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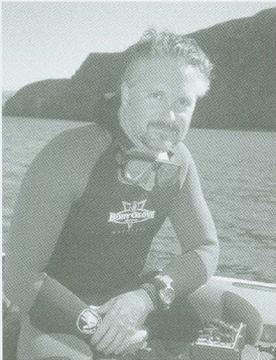
MINDING THE OCEAN

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Cover: California sea lions in the Channel Islands National Marine Sanctuary. Glenn Allen is a multimedia producer, consultant, and educator and an environmental and marine photographer who lives in Santa Barbara. In 2002 he won an Emmy for his work on the BBC's "Blue Planet" series. A member of the Santa Barbara Marine Mammal Center's rescue team, he believes sea lions should be captured on film, not in nets.

Back cover photo by Shirley Skeel



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Coming Home to the Ocean

IT'S BEEN MORE THAN 30 years since we marveled at the first images of our blue planet from space, yet our sense of home still does not encompass the oceans. We have, however, learned a great deal more about them, and made discoveries that are both wondrous and terrible.

After the Cold War ended, technology that had been developed for military purposes was made available for use in science and industry. This enabled ocean explorers to penetrate our *aqua incognita* and to bring back the news that there is life in the abyss, where we had assumed no life could exist. In fact, it now appears possible that life on Earth began there, as anaerobic organisms around the hot vents on the ocean floor.

Scientists have brought back creatures, or images of them, that are unlike any we have seen, and as strange as anything in science fiction. Some appear to be made mostly of water. We have been able to watch whales rubbing their backs on the ocean floor, to follow sea turtles migrating between Japan and California, listen to the sounds fish make. (Some noisily grind their teeth!) The ocean realm has become a little more accessible, if not familiar.

That same advanced technology, however, has also made it possible for our ocean commons to be looted on an unprecedented scale. Fish and shellfish can now be located so precisely that they have nowhere to hide. "Fishermen are the last major hunter-gatherers in modern culture, pursuing wildlife on an industrial scale with all the tools of

the space age brought to bear," writes Carl Safina, founder of the Living Oceans Program of the National Audubon Society, in his book, *Song for the Blue Ocean* (Henry Holt, 1998). He so powerfully describes the beauty of ocean creatures that his accounts of the brutalities being committed against them are almost unbearable to read. Safina is one of many scientists, activists, and artists who are trying desperately to summon our attention, hoping that we will help put an end to the harm being done.

Another writer, Richard Ellis, stopped by recently during a tour to promote his book *The Empty Ocean* (Island Press, 2003). Its bleak title matches the contents—a litany of loss. Chapter by chapter, great fishes and other marine creatures are brought before us, and we read the grim stories of their destruction. I looked for hope, found precious little, and put the book on top of other volumes about the ocean emergency. When Ellis arrived, I asked: What can we do?

"I wrote this book knowing I wasn't going to have the answer," he said. "I've been doing this for 40 years, just trying to get the story out because it's what people need to know. But I never felt about a book the way I felt about this one, that I wanted to stand on a street corner and say: 'You have to read this!' What does one do? You do what you can."

We cannot afford despair. Yet, given the enormity of the ocean crisis, can individual actions make any difference? Mitchell Thomashow struggles with that question in his book, *Bringing*

the Biosphere Home: Learning to Perceive Global Environmental Change (MIT Press, 2002). He has found that "hope emerges from being needed. Despair emerges from feeling useless." He suggests we face the challenge of despair and nurture hope by starting right where we are. He recommends that we develop intimate knowledge of what we can perceive close at hand—intuitively, sensually, scientifically—as the basis for what we need to imagine because it is beyond our reach, except with our minds. Anyone who gets to know a local creek, examines a storm drain emptying into it, follows the stream to the top of the watershed and down to the sea, is building the skills needed to search beneath the surface and beyond to the ocean horizon.

Eventually it all comes back to us, as in the recent finding of high levels of mercury in tuna, a favorite school lunch. The water in the tuna—and the water at our feet and in the clouds—is the water we drink and the water that flows through our own bodies.

In 1963 Jacques Cousteau recalled diving at night in the stream of Atlantic waters rushing into the Mediterranean, among "crystal bells indolently pulsating" and many other life forms "consisting of organized water." He reported: "All that life around us was really water, modeled according to its own laws, vitalized by each fresh venture, striving to rise into consciousness."

We too, are mostly water, striving for consciousness, inseparable from our planet, two-thirds of it covered by water, longing to be home.

—Rasa Gustaitis



CORDELL BANK EXPEDITIONS

We've Been Invaded!



JASON GIESSOW

When I first came to live in California, I was awed by the abundance, beauty, and diversity of plants—so many were new and exotic to my eyes. I loved the oaks scattered across golden hills, the redwood groves, madrone, and manzanita. I also loved the towering stands of eucalyptus, the waving plumes of pampas grass, the carpets of iceplant blooming magenta along miles of coastal highway. Decades passed before I learned that many of these plants were not only as alien to California as I, a Midwesterner, but—more importantly—they were causing serious harm to California's native plants and wildlife.

Take eucalyptus. Its blossoms gum up the nostrils of songbirds gathering nectar—and that's just one of its many impacts on the ecosystem. Pampas grass sucks up so much water and grows so fast that natives cannot compete; and that thick green carpet of iceplant eliminates nearly all other plants except oxalis, another invader.

Released from the natural constraints of their native ecological niches, many imported plants proliferate and disperse rapidly, use a disproportionate amount of water, and replace local plant communities with monocultures, thereby depriving native wildlife of the shelter and nourishment they require.

Because of their destructive effects, millions of dollars have already been spent on efforts to extirpate various invasive plants in California, and much more money, time, and hard work will be needed to keep them at bay, especially in areas where native ecosystems are being restored.

Meanwhile, new species continue to invade coastal lands and waters. Among recent arrivals are Atlantic cordgrass, which is spreading in San Francisco Bay and along the North Coast, and *Caulerpa taxifolia*, the "killer alga," which—we hope—has been successfully defeated soon after its arrival.

HAL HUGHES

Workers in protective suits cut down a stand of *Arundo donax* in the Santa Margarita River watershed, San Diego County.



PHOTOS THIS PAGE: MALCOLM LUBLINER

Katy Zaremba and Erik Grijalva of the Invasive Spartina Project remove new shoots of Atlantic cordgrass from Bolinas Lagoon, with Hal Hughes (far right) assisting.

Cordgrass Blues

ONE RECENT afternoon, a three-person force confronted a newly discovered clump of Atlantic cordgrass (*Spartina alternifolia*) in Bolinas Lagoon. This tall, sturdy marsh-grass comes from the East Coast, where its dense growth helps stabilize habitats that are scoured by intense seasonal storms. However, on the West Coast it behaves like a ruthless imperialist, outcompeting and hybridizing with the slower-growing, smaller native variety and colonizing marshes and mudflats at the expense of native cordgrass, pickleweed, and wildlife. In the mild West Coast climate, *S. alterniflora*'s dense clumps spread and merge into meadows, clogging channels and impeding the movement of birds and animals.

This alien was introduced into San Francisco Bay by the U.S. Army Corps of Engineers in the early 1970s as part of a marsh restoration project. By the '90s it had spread 15 miles both north and south, and biologists realized that it had become a serious problem, threatening to radically transform Bay habitats. Now the San Francisco Estuary Invasive Spartina Project, a multi-agency task force, is planning a massive eradication campaign. *Spartina* invasions in and near the Bay have been mapped and studied, but during the years of preparatory work—planning, organizing, compiling reports, and securing permits—the grass has continued to spread. At present the Spartina Project can only advise local resource agencies on how best to prevent its advance.

On this particular day, wetland biologist Katy Zaremba and field operations man-

ager Erik Grijalva met with Ari Golan, Supervising Open Space Ranger for the Marin County Open Space District, at the southern end of Bolinas Lagoon, near Stinson Beach. Their target was a clump of alien *Spartina* that Zaremba had recently spotted while driving along Highway One. *S. alterniflora* grows taller, with stalks thicker than those of the native *S. foliosa* and, unlike the native, often has reddish corms (thickened underground stems). By studying its growth pattern and density, she estimated that it had been there for three or four years. Apparently, it had been missed on the mapping survey the Spartina Project had conducted in 2001. The survey had turned up only a single clump of *S. alterniflora* in Bolinas Lagoon, at its north end (which is part of the Point Reyes National Seashore). That one had been dug out, but today's subject clump (which is in the Open Space District) had been judged too large to remove easily and completely by digging, so it was to be smothered under a vinyl tarp.

Earlier that morning, Golan had cut down the two-foot-tall shoots. Now the entire clone—a dense circle of about 60 square meters—would be covered with the black tarp, which would absorb solar heat, raising the temperature beneath to effectively "cook" the plant, as well as depriving it of light and oxygen. This "solarization" is expected to kill even the roots and rhizomes. If the tarp stays in place for a year the plant should be gone, because cordgrass seed is viable for only eight months. There is always the possibility, though, that runners have already traveled beyond the area

to be covered. Local volunteers and agency staff will be monitoring the site.

I met the team at a highway turnout, where the vinyl had been spread on the ground so grommets could be installed around its edges before the trek into the marsh. "I was very surprised when I saw this plant on my way home," said Zaremba, who lives nearby. "How could we have missed something this big almost in my backyard?" She figured that it had been revealed by the removal of vegetation that had hidden it.

Carrying the tarp, rope, stakes, and hammers, we moved through cattails and thistles, and into pickleweed marsh interspersed with rings of native cordgrass. The alien *Spartina* was conspicuous, even with its stalks cropped: its growth was far denser.

"We call this a clone," Grijalva said. "One plant sends out runners that put up shoots in a roughly circular pattern. All the shoots are genetically identical, so DNA testing can tell us not only what species it is, but, we hope, where it came from." The team unfolded the tarp, centered it over the plant, and tied loops of rope through the grommets. To hold the cover in place, they hammered yard-long stakes through the loops and deep into the marsh mud. An hour later the job was done. "We hope this will work," Zaremba said. "It will do some damage to the other plants that are covered, but it has less impact than using herbicides, and it's a lot easier than trying to dig it up."

Before leaving, Zaremba took samples of plant matter from the site and from nearby native cordgrass for DNA testing, which would determine whether the removed plant was *S. alterniflora* or something even more problematic—a hybrid with the native. "There's just enough overlapping of the flowering periods of the two plants that they can fertilize each other, and the hybrids have the hardiest traits of both species, so they outcompete the original strains," she noted.

The tests might also show where this particular plant came from. *Spartina* can propagate either by dispersing seed into the water or by sprouting from pieces of root or rhizome. "This plant could have come from almost anywhere," Grijalva added. "Bits of root can stick to muddy boots, dog hair, boat bottoms, and travel a long way."

The *Spartina* team had one more task: to check the site of the north lagoon

INVASIVE SPARTINA PROJECT



Above: A conspicuous clump of Atlantic cordgrass at Pier 94 in San Francisco

clump. Sure enough, a score or more of new *S. alterniflora* shoots had sprung up from remaining subsurface plant matter. Even single stalks were easily distinguishable from the native cordgrass, which is more slender, smaller, and sparser than the invader. Grijalva pointed out the reddish tint on some of the corms.

Helping to pull up the young stalks gave me a new appreciation of the challenge. They were tenacious, and it was easy to miss fragments left behind.

This kind of intensive labor is a holding action, meant to keep *S. alterniflora* from spreading beyond the Bay region before a comprehensive attack on the plant can be launched. The worst infestations are in the central parts of the Bay, between the Bay and Dumbarton Bridges, where it was first planted. Three other alien invasive cordgrass species have been found around San Francisco Bay: *S. densiflora* and *S. anglica* near Corte Madera, and *S. patens* near Benicia. Those infestations are relatively small and isolated, so there's a good chance that they can be eradicated.

The larger effort must wait until all the required environmental documents and permits are secured. That could be within the next few months, according to Maxene Spellman, project manager for the Coastal Conservancy, which is leading the multi-agency task force. The treatment must be done within a small annual window of time determined by the breeding and nesting seasons of the endangered California clapper rail and other natural constraints. Over \$3 million has already been committed to the Invasive *Spartina* Project.

Bottom: Ari Golan stakes down a black tarp to "solarize" a clump of Atlantic cordgrass.



MALCOLM LUBLINER

The Monster Reed

THE DELIBERATE INTRODUCTION of *Spartina alterniflora* into San Francisco Bay, though well-intentioned, now looks like a colossal error. In hindsight, some wonder how such a mistake could have been made, given the key evolutionary concept that species evolve in relation to all the other species that share their ecosystems. But humans have always moved plants and animals—domesticating and breeding them to suit their needs, then taking them along wherever they have gone. In most cases, that hasn't been a problem. Most food crops and garden plants stay where they're wanted.

Trouble comes when plants that are introduced for a particular purpose turn out to have dire impacts in the long run. *Arundo donax*, the giant reed, was brought to California from Spain in the 1820s because of its many practical uses. It produces abundant material for thatching, fencing, basketry, and fishing rods, and is also cultivated for the making of reeds for woodwind instruments. In its native habitat, it is planted to keep stream banks from eroding. Here, however, outside its ecological niche, it has become a monster. In southern California,

settlers apparently carried it high into watersheds, and it spread rapidly downstream, creating dense monocultural thickets. It usurps huge quantities of water, chokes out trees and other native plants, is extremely flammable, and destroys riparian habitats that support many birds and other wildlife. Yet *A. donax* itself provides neither food nor nesting places for these creatures.

To defeat this invader seems as difficult as keeping sand from being swept out to sea from beaches. Like *S. alterniflora*, *A. donax* tends to spread and grow back at least as fast as it can be removed. In California its seed is sterile, but because it can reproduce from bits of vegetable matter, even very thorough methods may not prevent regrowth. It grows up to 30 feet tall, by as much as two inches a day, with root masses up to a yard thick, from which pieces break off—especially during floods (or removal efforts)—and wash downstream where they can start new plants.

Arundo donax is now the most despised plant in coastal southern California, having infested most coastal rivers and many of their tributaries. It has also become a problem in the Sacramento, Russian, and Gualala Rivers, and other streams in northern California. During the past decade, millions of dollars have been poured into *Arundo* eradication efforts, yet it continues to advance.

The situation is not altogether hopeless, however. In San Diego County, the Mission Resource Conservation District began attacking *Arundo* in the early 1990s, and has successfully eradicated the plant from the Santa Margarita River watershed above Camp Pendleton. It is now ready to shift its operations to the San Luis Rey River. "You have to start at the top and work downstream," said project coordinator Jason Giessow, "because every time there's a big flood, it shuffles the whole ecological deck. We've shown that the watershed approach is effective."

The best way to attack *Arundo*, according to Giessow, is to spray Rodeo (glyphosate—the only herbicide approved by the EPA for wetland use) on the foliage in the fall, as the plant prepares for winter. The poison is drawn down into the roots, killing the entire plant. Three or four months later, the remaining biomass is mowed or cut down and left as mulch, to help riparian vegetation to get reestablished. "We basically trick the plants," he explained. "We don't disturb the root mass, which would trigger new

If foliage of giant reed is sprayed in autumn, herbicide will be drawn down to kill roots.



JASON GIESSOW

sprouting." Other methods, ranging from cutting to bulldozing to grazing by goats, tend to be considerably more costly and labor intensive, and less likely to stop stem nodes or rhizomes from washing downstream.

"*Arundo* seems to be unique among invasive plants, in that it brings everybody to the table," Giessow said. "Private landowners are concerned about the flooding and fire risk that it causes. Normally, riparian corridors stay green all year and help keep fires from spreading, but *Arundo* acts as a kind of wick, that actually can spread fires faster. We've had amazing participation."

Meanwhile, as the battle against *Arundo* continues in California, an entrepreneur has proposed planting 200 acres of it in Florida as a source of paper pulp. This is certainly a viable use of *Arundo* biomass—thatched roofs are no longer very popular—but to those who know the California story, the possibility that the plant might escape into Florida's vast wetlands is appalling.

Green Death

THE DISCOVERY OF the "killer alga" *Caulerpa taxifolia* in California waters in 2000 set off the most sensational invasive plant ado to date. As soon as the invader was recognized, concerned scientists made sure that its story was well-publicized, so that immediate action would be taken to deal with the threat. A significant part of the *Caulerpa* tale is that after its discovery in the Mediterranean, warnings were not taken seriously until it had spread explosively, significantly damaging sensitive habitats, perhaps past the point where it could be controlled. In California, said Bob Hoffman, Southern California Environmental Coordinator for the National Marine Fisheries Service, "everyone was determined not to let that happen. There was a multi-agency push for instant action—let's just get rid of it!"

The largest California infestation, in Agua Hedionda Lagoon in San Diego County, covered as much as 11,300 square feet at its peak. Immediate emergency treatment—patches were covered with plastic enclosures that were then injected with chlorine—combined with extensive educational efforts, seem to have been successful. No *C. taxifolia* has been found in Agua Hedionda Lagoon since September 2002, and none in Huntington Harbor (the second, much smaller California infestation) since November 2002. "As far as we know, this was the only



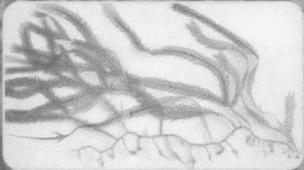
PHOTOS THIS PAGE: RACHEL WOODFIELD

Destructive Seaweed Threatens California's Coastline



- If you see this seaweed while diving, DO NOT disturb it — report it!
- If you find it on your fishing gear or watercraft, bag it, and report it.
- Never dump the contents of your aquarium into any storm drain, creek, lagoon, bay, or ocean.
- For more information, visit: <http://www.nmfs.noaa.gov>

Your help is needed!



This saltwater seaweed is bright green with flat, leafy (fern-like) fronds.

Report all *Caulerpa* sightings to:

National Marine Fisheries Service 1562988-4843 bob.hoffman@noaa.gov	California Dept. of Fish and Game 18591467-4218 wpaczokas@dfg.ca.gov	SD Regional Water Quality Control Bd. 18581467-2952 pete@rtrb.swrcb.ca.gov
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Caulerpa taxifolia was discovered in Agua Hedionda Lagoon in 2000. Urgent eradication efforts followed.



successful marine alga eradication project in the world," said Hoffman. "All the others made the decision to act too late, so they entered control mode. That's what happens with most invasive species programs."

This highly invasive strain of tropical seaweed was developed in Germany for saltwater aquarium use, then widely distributed to European marine aquaria. It most likely entered the Mediterranean when tanks were flushed at the Oceanographic Museum of Monaco. From the square-yard patch reported there in 1984, *C. taxifolia* has spread to cover about 32,000 acres off the coasts of Spain, France, Monaco, Italy, Sardinia, Croatia, and Tunisia. This invasive *Caulerpa* tolerates much colder water than the original, and grows on almost any kind of seafloor. It grows fast and spreads rapidly, outcompeting native species and creating a monoculture carpet, eliminating seagrass meadows that many creatures depend on for survival. As the alga can reproduce from fragments as small as one millimeter in length, even infestations that seem to have been eradicated must be continually monitored to prevent recurrence. The qualities that made the alga desirable for aquaria turned out to make it an extremely successful invader, and it was likely introduced into California waters as it was into the Mediterranean—by an aquarist flushing a tank.

The rapid response to the California *Caulerpa* infestation included legislation that now prohibits the sale, possession, import, transport, and release of *Caulerpa taxifolia* in the state. The threat is far from over, however, as many home aquarists must still have the alga in their tanks, some of which may eventually find its way into state waters. Hoffman says that the Southern California *Caulerpa* Action Team is putting together a program to educate the public, including aquarists and their suppliers, about the dangers of this *Caulerpa* strain, while the Department of Fish and

Game has organized a team of senior volunteers in San Diego to monitor stores. Any coastal construction or restoration projects must now include *Caulerpa* searches in order to get permits.

Beautiful Banes

ONE REASON that invasive alien plants are so difficult to control is that people are very fond of many of them.

When word of *Caulerpa taxifolia*'s appearance in California first reached *Coast & Ocean* in 2000, I did a web search on the name. Much to my surprise, there were almost as many sites that advertised the alga for sale for use in home aquaria as there were sites that reported its invasive impacts in the Mediterranean. I even stumbled onto a chat room where some home aquarists were wondering how to get rid of "feathery caulerpa" in their tanks, while others were begging for samples. Much has changed since then. Now even aquarists who had been harshly critical of the proposed ban have calmed down, and I no longer find it for sale on line.

That beautiful pampas grass (*Cortaderia selloana*), however, is still popular and sold in nurseries, even as squads of volunteers, armed with shovels and machetes and protected by leather gloves, march to coastal bluffs and meadows to defend the local flora. A web search found an overwhelming majority of sites selling or praising the plant as an ornamental, rather than warning of it as a destructive invader.

Originating in the Andes, pampas grass and its more invasive cousin jubata grass (*C. jubata*) have colonized vast stretches of the California coast, most conspicuously Monterey County. These grasses grow rapidly, forming dense clumps up to 15 feet tall. Their plumes produce abundant light, wind-dispersed seed that can grow almost anywhere. They outcompete less aggressive native plants by robbing them of water, nutrients, and sunlight.

To control pampas and jubata grass, it's important to attack large plants first, cutting and bagging the seed-producing plumes. The entire root crown and dead biomass need to be removed so other plants have room to recover. Herbicides can be effective, especially for large stands, but biomass removal can be difficult because the grasses often grow in places that are



PHOTOS THIS PAGE: RACHEL WOODFIELD

Divers covered patches of *Caulerpa* with these tarp structures, then injected chlorine through the center pipe.

hard to reach—steep hillsides in roadless areas, or even isolated offshore rocks. The California Exotic Pest Plant Council reports that efforts by its members have convinced Wal-Mart to stop selling pampas grass in its California stores, and that they are working to stop sales in other nurseries.

Weeds Large and Small

THE LARGEST INVASIVE WEED in California is the blue gum eucalyptus (*Eucalyptus globulus*). It is also one of the most controversial, as it has a sizable contingent of ardent supporters ready to battle any efforts to remove it. Introduced to California from Australia in 1853, it has spread over much of the state. Beautiful though it may be, its negative impacts are considerable.

Blue gums can attain 40 feet in height in three years, and 175 feet in 35 years. A grove can double in size every decade. As anyone who has lived around them knows, eucalypts shower surrounding areas with leaves, bark, seed pods, and branches. This detritus contains a natural herbicide that poisons many other plants. The trees' high oil content and litter create highly flammable zones: the devastating Oakland Hills fire of 1991 was largely fueled by eucalyptus.

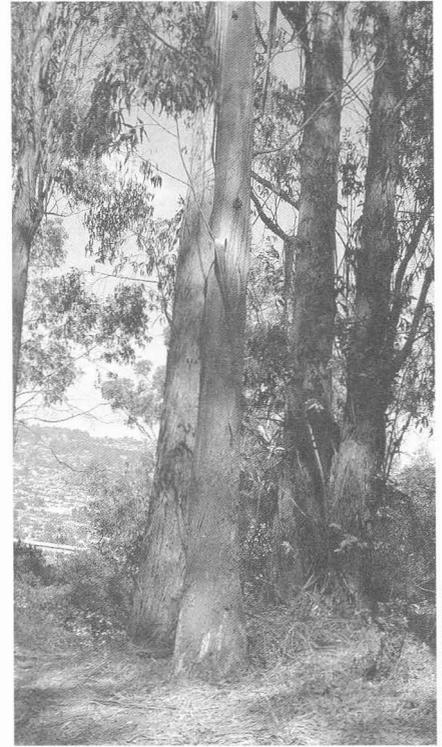
The thing that often sways people's opinions about eucalyptus is learning of its negative impacts on bird populations: the gummy flowers fatally clog the nostrils and beaks of would-be pollinators. They also gradually deplete bird populations because many nests built in their branches are shaken out by wind. Eucalypts also aggravate erosion of stream banks, and dewater and clog riparian corridors.

One might think that this considerable (and incomplete) litany of woes would have given eucalyptus a bad reputation, but its defenders are not easily discouraged. Eradication efforts in Bolinas in Marin County and on Angel Island in San Francisco Bay were met with intense counterattacks and lawsuits, and a similar response is building against intended removals in San Francisco's Presidio. Many people seem to prefer trees of any kind over coastal dune or sage scrub habitats.

The small plant known as sourgrass or Bermuda buttercup (*Oxalis pes-caprae*) has been a common pest in California lawns and gardens at least since the 1960s, but has been labeled a noxious invader only



RASA GUSTAITIS

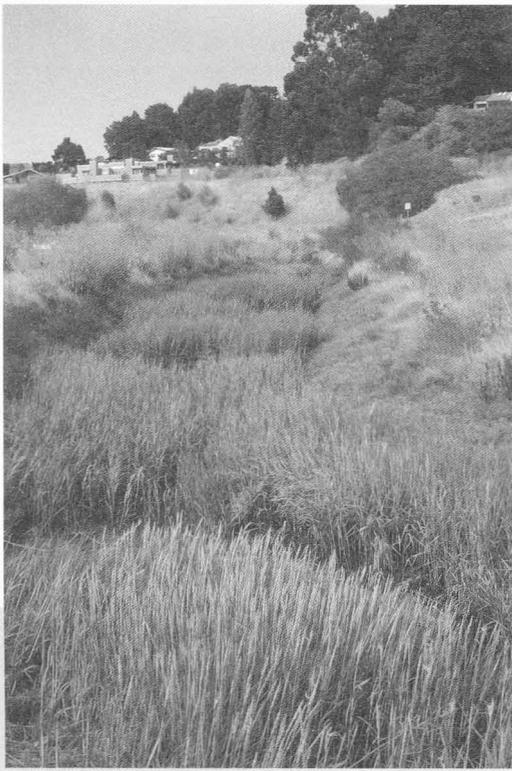


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BONTERRA CONSULTING

Clockwise, from left: Pampas grass, eucalyptus and Bermuda buttercups



Spartina alterniflora hybrids are filling in this channel at Blackie's Pasture, Tiburon, Marin County.

SOURCES FOR INVASIVE PLANT INFORMATION ON THE INTERNET

San Francisco Estuary Invasive Spartina Project:
www.spartina.org

Team Arundo del Norte:
<http://teamarundo.org>

Santa Margarita and San Luis Rey Rivers Weed Management:
www.smslrwma.org/index.htm

Team Arundo (southern): www.sawpa.org/arundo

List and descriptions of some California Arundo control projects:
http://endeavor.des.ucdavis.edu/weeds/SpeciesQuery.asp?keyw_pk=7002

Southern California Caulerpa eradication:
<http://swr.ucsd.edu/hcd/caulerad.htm>

International Caulerpa research:
www.sbg.ac.at/ipk/avstudio/pierofun/ct/caulerpa.htm

The Nature Conservancy's Wildland Invasive Species Team:
<http://tncweeds.ucdavis.edu>

Plant Conservation Alliance's Alien Plant Working Group:
www.nps.gov/plants/alien

California Exotic Pest Plant Council: www.caleppc.org

California Native Plant Society: www.cnps.org

California Department of Food and Agriculture's excellent weed site has plant lists, descriptions, photos, plus laws, prevention programs, and more:
www.cdffa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm

INVASIVE PLANT ARTICLES IN COAST & OCEAN

Winter 1990 (volume 6, #1): Eucalyptus, pampas grass, and others

Summer 2000 (volume 16, #2): Spartina, arundo, caulerpa

recently, as it has moved into native dune habitats in Humboldt and Monterey Counties. It is the only plant found to survive among iceplant (*Carpobrotus edulis*). Both of these invaders are natives of South Africa. *Oxalis* is difficult to get rid of, as the bulb from which it grows forms up to 20 tiny bulblets that fall off and quickly start new plants. It outcompetes natives for light and space, forms a monocultural carpet, and contains oxalic acid (the source of its sour taste) that can cause oxalic poisoning in livestock. Herbicides or covering with plastic or cardboard can kill it, but even sifting the soil may not remove all the bulblets.

A Monoculture Future?

THE LIST OF HARMFUL invasive plants in California is long, including several thistles, ivies, and brooms, black mustard, pigmy eel grass, tamarisk, hemlock, and water hyacinth. On the day I joined the *Spartina* expedition, by the highway I could see ice plant, scattered tufts of pampas grass (or, more likely, jubata grass), and invasive brooms. Eucalyptus and invasive oxalis grow nearby. I was surrounded by many of the most troublesome alien plants in California. Have we already lost the battle against the green invaders?

On the *Spartina* front, Zaremba, Grijalva, and Golan were all at least slightly optimistic. They find that volunteers who help remove invasives tend to become well-informed proselytizers, spreading the word to others. In the Bay Area, at least, they see a growing awareness of the problem and a willingness to help do something about it.

On the other hand, who knows what invader may turn up next?

Many people believe that none of this is a problem, that it's man's destiny to transform the face of the planet, and that we should accept altered environments as inevitable. Humans and their works are as much a part of nature as anything else, after all, and we have no idea into what we may be evolving.

Once we gain some awareness of these invaders, however, it's easy to observe what happens when we ignore the impacts of our actions or surrender to apparently overwhelming forces. We find ourselves in the midst of a monoculture, where diversity is lost, and only the most aggressive competitors can survive—whether they have anything to offer to the rest of us or not. ■



Cows at School

SHIRLEY SKEEL

JEFF BYERS HAS AN unconventional solution for world strife. "If everyone had a cow, the world would be a more peaceful place," he says in a solemn tone. It's not exactly a workable plan in practice. But Byers does what he can to introduce harassed city folk to this slow and serene vegetarian.

This particular day he is at Bessie Carmichael School, a squat, terra cotta-colored building south of Mission Street in San Francisco, where many Filipino, Hispanic, and Cambodian children spend their days. His big Chevy truck has pulled into the schoolyard, towing an even bigger white van, marked "Dairy Council of California, Mobile Classroom." He opens the rear doors and hauls out a bucket of carrots and artichokes, then leads out a long-legged calf and ties it behind the van.

He's just in time. The school doors swing open and the wall of noise that only 200 excited kids can make pours into the playground. Two by two, the children plop down before the van for a quick lesson in bovine etiquette.

"Call me Mr. Jeff. I want *no noise*. Cows don't like noise," says Byers, who was a teacher before he became an instructor in the Dairy Council's nutrition education

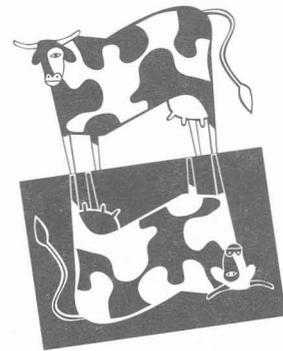
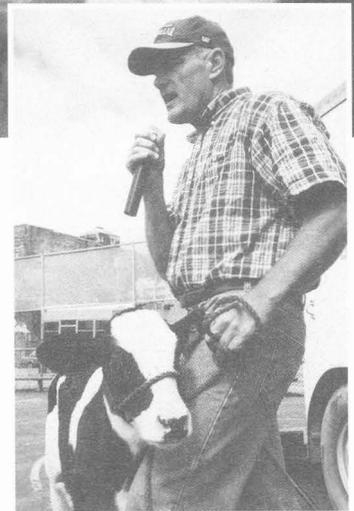
program. "And the cow behaves like a cow. If she acts like a cow, *do not* laugh at her. She'll chew and she'll gulp and she may stick her tongue in her nose. *Please do not* laugh at her."

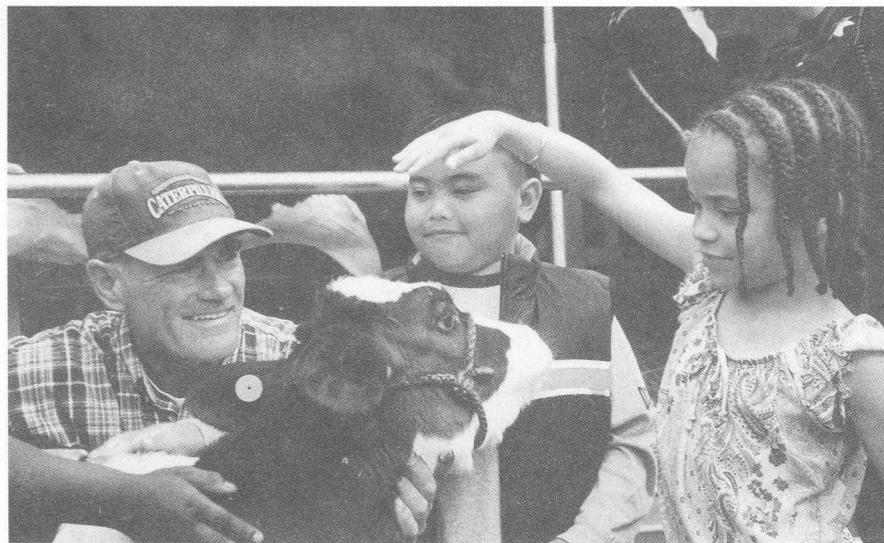
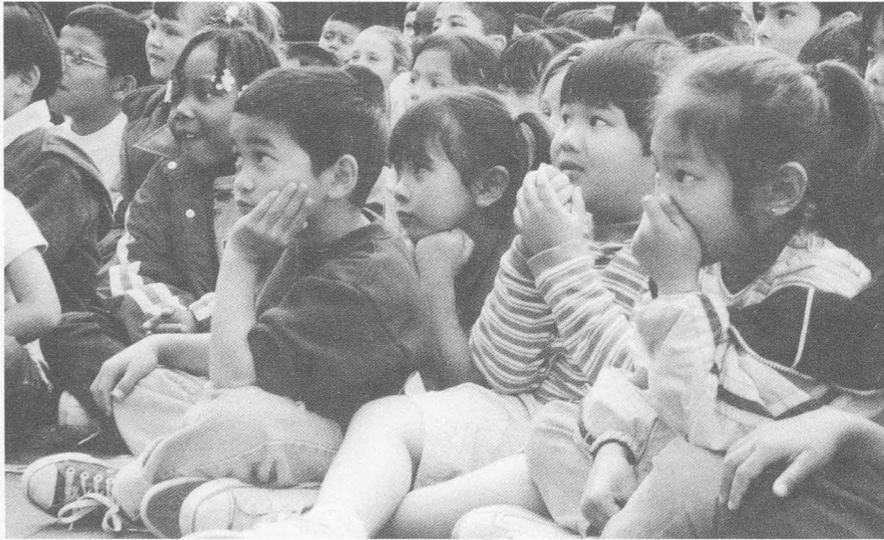
He opens the van's side doors. Electra, or Ellie for short, is big. Huge. Maybe eight feet long and five feet high. Black and white and a mother of three, she is an 1,800-pound Holstein heifer with the hips of an army sergeant and the eyes of a saint.

The children go silent. Two girls put their hands over their mouths. A serious-faced redhead frowns. The kids are aged five to eleven and many have only seen cows on television. But the cool retain their cool. A young man with a peacock-colored tuft of hair looks bored and knowing. His neighbor hugs a basketball.

Jeff scans the kids' faces, then the lesson begins. Ellie, offered a fistful of alfalfa, demonstrates how you tackle the ritual of eating when—like the deer, camel, goat, and giraffe—you have four stomachs. Thirty-nine chews, a gulp, a pause, and the food slides back up for a second work-over.

The kids learn that Ellie walks on two toes, has 32 teeth, and takes nine months to give birth. And she's not stupid. Every day, Saturday and Sunday included, she waits at





the gate of Moon Glow Dairy, at Moss Landing on Monterey Bay, for Jeff to take her to school. She is affectionate, patient, and never gets riled.

Can the same be said for kids? Jeff decides to find out. He grabs a teat and squirts a stream of warm milk into the front row. The children screech and reel in horror.

Five-year-old Daniela later admits she didn't know milk came from a cow. Arnrow, 8, says there's "no way" she would ever milk a cow. Then, perhaps having learned a thing or two from reality TV, she relents: "I would if you gave me \$10,000." Shannell, 11, declares Ellie "cool."

But wait. There's still Della, the calf. Jeff leads her out, and the children wiggle into a line to meet her. Some pet her tentatively, some draw back.

"I think he's a girl, because the bottom is a girl," observes eight-year-old Leo.

Jeff Byers, 53, takes cows to some 600 schools a year. The Dairy Council of California's four mobile classrooms visit 235,000 children in urban elementary schools each year. They work out of Culver City, Irvine, Sacramento, and Oakland. Because the demand is so great, some schools wait five years for a visit. Local dairy farmers have footed the bill for the education program for 85 years. (California has 2,300 dairy farms, ranging in size from small family farms to operations with over 1,000 cows.)

Sure, Jeff says, cynics might see this as a marketing ploy to sell more milk. But "most of the dairymen I know . . . they're doing it as a public service. A lot have come through 4-H (agricultural club) and the public service ethic is instilled in them."

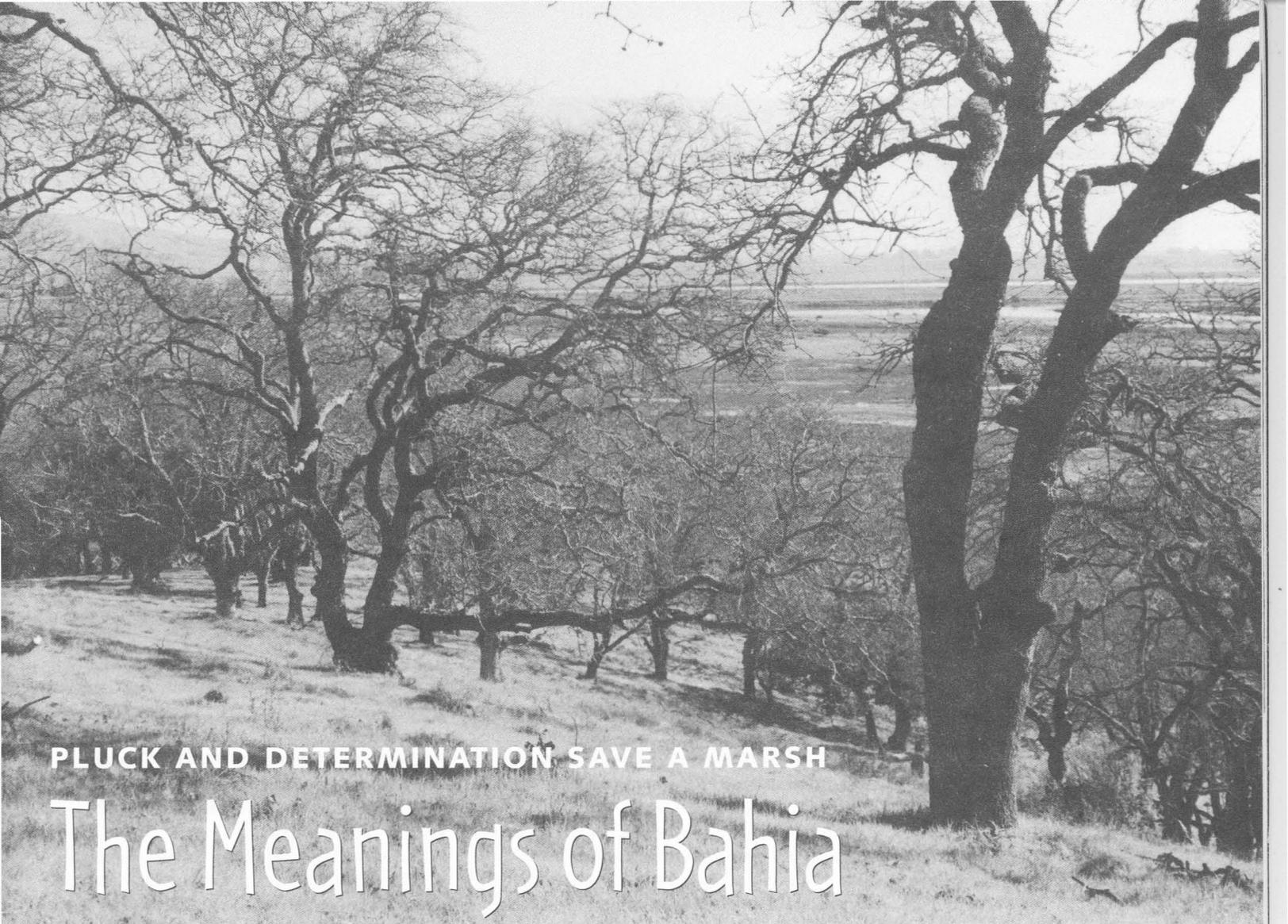
Carmen Kirk, a fourth-grade teacher, believes the cow's visit helps her foreign-born students understand their new home. Ellie's performance crosses all language barriers.

However, by the time the mobile dairy pulls out of the school yard, not every question is answered. Chewing on pizza back in the classroom, Jeremiah struggles to fit Della into the world he knows.

"Can the little calf play catch? Will it go after a stick or something?" he inquires.

Too bad Byers is gone. He may not be alone in wishing that every family owned a cow. ■

Elementary schools that would like to sign up to have a cow visit should call the Dairy Council of California: (916) 263-3560.



PLUCK AND DETERMINATION SAVE A MARSH

The Meanings of Bahia

ANN THOMAS

ANN THOMAS

ON THE EVENING OF December 12, 2000, when the Novato City Council was to vote on whether to permit 424 new housing units to be built above some wetlands and in oak-studded hills that environmentalists had tried for 25 years to protect, nine horsemen led a solemn procession through downtown to City Hall, followed by picketers carrying lighted tapers and chanting "Save Bahia."

A photograph of the dramatic procession appeared on the front page of the next day's *Marin Independent Journal*, but the Council's action was a blow to the Save Bahia effort. Shortly after 3 a.m., before an overflow crowd, the Council had unanimously (with one abstention) approved the development.

That looked like the end of the story. But the Save Bahia group had prepared one more move—a long shot. Quickly, a new campaign committee, Citizens to Save

Bahia, filed with the Fair Political Practices Commission and began to gather signatures on a petition for a special election in which Novato citizens would have the final say. Four months later, after an intense campaign, 70 percent of the city's voters turned out to reverse their City Council's decision by a margin of two-to-one. Soon after, the developer called the Marin Audubon Society. He was interested in discussing the sale of the entire 641-acre Bahia property. On January 6, 2003, Marin Audubon closed escrow.

Bahia is a rhythm of oak woodland and salt marsh weaving in and out of five shallow coves that ascend from the sloughs on the Petaluma River's west bank. It is a rare remnant of habitats, the only known location in the San Francisco Bay Area, and possibly the state, where blue oak woodland adjoins salt marsh. Its purchase, an

To its residents, "Bahia" meant a chance to sail from home out into the world. Now their waterway is a saltmarsh, and endangered species have moved in.

Previous page: The mixed woodland includes blue oaks, which seem to be resistant to Sudden Oak Death.

Right: Looking east over the Bahia wetlands toward the Petaluma River in the distance. Existing houses are to the right of the photo.

Below: In the winter, migratory birds gather in the Bahia wetlands.



DEWEY SCHWARTZENBURG

achievement in itself, is also a major step toward the Herculean goal of restoring 7,000 acres of Marin County's historic wetlands to San Francisco Bay, a goal that is shared by a consortium of organizations and agencies, led by Marin Audubon and Marin Baylands Advocates.

The story of Bahia is unique, but it has parallels in other communities around San Francisco Bay and along the coast. It demonstrates that citizens can prevail over powerful development interests when fighting for the survival of a valued natural place—given sufficient determination, energy, passion, endurance, political savvy,

and luck. The luck is partly in the availability of public funds. Had California voters not passed Proposition 12 in 2000 and Proposition 40 in 2002, the effort to save Bahia may well have failed. The Coastal Conservancy's contribution, for example, came largely from money made available through these bonds.

This story also demonstrates that people who buy houses built in defiance of the natural dynamics of their location may be buying future disappointment.

Marsh to Waterway to Marsh

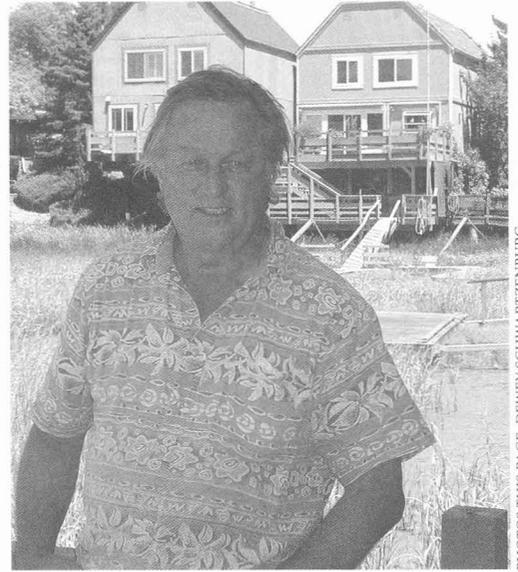
BAHÍA IS THE SPANISH WORD for "bay," but this property is not a bay. As you approach it on a summer day heading east on Bahia Drive, the road rises to the crest of a hill, and before you lies a watery plain, in hues of green, brown, and gold. In winter and spring a sheet of water covers the lowlands and migrating waterfowl and shorebirds abound.

To the south, the Petaluma River glistens—actually a tidal estuary, not a river. In the late 19th century, schooners and flat-bottom scows passed by, plying the route between San Pablo Bay and the town of Petaluma, 10 miles north. Later, steamers traveled the river. The last sternwheeler made its final run in 1950.

More hills frame the far horizon. This marshy plain is a historic wetland, a rem-



TOM GANDESBERY



PHOTOS THIS PAGE: DEWEY SCHWARTZBURG

nant of the vast marshes that fringed San Francisco Bay a couple of centuries ago. Most of these wetlands were diked and drained for farming, and subsequently were lost to roads, buildings, and streets as the San Francisco Bay metropolitan area kept growing. Here on the upland vantage point of Bahia Drive, it's easy to imagine what once existed.

There is a woodland to your left, various oaks mixed with madrones and other trees. To your right, large steps have been cut into the hillside—sites for more houses. Grass has covered them. At the edge of the marsh below, single-family houses are scattered along winding streets. A channel overgrown with bright green marsh grass leads from this residential enclave to a larger channel, which runs to the river.

These houses, 288 of them, were built in the late 1960s as the beginning of what was to be a 2,200-home water-oriented community. The original developer, a southern California engineer, graded the streets and dug two lagoons from what was then grazing land, but then lost the property due to financial setbacks, according to Bill Wright, who worked as an engineer for developers who built the houses around the first of the two lagoons. The second lagoon remained undeveloped.

To those who bought homes here, the name "Bahia" was a promise—or perhaps only a dream—that they could sail from their doorsteps out into the world. Some envisioned themselves sailing from their back doors out into the river, through the Golden Gate, then perhaps south toward the beautiful *bahías* of Baja California.

But the lagoon silted in and evolved into a tidal marsh.

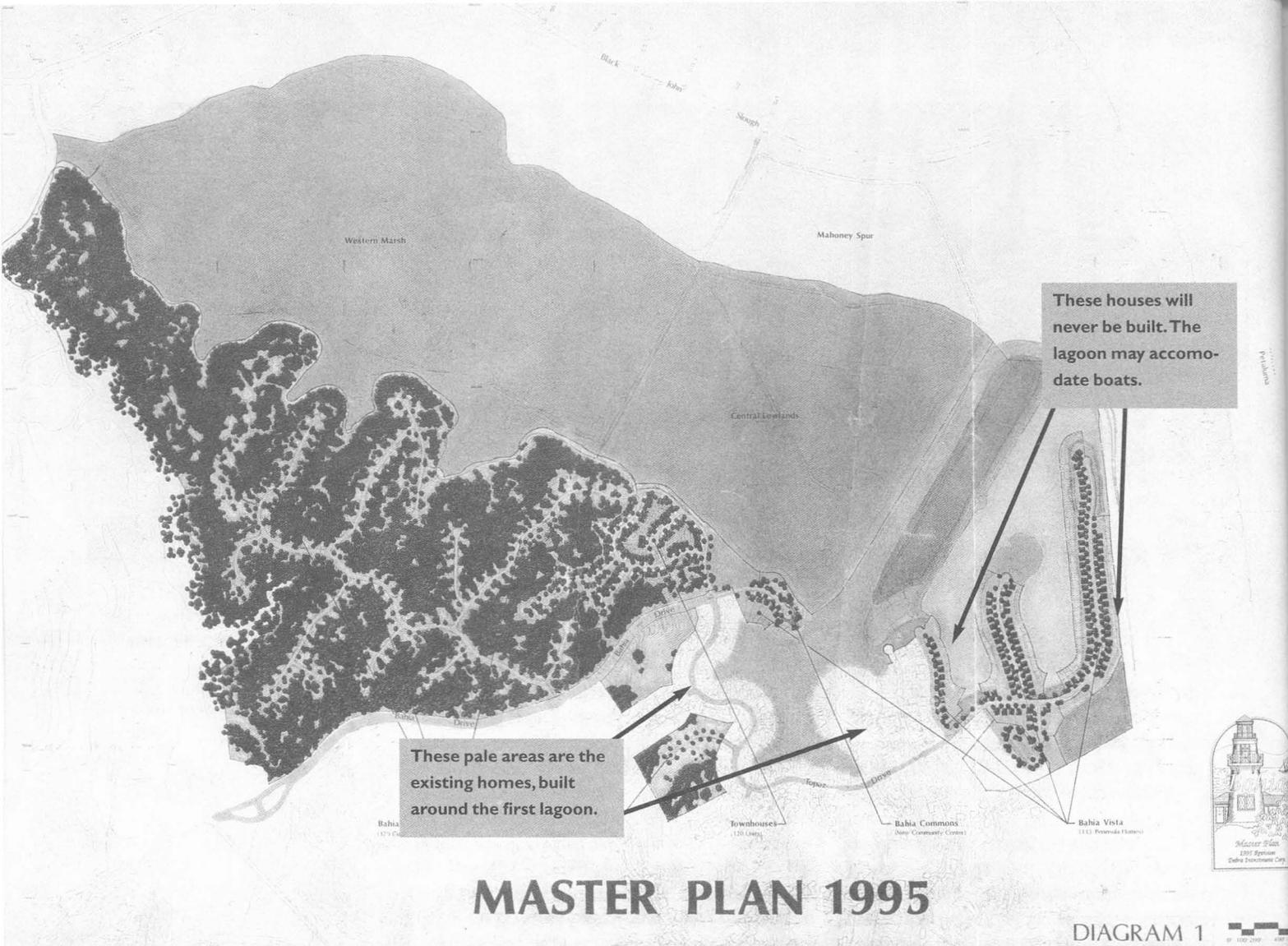
In 1978, Art Condiotti, a Sonoma County developer, bought the remaining acreage, built about 100 more houses, and began fielding plans to "complete" the residential community by building up to 1,500 more houses. When these plans floundered on conservationists' staunch resistance, he modified and scaled them down repeatedly, finally proposing to build in the upland, and to plant 10,000 oaks to replace those to be cut down. But the conservationists held firm: a smaller development would still damage the marsh, and the woodland was unique. Many Bahia homeowners, especially those closest to the silted-in lagoon, supported further development, having been persuaded that if Condiotti won, he would restore their lost waterway.

"He said that the moment he got the permit, he would dredge the lagoon," said Jon Dahlstrom, standing on his deck looking out at a neighbor's mired sailboat. Dahlstrom's own boat, a 32-foot Yorktown hull sailboat he built in Santa Barbara and transported here, has now been sold. "I bought this place because of the lagoon and the dock," he said, "so I could sail to Tahiti from here."

Even if the City Council-approved expansion had gone ahead, however, dredging might not have been permitted. Environmental laws now require permits from numerous agencies that are unlikely to agree to the dredging of a tidal marsh. What's more, this marsh—the former lagoon—is now home to some endangered species. Several pairs of California clapper rails have recently been seen.

Left: Bahia and Topaz Drives, with the silted-in lagoon behind the near houses

Right: Jon Dahlstrom on his deck



MASTER PLAN 1995

DIAGRAM 1

The Tide Turns

SUSAN STOMPE HAS FOLLOWED Bahia's history for 25 years—as a Novato Planning Commissioner, City Council member, mayor, and currently as a member of Marin Baylands Advocates, the environmental coalition working to preserve Marin baylands. A shelf in her home office allows a glimpse into Bahia's history. There lie the 1978 Bahia Master Plan, the 1979 draft Environment Impact Report (EIR) for the Bahia Master Plan Amendment, a 1980 Final EIR, a 1983 Draft Environmental Review of a Revised Bahia Master Plan, a two-volume 1984 Bahia Master Plan, a Revised Draft EIR for the 1990 Bahia Master Plan Revision, the 1992 Final EIR for the 1990 Bahia Master Plan Revision, a 1995 Bahia Master Plan Subsequent EIR Report, and a 1997 Draft Addendum to the Final EIR for the 1995 Bahia Master Plan.

Stompe estimates that she spent hundreds of hours reviewing EIRs and other documents related to five different versions

of the development that have undergone review. "It seemed futile at the time—so much work to get any small change to improve the plans—perhaps redesigning a road to avoid a few oaks. Now I look back and think, 'Thank goodness for every minute spent. I helped save this land.' "

Condiotti's efforts to build out Bahia were doggedly opposed by environmentalists from the beginning, but in the 1990s Marin's once potent green community had been losing ground. The County's most buildable lands were gone and sprawl was reaching aggressively out from Highway 101 to the former tidal marshes that extend from north of San Rafael to the Sonoma County line. This swath, comprising a 10-mile arc along San Pablo and San Francisco Bays, is largely diked historic baylands underlain by bay mud: environmentally sensitive and unsuitable for building. But these concerns were no longer sufficient protection for such valuable land.

In 1994, activists from several environmental organizations formed a loose

alliance, Marin Baylands Advocates, and began to promote the cause of wetland preservation. They selected 38 privately owned sites along San Pablo and San Francisco Bays for protection, including six high-profile properties—Bahia among them—that were under threat of development. The 900-acre Hamilton Wetlands Restoration in southern Novato, then being planned by the Coastal Conservancy and the U.S. Army Corps of Engineers, was identified as the keystone of what they hoped would eventually be a baylands wildlife corridor. Marin Audubon Society took the lead in preparing to purchase and manage the properties.

In 1999 an anonymous \$250,000 donation kicked the nascent effort into high gear and enabled Audubon to purchase the 34-acre Triangle Marsh in Corte Madera for \$750,000. With that, the Campaign for Marin Baylands was up and running. Another boost came in 2001 when the Coastal Conservancy purchased the 1,600-acre Bel Marin Keys Unit 5, a diked bayland south of Novato adjacent to the Hamilton restoration. Unit 5 was another of the selected sites.

As the campaign for the baylands moved forward, the habitat value of Bahia increased. Its preservation would provide more continuity among habitats, for it is virtually surrounded by marshes owned by the Marin County Open Space District and the State Department of Fish and Game.

Besides blue oak, the 214 acres of mixed woodland covering Bahia's slopes includes black oak, coast live oak, small numbers of madrone, buckeye, and valley oak. Purple needlegrass, Indian soap root, and California poppy grow among the trees, overlooking 333 acres of diked salt marsh. Marin Audubon approached the landowner about the possibility of his selling Bahia, but he was not interested—until after the referendum.

"It was a hoot."

CITIZENS TO SAVE BAHIA had only 30 days to collect signatures from 10 percent of Novato's voters—2,645 names.

More than 700 people helped, standing at ironing boards in shopping areas on weekends, walking precincts to hand out flyers, calling neighbors, or writing checks to pay



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for mailings. Referendum law requires that each petition include the full text of the approved legislation, which in this case was the entire Bahia master plan—about 300 pages with accompanying maps and diagrams. Lugging a document thicker than the Novato phone book, the volunteers collected 5,170 signatures—more than twice the number required.

The election was set for May 22. The referendum campaign raised the bar on election spending in Novato. Development proponents spent \$634,000—almost ten times the budget of Citizens to Save Bahia. They even distributed a videotape featuring unhappy Bahia homeowners beside their lost lagoon, with two City Councilmen explaining that the development would bring benefits including new tax revenues for schools.

The Save Bahia group found allies among citizens who were outraged by traffic congestion and the City's pro-growth policies. The 424 homes approved by the City Council would have enlarged the existing Bahia community by 150 percent. The development lies at the end of a single-access road, a five-mile drive east from Highway 101, making the additional traffic it would generate, and its impact on the already congested 101 commute, a major campaign issue.

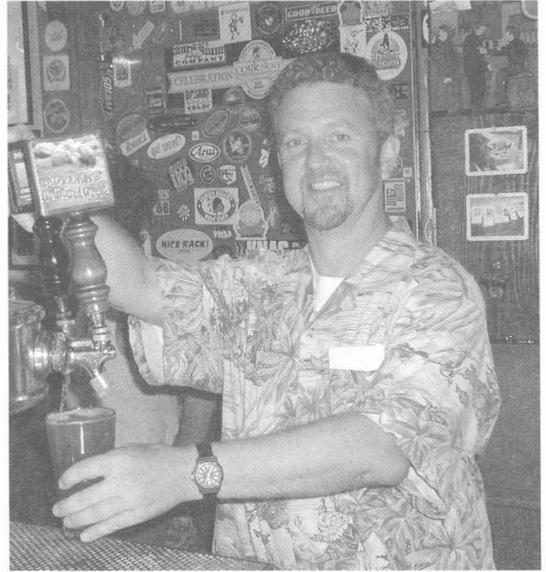
Then an unexpected ally appeared: the Novato Horsemen. They have a clubhouse and barns on five acres adjacent to the

The main lagoon has become a marsh.



Left: Many people in Novato own horses. (These are not at the Horsemen's Club.)

Right: Brendan Moylen brewed "Referendum Ale."



Bahia woodland, and were worried that the added traffic might threaten the safety of equestrians on neighborhood roads. Northeastern Novato still has a rural quality, and a teenager astride a horse clapping along Bahia Drive is a fairly common sight. So, although they are not generally a political force, the Horsemen were roused to action.

"They had houses planned much too close," said Brendan Moylen, a Horseman who owns and operates Moylen's Brewery and Restaurant in Novato with his wife Eileen. "We're a horse club; 100 members and 400 juniors. We have parties and community events—cow events, roping, team pulling, ranch cutting, sorting, and kids' relay days."

The Moylens produced and dispensed 60 cases of Referendum Ale—with the story of Bahia on the labels—and served it throughout the referendum campaign to, among others, the local Chamber of Commerce, which holds lunch meetings in the brewery. The Moylens' home and place of business became the Bahia allies' campaign headquarters. "They laughed us off," Brendan said of the pro-development forces. "It was a hoot. We stomped them, two-to-one."

It was at the brewery that the Save Bahia campaigners gathered on the night of the special election. At about 8 p.m., when the absentee ballot count was announced, they went wild. These ballots—counted before the results came in from the polls—showed that, by 67 percent of that vote, the Bahia development was going down. Results from the precincts trickled in for two hours, but the plurality held firm. It was an aston-

ishing reversal for a project that a year earlier had seemed unstoppable.

And Now the Money

A TWO-TO-ONE VOTE gets respect. Aside from that, Marin Audubon had challenged the City Council's approval of the development in state court, arguing that it was not in compliance with the California Environmental Quality Act. "We were going to call Mr. Condiotti," said Barbara Salzman, "but he called us first." Negotiations began, and a price was agreed upon: \$18 million.

"We gave them a year to come up with the money," said Philip Trowbridge, executive vice president of Condiotti's firm, Bahia LLC.

The *Independent Journal* reported that, at a meeting of the Novato Planning Commission before the City Council took up the Condiotti development proposal, Bahia attorney Al Bianchi had "warned the Commission that some environmentalists might try to delay the project's approval by saying they want to buy the land. 'If you hear that tonight, please remember this: these folks sing but they don't dance.'"

Barbara Salzman danced. She was known for her ability to raise money for projects of the all-volunteer Marin Audubon Society. The idea of the Marin Baylands Advocates and the Campaign for Marin Baylands began with Salzman. Marin Audubon had already taken title to three bayland sites, including Triangle Marsh. Bahia was a big step up, but she moved quickly. "You have to be persistent, and go for it," she



Ed Nute and Barbara Salzman of the Marin Audubon Society consider new possibilities.

explained, "and you have to be optimistic, otherwise you wouldn't even try."

The terms of the referendum postponed any action on proposed development for a year. The agreement with the landowner required that Audubon come up with the purchase price by August 31, but Condiotti agreed to an extension. "We were tired of it. We were moving on," Trowbridge explained.

Governor Davis signed a bill allowing the Coastal Conservancy to redirect \$3.75 million to Bahia from another project—with the proviso that there be a dollar-for-dollar match from non-State funds. Marin County Open Space District, which had made the initial contribution to the Bahia fund, was the first matching donor.

Marin's elected officials, including State Senator John Burton, Assemblyman Joe Nation, and Novato Supervisor Cynthia Murray, were quick to lend support. During the year after the referendum, Marin Audubon and Marin Baylands Advocates approached potential funders throughout the state. The Coastal Conservancy contributed \$5.8 million and the Wildlife Conservation Board gave \$4.5 million.

CALFED, a consortium of state and federal agencies concerned with the Bay and the Sacramento-San Joaquin River Delta, was tapped for a total of \$3.45 million: \$2 million for acquisition and \$1.45 million toward restoration. Other funders included the Marin Community Foundation, the North American Wetlands Conservation Council, the California Department of

Transportation, the Marin County Board of Supervisors, the Bay Institute, the Sierra Club, the Marin Conservation League, the California Native Plant Society, the Forrest C. Lattner Foundation, and more than 1,600 donors to the Marin Baylands Fund.

Marin Audubon wound up purchasing 632 acres at Bahia. Two small parcels on the property were deemed to have no habitat value and were dropped from the purchase arrangement. Since then, Audubon has transferred almost 200 acres of blue oak woodlands to the Marin County Open Space District, and almost 400 acres of wetlands at the base of the Bahia hills to the Department of Fish and Game. Audubon is retaining approximately 60 acres of filled baylands for restoration purposes.

Bahia homeowner Ed Levitt said he was "much in favor" of preserving the Bahia landscape, but he still hopes that the lagoon will be reopened for boats. Dahlstrom says there is enough silt there now "to build a wall three feet wide and six feet tall from here to Tahoe." It's that way, he says, "because of Barbara Salzman and the Audubon Society."

Sittin' by the Dock of the Marsh

LOOKING OUT HIS LIVING ROOM window, Dahlstrom explains: "First the pickleweed started to grow [habitat for the endangered salt marsh harvest mouse],



WARNING DANGER

Because of heavy siltation, this lagoon is subject to quicksand and shifting mud which may endanger human life. The lagoon is not patrolled. If you become stuck in the mud and the tide comes in, you may drown!

DO NOT ENTER THE LAGOON ON FOOT!

Try to keep pets out of the lagoon, as well.



Bahia is now protected for the benefit of wildlife and the public.

then it was habitat for the clapper rail." Salzman said an estimated three to nine pairs of clapper rails have been found to be living there. "That's probably the highest population of any place in the entire north Bay," Salzman said. "Elsewhere, the populations have been plummeting." The California black rail, another species of concern, may also be present, according to Carl Wilcox, regional habitat conservation manager for the Department of Fish and Game. Available habitat elsewhere is "pretty much saturated, so any birds that are displaced would likely be lost," he said.

"I liked it when I had white pelicans diving outside my window," Dahlstrom said wistfully. "You can't even see the clapper rail. We do have a lot of frogs." Then he added: "I give her a lot of credit. She's good. I think she's wrong, but she does not lie about this stuff."

There is some hope that the boating needs of the Bahians might still be accommodated, though probably not as the residents hope. That second lagoon, the one surrounded by home sites that will never be built upon, has room for boat slips and a dock, and access to the Petaluma River. Discussions about that alternative have begun. Meanwhile, "Save Marin Baylands" has entered the vernacular in the county. Local activists aren't resting on their laurels, but are looking south to two other high-profile

sites along San Pablo Bay. St. Vincent's School and the Silveira Ranch, comprising about 1,100 acres, are valued for their wetlands, grasslands, and pastoral oak uplands, as well as for the "community separator" greenbelt relief they provide along Highway 101 between Novato and San Rafael. A proposal for housing and commercial development at St. Vincent's was deactivated earlier this year, and bayland advocates are preparing for action to preserve the two properties. Saving Bahia is hardly the end of the Campaign for Marin Baylands—it is only the opening salvo.

All but ten percent of San Francisco Bay's historic wetlands have been destroyed, but a dramatic turnaround has occurred within the past decade. Not just in Marin County, but in every one of the nine counties that surround the Bay, work is under way to preserve what remains and to restore as much as possible. In late 2000, the San Francisco Bay Joint Venture, a partnership of agencies and organizations concerned with wetlands, adopted a goal: to preserve or restore and enhance 200,000 acres by 2020. In late July 2003, Joint Venture coordinator Beth Huning said that goal is within reach. ■

Ann Thomas has been active with Marin Baylands Advocates since its inception in 1994, and helped to organize the Bahia petition drive.

Soul of a Swimmer

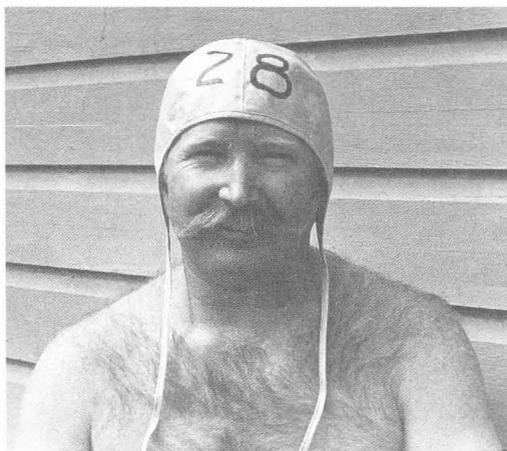
HE COMES OUT of the water all pink and beaming, the swimming cap and big grin making his face look round as the full moon, and as friendly. "Can't imagine a better way to end a working day," he says, stepping onto the sand at the Dolphin Club, at Aquatic Park in San Francisco. "I'm the oldest living ditchdigger that's still working as a ditchdigger in San Francisco. But no matter what kind of day it's been, I come here and feel 18 again. I'm all refreshed so I can be nice and kind when I get home."

Indeed, though he probably had more hair on his head at 18, Conrad von Blankenburg at 63—eyes sparkling, feet firmly planted in the sand—is the picture of vigor and health. "There's no gravity in the water. It's good for the soul and it's good for the joints," he explains.

Making a living as a general contractor requires intimate contact with the ground. He puts garages under old Victorian homes, builds new earthquake-proof foundations under old houses. That requires a lot of horizontal moving through crawlspaces and a lot of exertion. All that is hard on the joints. But come late afternoon, you will find him in San Francisco Bay, be it winter or summer, rainy or hot. Unless, that is, he is swimming down-coast, or in Hawaii, Tarawa, or—his latest venture—around California's coastal piers.

We have the sea in our blood, which has close to the same salinity, but few hear the ocean beat as powerfully as von Blankenburg. He was born to it, son and grandson of swimmers. He grew up in Redondo Beach, and remembers going into the surf for the first time at around age two, on the back of his father, who was then a lifeguard in Santa Monica. When he was around 10, his mother made him a surfing bag of unbleached muslin. "All the kids had them. She had one too when she was a kid," he says. "We'd run along the beach until the wind filled it, then we'd hold the open end closed tight and run into the water and surf on it. Then we'd do it again. There were few surfboards around then." He made his first surfboard of redwood and plywood in 7th grade, in shop class.

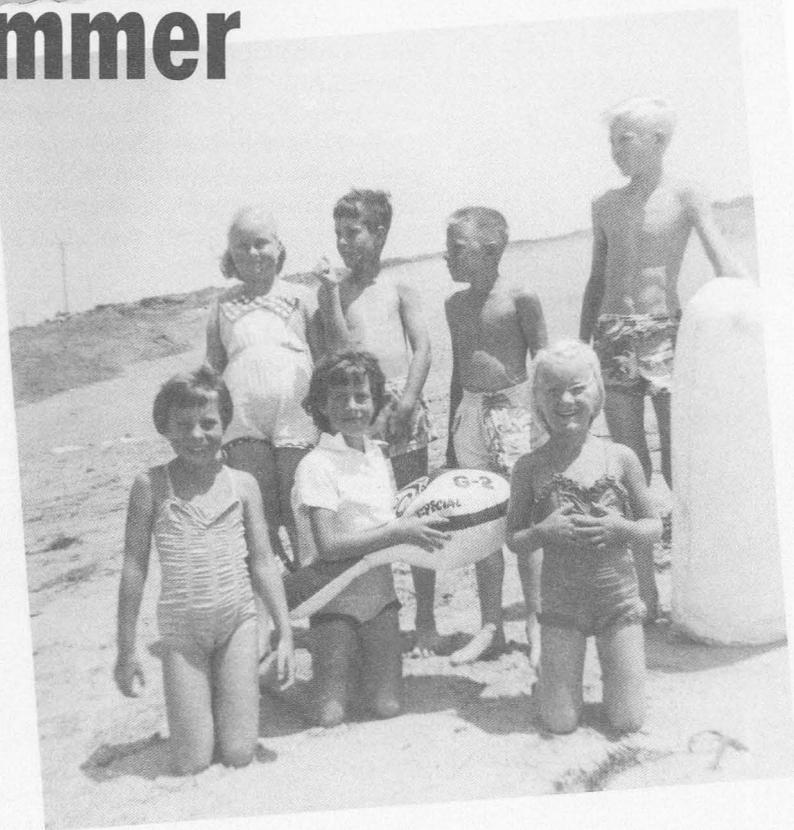
At age 14 he started applying to be a lifeguard, though you had to be 18 to qualify. At 15 he was hired. "I lied," he explains. Later, in the Coast Guard, he went diving



PHOTOS THIS PAGE COURTESY CONRAD VON BLANKENBURG

everywhere the ship dropped anchor in the western and south Pacific. In Okinawa he went bodysurfing in a typhoon.

Home base for him right now is the Dolphin Club, and he takes part in just about every swim it offers. Since 1975 he has taken part in the Golden Gate swim every year, except a couple of times when fog cancelled the event. His father did that swim in 1927–28, his grandfather in 1891, when he was in the Navy. His son Erick has swum it four times. A daughter, a former Navy deepsea diver who lives in Florida, is a



Above: "There were few surfboards then. My mother made me this bag of unbleached muslin. All the kids had them. She had one my grandmother had made for her when she was a kid. We'd get it wet and run along the shore so the wind would fill it with air. Then we'd close it tight and go into the water to ride a few waves until the air went out, then come out and fill it up again."

"terrific swimmer," he says. His two-year-old granddaughter will likely follow family tradition, he figures.

It was his wife who got him to venture across the Golden Gate for the first time. "She saw an article that the Dolphin Club was about to have a Golden Gate swim and said 'You probably couldn't do that.' So of course I found out what you have to do and did it.

"The Club is a treasure. It's public and costs about a \$1 a day if you join. You also can pay \$5 and just use the facilities, which include showers, sauna, a gym, and hundred-year-old rowboats that members keep up. Till '76 it was all male, but then some women wanted to join and swim. And of course that was the end of the world. But then a whole lot of them got together and got married, and then women started swimming faster than the men. Of course the club's real nice now with the women. I personally didn't care for just being around a bunch of men. People in their 80s and 90s still swim, and young people bring their families, and they join."

When he has the time, von Blankenburg likes to drive down the coast, stopping and swimming along the way. "There's nothing more enjoyable on a Sunday than swimming from Avenue C in Redondo to Palos Verdes and back," he says. "There are always dolphins. You can see rays. A couple of times there was a lobster crawling on the bottom. All sorts of fish." Some changes over the years have been distressing. "In Palos Verdes there were lots of abalone till 1958, but in 1963 there was not one left, and all the kelp was gone," he says. "The bottom was covered with sea urchins."

It was during one of his coastal drives, with a copy of the *California Coastal Access Guide* beside him, that von Blankenburg decided to swim around all the coastal piers. He was thinking about piers, how they provide a way for people to walk out over the water. It occurred to him that he had never heard of anyone swimming around all the piers, so he decided, "Why not put me down for something no one has ever done?"

He found that lifeguards tend to frown on swimmers near piers, so he would go out early, before the lifeguards arrived. Staying far enough from the structures to avoid fishing lines, he first swam around the 1,140-foot Pacifica Pier, then Santa Cruz, and on down the coast to Imperial Beach. At Avila Beach, a sea lion swam with him the whole way around the long oil company pier. "That was great, having company," he says.

He liked going around the Santa Monica Pier, because his dad had been a lifeguard there. Now he's swum around 40 of the 42 coastal piers. Point Arena is next. That will leave only the private pier at Paradise Cove in Malibu. "They want me to pay \$20, so I have to sneak in," he says.

What will he do next? "I figure the way people are living these days, I'll probably live to 100," he says. "The doctor gave me a new hip in '93 and it's still perfect." (Ten days later, he was back in the water. A friend hung his crutches from the end of the pier at the Dolphin Club so he could get out.) "So if they can keep putting in spare parts, I can make it a few more years. I can't imagine not swimming in the ocean. Something happens to your soul when you're in the ocean." ■

—RG



SHIRLEY SKEEL

SANCTUARIES

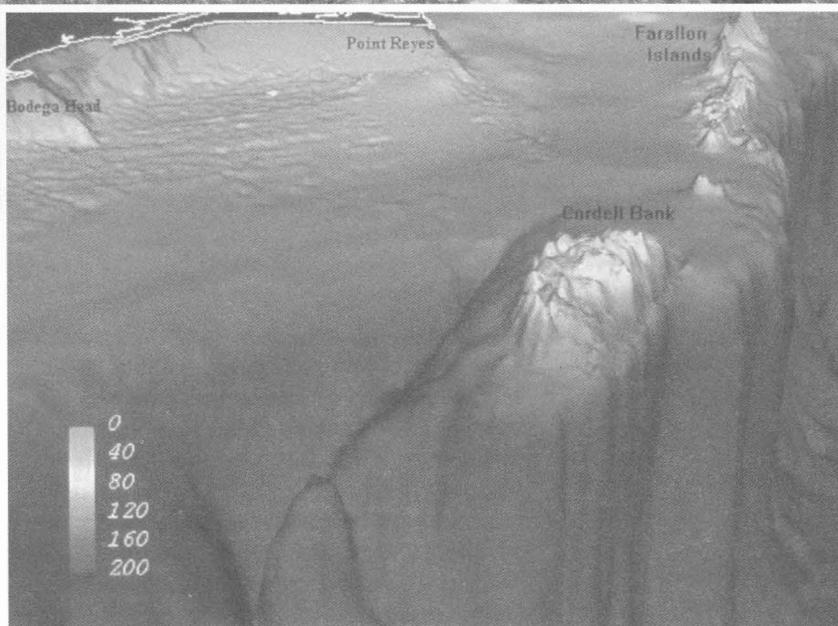
Cordell BANK



MICHAEL CARVER

ANNE CANRIGHT

IMAGINE A SHEER CLIFF nearly 6,000 feet high—twice as high as Yosemite's El Capitan—facing west and south, atop which perches a 200-plus-foot-tall broad-based, flat-topped granite monolith with ultrawide hips.



USGS WOODS HOLE

Stretching eastward from the cliff edge and the base of the monolith, sediments slope gradually upward. Now cover all that with water, allowing 120 or so feet from the monolith's top to the surface, and 400 feet from its base. Let the water

Top: Crinoids are animals, not plants.

Above: Computer imagery shows Cordell Bank and the nearby Farallon Islands perched at the edge of the continental shelf.

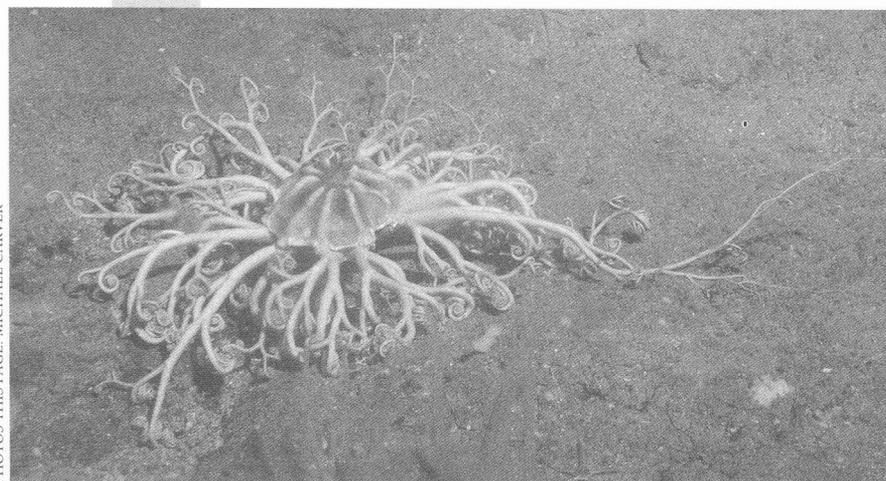


Top: A sea anemone, *Urticina picivera*

Bottom: Gorgon's head basket star, *Gorgonocephalus*

slosh down into the western abyss; and up and over the sloping sediments and, eventually, onto beaches and rocks. Finally, cover the cliff face and pillar walls with slimy, bristly, felty, calcareous, gushy, spiny, elastic (pick a texture, any texture), astoundingly varied and colorful invertebrates—and *really* pile these critters on top of the monolith and on those broad hips. Oh, and one last thing: think fish, floating in vast numbers within a few feet of horizontal surfaces, vertical surfaces, and up into the water column.

You have just imagined yourself onto Cordell Bank, 18 nautical miles (about 20 statute miles) west of the Point Reyes lighthouse: an extraordinarily rich marine environment in which countless species of invertebrates, fish, birds, and marine mammals feed, breed, and flourish. So valuable is this geologic feature—a sort of Yosemite of the deep—that in 1989 it was designated the sixth national marine sanc-



PHOTOS THIS PAGE: MICHAEL CARVER

tuary, joining the Gulf of the Farallones and the Channel Islands as California's representatives in the system (Monterey Bay was added three years later). Encompassing 526 square miles on the surface, the sanctuary boundary starts six miles off Point Reyes. Underwater, it takes in the "island" of Cordell Bank, which measures 4.5 miles wide by 9.5 miles long at the base and tapers to "hip"-straddling reefs some 165 feet deep and a series of flat-topped plateaus.

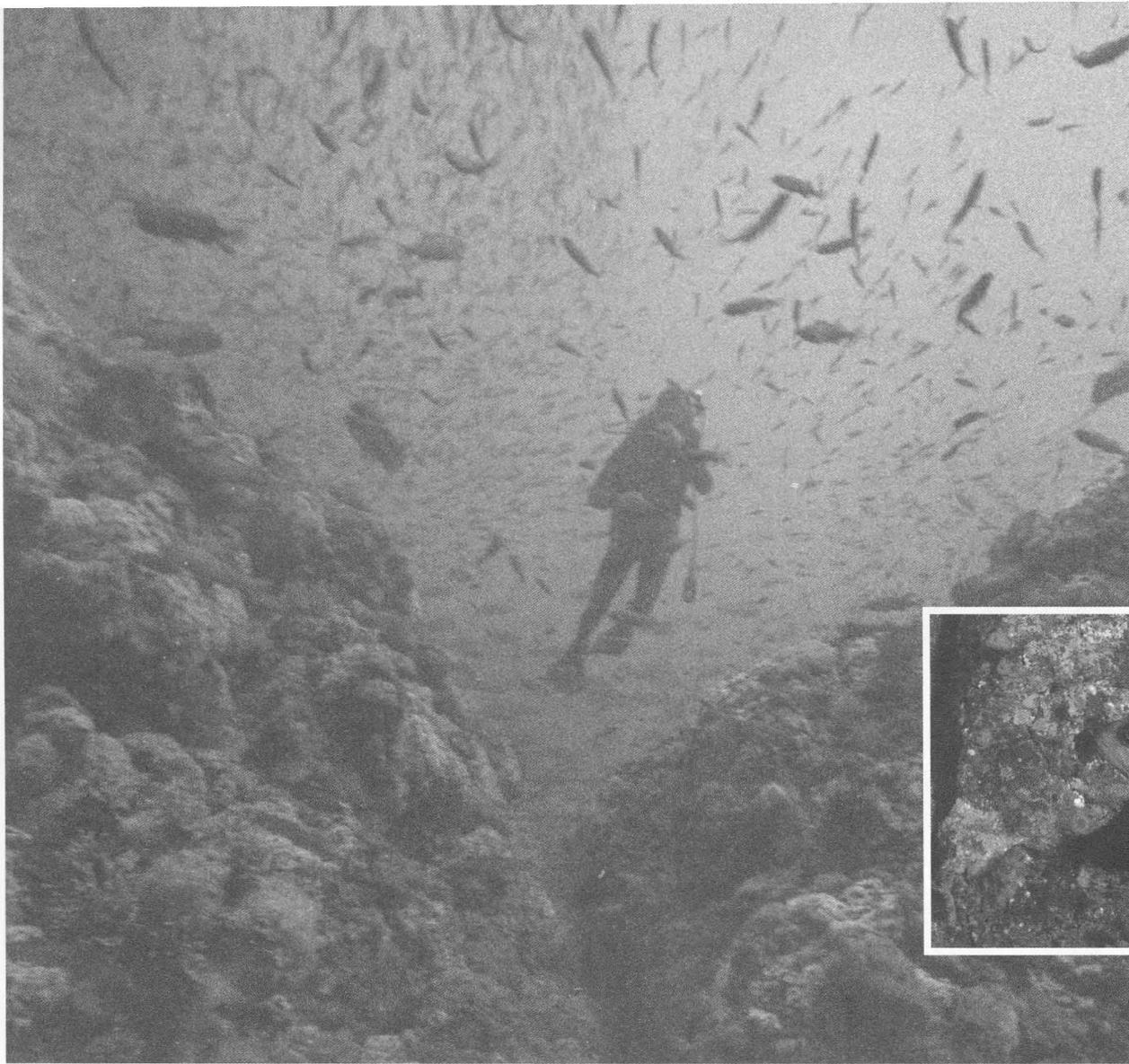
Those few who know the place describe an environment beyond belief, as rich in species diversity and abundance as a tropical reef. Yet for most of us, it must forever remain a place of the imagination. SCUBA diving isn't really a possibility. "Besides white sharks, cold water, lack of light, and lack of time at the bottom," explained Ed Ueber, manager of the Gulf of the Farallones Sanctuary, "the current is so strong that you could wind up five miles away from the boat." And that, as they say, would be that.

How, then, do we know what's down there? For that matter, how did we figure out that there was anything down there in the first place? And who was Cordell, anyway?

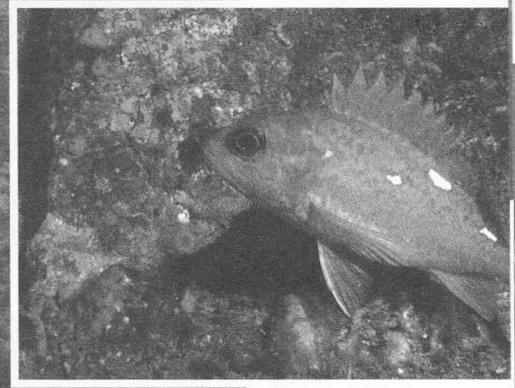
An Open-Ocean Shoal

FOR THE ANSWERS to those questions, we must go back to 1850. The granting of statehood to California brought a flurry of fact-finding missions as the government sought to ascertain just what it had acquired. One such undertaking was a survey of the coast to ensure maritime safety, carried out by the U.S. Coast Survey. Among those in charge of the hydrography was George Davidson. On the night of October 20, 1853, Davidson was proceeding south along the coast when he was enveloped in dense fog. Wishing to determine his position, he dropped a lead line overboard and found himself in a mere 30 fathoms (180 feet) of water: less than half the depth he expected over the continental shelf. He surmised—correctly—that he had discovered a rocky bank, which he placed—also correctly—23 miles west of the Pt. Reyes head.

Now skip forward in time, to after the Civil War. In late 1868 Davidson became aware of mariners' reports of a "shoal west of Pt. Reyes." By this time, Edward Cordell,



LEFT: CORDELL BANK EXPEDITIONS; INSET: MICHAEL CARVER



a German-born surveyor who had aided the Union navy by surveying harbors essential for replenishing supplies, had been appointed assistant to the superintendent of the Coast Survey and sent to California. Davidson suggested to Cordell that he search for the reported shoal. Cordell did so, at first without success, but finally his diligence paid off: in June 1869, attracted by large numbers of birds and mammals, indicating abundant food, he located the bank. Six months later, Cordell died of an accidental fall, an unfortunate event that nevertheless assured his place in the list of California place-names.

Cordell was the first to collect samples of the life of the bank: eight vials' worth, which he described as "red, slimy masses," while the bank itself he characterized simply as "rocky, with live barnacles." Although several more hydrographic surveys were conducted over the ensuing decades, no significant research was done

until 1949, and that was largely geological in focus. The most extensive study of the bank's living organisms, lasting ten years, was initiated in the late 1970s by Robert Schmieder of Cordell Expeditions, a non-profit research group based in Walnut Creek. "Using air scuba, volunteers, and the optimism of inexperience, the first scientific dive on Cordell Bank was made on October 20, 1978," Schmieder wrote in his 1991 book, *Ecology of an Underwater Island*. "The sight we beheld that day was breathtaking: visibility greater than 25 m, jagged rocky outcrops with a dense and lavishly colored invertebrate and algal community, and a myriad of large rockfish circulating slowly overhead. A single glance was enough to convince even the most skeptical that this was truly an extraordinary place." Dives were short—about 15 minutes in duration—and divers oriented themselves by lines attached to buoys floating on the surface and snagged on the reef by anchors.

Left: A diver among the pinnacles of Cordell Bank

Inset: Rosy rockfish, *Sebastes rosaceus*





More recently, the sanctuary has been conducting an ecosystem dynamics study both on the surface and beneath the swells. Water samples taken at several depths both day and night suggest just how bustling this area of the ocean is. In the surface layer alone, said Sanctuary Manager Dan Howard, "It's fascinating what you see. Krill can travel from below 200 meters up into that surface layer in little more than an hour. Juvenile rockfish,

juvenile dungeness crabs, krill, copepods, salps, ctenophores, siphonophores, and myctophids [a deepwater group of fish commonly known as lanternfishes]: they're all there." And then there's the stuff that makes all of this zooplankton possible in the first place: microscopic plant life, which is measured by analyzing the water for chlorophyll content.

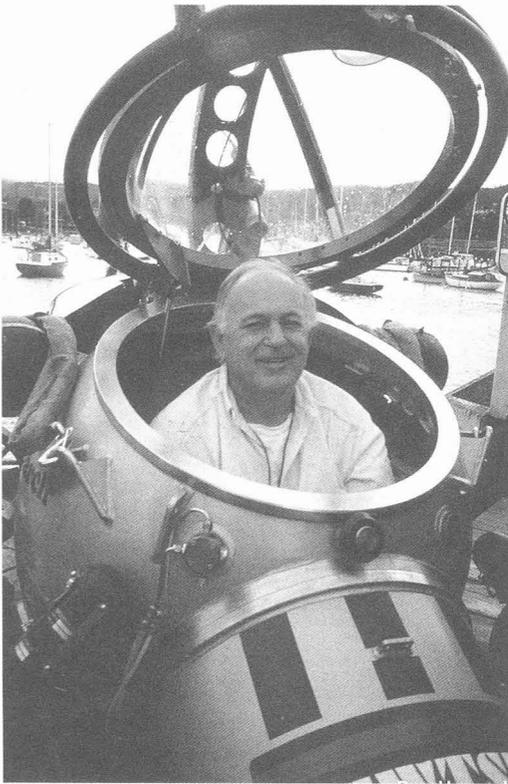
Perhaps the most exciting work is going on below the surface. After having some success with remotely operated vehicle surveys, two years ago the sanctuary contracted the use of the two-person Delta submersible. As Ueber observed, to be at such depths is "incredible: it opens up a window into a world that almost no one has seen. I bet you there aren't 50 people who have seen what people on these expeditions have seen. There are more people who get to the top of Everest every year."

And what they have found truly is incredible. Vast numbers of rockfish at various life stages, especially widows, yellow-tails, and blues, which tend to school in midwater, and some deeper-water species such as yelloweyes, canaries, vermilion, and bocaccios, which are not typically seen near shore. Traveling through an aggregation of 700 fish was not unusual. Indeed, Ueber said, "At times you couldn't see 10 feet because of the concentrations of small fish. And we saw animals down there schooling that we didn't know schooled. Spotted ratfish, for example: we estimated 250 of them in one school, and there were probably a lot more than that that we just couldn't see."

The Food Web Stops Here

WHAT MAKES FOR THIS abundance, this diversity? In a word or two: geology and oceanography. "The Sonoma/Mendocino coasts," explains Howard, "have some of the strongest upwelling in the world. This produces incredible productivity north of the bank, and when the current flows southward, the plankton that thrive on the nutrients brought to the surface flow over the bank and wash bank residents with food." [For an explanation of upwelling, see *Coast & Ocean*, Summer 1998.] Sanctuary biologists are trying to find out if a local eddy exists over the bank during upwelling. If so, this eddy could retain food and increase feeding opportunities for bank residents. And then the larger animals come: black-footed albatross swoop 3,000 miles from their nesting grounds in the Northwest Hawaiian Islands, several times a year, just to nibble at this delectable buffet, and baleen whales regularly stop here during the summer months to feed. These animals eat at many trophic levels. Blue whales and gulls, for instance, dine on krill, and humpbacks and puffins prefer fish. Meanwhile juvenile and adult rockfish—some forty species in all, ranging in adult size from the eight-inch pygmy to the three-foot yelloweye—can be found up and down the water column, benefiting from this soup as well. They are joined by many other fish, including lingcod, flatfish, little reef-flitting greenlings and sculpins, rays, and sharks. And interestingly, several animals that are normally considered strictly intertidal (living on relatively shallow, nearshore rocks) can be found on Cordell Bank, including the red-striped acorn barnacle, a turban snail, and a kelp—again bespeaking the unique living conditions that the Bank provides.

For those of us not lucky enough to have access to a submersible, there is still plenty to see on the surface. The Oceanic Society offers trips to both the Farallones and, less frequently, to Cordell Bank (visit their web site for information: www.oceanic-society.org/index5.html). Also, Point Reyes Field Seminars offers wildlife watching boat trips to Cordell Bank (www.ptreyes.org/field/fsnat.html). If you're a birder on these trips, you can add a number of open-ocean birds to your life list: albatrosses, shearwaters, storm petrels, puffins, auklets, murrelets, phalaropes, terns, jaegers, and skuas. And very rarely an endangered short-tailed alba-



DAN HOWARD

While manager of the Cordell Bank Sanctuary, Ed Ueber was among the first to pilot the Deep Worker submersible research vessel.



tross skids in for a snack, causing birders' boats to list dramatically. Twenty-six species of marine mammals are known to occur in the waters around Cordell Bank, including gray, blue, humpback, minke, fin, and sei whales, Pacific white-sided dolphins, and various pinnipeds. Occasionally an ocean sunfish or sea turtle will lumber into view. Sport fishers, too, visit the area, despite rough seas and unpredictable weather; their main catches now are albacore and salmon. (Rockfish are currently off-limits due to a federal moratorium on groundfish that restricts fishing between 20 and 120 fathoms.

If you are prone to seasickness, you can visit the sanctuary website (<http://cordellbank.noaa.gov>) or visit land-based visitor centers to learn about the sanctuary. The Crissy Field Coast Guard station has a Cordell Bank display, and within two years there should be a display in the Bear Valley Visitor Center at Pt. Reyes National Seashore and possibly in Bodega Bay (the launching point for natural history excursions to the Bank).

The depth, distance from shore, and roughness of the seas around Cordell Bank make it a place that few of us will experience first-hand. "This is the one sanctuary where important ecosystem research can be carried out because you remove the effects of man," said Ueber, who until recently was also man-

ager of the Cordell Bank Sanctuary. Though, as always where humans are concerned, that statement needs to be qualified, for of course, evidence of human activity can be found even here. Lost longlines, gill nets, and trawl cables sparsely litter the Bank. And as Ueber pointed out, although the numbers of rockfish seen today are impressive, "It's hard to judge the numbers without historical background: it seems like a lot, but it could be but a fraction of what there was."

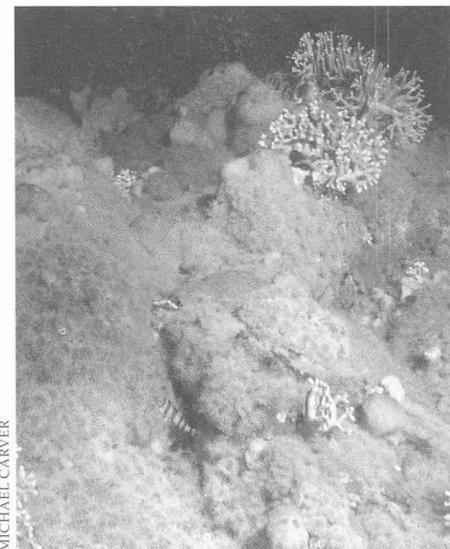
The sanctuary's job is to safeguard this precious resource for the future, and the Bank's remoteness does help. Right now a review of the management plan is in process, said Howard, to chart a course for the next five years as regards research, education, outreach, resource protection, and other matters. The documenting of habitat types, species makeup of the invertebrates and algal turf, determining fish abundance and distribution, and describing planktonic communities will increase our knowledge of this exquisitely productive area. This knowledge can then be used to further protect and better manage this unique marine area known as Cordell Bank National Marine Sanctuary. ■

Anne Canright is associate editor of Coast & Ocean.



Top: Fish are abundant in Cordell Bank's rich habitats.

Bottom: The pinnacles of the Bank are densely encrusted with life.



MICHAEL CARVER

Toward Safe Havens for Marine Life

MICHAEL BHARGAVA



CHANNEL ISLANDS NMS

Top: Garibaldi (*Hypsypops rubicundus*) in the Channel Islands sanctuary

Bottom: Purple striped jellyfish in Monterey Bay

UNTIL THE BLOWOUT at Union Oil's offshore Platform A dumped massive amounts of fresh black crude onto Santa Barbara's white beaches 30 years ago, conservation efforts had by and large focused on land. The January 28, 1969 disaster, however, became a catalyst for a popular campaign to protect nearshore waters from pollution and other damage.

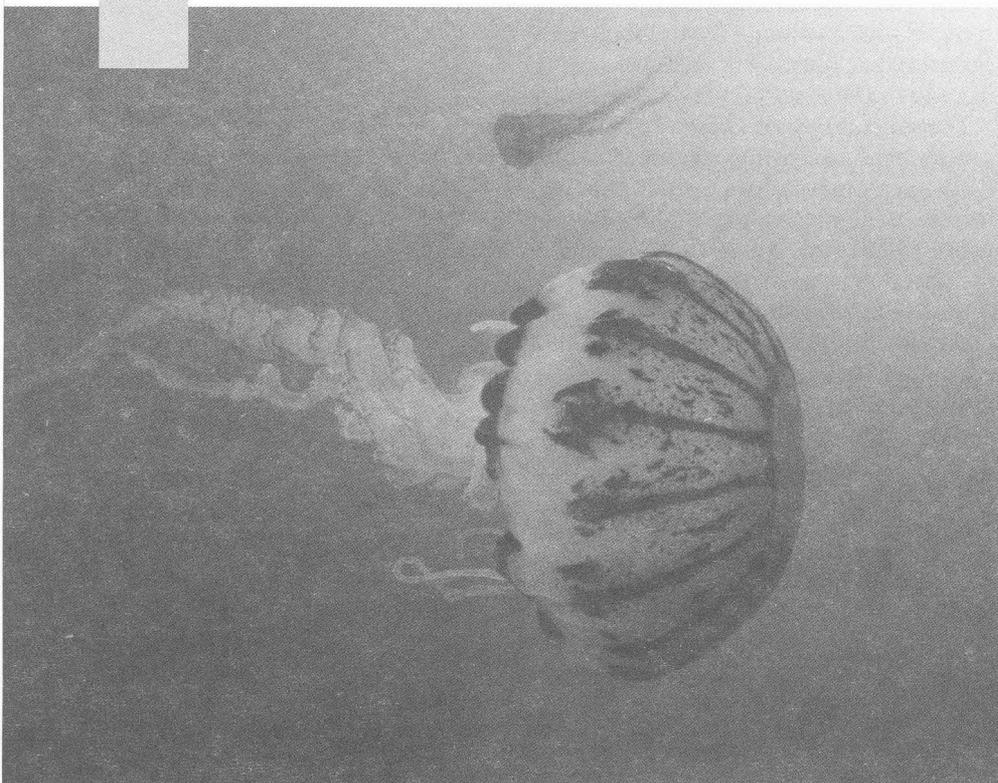
Enraged citizens in Santa Barbara County organized Get Oil Out! (GOO). They stopped attempts to install more oil rigs

off their coast and joined in a statewide campaign for a larger goal: to protect the entire California coast. It was a propitious time, for the environmental movement was about to sweep the country.

The year 1972 brought results. In California, voters passed Proposition 20, the "Save Our Coast" initiative, which established the state's coastal management program. In Washington, D.C., landmark legislation was passed, including the Clean Water Act, Marine Mammal Protection Act, and the Marine Protection, Research, and Sanctuaries Act, which enabled the National Oceanic and Atmospheric Administration (NOAA) to designate offshore regions as National Marine Sanctuaries. These sanctuaries were "to maintain the natural biological communities . . . and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes."

NOAA designated 13 marine sanctuaries in the 1980s and 1990s, four of them in California: Channel Islands (1980), Gulf of the Farallones (1981), Cordell Bank (1989) and Monterey Bay (1992). Together, these four embrace over 6,000 square nautical miles of ocean. The Channel Islands sanctuary includes all waters within six miles of five islands. The others extend along about 300 miles of contiguous coastline, from Cambria in San Luis Obispo County north to Bodega Head in Sonoma County.

For sanctuary advocates in California, a paramount goal was preventing further oil drilling. Fishing was not considered to be a major problem at the time. In fact, the sanc-



KIP EVANS

tuaries were expected to protect the fishing industry from the threat of oil development. Local and federal officials often assured local fishermen that they would not be subjected to further regulation. Sanctuary regulations generally exempt commercial fishermen from bans on dumping (fishing) waste and altering the seabed (by bottom trawling). Marine managers tended to assume that issues of overfishing and bycatch had been taken care of by the 1976 Magnuson Fisheries Conservation Act, which regulates commercial fishing. In hindsight, that was overoptimistic.

Oil spills had plagued the coast throughout the 20th century, killing tens of thousands of birds and marine mammals. Oil flowed from shipwrecks, leaked from passing ships, and was dumped offshore in ballast water.

Coastal residents in California had been complaining about beaches blackened and birds killed by oil for more than 80 years. In 1919 Samuel Newsom, then residing in the Farallones Islands, reported in *Gull* magazine that oil slicks appeared about every two weeks. "Hundreds if not thousands of murrelets could be seen about the islands trying in vain to free themselves of the oil," he wrote, describing one episode. "Many could be seen splashing in the water, trying to wash the oil from their plumage, while most perched dejectedly on rocks and pecked at their black, oily breasts and wings."

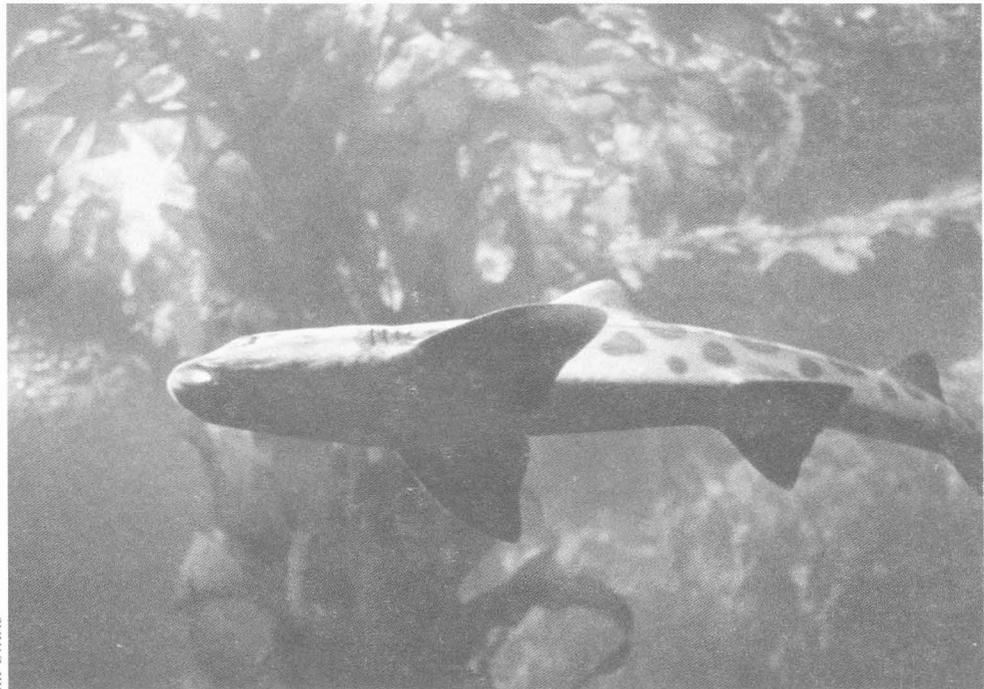
Fifty years later, with images of oil-soaked birds and seals fresh in their minds, Californians wanted to ensure that a tragedy like Santa Barbara's would never happen again. They campaigned, successfully, to stop further expansion of offshore drilling in the Santa Barbara Channel and joined in a growing statewide campaign for a larger goal: to protect California's whole coast.

President Jimmy Carter's designation of the Channel Islands and the Gulf of the Farallones sanctuaries forbade oil exploration or development within their boundaries. Dumping of sewage and other wastes was also prohibited, as was any alteration of the seabed by mining or other activities. When the Cordell Bank Sanctuary was established, the banning of oil exploration was again a top priority, even though the granite formations there contain little oil. With the creation of the Monterey Bay Sanctuary, most of California's central coast was protected from oil development.

To be sure, coastal waters and the shore continued to be exposed to oil pollution

from spills. Several tankers have wrecked off the California coast in recent decades, spewing toxic oil into marine ecosystems. In 1971, two Standard Oil tankers collided in the fog just outside the Golden Gate Bridge. The *Arizona Standard* ripped into the *Oregon Standard*, spilling some 1.9 million gallons of heavy bunker oil into the bay and ocean, killing an estimated 20,000 seabirds. The SS *Jacob Luckenbach* sank in 1953, 17 miles outside the Golden Gate. Oil leaked from the wreck from at least 1992, until in 2002 it was identified as the source of mysterious tarballs that had been marinating the coast. Salvagers removed or sealed off the oil remaining in the wreck. (See *Coast & Ocean*, Winter/Spring 1991, Autumn 1999, and Summer 2002.)

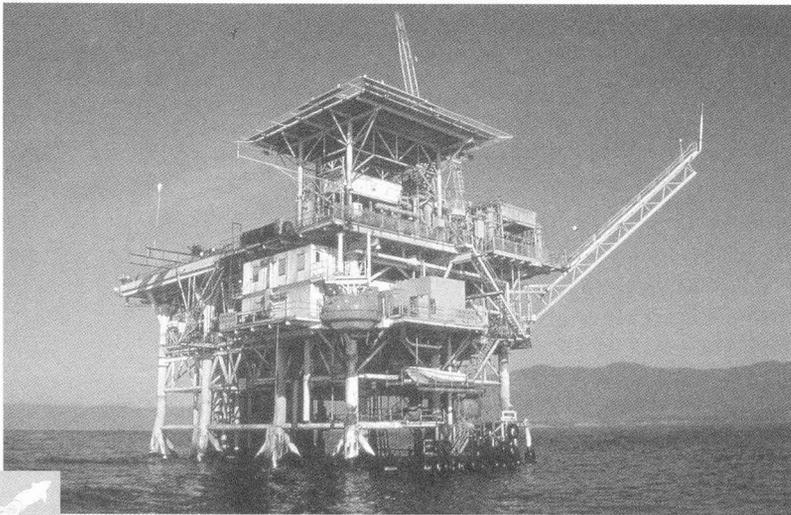
Leopard sharks are common in Monterey Bay kelp forests.



KIP EVANS

Ocean Abuse

OIL WAS NOT THE ONLY troublesome pollutant, of course. After World War II, the Department of Defense scuttled off the California coast at least eight warships and submarines that had been contaminated by nuclear tests at Bikini Atoll. These included the aircraft carrier USS *Independence*, which was sunk off San Francisco in 1,000 fathoms of water. Between 1946 and 1970, the federal government also dumped nearly 50,000 barrels of low-level nuclear waste about 30 miles from San Francisco, southwest of the Farallon Islands, at a depth of



FARALLONES

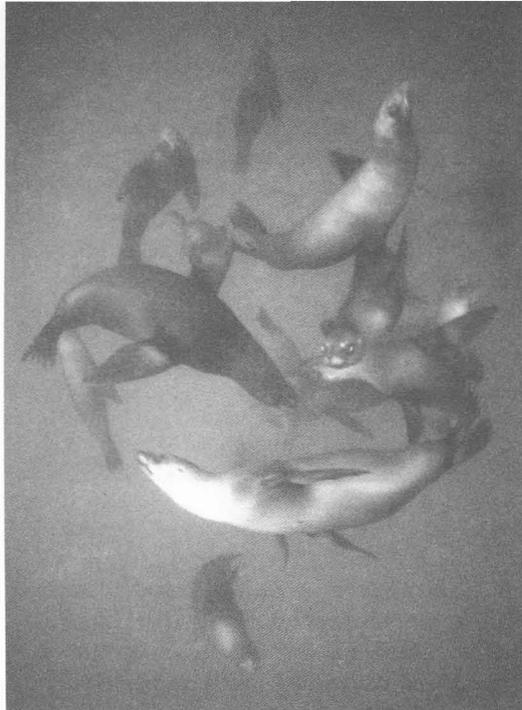
AMONG CALIFORNIA'S FOUR NATIONAL marine sanctuaries, only a few small areas enjoyed some degree of protection before 1980. In 1909, President Theodore Roosevelt issued an executive order creating "a preserve and breeding ground for native birds" in the Farallon Islands, home to the largest concentration of breeding seabirds in the 48 contiguous states. The reserve comprised five islands (Middle Farallon and North Farallon) and one pinnacle (Noonday Rock) that stops just short of the ocean's surface but provides valuable habitat for dozens of species of marine mammals, seabirds, fish, and invertebrates. The largest of the islands, Southeast Farallon, was not included because it was the site of a lighthouse. It was added in 1969, when the preserve became the Farallon Islands National Wildlife Refuge. In 1981, the much larger Gulf of the Farallones National Marine Sanctuary was established, encompassing not only the waters around the islands but also 948 square nautical miles of other food-rich surrounding waters. This refuge now provides habitat for more than 400,000 birds of 15 species, as well as resting and feeding areas for dozens of migrating bird species.

about 600 feet. This waste had been generated by atomic laboratories and industry. Before the Clean Water Act, many coastal cities dumped untreated wastewater into the ocean for years. Now the toughest land-based source of marine pollution is the kind termed "non-point source," mostly runoff from cities and agricultural operations. Pesticides, herbicides, and bacterial pollution continue to pour into coastal ecosystems, as well as excess nutrients that can contribute to toxic algal blooms.

This ocean abuse continues to exact a toll on marine life already decimated by more than a century of reckless hunting and fishing. Almost every major species in coastal waters is now severely depleted or, in some cases, recovering from depletion. Populations of sperm whales, sea otters, sea lions, common murre, rockfish, and dozens of other species have experienced a roller-coaster of fluctuations. Populations of sardines, elephant seals, and gray whales have recovered to healthy numbers but others continue to decline. Since the Monterey Bay National Marine Sanctuary was established, nine new species or populations in those waters have been added to the federal list of endangered or threatened wildlife, including the western snowy plover, marbled murrelet, and various runs of Chinook salmon, coho salmon, and California steelhead.

The sanctuaries have helped to protect coastal waters from the threat of oil exploration and development, and from some other harmful practices, including alteration of the ocean floor, collection of minerals, discharges from vessels, and wastewater discharges from land-based treatment plants. The use of personal watercraft (jet skis) has been curtailed in Monterey Bay and banned from the Gulf of the Farallones. Aircraft may not be flown at less than 1,000 feet in certain zones where nesting seabirds would be disturbed.

The sanctuaries have, however, failed to protect marine life against the most direct current threat: commercial and recreational fishing. Both overfishing and bycatch problems persist. Gill netting continues to entangle pelicans and other birds that dive for fish. The first significant step toward addressing that problem was taken in October 2002, when the first no-take reserves (Marine Protected Areas) were established around the Channel Islands. The reserves consist of 12 areas (ten of which are no-take and ban fishing altogether) and encompass 19 percent of the Channel Islands National



Marine Sanctuary, an area of 175 square miles (see p. 32).

Over the course of the last decade concern has risen among a range of scientists and policymakers that, by and large, current fisheries regulations are not adequate to protect ocean resources. More than 1,200 vessels catch fish and shellfish in the Monterey Bay Sanctuary alone. Bottom trawling devastates underwater ecosystems, and the sanctuaries are powerless to prevent it.

Dozens of fish species have decreased in abundance, forcing fishermen to work harder and longer to catch the same amount of fish. The catch per unit of effort (CPUE), a measure of the relative abundance of a species in a fishery, has declined significantly for various species of groundfish.

In 2002 the situation became so dire for several species of rockfish that the Pacific Fishery Management Council closed a wide swath of Pacific coastal waters to taking of most groundfish. This drastic action came after decades of overfishing and regulatory inaction. Scientists have estimated that some rockfish species may take decades to recover to their historical levels—a recovery that is unlikely to happen if strong, permanent measures are not instituted immediately.

Many American fisheries are overcapitalized, with too many boats vying for too few fish. Since the passage of the Magnusen-Stevens Fishery Conservation and Management Act and through the 1980s, federal fisheries policies have encouraged the construction of larger vessels, especially tuna purse-seiners, trawlers, and

long-liners, significantly expanding the catch capacity of the fleet. In the past few years, the National Marine Fisheries Service has attempted to bring the number of fishing vessels in line with the number of fish, but with only limited success. In many instances federal regulations have failed to prevent overfishing or collapse of fish stocks, or to protect other marine species against destructive fishing practices.

Not Yet Safe Havens

HAVE THE SANCTUARIES fulfilled their mandate to “maintain the natural biological communities . . . and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes”?

The record is mixed. The legislation that made the creation of National Marine Sanctuaries possible requires that they fulfill their mission by “comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing regulatory authority.” The prohibition of oil and gas activities within sanctuary waters was a critical first step, but no more than that. If “existing regulatory authority” does not stop destructive practices, sanctuary regulations need to do so. Sanctuary managers do consult with other agencies and engage the public. Some have led the way in efforts to resolve resource conflicts, but their powers are largely advisory. The creation of no-take reserves was another important step. Scientists hope that

(continued on page 40)

Opposite: Oil drilling and fishing can have severe impacts on marine life and habitats. Sanctuaries help to mitigate the effects of human activities.

Top left: Over 80,000 California sea lions live and breed in the Channel Islands.

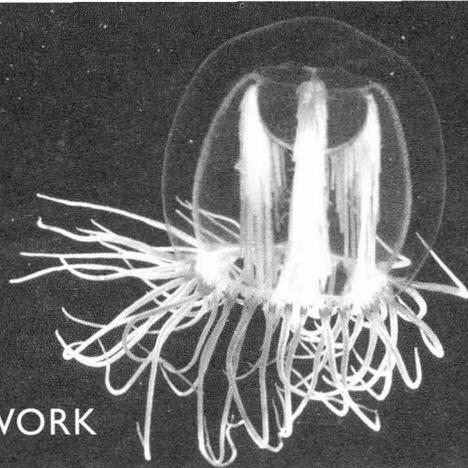
Top right: Harbor seals feed, play, and find refuge in Monterey Bay kelp forests. At night they dive deeper, looking for prey.

Bottom: A diver explores one of many shipwrecks that create artificial reef habitat in the Channel Islands sanctuary.



Truly Safe Havens

CALIFORNIA'S NEW MARINE RESERVE NETWORK



SHANE ANDERSON

Medusa

PUBLICATIONS

TWO RECENT publications complement the Pew Ocean Commission's report. Both are available on-line as downloadable PDF files.

- *What Price Farmed Fish: A Review of the Environmental and Social Costs of Farming Carnivorous Fish*, by Michael Weber, published by SeaWeb, examines the impacts of farming salmon and other carnivorous fish: www.AquacultureClearinghouse.org.
- *Protecting Wild Salmon from Impacts of Atlantic Salmon Aquaculture*, published by the World Wildlife Fund and the Atlantic Salmon Federation, focuses on Atlantic nations with salmon farming operations, but is relevant to the Pacific Coast, where Atlantic salmon are also farmed, with potentially more negative impacts on wild Pacific species: www.worldwildlife.org/news/pdfs/osloresprogress.pdf.

RESEARCH IN NEW ZEALAND, Florida, and elsewhere shows that ecologically designed Marine Protected Areas (MPAs) benefit both marine ecosystems and fisheries. Now Californians have a chance to find out on home ground whether that is true. On April 9, the California Fish and Game Commission established a network of 12 MPAs in the Channel Islands National Marine Sanctuary. This is the largest such network on the West Coast and one of the largest in the world. It encompasses 142 nautical square miles and protects 19 percent of state waters within the Sanctuary. Reserve boundaries have been drawn scientifically, to protect the Sanctuary's entire ecosystem.

Ten of the protected areas are Marine Life Reserves—or no-take reserves—where all fishing or other harvesting is prohibited and fishing boats may enter only if their gear is stowed. Two are Marine Conservation Areas where limited fishing may be permitted. The intent is to help restore fish stocks and other marine life devastated by destructive practices. Endangered white abalone, rockfish, and kelp forests will have a better chance of recovery.

"This is a first step, and it's a test case," said Gary E. Davis, visiting chief scientist for the National Park Service's Ocean Programs. "In the past, we were relying on our inefficiency to protect us from ourselves. Though we didn't realize it, we were relying for recruitment on places we couldn't get to, that were difficult to locate with a compass—hidden places such as little piles of rock off a reef. Today all those places have been lost. They can be located with certainty with a GPS system and have become available to everyone." Modern fishing technology allows access to far greater depths and includes gear that enables trawl nets to crush bottom habitat structures on which they previously would have snagged. "So we have to make the refugia explicit," Davis explained.

The new reserves will help long-living fish to mature to sizes at which they are most fecund, thus increasing fish populations. "Evidence from around the world is that you get pretty rapid increase in biomass," said Fish and Game Commissioner Sam Schuchat. "Different species come back at different rates."

Before the creation of the Channel Islands MPAs, only 0.2 percent of state waters were in a scattering of small no-take reserves, which "were placed where nobody complained, not necessarily where the best habitat is," according to John Ugoretz, senior marine biologist for the Marine Region of the California Department of Fish and Game. The new network brings the total area of state waters thus protected to 3.5 percent. The earlier reserves did yield some benefits, but the new ecologically based network has far greater potential.

"It was created because recreational fishermen from Ventura County petitioned for it," said Schuchat. The fiercest opposition also came from recreational fishermen, whose emblematic red shirts were dramatically visible at the numerous hearings and meetings on the MPA proposal during the past four years. Now the Department of Fish and Game is enlisting commercial and recreational fishermen as volunteers for monitoring.

Enforcement has been "very successful," so far, Ugoretz said. "Only two violations have warranted citations." Citizens who see a violation may call a 24-hour hotline: (888) DFG-CALTIP.

"I'm pretty confident that 10–20 years from now, fishing around the edges of the reserve will be terrific," Schuchat said. "People will say: Isn't it great that they had the foresight to set this up?" Monitoring and studies already under way will test this prediction. ■

—RG



Pew Oceans Report

AMERICA'S LIVING OCEANS:
CHARTING A COURSE
FOR SEA CHANGE



Ignorance and destructive practices are destroying the health of the oceans, the Pew Oceans Commission has found, and major changes in governance and practices are urgently needed to make recovery possible. The Commission's report, *America's Living Oceans: Charting a Course for Sea Change*, presents conclusions of the first independent review of United States ocean policies in 30 years. It was begun in June 2000 and published in June 2003.

The 18-member commission, chaired by former Congressman from Monterey Leon E. Panetta, traveled throughout the country to learn first-hand of ocean problems, not only on the coasts but inland as far as Iowa, to talk with farmers about polluted runoff. "The story that unfolded is one of a growing crisis in America's oceans and along the coasts . . . a shared sense of urgency and commitment to reverse the decline in the health of the oceans," states the Pew Commission. Here are some excerpts:

. . . We are now capable of altering the ocean's chemistry, stripping it of fish and the many other organisms which comprise its rich biodiversity, exploding and bleaching away its coral nurseries, and even reprogramming the ocean's delicate background noise.

We love our freedom to move about the ocean surface where no streets, signs, or fences impede us, yet our sense that no one owns this vast realm has allowed us to tolerate no one caring for it.

During the 20th century our nation came to regard the air we breathe, the fresh water we drink, and the open lands as "common goods," part of our public trust. Now we must acknowledge that the oceans, too, are part of our common heritage and our common responsibility. . . .

Both comprehensive and detailed, the report presents a new direction for governing our oceans. . . . the Commission has confronted the

San Miguel Island

RESTORING OUR OCEANS

HIS COMMISSION has a vision of how the health of our oceans and coasts can be restored and protected. It is a vision based on the principle that we must treat our oceans as a public trust to be managed for the common good. It recognizes that the land and ocean are interrelated and that we must work regionally and locally to protect our ocean ecosystems and the watersheds that sustain them. The outcomes of this vision are healthy and plentiful marine life, thriving fishing communities, clean beaches and coastal waters, and healthful seafood.

—Leon Panetta
Chair of the Pew
Oceans Commission



Cordell Bank pinnacle

most challenging aspect of ocean policy. If its recommendations are accepted and acted upon, we can anticipate a future when fish will again be plentiful and fishing communities will thrive, when beaches will be clean, and now-impooverished coral reefs will teem with life.

The oceans are our largest public domain. The United States' oceans span nearly 4.5 million square miles, an area 23 percent larger than the land area of the nation. Their biological riches surpass that of our public lands. The genetic, species, habitat, and ecosystem diversity of the oceans is believed to exceed that of any other Earth system. Yet, incredibly, we are squandering this bounty.

Our current state of knowledge can make it difficult to unravel the relative roles of natural processes and human influence, whether from chemical pollution, nutrient enrichment, or climate change. But scientists are finding increasing human influence on the environment.

For example, in Puget Sound, PCB contamination may be a factor in the decline of orcas, or killer whales, whose numbers have declined by 14 percent since 1995. PCB levels in the Puget Sound population exceed that known to suppress immune function in another marine mammal, the harbor seal. Similarly, high levels of PCBs, DDT, and tributyltin (a component in boat paint) may be contributing to the deaths of California southern sea otters. . . .

The crisis in our oceans is such that many marine populations and ecosystems may be reaching the point where even a small disturbance can cause a big change. We must therefore initiate large changes ourselves, if we are to protect and restore the oceans, in our governance of them and our attitude toward them. We must no longer structure our thinking in terms of

maximizing the short-term commercial benefit we derive from the oceans, but rather in terms of maximizing the health and persistence of ocean ecosystems.

In considering ocean governance, the Commission identified three primary problems: resource exploitation with too little regard for environmental consequences; institutional, legislative, and geographical fragmentation; and a focus on individual species rather than ecosystems.

To correct these shortcomings, the Commission identified five main challenges and corresponding recommendations for revising laws and institutions: reforming ocean governance, restoring America's fisheries, protecting our coasts, cleaning coastal waters, and guiding sustainable aquaculture. To meet these challenges, comprehensive action is required.

New laws and policies, however substantial, are not enough. . . .

Our society needs an ethic of stewardship and responsibility toward the oceans and their inhabitants. Like the conservation land ethic that has taken shape in our nation over many decades, an ocean ethic provides a moral framework to guide the conduct of individuals and society.

Six key principles form the core of this new ocean ethic and all of the Commission's recommendations: Uphold the Public Trust, Practice Sustainability, Apply Precaution, Recognize Interdependence, Ensure Democracy, and Improve Understanding.

Recommendations for Congressional action include:

America's Living Oceans is available at www.pewoceans.org as a downloadable PDF file. Print copies can be ordered through the web site or from Pew Oceans Commission, 2101 Wilson Boulevard, Suite 550, Arlington, VA 22201; phone (703) 516-0624; FAX (703) 516-9551.

(continued on page 40)



LOOKING TOWARD THE OCEAN

THE COAST IS FORMED by land and water, and we cannot solve the problems of one if we ignore the problems of the other. Since it began operating in 1977, the Coastal Conservancy has concentrated its efforts on the landward side of California's coast. Our primary focus has been on the nearshore lands of the Coastal Zone, but we have extended our work into watersheds because land-use decisions upstream greatly affect the coast itself. As the understanding of this relationship has grown, our authority to work in watersheds has become more explicit and our efforts have expanded.

Now we are looking offshore. Recently, the State Legislature allocated \$7 million to the Conservancy for an ocean current monitoring and mapping program that will investigate how pollutants are transported in coastal waters. This research is essential to our understanding of the full effects of pollution and of how we might reduce its damage. The program will also provide information on nearshore sand transport, to help California to maintain its world-class ocean beaches.

Considerably more research such as this is needed if we are to make headway on our ocean problems. We need to know more about fish populations, their habitats, and the

effects of fishing techniques and gear on their numbers; about the diseases that have reduced populations of otters, abalone, and other marine life in

California, and the contaminants that make our recreational beaches unsafe for people. We also need to find out more about the influx of invasive species to our waters, how we might reduce that influx and control invaders that are already established. Research will help answer many of our questions, and enable us to ask still more questions about improving the marine environment.

California's Coastal Zone extends three miles from the shoreline, encompassing about 3,300 square miles of ocean waters. It seems pretty obvious that what we do with our coastal lands will affect the marine environment, and that the quality of the marine environment will affect the quality of our lives on the coast. Too often, however, we've been blind to that interdependence. As late as the 1960s, for example, it was not uncommon in California for truckloads of trash to be dumped directly

into the ocean, which then was thought big enough to absorb the wastes we are so adept at generating. We are rapidly learning that the world's oceans are not so big after all, and that human activities can have profound, and sometimes

devastating, effects on the vast environment of the sea.

The Conservancy has long been involved with projects to improve the



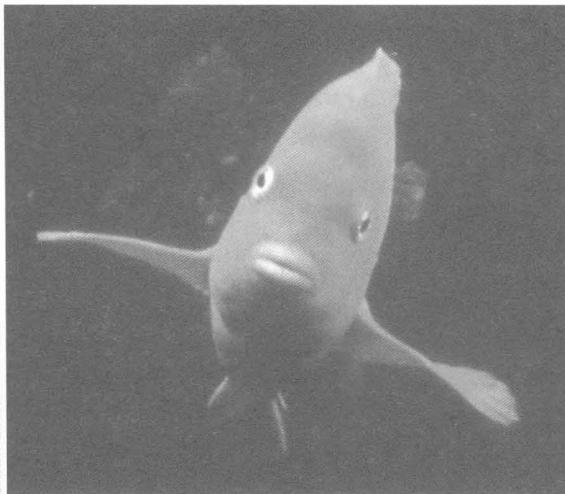
health of the ocean. From its earliest days, this agency has worked to restore coastal wetlands that help filter pollutants while providing habitat for a wide variety of wildlife, including the young of many fish. We are helping to remove dams and other barriers that prevent salmon and steelhead trout from reaching their historic

upstream spawning grounds. We are also actively working with local communities to reduce ocean-bound pollution, including trash from urban sewers and wastewater seepage from inefficient septic systems.

In May 2003, the Pew Oceans Commission, a nonpartisan panel created to take stock of our nation's waters, published its report, *America's Living Oceans: Charting a Course for Sea Change*. The report discusses many threats to our oceans—point and non-point source pollution, invasive species, aquaculture, coastal development, overfishing, habitat alteration, fisheries bycatch, and climate change. It also outlines approaches to counter these threats, primarily through policy and regulatory means. The Coastal Conservancy's 26 years of experience indicate there's also a strong role for nonregulatory approaches.

We are prepared to carry out the Legislature's mandate that we develop a program to monitor and map ocean currents. In this undertaking, we look forward to working with the many public and private organizations that are committed to improving the health of our oceans. This is another important step toward protecting California's coast and making it a better place for our wildlife, our economy, and our enjoyment of life. ■

—Sam Schuchat



CHANNEL ISLANDS NMS



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COASTAL CONSERVANCY NEWS

AT ITS JUNE 4 MEETING in Oakland, the Coastal Conservancy approved funding for projects to restore streams and beaches from erosion, improve wildlife habitat and water quality, plan for trails and visitor-serving facilities, and accomplish other purposes along the coast and San Francisco Bay. Almost all the funding for these projects was provided by Proposition 40, the resources bond act passed last March, and Proposition 12, the park bond act of 2000.

SOUTH COAST AND CENTRAL COAST

IN SAN DIEGO COUNTY, the City of Del Mar will make public safety and visitor-serving improvements at the 25th Street entrance to **Del Mar City Beach**, using \$365,000 from the Coastal Conservancy and \$85,000 of its own funds. A lifeguard tower will be rehabilitated, restrooms will be built, and a ramp that now passes over a seawall will be replaced.

The San Elijo Lagoon Conservancy will prepare a plan to improve water quality and native habitats along **Escondido Creek**, which drains into

The 750-acre **Sea West Ranch**, on the **Harmony Coast** between Cambria and Cayucos in San Luis Obispo County, has been purchased by the American Land Conservancy with substantial funding from the Coastal Conservancy, and conveyed to the State Parks Department. One of the largest remaining coastal prairie grasslands on the coast, the property provides significant wildlife habitat, and will add three miles to the **California Coastal Trail**.

San Elijo Lagoon, with the help of \$250,000 from the Conservancy. The cities of Escondido and Encinitas will provide services valued at over \$120,000.

The City of San Diego will evaluate the structural integrity of storm-damaged **Ocean Beach Pier**, a popular landmark. The Conservancy approved \$120,000, to which the City will add \$80,000 of its own funds.

Using \$878,700 approved by the Conservancy in June 2001, the City of San Diego will make improvements on **Chollas Creek**, which has been degraded by the effects of urban development. The funds are for restoring habitat, building trails, installing new flood management facilities, and an open-air interpretive center.

In **Los Angeles County**, an urban waterfront plan will be prepared for the **Los Angeles Harbor area**, which has not yet been developed for visitor-serving, recreational, and commercial uses. An important goal is to link the waterfront with shoreline areas of Wilmington, San Pedro, and Harbor City. The Conservancy authorized \$300,000, including a grant of \$225,000 to the Los Angeles Harbor/Watts Economic Development Corporation and \$75,000 in direct Conservancy expenditures. Local sources are expected to provide an additional \$250,000.

The Malibu Coastal Land Conservancy will install a bridge over **Malibu Creek**, replacing a road crossing that blocks steelhead trout migration. Removal of the crossing will allow

the fish to reach about 2.1 miles of spawning and rearing habitat within Malibu Creek State Park. The Conservancy approved \$400,000 for the project. Another \$150,000 is expected from other sources.

In **Santa Barbara County**, the Conservancy authorized \$275,500 to the City of Santa Barbara to prepare environmental documents, permits, and engineering and construction plans for the first phase of the **Arroyo Burro Estuary Restoration Project**. Adding \$135,000 of its own funds to the project, the City will remove invasive non-native plant species, revegetate with native plants, remove in-stream concrete structures, restore habitat in the stream channel, stabilize eroding stream banks, install storm drain filters, and develop an interpretive trail.

A master plan to address chronic shoreline erosion at **Goleta Beach County Park** will be prepared with \$60,000 from the Conservancy, plus \$10,000 in Santa Barbara County funds. Severe erosion has narrowed the popular beach considerably and made upland park facilities vulnerable to storm waves. A Conservancy-funded **Goleta Beach Nourishment Project** planned for this autumn will temporarily alleviate the problem. The Conservancy approved a modification in this project, initially approved in April 2002, calling for sand donation from West Beach, Santa Barbara Harbor, rather than from an offshore borrow site at Goleta Beach.

In **San Luis Obispo County**, the **City of Morro Bay** will develop strategies for retaining commercial fishing operations at a City-owned **fishing pier** with the help of \$35,000 from the Conservancy, matched by \$35,000 from the California Department of Community Development. The pier is currently leased to a commercial fish buyer, but the City needs to prepare for a time when the leaseholder may be unwilling or unable to continue its operation.

In **Monterey County**, the Elkhorn Slough Foundation will provide training for a variety of regulatory, scientific, and non-government organizations and individuals with the help of \$110,000 from a grant from the National Oceanic and Atmospheric Administration approved by the Con-

servancy. The training will provide information about resource enhancement programs of the **Elkhorn Slough National Estuarine Research Reserve**. The Department of Fish and Game will contribute materials and services valued at \$47,000 to the project.

In **Santa Cruz County**, the first phase of the **Integrated Watershed Restoration Program** is under way. The Conservancy approved \$4.5 million to the County Resource Conservation District to provide for design and permitting of 75 to 95 restoration projects, watershed monitoring and community outreach, a lagoon management plan, a watershed activity guide for school children, and improved coordination among resource agencies and local watershed partners. These projects constitute the first phase of the county-wide program, which is designed to address several common problems affecting fisheries, water quality, and the health of streams and wetlands in 13 watersheds. The Conservancy's funds, available through Proposition 40, will be joined with an expected \$1.5 million from federal, state, and local sources for this first phase of the program, and considerable additional funds for later phases.

SAN FRANCISCO BAY AREA

THE CITY OF PACIFICA will build a 7,700-foot segment of the **Coastal Trail** over the **Pedro Point Headlands**, linking the city with the Devil's Slide highway right-of-way. This will complete the seven-mile Coastal Trail in Pacifica. Pedestrians, bicyclists, and wheelchair users will have a safe alternative to the Highway 1 shoulder. Caltrans will provide \$800,000 for the project, the Conservancy approved \$200,000, and the City will provide \$100,000.

In November 2000, San Francisco voters gave 73 percent approval for a **San Francisco Bay Delta and Estuary Center** to be developed at Pier 45, in the Fisherman's Wharf area. Plans call for this to be a center for learning and research, with indoor and outdoor exhibitions, laboratories, classrooms, and satellite video-conferencing and web-casting facilities. The Conservancy approved \$250,000 to the San Francisco Foundation Community Initiative to complete planning. Con-

struction costs, estimated at \$32 million, are to be funded from public and private sources.

Sail San Francisco will use \$75,000 approved by the Conservancy to coordinate and facilitate visits of tall sailing ships, international maritime training vessels, and other craft to California's coastal ports; also to assist in development of waterfront festivals that highlight such ships; and to carry out educational projects involving the vessels for students from kindergarten through the 12th grade. An additional \$225,000 will be provided by a variety of public and private sources.

To help in the development of public access improvements to the **Bay Area Ridge Trail** at the 23,000-acre Peninsula Watershed property, which contains **Crystal Springs Reservoir**, in **San Mateo County**, the Conservancy approved \$125,000 to the San Francisco Public Utilities Commission. The improvements will allow opening of this 10-mile section of the Ridge Trail to docent-led access.

With \$6.5 million of its own funds and \$2 million from the Conservancy, the East Bay Regional Park District expects to purchase approximately 16 acres at the bay end of Gilman Street in **Berkeley** next to **Eastshore State Park**. The site, currently used to store horse trailers and zoned for a 50,000-square-foot retail complex, is proposed as a location for recreation and playing fields that many members of the community want to see included in the adjacent Eastshore State Park.

A \$246,250 grant will help the Park District to purchase a conservation easement on the 36-acre **Mount Diablo Gateway** property in **Contra Costa County**. The easement will protect the open space, habitat, and scenic values of the property by preventing its subdivision and residential development. Continued grazing will be allowed, along with recreational uses such as trails, a staging area, and a small equestrian center managed by the City of Walnut Creek. The property is near Mt. Diablo State Park's Northgate Road kiosk entrance and is adjacent to Diablo Foothills Regional Park. The Park District has allocated \$250,000 toward the \$1.56 million purchase, the City of Walnut Creek is contributing \$250,000,



San Diego's inner-city schoolchildren are enjoying after-school and summer marine science programs provided by the Aquatic Adventures in Science Education Foundation of Mission Bay. A June 2002 Coastal Conservancy grant enabled AASEF to purchase this 15-passenger van and adapt it to also accommodate one wheelchair rider.



Public access around the Point Arena Lighthouse will be expanded with the acquisition of 1,800 acres of Stornetta Brothers Coastal Ranch lands. The Garcia River estuary will be protected and farming will continue.

and local conservation organizations will add \$200,000 more.

With the help of \$150,000 from the Conservancy, the National Park Service will acquire the three-acre Whitton property on the east shore of **Tomaes Bay** in **Marin County**, and design a **California Coastal Trail** link southward to Millerton Point State Park. If not purchased for public use, the property would likely be developed as a residence. The Park Service will contribute \$410,000 toward the total purchase price of \$590,000, and the owner will contribute \$60,000. The property will be added to the Golden Gate National Recreation Area.

The Conservancy authorized the redirection of \$1,135,600 previously granted to the Marin County Open Space District to allow the District to reformulate and complete the feasibility study for the **Bolinas Lagoon Ecosystem Restoration** project, and to conduct engineering and design tasks.

NORTH COAST

THE U.S. BUREAU of Land Management will acquire fee and conservation easement interests in 1,800 acres of the **Stornetta Brothers Coastal Ranch** near Point Arena in **Mendocino County** with the help of \$3.5 million from the Conservancy, plus \$1 million from the U.S. Fish and Wildlife Service and \$3,354,000 from the state Wildlife Conservation Board (WCB). The acquisition will protect natural resources, prime farmland, and the scenic corridor along Highway 1, while providing for increased public access and continued agricultural use of an historic North Coast farm. The property adjoins Manchester State Beach and surrounds the Point Arena lighthouse. BLM will purchase in fee approximately 1,200 acres of coastal bluffs and dunes and habitat along Hathaway Creek, plus an agricultural conservation easement over 600 acres of prime agricultural lowlands and grazing land.

The watersheds of the **InterTribal Sinkyone Wilderness** and the **Sinkyone Wilderness State Park** were degraded by decades of commercial timber harvesting. Logging ceased in

1983, and the InterTribal Sinkiyone Wilderness Council will continue repairing the damage by creating new and deepening existing pools and removing barriers to salmon migration along the 2.7-mile-long **Wolf Creek**. With the help of \$67,250 from the Conservancy, the InterTribal Council will also examine the possibility of introducing coho salmon, which were last seen in the creek in 1948. The Council and California State Parks will contribute over \$19,000 for this work.

In **Del Norte County, McGarvey Creek**, a tributary of the lower Klamath River, hosts populations of coho and Chinook salmon, steelhead trout, and coastal cutthroat trout. With the help of a \$600,000 Conservancy grant, the Yurok Tribe will improve water quality and spawning and rearing habitat for salmon and trout in the creek. The work will take place on private industrial timberlands, and will repair damage to the land that occurred decades ago. The U.S. Environmental Protection Agency will contribute over \$129,000, Simpson Resources Company \$100,000, and Caltrans \$50,000.

The 5,500-acre **Lake Earl** wetland complex supports a great number of rare and endangered animals and plants, and is considered one of the most productive wetlands in the state. Pacific Shores, approximately seven miles north of Crescent City, is a 1,535-lot subdivision, undeveloped save for roads. The subdivision was never certified by the Coastal Commission. It is located in an area of dunes and wetlands that is periodically subject to flooding. A \$150,000 Coastal Conservancy grant will enable Smith River Alliance, Inc. to undertake a systematic program to research the lots and negotiate with their owners for possible purchase. The Alliance estimates that pre-acquisition activities for up to 300 transactions could be accomplished with the Conservancy's grant. In 2002, the Conservancy provided the WCB with \$1 million to purchase properties on the lake's eastern shore. Future lot purchases are likely to be funded by the WCB. ■

THANK YOU, SANTA

Editor:

Compliments to Ms. Chase and to *California Coast & Ocean* for a well-written and informative article. I've worked with Joy on the prescriptive rights study for Santa Claus Beach here in Santa Barbara County, and look forward to its culmination.

Chase introduces the area with the phrase, "A Highway 101 off-ramp leads to Seaside Village Drive (until recently named Santa Claus Lane) . . ." Indeed, the Santa Claus Lane commercial property owners did apply for such a road renaming, which was approved in February 2003 by the Santa Barbara County Zoning Administrator. However, this approval was appealed by a neighboring resident and, on July 15, 2003, the Board of Supervisors upheld the appeal and thereby denied the road re-naming. Santa Claus himself may be gone, but this road will continue to be called Santa

Claus Lane and, so it appears, the beach will continue to be known as Santa Claus Beach.

*Gregory Mohr, Planner III
Santa Barbara County
Planning & Development
Comprehensive Planning Division*

NAME THAT FISH!

Editor:

Read the latest *C&O* and excellent as always. Noticed that birds are often named, but not the fish. I would be more than happy to try and ID your fish. Spring 2003: p. 7—almost certainly a surf smelt (*Hypomesus pretiosus*) [see below]; p. 11—striped surfperch (*Embiotoca lateralis*).

*Ed Ueber
Sanctuary Manager
Gulf of the Farallones
National Marine Sanctuary*



KEN GARDNER

the Channel Islands no-take reserves will help marine species recover and even boost commercial fisheries; ongoing research will show whether this will happen. The California Marine Life Protection Act of 1999 promised a network of such reserves up and down the California coast.

Current management plans for the national marine sanctuaries in California do little to protect the biological resources within their borders, beyond the protections already granted by the Marine Mammal Protection Act, Clean Water Act, Endangered Species Act, and other state and federal legislation.

For the past two years, NOAA has been conducting a joint review of the management plans of the three sanctuaries in central California in order to

update them to meet current environmental threats. The review process is considering current sanctuary borders, the possibility of more no-take reserves, better protection of tidepool areas, and improvement of research and monitoring programs. Also being considered is the emerging problem of climate change, which is expected to bring more weather extremes and climatic events such as El Niño. After an extensive process of public input, NOAA is expected to release draft management plans early in 2004. Information on how to get involved in the process can be found at www.sanctuaries.nos.noaa.gov/jointplan.

Not until the sanctuaries gain the authority and the will to fully regulate destructive activities within their

boundaries will they accomplish their mission of comprehensive management. Because present management plans specifically exempt the fishing industry from regulation, destructive bottom trawling and the dumping of bycatch do not stop at the sanctuary boundaries. The national marine sanctuaries have played a large role in protecting the coast from oil and gas development, but there is a long way to go before they live up to their names as true sanctuaries. ■

Michael Bhargava is a freelance writer on environmental and marine issues. He earned his PhD in environmental history from Duke University and has served as a visiting professor of environmental studies at Oberlin College.

PEW OCEANS REPORT *continued from page 34*

Congress should enact a National Ocean Policy Act requiring federal, state, and territorial agencies to protect, maintain, and restore marine and coastal ecosystems, and reorienting national and regional decision-making bodies to these ends. This legislation should provide clear and measurable goals and standards to govern activities affecting the oceans, establish mechanisms to ensure compliance with the national policy, and establish national and regional institutions capable of carrying out that policy. . . .

As part of the National Ocean Policy Act, Congress should establish regional ocean ecosystem councils consisting of appropriate federal, state, and tribal representatives. These councils should be charged with developing and overseeing implementation of enforceable regional ocean governance plans to carry out the national policy to protect, maintain, and restore marine ecosystems. . . .

Congress should enact legislation mandating the establishment of a national system of marine reserves to protect marine ecosystems, preserve our national ocean treasures, and create a legacy for our children. Congress should authorize regional ocean ecosystem councils to create marine reserves within the areas of their jurisdiction but should itself take action to protect areas of national significance. . . .

Congress should establish an independent agency outside the Department of

Commerce to address the national interest in the oceans and atmosphere. This agency should consolidate under one roof as many federal ocean programs as is practical.

Recommendations for restoring fisheries are based on adoption of an ecosystem-based approach:

The principle objective of fishery management should be to protect the long-term health and viability of fisheries by protecting, maintaining, and restoring the health, integrity, productive capacity, and resilience of the marine ecosystems upon which they depend.

Regarding aquaculture, the commission's recommendations include:

Congress should enact legislation to regulate marine aquaculture pursuant to sound conservation and management principles. The legislation should establish national standards and comprehensive permitting authority for the siting, design, and operation of ecologically sustainable marine aquaculture facilities.

Until . . . standards and policy are established, the Administration or Congress should place a moratorium on the expansion of marine finfish farms. Likewise, until an adequate regulatory review process is established, the government should place a

moratorium on the use of genetically engineered marine or anadromous species. . . .

The United States should negotiate and work with other nations to establish environmental provisions in international trade agreements to encourage ecologically sustainable marine aquaculture practices in the international community.

In concluding, the Commission observed:

Our vast oceans—the final frontier on this planet—are now showing the same signs of stress that mobilized our nation to protect our land, air, and fresh water 30 years ago. Pollution, poorly guided development, and habitat-destroying fishing practices are a sampling of humanity's heavy hand on the oceans. We are altering ecosystems and their capacity to support marine life, as well as their ability to provide the goods and services that we have grown to expect without thinking, just as we take for granted the beating of our hearts.

Extending strong environmental protection to the oceans is both a practical measure to preserve the ecological benefits that we require as a species and our moral obligation as the stewards of our planet.

It is time we apply this ethic to our oceans, our country's largest public resource. ■

We have framed the problem improperly—there is no environment “out there” that is separate from us. Aboriginal people are right; we are the Earth, created like everything else from the four sacred elements of water, air, fire, and earth. This statement isn’t meant in a metaphoric or poetic way but as scientifically demonstrable reality. When we think of the “environmental crisis” this way, our response has to be completely different. . . . If we can grasp that we are the world we depend on, then we will find where we truly belong and get on with seeking a way to live in harmony within a rich, vibrant community of living things.

—David Suzuki

From *The Sacred Balance: A Visual Celebration of Our Place in Nature*, by David Suzuki and Amanda McConnell with Maria DeCambra. Greystone Books, Vancouver, BC, 2003.



Coastal Conservancy

CALIFORNIA COASTAL CONSERVANCY

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