteran campers who know how to use



PHOTOS THIS PAGE: CALEB HUGHES

Top: Campers review their experiences.

Above: Jack Shu



PHOTOS THIS SPREAD: CALEB HUGHES

Top: On the Sunset Trail

Above: First to the top!

it," he said. "We need ways for other people to have access."

Eat, Meet, and Climb

WE LEFT THE Immigration Station and hiked back around the island to a picnic area near the visitor center and ferry pier. As we walked, Shu, along with Beacon Center chaperones Kyomi Noguchi and Joe Sullivan, drew the hikers' attention to their surroundings. Noguchi showed how to identify trees and other plants using a field guide, and Shu solicited theories about possible causes for a line of foam that stretched across the channel between the island and Tiburon Peninsula. A couple of boys surmised a connection with gravity and the moon, and in fact the foam marked the meeting of freshwater outflow with incoming tide.

By the time we reached the picnic tables, we found that most of the group had already eaten the lunches they'd packed. Shu then used the extra time to review the camping experience so far, and to ask for suggestions on how it could get better. Answers of more than one word were few, but I could see from their expressions and interaction that the campers were beginning to understand the value of cooperation, and that they enjoyed the feeling of being in this experience together, with some power to shape it to their liking. Among suggestions for activities to be added were another night hike, more play on the beach, games, bike-riding (not in the budget), and staying up until three a.m. (deemed inappropriate).

Next on the agenda was a hike to the top of Mount Livermore (elevation 788 feet) along the island's Sunset Trail, which winds upward through wooded slopes to the more open grasslands near the peak. The walk was divided into thirds, with a different youth chosen to be leader for each segment. Shu outlined each leader's responsibilities, saying, "Set a good pace, not too fast and not too slow. Don't let anyone go ahead of you or off the trail." At each rest stop, the trail opened out to wonderful views of the Golden Gate and Marin County. Each time, cameras would suddenly appear from nowhere, and the mood of the group would shift to excited chatter and clicking shutters. And each time, the hikers would be surprised that we had not yet reached the top.

The more sensational moments of this hike came with the appearances of deer among the trees, and the sounding of vocal alarms when patches of poison oak were spotted next to the trail. Muddy places brought squeals and concern for shoes and clothes.

On the final leg of the climb, trees thinned out considerably, yielding more expansive views of the Bay and, from the south side of the island, San Francisco. Noguchi pointed out that the dirt path was now marked with spoor of deer and other animals. By the time the viewing platform at the top of the mountain was in sight, the hikers were noticeably tiring. Walking in the middle of the pack, I found myself growing a bit impatient, as the time left for Caleb and me

to make it to the last ferry was dwindling. He'd gone ahead of the group, not being subject to the rules of the hike leader, and I hastened to join him and talk over our strategy for the descent.

We made it to the top of Mount Livermore a few minutes before the rest of the group, and watched as a few hustled up, trying to be first to the summit. The glee and satisfaction of conquering the peak wore off rather quickly, however, and soon heads started drooping toward the picnic tables. The effort had taken its toll, and it was dawning on everyone that the impending descent meant quite a bit more hiking ahead.

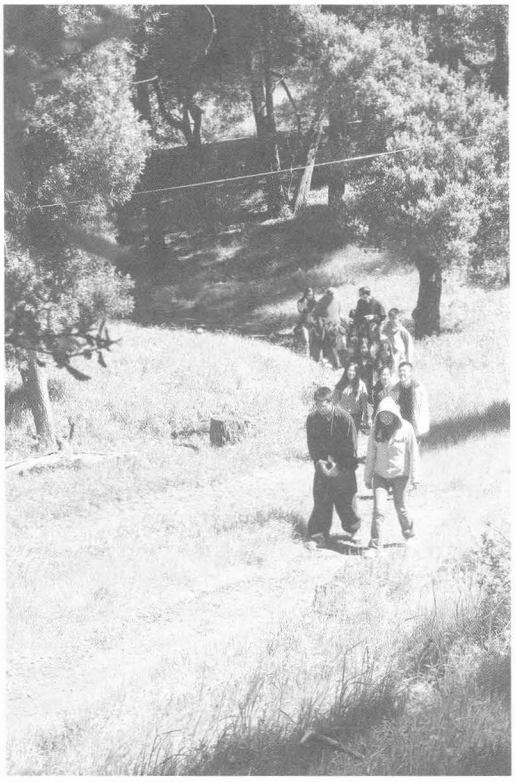
Down, Down, Down

FOR CALEB AND ME, time was running very short—it had taken an hour and a half to reach the peak, which meant we had only a half-hour to get back to the ferry. We said our goodbyes, and lit out as fast as we could, heading for the North Ridge Trail, which, on the map at least, looked shorter than the Sunset Trail. Caleb, who is 23, was much faster than I, and he zoomed ahead in hopes of trying to persuade the ferry crew to wait for me if necessary. I'd heard of power hiking, and this was it in earnest. Just as I'd started to wonder whether I'd even make it to the bottom, a voice rang through the trees from below: "Dad! I'm at the stairs—we can make it!"

Several minutes later the stairs we'd climbed at the beginning of the day came into view, and I could see through the trees that the ferry was just closing in on the dock. Amazingly, we had a few minutes to stop and catch our breath before the ferry tied up to take on passengers.

With great relief, we found seats on the top deck, where we were happy to relax and breathe deeply. We didn't envy the campers, who, besides the descent of Mount Livermore, were scheduled to visit other historic sites on the island before returning to camp. I wondered whether they'd still want to take another night hike after dinner.

Caleb and I felt we'd spent a good part of the day rushing too fast to really appreciate the beauties of Angel Island, but fortunately it was not the first time we'd been there, nor will it be the last. There's a good chance that these eager urban youth, introduced to such a lovely place by a program so well-equipped, with people who care so much, will be back, too. ■

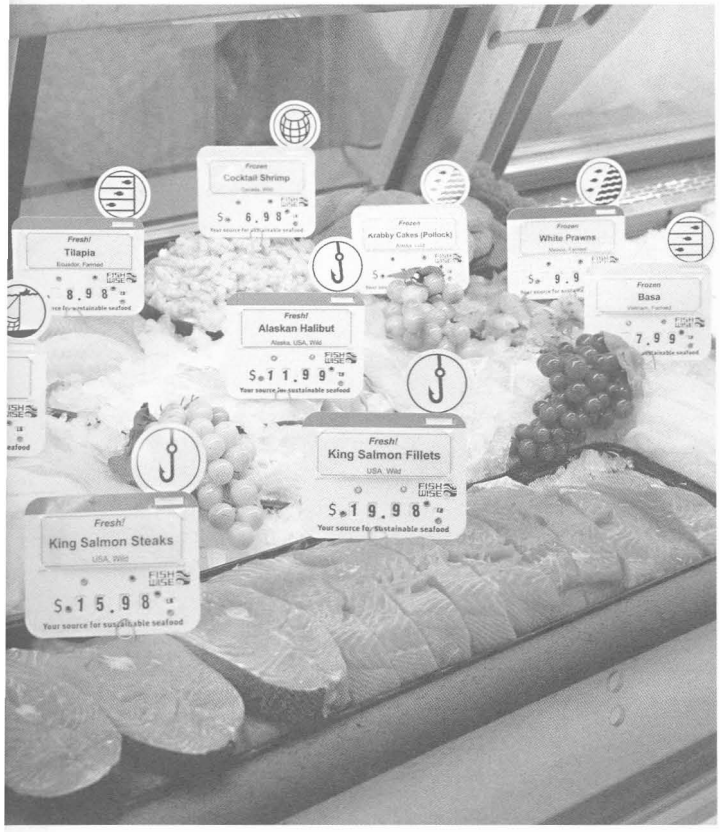


ANGEL ISLAND State Park has four camping areas, including six environmental campsites and a kayak camp. For camping information and reservations, call (415) 435-1915 or see www.parks.ca.gov/?page_id=468. For additional information see www.angelisland.org, and for more on the Immigration Station, www.aiisf.org. For ferry schedules see www.angelislandferry.com (Tiburon) or www.blueandgoldfleet.com (San Francisco). For more on FamCamp, contact Pati Brown at (619) 653-8776 or pbrown@parks.ca.gov. Shu, who was the superintendent of the State Parks Office of Community Involvement, left State Parks at the end of April after 28 years of service.

Top: Skipping stones

Left: Hikers head up Mount Livermore.

MALCOLM LUBLINER



FishWise

Beyond Generic Fish Guides

MOST GUIDES TO ocean-friendly seafood suffer from the same problem: They try to simplify a complex economic and ecological system into a set of guidelines that will fit on a wallet-sized card. That inevitably leads to some omissions. Eating rockfish, for example, isn't always a bad thing, as long as the fish belongs to one of the few remaining species with healthy population numbers and was caught with a single hook and line. That kind of thorough familiarity with fish and fishing methods would take up hundreds of wallet cards and could never fit on fish shop labels.

That's where FishWise steps in. Begun by Sustainable Fishery Advocates (SFA) in 2003, FishWise is a labeling system that untangles the sustainability issue and puts the responsibility for saving species into the hands of the person selling the fish. Two ocean sciences graduate students at the University of California, Santa Cruz, Teresa Ish and Shelly Benoit, founded SFA when employees in their local health-food store expressed a desire to carry mainly sustainable seafood—but they didn't know which fish met the standards.

As with the popular Monterey Bay Aquarium Seafood Watch pocket guide, FishWise labels fish red for bad choice, yellow for questionable, or green for sustainable. But in the FishWise program, the labeling is the result of research that extends all the way to the individual fishers, allowing a level of precision that other systems lack. Take salmon: Using the Seafood Watch guide, wild-caught salmon appears as a questionable choice. That's because some salmon fishers still use longlines, fishing lines that, according to the Humane Society of the United States, can be as long as 100 kilometers and that have sets of secondary hooked lines leading off from them. This method brings in a significant amount of bycatch—fish and other marine life besides salmon. By getting beyond species, or fresh versus farmed, and buying only fish caught by those fishers who use single hooks and lines, stores participating in FishWise can label some salmon as green and others as yellow.

"We give the stores material and education," SFA executive director Shelly Benoit says, "but they need to be asking their distributors the questions about their fish, like where it came from and how it was caught." It's a lot of work for the employees, she said, which is why the first step in preparing them to label their seafood is teaching them why they should care. "We've found that when people are educated, they have different attitudes and make very different decisions."

So far the program is a hit with the stores—and their patrons. Shoppers in the eight Santa Cruz and San Francisco Bay area stores that use FishWise have been buying more fish in general, and specifically many more pounds of sustainable fish. That change is all the more encouraging because FishWise is basically a voluntary program, although with participation comes, in effect, a FishWise seal of approval that can be revoked.

"We aren't telling the stores not to carry anything, we just ask them to label it more precisely. And we don't tell the consumers not to buy anything; it's all still right there in the case," Benoit said. Surprise audits by the organization test to make sure that the stores are labeling correctly. "If we get the feeling a store is trying to greenwash itself, we'll pull our names," Benoit said.

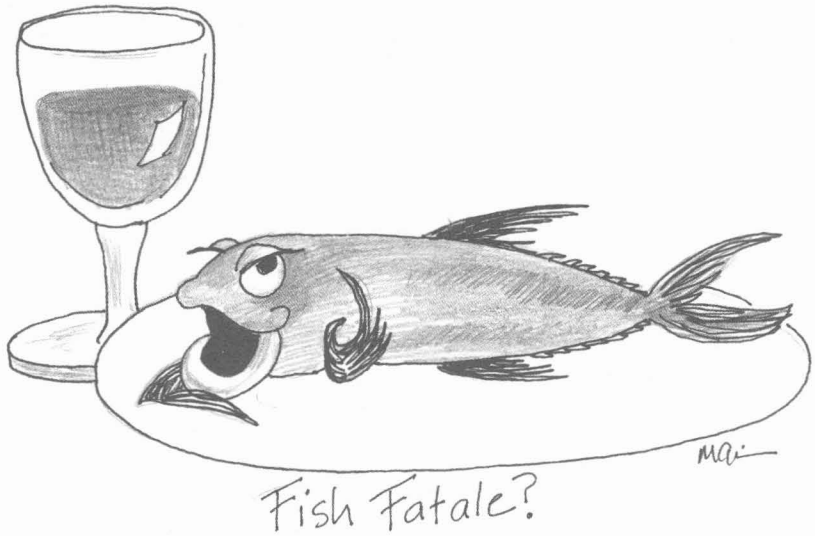
So far, only small chains of health-food stores are participating, but FishWise plans to expand its program to the big grocery chains within a few years, Benoit said. "We're going to approach Whole Foods next year." And Safeway? "That," she said, "is the ultimate goal." ■

—Arno Holschuh

For a list of stores participating in FishWise, visit www.sustainablefishery.org/members.html. The Monterey Bay Aquarium Seafood Watch Guide is at www.mbaq.org.

Revenge of the Escolar

Succulent Fish Can Be Tough to Stomach



MARCIA GRIMM

WESLEY MARX

ESCAROLE? No, escolar. It's a fish, a tasty one appearing on menus in California, with a potential downside that diners should approach with caution. Eat too much escolar and your stomach and your bowels can rebel.

Escolar *(Lepidocybium flavobrunneum)* is a member of the snake mackerel family, usually caught as bycatch by commercial longline tuna and swordfish fishermen. Its high oil content adds flavor and allows a longer cooking time than other fish. It has a rich buttery taste and firm texture. With its popularity growing, some chefs are competing to concoct exotic versions. One chef in Portland, Oregon, for example, serves escolar with mango and shrimp ravioli, and another in Las Vegas teams escolar with couscous and mushrooms in a red wine reduction sauce. I personally prefer my escolar grilled and drizzled with lemon.

Escolar oil, however, contains mainly wax ester, and that's the rub. This ester is not very digestible. If the fish is not cooked at 425 degrees F. for ten minutes per inch of thickness to remove some of the oil—or is eaten in quantities larger than six to seven ounces—it can trigger sometimes severe stomach cramps and diarrhea. In effect, the ester becomes a laxative. The elderly and those with bowel conditions are especially susceptible to escolar's effects, and recovery can take from 24 to 48 hours.

The U.S. Food and Drug Administration has warned fish buyers and suppliers of the purgative nature of escolar, as it has received reports of illness caused by eating the fish from Georgia, Maryland, Texas, and North Carolina. A December, 2004 article in *Seafood Business* described precautions some chefs take in preparing it. The article also reports that one fish supplier in San Diego, Chesapeake Fish Co., sells escolar to food service accounts only, and not to retail markets, out of concern that a customer might buy two pounds of the succulent fish then eat it all at once.

Mislabeling, however, can undermine such precautions. In a recent three-year period, health officials in Victoria, Australia, recorded three outbreaks of stomach illness linked to escolar and a related high-oil species served in restaurants. In one case, ten of a group of 15 people suffered diarrhea, this large number causing concern among health officials. During the subsequent investigation, the chefs claimed they were unaware of the problems with escolar, and that the fish had come to them labeled as butterfish. Responsible chefs need to be aware of the significant traits of the fish they serve, and that "butterfish" is a term applied indiscriminately to various species of fish, each with different cooking requirements. Escolar has also been sold as white tuna and sea bass.

Whenever I see these appealing names on a menu or at a market, I ask for more complete identification. Escolar have smooth dark brown to black skin, sharp curved teeth, large golden eyes, and white flesh. Cooked, the flesh should still be white with buttery flavor and firm texture. If you see escolar on a menu, you may want to ask how large the portions are. If they are larger than six or seven ounces, you risk experiencing the reason for another escolar nickname—the Ex-Lax fish. ■

Little-known Causes of Cliff Erosion

Thirty-four Years of Observations at Isla Vista

ROBERT M. NORRIS

PHOTOGRAPHS BY ROBERT M. NORRIS

THE COUNTY OF Santa Barbara condemned several cliff-top buildings in Isla Vista, near the University of California campus, that were judged to be unsafe to occupy. This forced about 100 students to seek other accommodations in a tight housing market with rather short notice. (See *Coast and Ocean*, Winter 2004–05.)

It may be useful to review the recent history of the area and the causes of the erosion that has put these and other buildings at risk. Most were built in the 1950s and 1960s, before the County began to enforce strict setback rules, and probably before the rate of cliff retreat at Isla Vista was widely appreciated. Furthermore, even when the rate of erosion began to be recognized, it was assumed that the principal—perhaps the only—cause of the cliff retreat was wave erosion at the cliff base. In response to this seemingly reasonable assumption, several wood piling seawalls were constructed after approval was obtained from the County and the Coastal Commission. These seawalls have provided scarcely any protection from the erosional processes that cause cliff retreat. On the contrary, they demonstrate that wave erosion at the cliff base does little beyond clearing away debris provided by other erosional processes.

What are these processes? Perhaps the most obvious is the effect of rain and sea spray driven against the cliff face by wind. Because the rocks making up the cliff face in the Isla Vista area are soft, laminated, and fractured shales and mudstones of the Miocene Sisquoc Formation, they succumb readily to water running down the cliff face.

Two other closely related processes are also involved. Any surface runoff from the area landward of the cliff top augments this type of erosion. Although attempts have been made to direct surface runoff from cliff-top properties to the street rather than down the face of the cliff, or in some cases to drains that discharge at the cliff base, maintenance of these systems has not been very good or consistent. Poorly maintained drainage schemes have too often exacerbated rather than prevented erosion.

Another related but very inconspicuous process is salt weathering. When sea spray is blown against the cliff face, some of this saline water soaks into porous places in the rock and evaporates during dry periods, leaving tiny salt crystals. These crystals grow during evaporation, and slowly and persistently wedge apart rock grains in the cliff. This process is similar to frost-wedging seen in high mountains, where the formation of ice in tiny cracks splits even hard rocks.

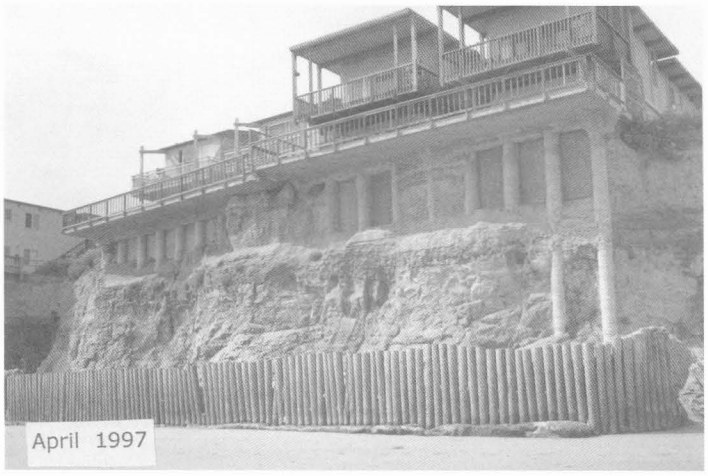
Yet another group of erosional processes are those attributable to organic agents. Among these are burrows made by gophers and ground squirrels that occasionally act as drains from the ground surface to the cliff face. Others are due to the activities of burrowing owls and bees, and perhaps of other animals as well.

Student occupants of these buildings have contributed to erosion occasionally by constructing rope ladders to climb up and down the cliff face, dislodging bits of rock as they go.

Plants too, play a role. Tree or shrub roots associated with vegetation growing near the cliff edge regularly wedge rocks apart, often leaving fairly large roots dangling in the air. It is not unusual for entire trees to wind up on the beach as their supporting

February 1987

February 1994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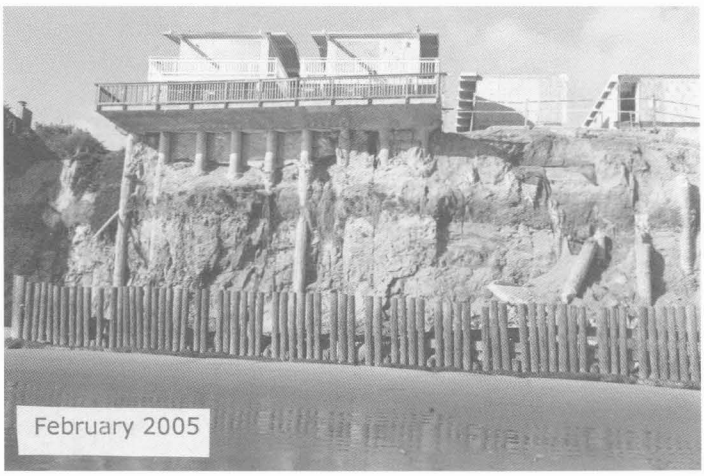

February 2005

soil and rock is eroded away. Further, heavy masses of plants such as ice plant regularly pull away blocks or slabs of cliff-face rock, and fall with them to the beach below.

The net result of these processes is to produce a nearly continuous, generally inconspicuous, rain of fine material, punctuated from time to time by spectacular rockfalls, some of which may have no obvious, immediate cause, but are almost certainly due to the cumulative effect of several of the erosional agencies just mentioned.

On one of the writer's photographic visits, on a fine, windless day, several hundred pounds of rock suddenly broke free 15 or 20 feet above the beach, and certainly would have killed or seriously injured anyone sitting at the cliff base. Exactly such an event occurred at More Mesa, about a mile east of Isla Vista, in the early 1980s—a man and his dog were killed.

Landsliding of large masses of rock has been quite frequent at other places in the Santa Barbara area, but not at Isla Vista. It would certainly be foolish to assume, however, that landsliding will not occur.

For the most part, landslides in Santa Barbara County have occurred in the Miocene Monterey Formation. This rock is highly fractured, and rock layers are often separated by thin seams of soft, slippery clay. Also, the cliffs at Isla Vista are usually only about 35–40 feet high, whereas cliffs cut in the Monterey Formation, which is somewhat more resistant to erosion, often exceed 100 feet. Whenever water works its way into fractures behind a nearly vertical cliff, abrupt failure of the over-steepened block may occur with little warning. Accordingly, landslide events most often occur during heavy rains, or shortly thereafter.

No Happy Solution

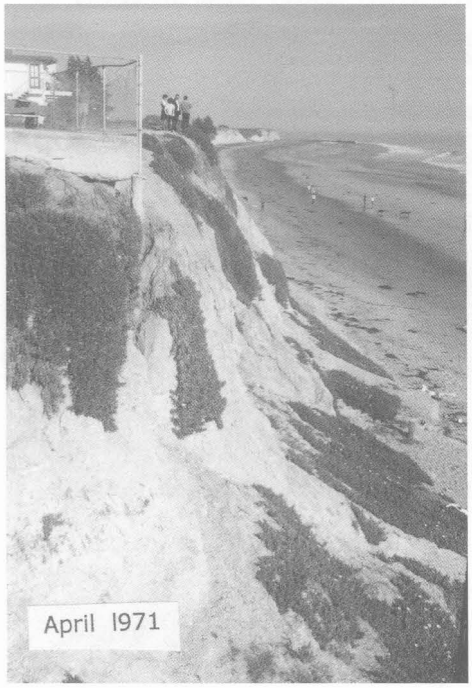
IS THERE ANY practical and economically justifiable way to protect these cliff-top buildings from the effects of erosion? The answer, perhaps unfortunately, is clearly no, if one considers both costs and the difficulty of getting authorization from various state and county agencies. Theoretically, a massive concrete wall keyed into bedrock at the

cliff base, extending to the top of the cliff and protected from water entering behind the wall, would provide some protection, but even such a structure would be attacked from its ends.

As far as the property owners of cliff-top buildings are concerned, there is no happy solution to the problem. Sooner or later all these buildings will be endangered by erosion. They might possibly be supported on concrete piers extending into bedrock in the surf zone, but not without intruding on the public's beach and right of access to the shore. However, because these buildings command premium rents, any County effort to condemn them as safety hazards will result in major resistance and attempts to find engineering solutions. Some building owners have opted for temporary fixes and have merely cut off the front parts of the buildings, as illustrated on page 33.

Slowed, Not Stopped

WHAT CAN BE SAID about rates of cliff retreat in the Isla Vista area? The first thing worth noting is that rates of erosion behind so-called protective sea walls are essentially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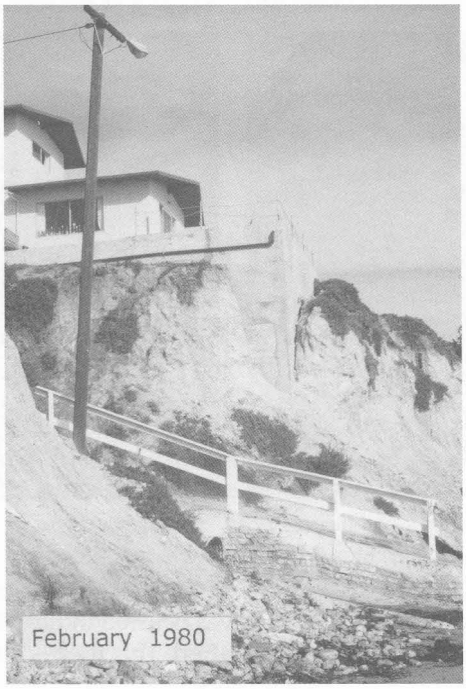
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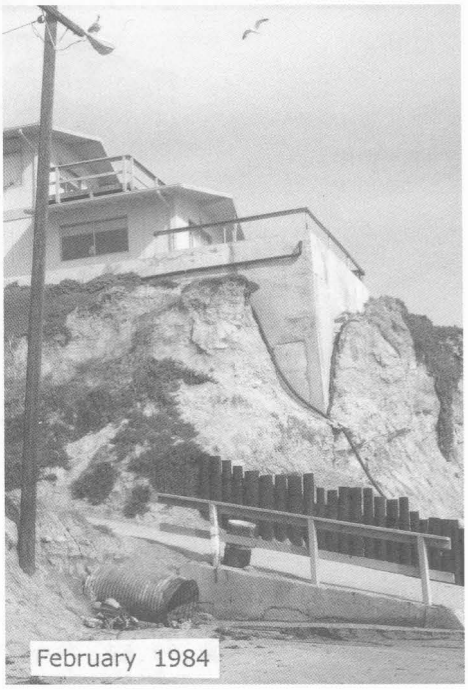
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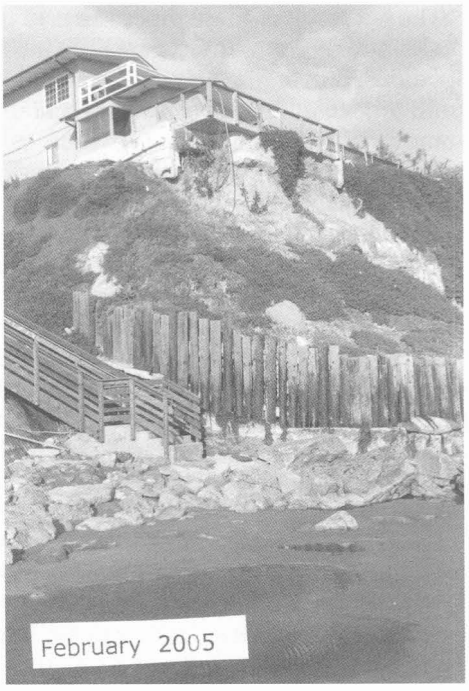
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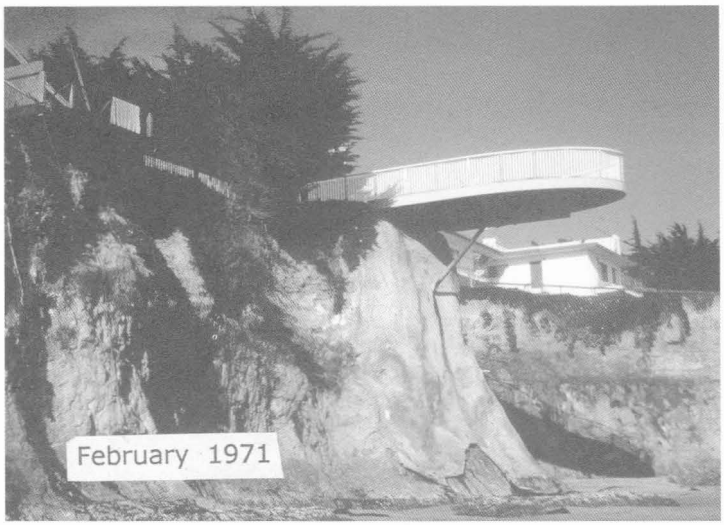
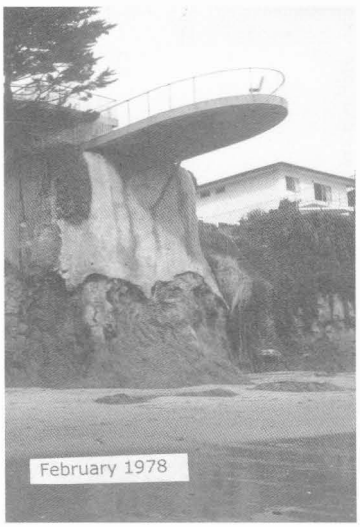
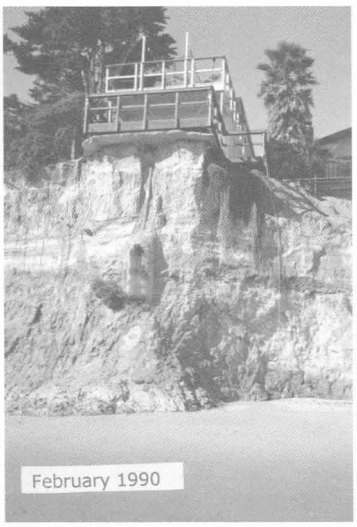






the same as on adjacent "unprotected" areas. There is so little difference that one must conclude that the sum total of the non-marine processes (not direct wave erosion), account for at least 90 percent of cliff retreat.

The photos above show an area in which the entire cliff face, from top to bottom, was protected by a coat of "shot-crete." Although this did indeed slow cliff erosion at that point for a time, it was ultimately defeated by wave erosion at the base and non-marine erosion on the sides. The period of protection left a slight but noticeable seaward bulge in the cliff face.

The long-term retreat rate measured from dateable structures, such as survey monuments atop the cliff, averages about six or seven inches annually. It is important to note that this rate is based on a long period, at least 40–50 years. Short-term rates may be dramatically different, especially during very stormy El Niño years marked by heavy rains. In the winter of 2004–2005, which was not an El Niño year but had periods of heavy rain, as much as eight feet of the cliff collapsed during and immediately following a single storm.

If one lived in a world where long-term public benefits and safety took clear precedence over individual property issues, and if government agencies had sufficient discretionary funds, a county or park district would condemn and purchase all properties to at least 150 feet from the cliff top and convert them to public parkland with few or no permanent buildings. The City of Santa Barbara has just such a park on the Mesa lands just west of the harbor. This is a beautiful asset not only to the immediate neighborhood but to the entire city. ■

Robert M. Norris is a professor of geology, emeritus, at the University of California, Santa Barbara.

IMPERIAL BEACH AND THE WEALTH OF NATURE

RASA GUSTAITIS

RASA GUSTAITIS AND JIM KING

JUST ABOUT 14 MILES south of downtown San Diego, Imperial Beach is, in some ways, the classic laid-back southern California beach town—the kind of small, quiet place that is now mostly a memory along the coast. From the long sandy beach, a recreational fishing pier (with a modest little café at the end) extends out into the Pacific. Surfers bob in the waves, stand around their vans, and lounge at snack shops. The most prominent retail establishment on Seacoast Drive, the street that runs parallel to the beach, is Bibbey's Shell Shop. There are no megastores or fancy boutiques. The only sizeable hotel has a dated look. You may see "for rent" signs in windows of single-family beachfront homes. Imperial Beach would make a good location for a movie set in 1960. But it's no backwater.

During the past 25 years this small city—four square miles, 28,000 souls, southern boundary extending to the Mexican border—took some decisive steps to preserve its special character and its natural environment. Now it is working on an economic development plan that taps into and supports its natural assets.

It's worth noting that despite its grandiose name, Imperial Beach is not wealthy. It has the lowest per capita sales tax revenue in San Diego County. Until recently it was primarily blue-collar, now it's mostly a bedroom community for military people, law enforcement and other public servants, teachers, and other working people in the lower income brackets of the middle class. Some higher-income professionals have lately begun to move in. The city was first developed as a resort in the 1880s and '90s, at about the same time as Coronado Island, but was marketed to Imperial Valley farmers for summer homes. "I don't know how successful that was," said Mayor Diane Rose, "but the name stuck." Today the town is a popular destination for Imperial County residents who beat a path due west to escape the desert heat.

When Mayor Rose, attending a recent conference, heard talk about "smart growth," she had the satisfaction of knowing that her city had been putting life into that concept for quite a few years. "More and more cities are considering open space as part of their infrastructure, as important as schools, streets, and sewers," she said. "That's what people who are thinking of moving into a community look for. But we have more than just parks and green space.

We have real environmental assets, so we hope to tap into these as part of economic development. We have the ocean to our west, San Diego Bay [with its recently-designated South San Diego Bay National Wildlife Refuge] to the north, and the Tijuana Estuary to the south."

The town's southern neighborhoods lie on the edge of what in coastal southern California could be counted as wilderness. To the south and east, a huge expanse of wild open space lies surrounded by cities. Altogether, some 4,000 acres— dunes and saltmarsh, riparian floodplain and coastal scrub upland—extend across the Tijuana River Estuary and on toward the Border Highlands and Mexico, with Tijuana's seaside bullring to the west and city center to the east.

In the late 1960s, a large marina development was proposed at the south end of town, in the saltmarsh at the mouth of the Tijuana River. A majority of local citizens had expressed support through an advisory vote, but a few, with the help of their Congressman, Lionel Van Deerlin, campaigned successfully to protect the marsh as a wildlife sanctuary. It was a daring and controversial step at the time, but in 1980 they reached their goal. The Tijuana Slough National Wildlife Refuge was established. In 1982, when the 2,531-acre Tijuana River National Estuarine Research Reserve was created, one of only 26 such conservation areas, the refuge was incorporated into it. The destruction of wetlands for development was stopped right at sidewalks' edge in Imperial Beach.

The result is a sense of time suspended. If you walk south from downtown on Seacoast Drive past the last house, and get up to the back dune, your eye can travel along a sandy strand for two miles, all the way to Mexico. Midway, the Tijuana River breaks the bar and flows into the ocean. On the west side of the street is a row of small homes, with street ends allowing you to enter the beach or relax on a surfboard-shaped bench. On the east side of the street, where similar houses would likely have been constructed had the proposed marina complex prevailed, there is an expanse of marshland such as can be seen in

Below: Looking east from the footbridge on Oneota Slough

Bottom: Dunes Park with Seacoast Inn to the right

RASA GUSTAITIS

CALIFORNIA COASTAL RECORDS PROJECT

COURTESY DALE FROST/PORT OF SAN DIEGO

RASA GUSTAITIS

RASA GUSTAITIS

Top: Pier Plaza

Middle: Bibbey's Shell Shop

Above: Mayor Diane Rose

very few places in southern California. From the urban sidewalk—with no wall or fence between you and the wildland—you can watch herons and egrets stalking just a few feet away, almost within reach. In spring, you may hear the clucking chatter of the endangered California light-footed clapper rail, for there, deep in the pickleweed marsh, among sinewy tidal channels, is one of its prime mating grounds. This experience becomes even more amazing if you look around and notice that the marsh is bounded on three sides by residential streets.

Should you want to find out more about this unique place, head from Seacoast Drive and Imperial Beach Boulevard to the corner of Third Street and Caspian Way. Walkers can choose either city sidewalk or earthen path to the Tijuana Estuary Visitor Center, operated by California State Parks, which also serves as administrative center for the Tijuana River National Estuarine Research Reserve and the Tijuana Slough National Wildlife Refuge.

In the visitor center you will find various exhibits, as well as people who can tell you about the plants and wildlife around you, the colorful history of the place, and current challenges, including the federal government's massive border fortification project, which would move millions of tons of soil to fill canyons in the Border Highlands, forever altering its profile and imperiling what has been accomplished to protect the rich estuarine resources below. Someone can show you the native garden, a wonderful place to view and hear both songbirds and shorebirds, or direct you to nearby Oneonta Slough. The tide again flows in and out, native plants have been reestablished, and a wooden footbridge has been built so you can now enjoy a peaceful walk and take in the scene—the rich green stands of cordgrass, the life of the mudflats at low tide. The bridge is a good place to look back at the visitor center and consider that it stands on a former dump site, adjacent to smelly ponds that once held partially treated sewage. Just 25 years ago, these wetlands were a no man's land used for dumping of waste, both formally and informally. Now thousands of children from around San Diego and (fewer, lately) from Tijuana come each year to learn to know and appreciate what is here.

Mayor Rose and other city officials talk with infectious enthusiasm about all this and how it was accomplished. "In the 1980s and '90s there was a real push for high-rise, high-density development. Cottages were being torn down and blockbuster condos put in," said Rose, who has spent 25 years in the mortgage banking business while also taking time for civic work. "Investors wanted to just get in, build high, and get out. But we live here! This was a real downward cycle, with investors looking for big buckets of money up ahead. So citizens passed two ballot initiatives, the first of which set a 40-foot height limit for the whole town; the second basically downzoned the entire town." Nothing over 30 feet is allowed at the beach anymore.

"We're a perfect example of a small city where the citizens took charge of their destiny and made democracy work," said Patricia McCoy, city council member for the past seven years.

The City encourages small property development and improvement, and conversion of rental units to condominiums. The result has been "real neighborhood revitalization," said Rose. "Within the last decade we've seen an increase in owner occupancy and the reverse of the broken window theory," which holds that when blight begins in a neighborhood it spawns more blight. "We see condo conversion as a real benefit for neighborhood stabilization and improvement. Housing is being

upgraded and sold, reasonably priced, to people who are, for the most part, first-time homeowners." When Mayor Rose hears the "smart growth" buzzword, she can smile, knowing that "we were doing that ten or 12 years ago."

During the past decade the City has invested close to $15 million in improving the waterfront and downtown—the pier plaza, street-ends at the beach. It has also partnered with Scripps Institution of Oceanography in setting up a system of ocean-current monitoring that enables lifeguards to close the beach as soon as they see an oncoming problem, rather than wait for authorization from the county health department. This increases beachgoers' protection against water pollution hazards.

All this has improved quality of life in Imperial Beach and boosted the summer tourist industry, yet the City still finds it hard to meet basic service needs. There simply is not enough tax money coming in. "Our wealth is in natural resources," said Mayor Rose. Therefore, with funding assistance from the Coastal Conservancy, last summer the City hired a team of consultants to come up with a plan in which its natural wealth would serve as "a platform for economic development," Rose said. Over the past year, the team worked with the City and groups of citizens, business people, the Fish and Wildlife Service and other public agencies, and concluded that redevelopment oriented around ecotourism is feasible. "Imperial Beach could readily attract the birder market niche, with little investment on the part of the City," the team stated in its draft report to the City. Because birders like to go to the birds' winter homes, they could take up the slack during the regular tourist off-season. The consultants suggested that the City look into the possibility of developing a "birding enclave" on its waterfront, with bed and breakfasts and other small-scale local services, and that the City market itself as a birding destination.

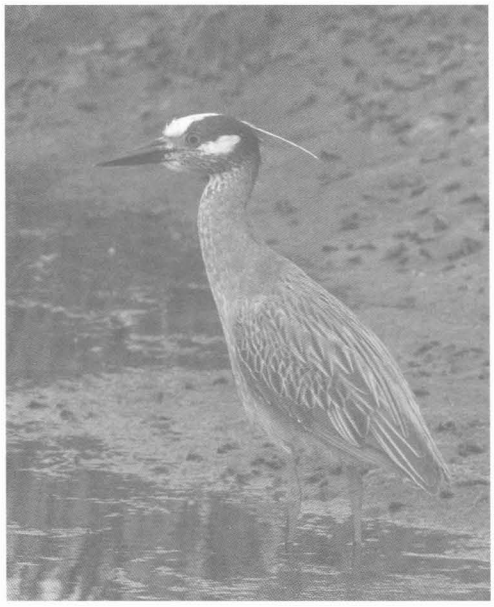
A keystone in such an ecodevelopment program would be a rebuilt and improved Seacoast Inn. According to the Specific Plan worked out in a collaborative process that includes the property owner, local citizens, and public officials, the 38-room, three-story hotel would be torn down and rebuilt at its current 40-foot height but would be moved back 30 feet from the beach. A strip of beach now in private ownership would be restored to the public.

The goals of the current vision will not be easy to attain, but Imperial Beach has a good track record of achieving what its citizens set out to do. On Earth Day this year, yet another milestone was celebrated at the Visitor Center: the Estuary has been listed as a Wetland of International Importance under the Ramsar Convention (see p. 2).

Soon after, another happy news bulletin came from the saltmarsh: a rare yellow-crowned night heron had been sighted at Tijuana Estuary, 2,000 miles from its Gulf Coast home. It made its West Coast debut in the restored tidal channel, near the footbridge and visitor center. It remained the next day. Best of all, it showed itself to be very cooperative and photogenic. The Audubon Society rare bird alert was sounded and soon out-of-town license plates were seen aplenty on the green outskirts of town. The town was abuzz with this promising signal from nature. Many think Imperial Beach's future wealth will be developed and savored just this way, modestly, one day at a time. And that in this next chapter of the city's history, all that its citizens now cherish will be preserved. ■

Jim King is a longtime champion of the coastal borderlands. He now represents the Coastal Conservancy on the North Coast. Rasa Gustaitis is the editor of Coast & Ocean.

Yellow-crowned night heron in the restored tidal channel



PHILLIP ROULLARD

JAY ROBBINS

Updates

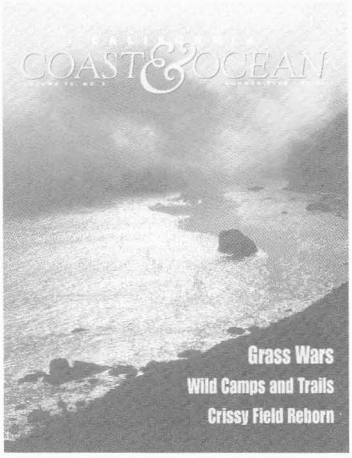
FIVE YEARS AGO

Piece by Piece, the Wiyot Reclaim a Sacred Site

"Recently, a 1.5-acre abandoned boatyard came up for sale. . . . This now gives them a foothold."

"Wiyot Will Dance Again on Indian Island"

Summer 2000: Vol. 16, No. 2



ON JUNE 25, 2004, two redwood dugout canoes arrived at the dock in downtown Eureka, carrying Wiyot tribal leaders—and the beginning of reconciliation between Native Americans and white settler descendants. Tribal Chair Cheryl Seidner disembarked and met with Eureka Mayor Peter La Vallee to accept 40 acres of Indian Island on her tribe's behalf.

The 275-acre island in Humboldt Bay represents the cultural and historical center of Wiyot life. It is also steeped in the memory of the horror that occurred on the night of February 26, 1860, during the annual world renewal ceremony. After the Wiyot men had gone to the mainland to procure supplies, several white men came ashore secretly and massacred a hundred people, mostly women and children. Only three who were on the island that night survived.

That was the beginning of the end for the traditional Wiyot way of life. Before the massacre, they had numbered in the thousands; 20 years and several relocations later, only a few hundred remained. Intermarriage and a federal policy of disbanding smaller tribes further diluted the tribal identity.

In 2000, the tribe reestablished a foothold on sacred ground by purchasing 1.5 acres of the island for $106,000. In 2004, when the City of Eureka transferred the adjoining 40 acres to the tribe, the Wiyot regained their historic burial grounds. Getting this large piece of the island back "is a fantastic feeling," Seidner said. "It's a piece of property that has always been there in our spirit, and now we're property owners on paper as well."

The land transfer opens up the possibility that the Wiyot can build a tribal center on the island, with a dock and, most importantly, a dance house. Seidner said the tribe hopes to rejoin the circle of North Coast tribes that perform the Jump Dance.

Nobody has a clear memory of the traditional Wiyot Jump Dance—or, for that matter, of the Wiyot language. Seidner is trying to reestablish both, building with remnant scraps. "We are working with other tribes [the Yurok, Hupa, and Karuk], trying to figure out what is similar. We have no one to tell us what it is, so we'll have to pray on it, fast on it."

In the meantime, the Wiyot are cleaning up contamination left from a ship repair facility, with the help of a $200,000 federal Brownfields Program grant. They are also looking to a time when they own the whole island, says Seidner. More than 170 acres remain in City ownership, and the rest is divided into small, private residential plots, including one where former Eureka Mayor Nancy Flemming lives.

"We may have to wait for a while," Seidner adds, but after 145 years, "we're good at that."

At War with Invasive Spartina

"If you stand at water's edge . . . you may well think: This is what the Bay must have looked like hundreds of years ago. But you'd be wrong. That expanse of tall cordgrass is an alien invader. . . ."

"Girding for Battle Against Spartina"

Summer 2000: Vol. 16, No. 2

FULL-SCALE EFFORTS to eradicate the aggressive non-native Atlantic cordgrass (*Spartina* spp.) from San Francisco Bay are now under way—and not a moment too soon. The problem is reaching the crisis level, according to Maxene Spellman, manager of the Coastal Conservancy–led Invasive Spartina Control Program (ISP). "When we first surveyed in 2002, there were about 400 or 500 acres of invasive spartina," she said. This year the estimate was 1,000 acres. By the time a full-scale attack can at last be launched, "it will have spread to 2,000 acres."

The alien cordgrass was introduced to the Bay deliberately as part of a misguided restoration project more than 30 years ago and has been flourishing ever since. Years passed before stewards of Bay wetlands realized that this vigorous plant was a problem, then more years were spent finding a suitable way of fighting it. Smothering the plants with tarps might have worked, but would have been extraordinarily labor-

intensive. Manually ripping them out and burning them proved ineffective. The ISP decided to use a herbicide, but was required to produce an environmental impact report before it could be systematically applied.

Only last September were teams permitted to go into the marshes to start spraying glyphosate (sold commercially as Rodeo or Aquamaster) on the invasive cordgrass. Another, more effective and more environmentally friendly compound, imazapyr (sold as Habitat) is being registered for aquatic use applications next September. The window of opportunity is small; the job can only be done for a few weeks in autumn without risk to the endangered California clapper rail, which lives in the targeted wetlands. The spartina warriors believe that they have eradicated about 435 acres of the invasive marsh grass so far. This coming autumn, the eradication effort is to be expanded to treat all known infected sites.

Treatment and control of invasive spartina and its hybrids is critical to the long-term health of the estuary and to the species that inhabit and rely upon the salt marshes and tidal flats along its perimeter. The non-native grass also threatens other restoration efforts within the estuary. "Invasive spartina spreads at a greater than exponential rate, and every marsh restoration project implemented within the south and central San Francisco Bay Estuary in the past 15 years has been invaded," Spellman reported.

In November 2004, the ISP sponsored the Third International Invasive Spartina Conference, which attracted scientists from the Bay Area, other coastal states, and elsewhere in the world. An expert panel agreed that the Conservancy's program should continue with an aggressive strategy to eradicate the plant and expressed confidence in its ability to do so.

Instream Harmony

"When fine sediment erodes from a vineyard or other land, it's a loss to the grower and a problem for the fish. . . ."

"Fish-Friendly Farming"

Summer 2000: Vol. 16, no. 2

NOTHING COMPLEMENTS a nice salmon steak like a good glass of white wine. Environmental consultant Laurel Marcus is trying to make sure that vineyards also complement salmon habitat. She started the Fish-Friendly Farming program four-and-a-half years ago, teaching grape growers in the Russian River watershed how to manage land so that the streams running through it become good salmon habitat, then certifying them as fish-friendly when they've finished the work.

Growers have responded very well, Marcus said. Ten took part the first year, and "now we have a couple hundred. We've expanded to the Navarro and Gualala Rivers, into the Napa Valley, and all at the request of growers."

The certification program may give participating viticulturists an edge in the market because they can label their wines as "fish-friendly." But the biggest draw for the growers has turned out to be the knowledge they gain, Marcus said. "From a business point of view, the program allows growers to create this comprehensive farm plan, so that they know where they're supposed to go with land management." Adhering to that plan and protecting salmon not only helps growers to sleep better at night; it may also help them stay out of trouble with regulatory agencies. The key to success, Marcus said, is to approach growers without accusing them of wrongdoing. "In a noncombative process, the people who would normally regulate you can [instead] tell you ahead of time what you're to do."

In light of Fish-Friendly Farming's success, Marcus has decided to create a nonprofit organization, the California Land Stewardship Institute, to run the program and "do scientific research on land management practices."

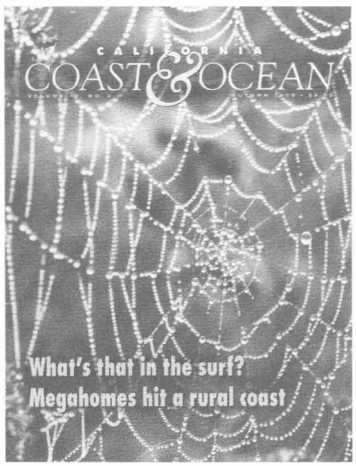
Surf Cleanup Slowed

"Moving beyond complaint, a diverse coalition of citizen stewards has emerged, and it has compelled government to respond, at both state and local levels."

"Dangerous Currents"

Autumn 2000: Vol. 16, No.3

AT RINCON POINT in southern Santa Barbara County, it is generally agreed that shoreline homes' failing septic systems are leeching sewage into the surf, a problem that leads to beach closures and, sometimes, to surfers getting sick. More than four years ago a majority of the owners voted to address the problem by hooking their homes up to the Carpinteria Sanitary



District's sewage treatment system. A small group of homeowners, however, opposed the hookups and sued, claiming that an environmental impact report (EIR) should have been completed before the vote. They won.

In the last four years, Heal the Ocean has taken another run at the problem. This local group that focuses on cleaning up beach pollution raised the grant funds to pay for an EIR, and the final report came out in September 2004. Everything looked set for another vote of the beachfront owners, but then three homeowners sued, claiming that the completed EIR was insufficient. A series of court hearings began in January. In February the judge ruled that the complaint was "vague, ambiguous and unintelligible," and requested clarification, which has since been submitted. The plaintiffs don't want to be required to hook up to the sewer system, which would cost them $20,000–50,000 per household, and the sewer proponents see the suit over the EIR as a stalling tactic. Meanwhile, Rincon Point continues to have problems when water levels are high.

The frustrating thing, said Hillary Hauser, executive director of Heal the Ocean, is that most homeowners are willing to pay to fix the problem. "For a long time," she said, "surfers at Rincon Point had a perception that the homeowners were evil. But when we talked to [the homeowners], they were desperate to find a solution to this problem, because a failing septic system is a terrible thing to live with. I mean, some of them can't wash the dishes or use the toilet when it rains. It only took a few contrarians to put the brakes on a sewage treatment plan. In the meantime, the beach still gets closed."

Meanwhile, in the tiny Sonoma County hamlet of Monte Rio, on the Russian River, a plan to solve a similar problem with septic tanks has succeeded. In a June 2003 election, 59 percent of the town's 440 voters agreed to form an assessment district to help foot the $11 million bill for building a sewage system. The town will still need some help, said Mike Reilly, Coastal Commissioner and County Supervisor for Monte Rio's district. Residents are taxing themselves $3 million over the course of 40 years, and a mix of grant funding has covered most of the remaining cost, but "we're $1.5 to $2 million short," Reilly said. Nevertheless, the town "hopes to go to bid this summer."

In a side note, water quality activist and surfer Donna Frye, who was featured in our 2000 article, went on to become a San Diego City councilwoman and, in November 2004, ran for mayor of San Diego. According to the official count, she lost to incumbent Dick Murphy by 2,108 votes. Three court cases have been filed to challenge the result.

—Arno Holschuh

Giant Ranch Easement Plan

"What Hackett has in mind is a rather radical move in the world of ranching. . . ."

"Howe Creek: An Experiment in Proactive Ranching"

Winter 2000–2001: Vol. 16, No. 4

When Steve Hackett sold a conservation easement on his Howe Creek Ranch in Humboldt County, he said he had "a lot of neighbors watching my project, most with a certain level of distrust and concern." A year later, however, "they wanted me to help them with easements of their own."

Howe's ambitious plan was to use the $1.3 million he received from the easement's sale to the Pacific Land Trust, funded by the Wildlife Conservation Board and the Coastal Conservancy, to pay off debt that was forcing him to harvest timber aggressively and even to consider selling lots for residential development. Instead, he invested the remaining capital in projects likely to bring him more money in the future—soil improvements, for example.

The easement will also help Hackett pass the ranch on to his children. By stipulating that the set-aside land can only be used for agriculture, the easement lowers its market value and, along with that, the estate tax.

"We were able to accomplish everything we wanted to accomplish," Hackett said. He reported that some 20 other ranchers and private timberland owners contacted him after the close of escrow on Howe Creek Ranch. "Of those 20," said Hackett, "five had the requirements necessary to be competitive for public funding." With Hackett's help, they've formed the Six Rivers to the Sea project, which aims to protect over 17,000 acres of ranchland through a single easement.

"It's fortuitous that someone like Steve Hackett is in the process of looking at the global scope of protecting habitat," said Su Corbaley, a project manager for the Coastal Conservancy who has been working with the ranchers on the giant project. Because of

the extent of land involved, it is unlikely that the Conservancy (or any other single agency) will be able to fund the project alone, so Corbaley and Hackett are trying to craft an easement that would attract funding from several agencies or private conservancies. The final easement will probably have to meet the standards of the Wildlife Conservation Board, Forest Legacy, the Nature Conservancy, or some combination of those.

And as if ranching and arranging mammoth conservation easements weren't enough, Hackett has also taken up salmon habitat restoration. His company, Northwest Resource, does stream bank stabilization and assessment work, helping to undo the legacy of damaging land use practices.

The key to Hackett's success in habitat conservation and restoration (other than his obvious enthusiasm) may be his cultural identity. "It's important that he's a rancher," Corbaley said. "He speaks the language, which makes him more able to get the process rolling with other ranchers." Hackett found simpler words to express his unique advantage: "I'm just a farm boy," he said.

—Anne Canright

Well...It's Experimental

"I haven't heard anyone say: Let's head to Pratte's. . . ."

"Bad Breaks at New Surfing Reef"

Winter 2000–2001: Vol. 16, No. 4

WHEN THE FIRST artificial reef in the United States was built off the coast at El Segundo in 2000, expectations were high. Pratte's Reef, named after Thomas Pratte, co-founder of the Surfrider Foundation, was designed specifically to create ideal surfing waves. Financed by Chevron USA as mitigation for disrupting a surfing spot by constructing a groin in 1984, the reef's construction broke new ground in the recognition of surfing as a coastal recreational use.

Unfortunately, "it doesn't work," said Jose Borerro, a research professor in the University of Southern California's civil engineering department. "It's not surfable, and it doesn't serve coastal protection."

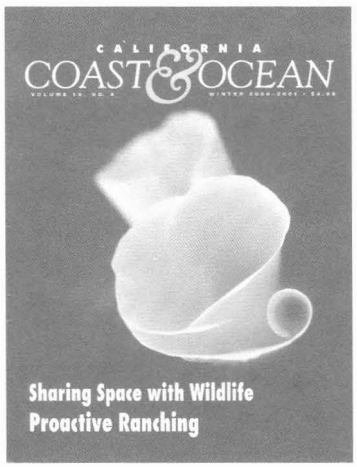
Borerro, who has monitored the reef since its construction, said the reasons for its failure are quite clear: "It was poorly placed, poorly designed, and it didn't have enough funding." Most of all, he continued, "it is just too small." The design itself may have been diminutive but, he pointed out, an increase in the cost of the material used to build the reef—sand—forced a further downsizing. The Coastal Conservancy funded an addition of 80 bags, each holding 300 tons of sand, to the 110 installed in 2000, but even that hasn't really helped, Borerro said.

There might be a silver lining. Borerro said that he's seen an increase in marine life since the reef's installation. "I remember going out there one day, and there were just hundreds of lobsters," he said. Biologists, nonetheless, are split as to whether this represents a gain in habitat. Some believe that structures like Pratte's Reef simply give marine life a place to congregate rather than actually increasing the amount of habitat.

The disappointing results of the reef at El Segundo, however, have not stopped plans for a new artificial reef off Ventura County. Exxon-Mobil is funding the construction of a reef at Oil Piers on the county's north shore to help protect a beach that is being swept away following the company's removal of inactive piers. There may be more hope for this project, as recent evidence indicates that the Narrowneck Reef, a larger, more ambitious artificial reef off the Australian coast, has helped to decrease the rate of beach erosion there.

Borerro stressed that the Ventura County reef was "not a surfing reef, but an erosion control project," being built in conjunction with an effort to place sand at the site. He said that if it works, artificial reefs might become quite popular as an alternative to seawalls, which contribute to beach erosion and diminish public access. Any good surf breaks that come about as a result of that development would be purely incidental, he said. "If it turns out that we can surf it, we should just be thankful."

—Arno Holschuh



COASTAL CONSERVANCY NEWS

IN THE FIRST THIRD of 2005, the Coastal Conservancy acted to protect ecologically significant land, much of which will be open to the public. It approved funding for the California Coastal Trail and the Bay Area Ridge Trail, and helped to protect farmland and to expand public access and environmental education opportunities.

SOKA UNIVERSITY LAND ACQUIRED

THREE DECADES of perseverance were rewarded with success in April when a group of private donors and state and federal agencies purchased a long-coveted 588-acre property in the heart of the Santa Monica Mountains. The $35 million price—$5.5 million of which was paid by the Coastal Conservancy—was justified by the ecological importance and scenic beauty of the land and its location in the heart of the Malibu Creek watershed.

Known as the Gillette Ranch because it was once owned by shaving magnate King C. Gillette, the property links undeveloped areas in the second-largest watershed draining into Santa Monica Bay. It borders on the Santa Monica Mountains National Recreation Area, Las Virgenes View Park, and Malibu Creek State Park. The varied habitats it provides include coastal sage scrub, oak woodlands, willow scrub, and coast live oak riparian forest.

Soka University, a Buddhist liberal arts college, had placed an April 15 deadline on the purchase, necessitating a frantic effort to collect enough cash. The university will continue to operate a campus on the Gillette Ranch for the next two years, after which time the buildings are to be used as offices for the National Park Service, the Santa Monica Mountains Conservancy, and California State Parks.

NEW PARK, SAVED FARMLAND IN SANTA CRUZ COUNTY

SAND HILL BLUFF, in northern Santa Cruz County, has been a working farm since 1928, but its continuance was threatened in 1999 when the owners sold the 154-acre blufftop property to a corporation that planned to build coastal estates there. The Trust for Public Land stepped in, offering to buy the farm and keep it in agriculture. A deal was reached in 2004.

The farm is now being split into 90 acres of coastal parkland and 64 acres of working farmland. The State Parks Department will create a shoreline park that will include a mile of Coastal Trail, while Agri-Culture, a nonprofit organization that promotes farming in Santa Cruz County, has bought the inland acreage with $2 million from the Conservancy and $2 million from the Department of Conservation. Agri-Culture has placed an offer to dedicate an agricultural easement on the property, and intends to find a farmer to buy and work the land within three years. Agri-Culture will then hold the dedicated easement.

CREATING A VIABLE WETLAND IN VENTURA COUNTY

WITH THE ASSISTANCE of its partner, the Nature Conservancy, the Coastal Conservancy took advantage of a unique chance to protect and restore an entire working wetland ecosystem at Ormond Beach, in Ventura County.

The Nature Conservancy is purchasing 276 acres of degraded wetlands from the City of Oxnard and the Metropolitan Water District of Southern California with $6.5 million from the Coastal Conservancy and $6.5 million from the Wildlife Conservation Board. The Coastal Conservancy will restore the property in conjunction with 265 acres of adjoining land purchased in 2003. Negotiations are under way to purchase another 220 acres of adjoining land and to create a 760-acre wetland—approximately the historic extent of

JOHN LOW

Soka–King Gillette property

SAM ROBERTS

Sand Hill Bluff

wetlands at Ormond Beach. That is above the critical threshold for a wetland ecosystem, meaning that freshwater flows and tidal action are expected to be sufficient to sustain a healthy wetland even if the surrounding land is developed.

Some of that land is indeed developed—a power plant is operated on an adjacent piece of land, and a wastewater treatment or desalination plant might be constructed by the City or water district in the future. But there are also neighboring wetlands, including 2,000 acres at Mugu Lagoon. If all of the existing and restored wetlands can be integrated, they will make up Southern California's largest coastal wetlands, stretching nine miles from Point Mugu to Point Hueneme.

COASTAL TRAIL, NORTH AND SOUTH

TWO COMMUNITIES at opposite ends of California got help from the Conservancy in building pieces of the California Coastal Trail. Crescent City, in Del Norte County, received $893,000 for the purchase of a property to serve as a trailhead and for construction of a stretch of the city's Harbor Trail, which will be part of the Coastal Trail.

San Clemente, in Orange County, received $500,000 to be used as matching funds for a federal grant to build a three-mile trail along a railroad corridor.

The Crescent City trail project is part of the City's plan, sponsored by the Coastal Conservancy, to revitalize California's northernmost harbor. Although the trail segment is only .25-mile long, it is a crucial link, including a bridge over Elk Creek that will save hikers from having to traverse a busy section of Highway 101.

The San Clemente project is considerably more ambitious. The trail will run three miles along a busy railroad corridor behind the beach. An informal trail is already in place along the route, but it is both inconvenient and unsafe, as hikers sometimes have to walk directly on the tracks and must cross the tracks to reach the shore. The new trail will provide a safer pedestrian route and two crossings to improve access to the beach. Most of the funding, close to $4 million, is coming from a Federal Transportation Enhancement Activities grant, which requires a match for at least 25 percent of the total price. That match is being provided by the Conservancy, together with grants from the Air Quality Improvement Fund, the City's General Fund, and a Community Development Block Grant.

MORE ACCESS AT AÑO NUEVO

OVER **200,000** people a year come to the Año Nuevo State Reserve on the coast of southern San Mateo County, but many more would like to do so. About half of the school classes that ask permission to visit the reserve, home to the world's largest mainland colony of elephant seals, are turned away for lack of space and resources.

That should change now that the State Parks Foundation has succeeded in raising the $3 million necessary for the construction of a new Marine Education Center. Three structures, left from the dairy farm that was on the site before it went into public ownership, will be renovated and converted into visitor centers and administrative space. The expanded facilities will contain numerous multimedia exhibits about coastal and marine environments, and will allow the center to increase its docent staff by 25 percent, to 255. More docents will allow more school classes to take guided tours.

The Coastal Conservancy put the final piece of funding in place by approving $350,000 to the State Parks Foundation. The largest share of the funding for the new Marine Education Center, $1.5 million, came from Proposition 40 monies. Another $1.2 million is being provided by private donors.

PROTECTING THREE HUMBOLDT BAY PROPERTIES

A TRIO OF SENSITIVE properties on the shores of Humboldt Bay, spanning both its geography and its habitat diversity, will be protected with Conservancy funding.

At the southernmost edge of the bay, the 5.5-acre Lighthouse Ranch will be purchased by the Wildlife Conservation Board, with the help of $500,000 from the Conservancy. This coastal bluff property, which overlooks the bay, the ocean, and the Eel River Delta, will be transferred to the Bureau of Land Management (BLM) for use as an administrative and visitor center for the more than 9,000 acres of public lands in the area: the Department of Fish and Game's Eel River Reserve, the BLM's South Spit Wildlife Area, and the County-run Table Bluff Park.

The presence of a public agency at the site is of great importance because some of the adjacent land has been used inappropriately. The South Spit became infamous as a squatters' encampment in the mid-1990s, when more than 300 people lived there. Vehicles were abandoned,

STEPHEN JOSEPH

Tolay Lake

trash was dumped, and off-road vehicles wreaked havoc on the land. The problems diminished after Pacific Lumber Company donated the land to the State in 2001. The BLM took on management of the site, put up vehicle barriers, and started to enforce laws against camping and ORV use, but some problems remain. Having BLM staff working at the Lighthouse Ranch will help to keep illegal activity down while giving visitors a place to go to learn about the land.

The second property being protected is Freshwater Farms, a 54-acre parcel on Freshwater Creek close to Humboldt Bay. Now used as a nursery for native plants, it provides wetland and riparian plants for revegetation and habitat restoration projects. The Northcoast Regional Land Trust will buy the Freshwater Farms property with $255,000 of Coastal Conservancy funding, and will restore damaged estuarine habitat there.

The meandering streamcourse and tidal flows that once made the land such good habitat for juvenile salmon and steelhead have been disturbed by extensive diking and draining for a dairy ranch. Freshwater Nursery represents an innovative way to keep the land in agricultural production while maintaining key habitat, and collection of wild seeds and willow cuttings will continue under Land Trust ownership.

The third property to be protected is on the northernmost end of Humboldt Bay, in the unincorporated town of Manila. With the help of $490,000 from the Conservancy, the Friends of the Dunes Land Trust will acquire the 173-acre Poovey property and, with another $15,000, will undertake access management planning. The Friends will build a network of low-impact trails through the fragile upland dunes and along the beach, and will manage the property, which is just south of the 101-acre Manila Dunes Recreation Area, managed by the Manila Community Services District. Together, they will constitute 276 acres of contiguous protected dune land.

CHARMSTONES AND SWEETWATER

WHEN TOLAY LAKE, Sonoma County's largest freshwater lake, was drained by European settlers in the late 19th century to open up land for cultivation, the new residents found a wealth of small carved stone objects. Called charmstones, they had been used for both ceremonial and practical purposes by the local Alaguali tribe, and by visiting leaders from tribes throughout the West. Some of the stones were sent to the Smithsonian Institution, but no systematic archeological survey was ever completed.

The archeological importance of the land is just one of the reasons the Sonoma County Agricultural Preservation and Open Space Trust chose to acquire 1,737 acres of the ranch surrounding the lake, in the foothills of the Sonoma Mountains. The property was also under serious development pressure. With its stunning views of Oakland, San Francisco, and Mount Tamalpais, it makes ideal parkland. In addition, Tolay Creek flows unimpeded from the lake to the Sonoma Baylands and provides a highly valuable habitat link for wildlife. That's why the Conservancy granted $2 million to the District, which will acquire the property and then turn it over to Sonoma County Parks.

STEELHEAD IN ALBANY?

LIFE IS ABOUT to get easier for a very hardy group of fish. The City of Albany is restoring a piece of Codornices Creek, an urban stream that still supports a small population of rainbow trout and, possibly, steelhead.

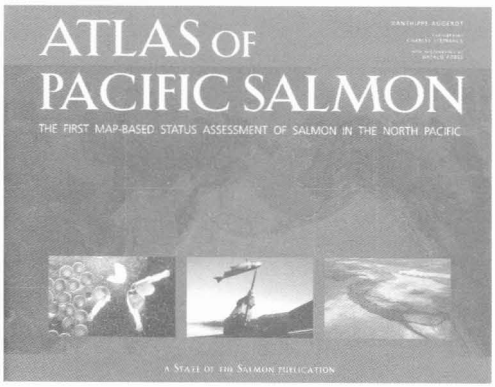
The current project would return about one-third of a mile of stream, which runs along three blocks at the city's border with Berkeley, to a more natural state by removing a concrete wall and replacing two culverts with bridges. The unnaturally straight stream course will be replaced with a sinuous series of riffles, pools, and runs, and invasive plants will be removed from the stream banks and replaced with native species.

When combined with past restoration projects on Codornices Creek, this effort will bring to a mile the total length of restored stream. The $2.4 million project will be funded with $900,000 from the Department of Water Resources' Urban Streams Program, $815,000 from the Coastal Conservancy, and $555,000 from local bond funds.

AN EXCITING NEW VIEW OF SALMON

Atlas of Pacific Salmon, *by Xanthippe Augerot with Dana Nadel Foley. University of California Press, Berkeley, 2005. 152 pp., $34.95 (hard cover).*

I DON'T USUALLY use my column space for book reviews, but recently a book came across my desk that was so beautiful and so thought-provoking that I just had to tell you about it. The *Atlas of Pacific Salmon* is a comprehensive look at the state of the salmon on the Pacific Rim. The *Atlas* is, literally, an atlas. Filled with gorgeous and finely detailed maps and graphics, it places salmonids in the context of the entire North Pacific, what it calls the "Salmon Ecoregion." This runs from Japan north to the Arctic Ocean and down the West Coast of North America to Baja California.



The *Atlas* is not just about fish, however. The book is divided into six sections, starting with the fish themselves, all the members of the genus *Oncorhynchus*. Then, the people of the region whose lives have become intertwined with the fish. The central concept of this book is to view the North Pacific rim through the subtle interplay among the spectacular fish, the people, and the region's physical characteristics and ecology. The rest of the book is divided into a discussion of the climate, geography, and biology of the Salmon Ecoregion; the distribution and extinction risks of all the salmonid stocks; the threats to biodiversity; and a discussion of what would truly constitute an ecosystem approach to preserving wild salmon.

Each section of the *Atlas* is organized around a series of maps that concisely convey an enormous amount of information. For instance, for each species the relative risk of extinction is graphically portrayed in a series of maps. The same base map displays fish hatcheries, catch data, ocean chlorophyll levels, sea surface temperatures, human population densities, logging activities, oil and gas pipeline explorations, and on and on.

Managing ecosystems rather than single species is all the rage now. Both the Pew Oceans Commission report and the U.S. Ocean Commission report call for ecosystem management of fisheries. The only problem is that no one really knows exactly what this means. The *Atlas of Pacific Salmon* takes a big step in the direction of showing what ecosystem management would look like if we did it. At the very least, this is the kind of information required, organized the way it needs to be, to understand this particular ecosystem.

Did I mention that the book is beautiful? Between stunning pictures, fascinating and beautifully executed display graphics, and some of the best overall book design I've ever seen, the *Atlas* would grace anyone's coffee table. Although one could read it from start to finish, it is just as much fun to open the book at random and move back and forth from topic to topic. Read in that manner it is rather like a web site, although better and easier to use than any I have encountered. I have been professionally involved in salmon recovery for almost a decade, and I learned something new on every page. Highly recommended!

—Sam Schuchat

NORTHERN NATURE WEEKENDS

Northern California Nature Weekends: Fifty-two Adventures in Nature, *by Jeanne L. Clark and Robert W. Garrison. Globe Pequot Press, Guilford, CT, 2005, 256 pp., $14.95 (paper).*

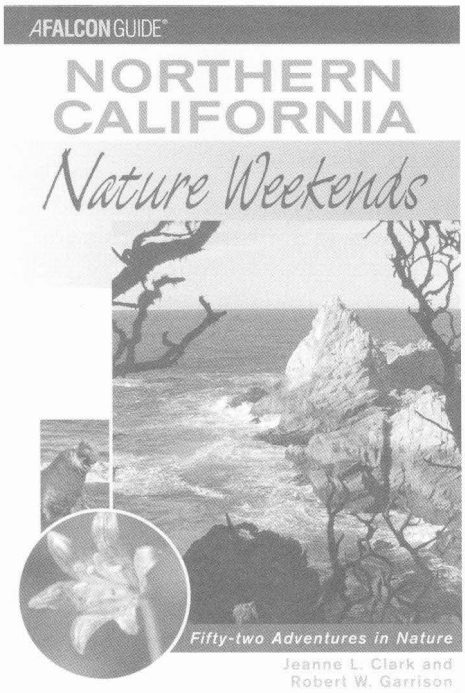
IF YOU'RE PLANNING a weekend getaway in northern California and want nature to chart your course, pick up a copy of *Northern California Nature Weekends: Fifty-two Adventures in Nature*. Then settle into a comfy chair, prepared to be immersed for a couple of hours as you contemplate "Tarantulas and Moonlight Hikes at an Ancient Volcano," "Pitcher Plants and Train Whistles on the Feather River," or "Backpacking in the Historic Ranchlands of the East Bay Hills."

Authors Jeanne L. Clark and Robert Garrison have spent years exploring California's natural resources and are committed to promoting recreation within the context of sustaining wildlife. Clark wrote the *California Wildlife Viewing Guide* (Falcon Press, 1996) and many other nature publications. Garrison, owner of Nature Tourism Planning, a private consulting firm based in Sacramento, has more than 25 years of experience as a naturalist and planner of nature interpretation programs, sites, and events throughout California.

Their nature weekend suggestions include many that are easily reached from the San Francisco Bay region, with others scattered along the coast and inland throughout the central and

eastern parts of northern California. The book is organized by month, to alert you to the seasonal peaks for viewing wildlife, or to the times when you'll be most likely to have a solitary experience, away from crowds of other people seeking a nature experience.

Nature Weekends also has a section called "Best Bets," listing sites that might appeal to certain types of people, such as families, the mobility-impaired, bicyclists, and birders, and for certain experiences, such as scenery, wildflowers, rainy-day options, and driving tours. The elegant, yet simply written text is accompanied by beautiful black-and-white photographs of some of the natural wonders described in the recommended trips.



The guide assumes you have a car. Perhaps in an updated version Clark and Garrison will provide public-transit information, where that is an option, and will include more destinations that can be reached by public transit or bicycle.

—*Abe Doherty*

BEST HIKES WITH DOGS

Best Hikes with Dogs: Bay Area & Beyond, *by Thom Gabrukiewicz. Mountaineers Books, Seattle, WA, 2005. 256 pp., $16.95 (paper).*

AS A LONGTIME DOG owner who has been involved in the battle over dog access in San Francisco for some years, I am very sensitive to edicts about where I can and cannot take my dog. In recent years, several books have been published that make decisions easier. Some describe dog-friendly hotels and resorts, others identify parks where dogs are welcome. *Best Hikes with Dogs: Bay Area & Beyond,* however, is the first guide I have seen that focuses exclusively on places where one can hike with a canine companion.

Geographically, the guide covers four regions—Mt. Shasta, the Gold Country of the Sierra foothills, Monterey County, and the San Francisco Bay Area. I suspect that the book will appeal mostly to Bay Area dog owners looking for day trips, who might like a greater focus on that area than the author has provided. That aside, the guide has good trail descriptions, seemingly accurate directions to trailheads, and helpful maps. The hikes range from 1.5 to 23 miles, with most falling within the three-to-six-mile range—to me the perfect distance to wear out both the owner and dog. At first glance, I couldn't easily detect which trails were on- or off-leash, a very important consideration to most dog owners. On a closer look, however, I found that this information is included in a helpful chart at the beginning of the book.

In addition to this book, Mountaineers Books has published *Best Hikes with Dogs* guides for other regions, including Oregon and Arizona. All of these are welcome additions to the expanding literature focused on dog owners. In California, dog walking is a major form of recreation. It's refreshing to see that this is finally being acknowledged with a spate of helpful guidebooks.

—*Carol Arnold*

ALTERNATIVES TO COPPER PAINT

Time for a Change: Alternatives to Copper-Based Boat Bottom Paint. *California Sea Grant Communications and University of California Agricultural & Natural Resources Communication Services, 2004. 30-minute video on DVD, $7; companion booklets free.*

DISSOLVED COPPER from copper-based boat bottom paints has increased in southern California boat basins to levels that are toxic to marine life. This video, in English and Spanish versions, is intended to help boat owners, businesses, agencies, and organizations learn about alternative, environmentally friendly anti-fouling methods. For more information or to order, call (858) 534-4446 or see http://seagrant.ucdavis.edu.

CALIFORNIA RAPTORS AND CONDORS

Raptors of California, *by Hans Peeters and Pam Peeters. California Natural History Guides 82, University of California Press, Berkeley, 2005. 305 pp., $50 (hard cover), $17.95 (paper).*

Introduction to the California Condor, *by Noel F. R. Snyder and Helen A. Snyder. California Natural History Guides 81, University of California Press, Berkeley, 2005. 288 pp., $50 (hard cover), $18.95 (paper).*

THESE TWO GUIDES have a narrower focus than most California Natural History Guides, so they are able to go into considerably more detail on their subjects. In addition to species accounts, *Raptors* is packed with interesting information on the lives of hawks and their kin, finding and watching raptors, and their relations with humans in contexts ranging from mythology to falconry. *Condor* details the birds' historical declines and recovery, as well as their biology and habits. There's a wealth of information here for those who love birds and want to know more about the challenges and successes of helping rare species to survive.

—*HMH*

Marsh grasses sway
lean to east and west
and whisper.
The wind
laves their fingers.
The midges sing,
dancing through the air,
shiny, frisky.

Between the cities
where people throng on the pavements and see what the
neighbours are wearing today and housewives wash up
in hot water and replace the dishes in their cupboards
after each meal,
and where we can buy toothpaste and collars and
gramophone records in interesting shops,
are the wildernesses

where marsh grasses sway,
lean from east to west
and whisper,
curtsy blithely to the wind,
bleach themselves in the sun.
The midges hum.

—Fifty years and the houses have new occupants,
the trams have new signs and new
leather on the seats.
—A hundred years and the cars are stopped in long
rows, side by side they stand in eternal
caravans, pile up in great heaps,
lie with their wheels in the air like dead insects.
—A thousand years and the iron girder is a red
stripe in the sand.

Marsh grasses sway
lean to east and west
and whisper.
The wind laves their fingers.
The midges sing,
dancing around in the air,
shiny, frisky.

—Rolf Jacobsen, 1935; translated by Judith Jesch
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Coastal Conservancy

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