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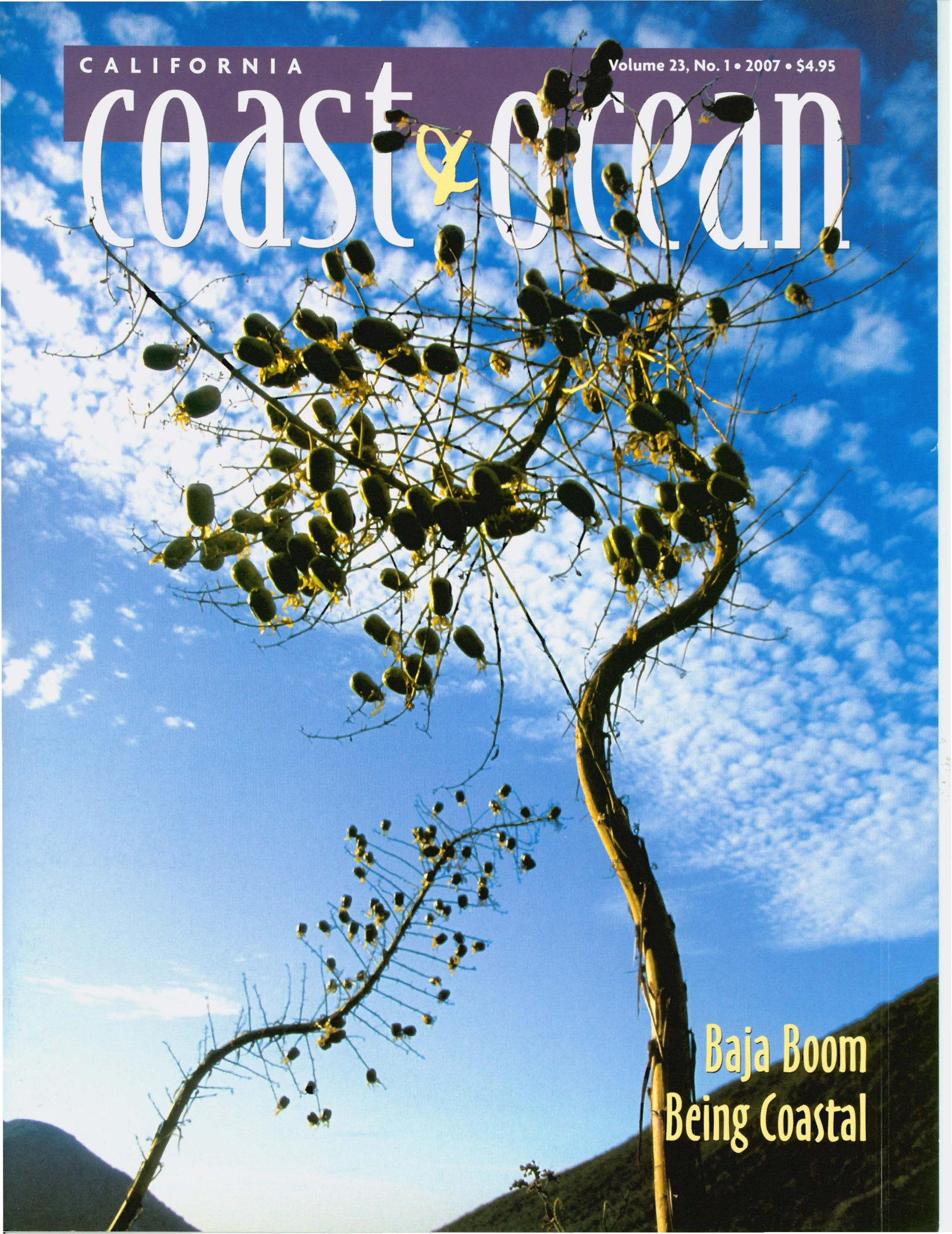

Baja Boom

Being Coastal

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Cover photo: Bennett Barthelemy. Chaparral yucca *(Yucca whipplei)* seed pods in Los Padres National Forest. This yucca is native to mountains of California and Baja California.

Back cover photo: Leafcutting bee *(Osmia ribifloris)*, by Jack Dykinga, USDA Agricultural Research Service, www.insectimages.org. Here on a barberry flower, this relative of the blue orchard bee is a good pollinator of commercial blueberries.

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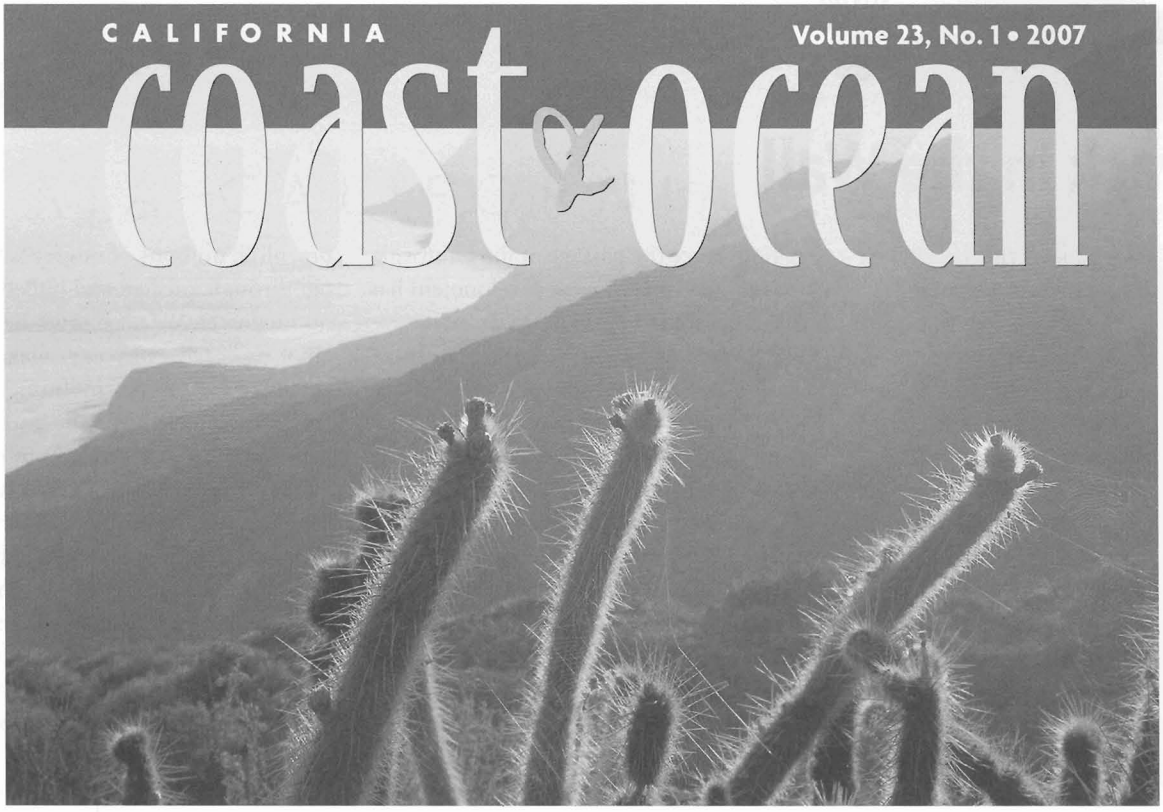


ALAN HARPER

Golden snake cactus *(Bergerocactus emoryi)* above Salsipuedes, Baja California

COASTAL VIEWPOINT

A Crack in the Wall

LATE IN MAY, A MALIBU beachfront property owner invited the public—anyone, strangers—to enter his gate, walk along his deck and down his stairs to Carbon Beach. And not just on one day. He arranged for that gate to be opened four days a week, Thursday through Sunday, from sunrise to sunset. He did all this without fanfare, voluntarily, without explaining why. Coastal Commission staff were surprised and glad to cooperate, and Caltrans installed the standard "Coastal Access" sign on the Pacific Coast Highway, with an arrow pointing to the gate at 21950. You can push open this blue-green gate, walk in, and continue to the public shore.

This was an amazing thing for a beachfront homeowner to do, especially in Malibu, famous not only for glamorous residents but also for a tendency to dispatch teams of attorneys into battle against anyone trying to provide the public with more access to the public beaches they enjoy. We know little about the rebel who committed this act of unexpected civic generosity other than his name, Peter Kleidman, and that he lives in Connecticut. He seems to have little interest in publicity.

This new accessway may turn out to be temporary, though he has said he hopes to make it permanent. Perhaps it's a theater piece. No matter. Whatever his inspiration or motive, word of his deed has delighted people who don't own a beachhouse in Malibu. He cracked the wall that has irritated a whole lot of people for a long time.

As John Gillis writes in "Being Coastal," (p. 10): "Americans have come to identify with their coasts as with no other geographical feature. They are considered a kind of national commons." The privatization of beach access at Malibu was a major catalyst for the 1972 voter initiative that established the most comprehensive coastal management program in the nation. Since the passage of the California Coastal Act in 1976, new development has been required to provide at least ocean view access, and about 40 percent of the coast is open to the public. See Serge Dedina's "The Baja California Land Rush" on page 3, and Sam Schuchat's column on page 37, for a picture of what could have happened without the Coastal Act.

The 1970s were, of course, a time when new and hopeful visions flourished. That era is now reverently enshrined—and also mockingly dismissed—in memoirs and stories. We are currently in an era that echoes the Middle Ages in Europe, when people sought safety behind walls, believers of different religions slaughtered each other, and the end of the world seemed close at hand. Fear was a powerful driver then, as it is now.

Disturbed and dislocated by powerful forces, both human-generated and nature's, we tend to seek protection by installing more and bigger fences and locks on houses and gardens, keeping children out of places where they might not be under control, erecting concrete and steel barriers to contain intractable conflicts. In the long run, attempts to wall off problems don't work. More likely, they damage things we don't mean to destroy, and blind us to imaginative, if difficult, ways to deal with change.

At the southern edge of San Diego, which cuts across the Tijuana River watershed, yet another barrier is being constructed along the already super-fortified border with Mexico, threatening decades of restoration work in the Tijuana River National Estuarine Research Reserve. The triple fence border project is driven by fear, though what is feared has lately changed. It used to be drugs, now it's terrorists. Certainly it's illegal aliens. And yet, as water finds its way through a crack because it must flow downhill, millions of migrants have gotten through, pushed and pulled by economic forces. We need them here for their labor, as nearly everyone engaged in the current effort to reform immigration policy has acknowledged. The border wall is a diversion from something more difficult: finding solutions to the immigration problem and the problem of terror.

I asked a teacher of the ancient martial art of t'ai chi what came to his mind at hearing the word "wall." He said: "Something vertical and wide, something to get around, get over, or go under. And then there are people who simply appear on the other side, nobody knows how." T'ai chi draws power from perceiving energy currents and moving with them. Surfers do something like that too. There's no choice but to accept the ocean.

Sometimes all it takes is a small crack for water to undermine a wall, freeing the pent-up currents behind it, allowing a buried stream to come back to life. Sometimes that's all it takes to free the imagination. A good place to think about such things, and to rediscover the American vision of liberty and the pursuit of happiness, is a beach. Any beach. Including Carbon Beach, I suppose. So I want to say thank you to Peter Kleidman for that little crack in the wall, for it has invited me to such reflection—even if what he did should turn out to be a theater piece. What fun!

—Rasa Gustaitis

Mysterious object identified. See. p. 40.

LEFT: SONOMA LAND TRUST. OPPOSITE PAGE: DAVID MAUNG

BAJA CALIFORNIA LAND RUSH

U.S. Residents Flock to Build on Mexico's Unprotected Coast

SERGE DEDINA

BAJAMAR, A GATED GOLF and resort coastal community about 35 miles south of the U.S.–Mexico border, is the type of development that environmentalists love to hate. The 27-hole golf course, billed as "Pebble Beach South of the Border," is built on a coastal bluff surrounded by pristine coastal sage scrub, with some of the finest ocean views north of Ensenada. More than 360 Spanish-style homes surround the golf course. Guests and residents are primarily from the United States.

A closer look reveals that nature is not dead at Bajamar. Large swaths of native scrub remain within its 650-acre grounds, and agaves (century plants) grow here and there. Red-tailed hawks on the lookout for jackrabbits patrol the fairways. Bajamar's developers worked with a team of conservation biologists from the Center for Scientific Research and Higher Education of Ensenada to preserve open space within the compound and also the coastal sage around it.

Despite such efforts to balance profits and the environment, however, what happens outside the resort's boundaries is beyond its control. Nor does any zoning or coastal plan protect against incompatible land uses. In 2005, Sempra-Shell began building a $700-million liquefied natural gas (LNG) terminal just south of Bajamar, and has since proposed to expand the facility to 2.5 times its current size. Most of the gas is destined for California, although some will be used in Baja California.

According to Bill Powers, co-chair of the Border Power Plant Work Group, a binational organization that has contested the placement of LNG terminals adjacent to residential areas in Mexico, "The area being developed by Sempra-Shell is either completely undeveloped or [has] low-impact development. They are building a huge industrial facility at the site, changing it from a rural windswept coast to one of the two biggest industrial facilities on Baja's coast."

The Baja Boom

During the past five years, quiet seaside villages and fishing settlements along the peninsula's Pacific coastline have been transformed into the Wild West of Mexico. Rosarito Beach and other boomtowns are filled with high-rise Cancun-style condo fortresses, gaudy narco-deco–styled spring-break hotels, and opulent mansions. But outside the party zones can be found more and more industrial development, buttressed by shantytowns where raw sewage flows freely into the ocean. Garbage washes down gullies when it rains and is rarely picked up.

The exorbitant cost of coastal housing in southern California, combined with the opening of lands in Baja California that were previously locked out of development by legal constraints, have created a land rush, the "Baja Boom." One promotional real estate brochure calls it "a repeat of what's happened to California since the 1940s." The natural coastal landscape is being carved up for residential and vacation developments at a frenzied pace.

Investing in real estate has always been a risky business in Mexico. Investors who purchase a homesite at a high-end, well-planned golf resort might one day learn that their neighbor will be an industrial facility that communities in California such as Long Beach, Malibu, Oxnard, and Ventura have fought to keep out of their backyards.

Throughout much of the peninsula, coastal land is held by *ejidos,* or agricultural collectives. A few of these rank among the largest in Mexico, comprising more than a million acres, with up to 50 miles of undeveloped shoreline graced by picturesque beaches and bays, as well as some of North America's most pristine wetlands.

Until 1992, foreigners could not legally own land in Mexico and *ejido* land could not be sold. Then, under former President Carlos Salinas de Gortari, Article 27 of the Constitution was amended to facilitate the modernization of agriculture. The redistribution of land through governmental expropriation was prohibited; parcelized communal lands can now be rented and, in some instances, sold to other farmers or multinational corporations. Corporations, both domestic and foreign, can now own land. This was a significant repudiation of the Mexican Revolution and a defining moment in Mexico's land use policy.

Ejido members began to privatize collective lands—and then sell plots of that land to pretty much anyone. However, because Mexican federal agricultural officials often took up to a decade to survey and title ejidal lands throughout the Baja California peninsula, many have come on the market only in the past few years.

Ejido members tend to be land rich and cash poor, so when developers offer them quick cash for their acreage, many jump at the chance to bring in income. The buyers very often represent land speculators and developer syndicates. The

Previous page: Heavy equipment levels a plot of land for construction along the coast between Rosarito Beach and Tijuana. The Coronado Islands are in the distance.

Below: On Punta Banda, just south of Ensenada, coastal sage scrub includes coast agave *(Agave shawii)*.

ALAN HARPER

result is the potential destruction of many of the peninsula's most scenic and ecologically significant natural sites, especially along the coast.

Post-NAFTA Deals

Contributing to the boom is the North American Free Trade Agreement of 1994, which eased restrictions on trans-border commerce. Some of the world's largest corporations began looking at Baja California as a possible location for industrial projects—especially those that cannot easily be built north of the border because they are considered hazardous or potentially polluting. The fact that coastal real estate is much cheaper there than in the United States was definitely a plus. Areas that have been targeted for development include some of the finest remaining examples of coastal desert and coastal sage scrub ecosystems left on earth.

Eighty miles south of Ensenada, at Punta Colonet, a network of Mexican and Asian investors is planning to build a new 27,000-acre megaport industrial complex, complete with a new city for 250,000 residents. The Ministry of the Environment of Mexico recently rejected the environmental impact assessment of the project as inadequate, but the document will be revised and resubmitted. The proposed port is designed to compete with the ports of Long Beach and Los Angeles.

In Bahía de los Ángeles, on the Sea of Cortez, the Mexican National Trust Fund for Tourism Development (FONATUR) is proposing to build a new mega-resort around what is now a remote and rural fishing community that fronts a network of islands, Santos de los Coronados, that are a UNESCO World Heritage Site. Plans for the project include expanding a port already built at the remote fishing village of Santa Rosalillita, on the Pacific Coast, and building a "land bridge" or superhighway from there to Bahía de los Ángeles to allow yachts to be hauled by large trucks across the peninsula to facilitate yachting in the Sea of Cortez.

Farther south, a number of large development projects have been proposed for the now-tranquil embayment of Bahía Concepción, which contains white-sand beaches, beautiful islands, and some of the the most ecologically sensitive coastal mangrove wetlands in the Sea of Cortez.

Aware that time is running out for Baja's coastline, a network of Mexican and American conservationists has formed in hopes of putting the brakes on anything-goes development and preserving at least some of Baja's wildest and most ecologically pristine coastal areas.

The focal point of the current Baja Boom is the 60-mile stretch of coastline between Tijuana and Ensenada. Up until the 1990s this area, connected by a four-lane toll road, was characterized primarily by small U.S.–expatriate settlements and the then-small tourist town of Rosarito Beach. Now it's buzzing with growth fueled by the demand for beachfront real estate. "For Sale" signs dot the edges of the coastal highway. The steel frames of high-rise condos loom beside ramshackle beachfront shantytowns crowded with workers in the construction and tourist trades.

Tijuana is expanding southward and now extends to the edge of Rosarito Beach. So great is the local demand for housing in Tijuana that new developments and *colonias* (neighborhoods) are spilling out onto the coastal plain just north and east of Rosarito, and even beyond the barren earth-colored mountains to the east.

One of the biggest concerns residents have is the lack of wastewater infrastructure adequate to meet the needs of existing and proposed development. Such sewage pump stations as exist break down continually because of power outages and leaks. Half of Tijuana's estimated population of two million lives in *colonias* without wastewater treatment, so sewage is often dumped directly onto the beach—even at the upscale Playas de Tijuana just south of the U.S.–Mexico border. Other *colonias* are served by septic systems, with hulking trucks pumping up the sludge and, often, emptying their loads directly into arroyos that lead to the beach. A mere six miles south of the U.S.–Mexico border, up to 30 million gallons of treated and untreated (50-50) sewage are dumped daily onto the beach at Punta Banderas, the location of a golf community and the site of the planned $200-million Trump Ocean Resort. The Trump project's website displays a seaside swimming pool adjacent to rocky cliffs and proclaims that its "oceanfront living" will appeal to

Top: Friends and visitors check the progress of construction of Keith Hoskin's house in the luxury Punta Piedra development, about 15 miles south of Rosarito Beach.

Above: View from a third-floor condominium in the Costa Bella complex, taken on a Coldwell Banker real estate tour of the Tijuana–Rosarito coast

PHOTOS THIS PAGE: DAVID MAUNG

"senses that will stir your soul." More than 80 percent of the first of three planned high-rise condo towers sold in a one-day sale event in San Diego in December 2006.

Baja California officials quoted in the *San Diego Union* estimated that more than 24 large projects with over 2,800 residential units are planned in the area between Tijuana and Ensenada, including more than a dozen condo towers. A new four-lane highway, Boulevard 2000, was recently opened, connecting eastern Tijuana to the seaside community of Popotla, just south of Rosarito Beach. It runs mostly through undeveloped and sparsely inhabited chaparral ranchland.

Sewage to the Beach

In building the new highway, Baja California officials seem to have anticipated the development boom that has doubled the size of Tijuana and Rosarito Beach in the past decade. How odd, therefore, that they have failed to invest in the construction of appropriate wastewater treatment plants for the existing residents of the region who lack basic services. Rumors abound in local newspapers about ties between officials who approved the road project and land speculators who have purchased land around the route.

In the small beachside community of Camp Torrest, north of Rosarito, Mark Padilla, 48, who has been a part-time resident for 34 years, documented a stream of sewage that empties onto the beach next to his house, courtesy of the San Marino housing development across the toll road. His landlord gave permission to the developer to dump the sewage into an arroyo on her property. "I just can't believe that it is legal," Padilla told me.

Matt Hoffower, a 33-year-old surfer, echoed Flores. He recently moved back to San Diego after living in Rosarito Beach with his wife and son while working as a real estate agent. "Living in Baja is hard," he said. "The arroyos are horrible and filled with trash." Hoffower smiles. "I used to tell the agents I worked with, 'You see how the ocean is glassy? That's from the sewage in the water. That isn't natural.' They didn't want to believe me. I couldn't justify selling property with conditions like that."

The real estate boom in northern Baja California is a vivid lesson for a network of conservationist and environmental leaders concerned with preserving undeveloped coastal areas south of Ensenada. During the six-year presidency of Vicente Fox, which ended in 2006, a slew of mega-development projects emanating from

PHOTOS BOTH PAGES: DAVID MAUNG

Mexico City impacted the entire Baja California peninsula, including some of the most biologically important areas. Whether it was the proposed Puerto Los Cabos marina development that has damaged the San José del Cabo estuary, a Chevron-Texaco LNG facility adjacent to the Coronado Islands, or the mega-resort planned for Bahía de Los Ángeles, these projects seemed to threaten just about every coastal area of ecological significance.

Because they are remote, hours by car from the nearest paved road, many wild areas in Baja California had until recently been considered undevelopable. For example, the Pacific fishing town of Punta Abreojos, just north of San Ignacio Lagoon on the Pacific coast, has attracted mostly surfers and fishermen. Now the state of Baja California Sur has proposed a cruise ship terminal there.

For Fernando Ochoa, a 32-year-old attorney from Mexico City who runs the Northwest Environmental Law Center in Ensenada—one of only two nonprofit environmental law firms in Mexico—the number of development projects in Baja is "overwhelming." He said, "The total budget for conservation of the Mexican government and NGOs is literally millions of times less than what is destined for development. . . . There are not enough people working in the conservation field compared to the development field."

Nevertheless, Ochoa successfully blocked efforts by FONATUR to build a marina in a wetland just north of Bahía de los Ángeles. He prevailed on behalf of local fishermen and community residents who use the wetland for fishing and recreation. After that victory, Ochoa switched his focus to blocking the cruise ship terminal in Punta Abreojos, with the help of Mexico's Group of 100, the Natural Resources Defense Council (NRDC), and WiLDCOAST.

"We want to see development that complies with Mexican laws so there is sustainable development, healthy communities, and projects that are appropriate for the natural environment where they are proposed," said Ochoa. "Punta Abreojos is not an appropriate location for a cruise ship terminal. Since the community has an economy based on fishing, they need projects that correspond to the needs of the community."

Ochoa believes that the long-term solution to conflicts between inappropriate development and conservation is working with local landowners to make conservation an economic option. "Poverty is a cultural and social problem in Mexico," he said. "If poor people who own nothing but their land sell out to a speculator for

Opposite page top: Lisa Davis (right), a Coldwell Banker real estate agent, shows construction at a Real del Mar site to potential buyers.

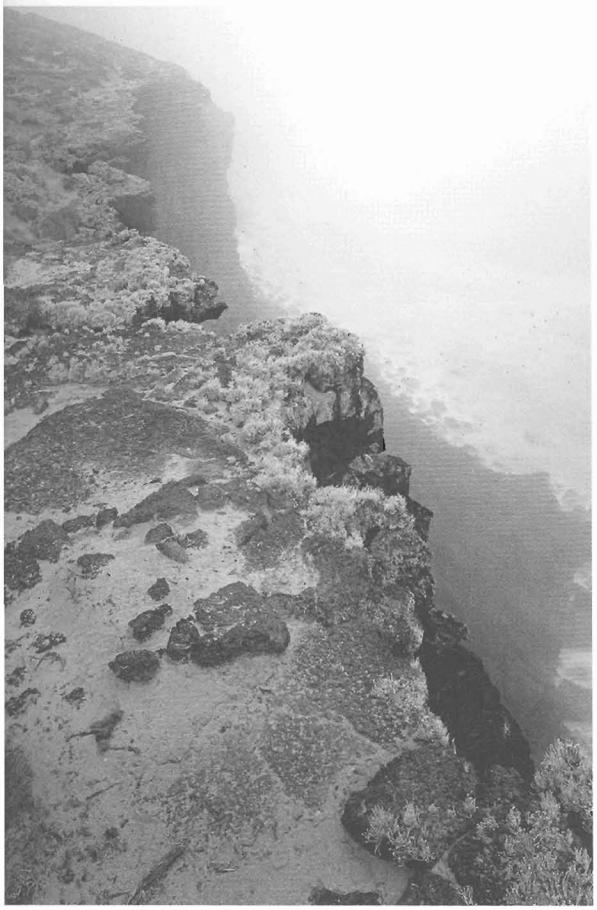
Opposite page bottom: Carmen Tetelboin and Mike Waggener explore the patio of a friend's apartment in the Plaza del Mar development, about 30 miles south of the border. Waggener lives in Mexico, and Tetelboin visits from Los Angeles.

Below: Sewage floods a popular city beach at Playas de Tijuana after a sudden rain.

Below: Twenty years ago these sea cliffs near Bahía San Quintín were carpeted with wildflowers. Now only a narrow strip of native plants remains between wheat farms and the coast.

Bottom: Major condominium development is under way here at Baja Malibu, between Tijuana and Rosarito Beach.

Right: Everyone owns this bluff at Wilder Ranch State Park, near Santa Cruz. Californian's state parks are a commons, preserved by the citizens. They're seriously underfunded, however (see p. 29).



a low price, they will either become destitute where they live or they will have to migrate to a city to work." What's needed are financial incentives for rural landowners to adopt conservation easements on their properties, to provide "long-term options, rather than just the short-term option of selling."

In San Ignacio Lagoon, where whales go to give birth, the strategy of land conservation combined with sustainable development has proved effective. The lagoon, also a UNESCO World Heritage Site, is some 600 miles south of the U.S.–Mexico border. About 500 local residents make their living from fishing and conducting whale-watching tours on the lagoon, an isolated wetland that is also habitat for black brant, eastern Pacific sea turtles, bottlenose dolphins, and thousands of shorebirds.

In 1994 San Ignacio Lagoon came close to destruction. The Mexican Salt Exporting Company (ESSA), 49 percent of which is owned by the Mitsubishi Corporation, announced plans to build a 500,000-acre industrial salt-harvesting facility along the north shore. A battle ensued between pro-development forces and an international coalition of environmental groups. In 2000, President Ernesto Zedillo canceled the project. A year later, however, ESSA renewed its concession to harvest salt from the lagoon, and rumors spread that ESSA planned to renew the large-scale salt project. In response, local landowners joined forces in 2003 with Pronatura Noroeste, WiLDCOAST, NRDC, and the International Community Foundation to form the Laguna San Ignacio Conservation Alliance. Their purpose was to establish an agreement with the Ejido Luis Echeverría, which owns 140,000 acres of the lagoon's southern shore, to plan a conservation program that would protect the 900,000 acres of lagoon habitat and help support local livelihoods.

The result was a pioneering deal by the *ejido* to protect all of the land within its boundaries—much of the southern portion of the lagoon's watershed—in return for the establishment of a $725,000 trust fund and $500,000 in direct payments to its 44 members. On March 15, 2007, Ernesto Enkerlin, the director of Mexico's National Protected Areas Commission (CONANP), announced that President Felipe Calderón had agreed to have his agency manage the 110,000-acre ESSA concession for conservation purposes. The agreement is awaiting final approval by the president. To date, the San Ignacio Conservation Alliance has preserved 140,000 acres and has a goal of protecting another 860,000 acres of lagoon habitat.

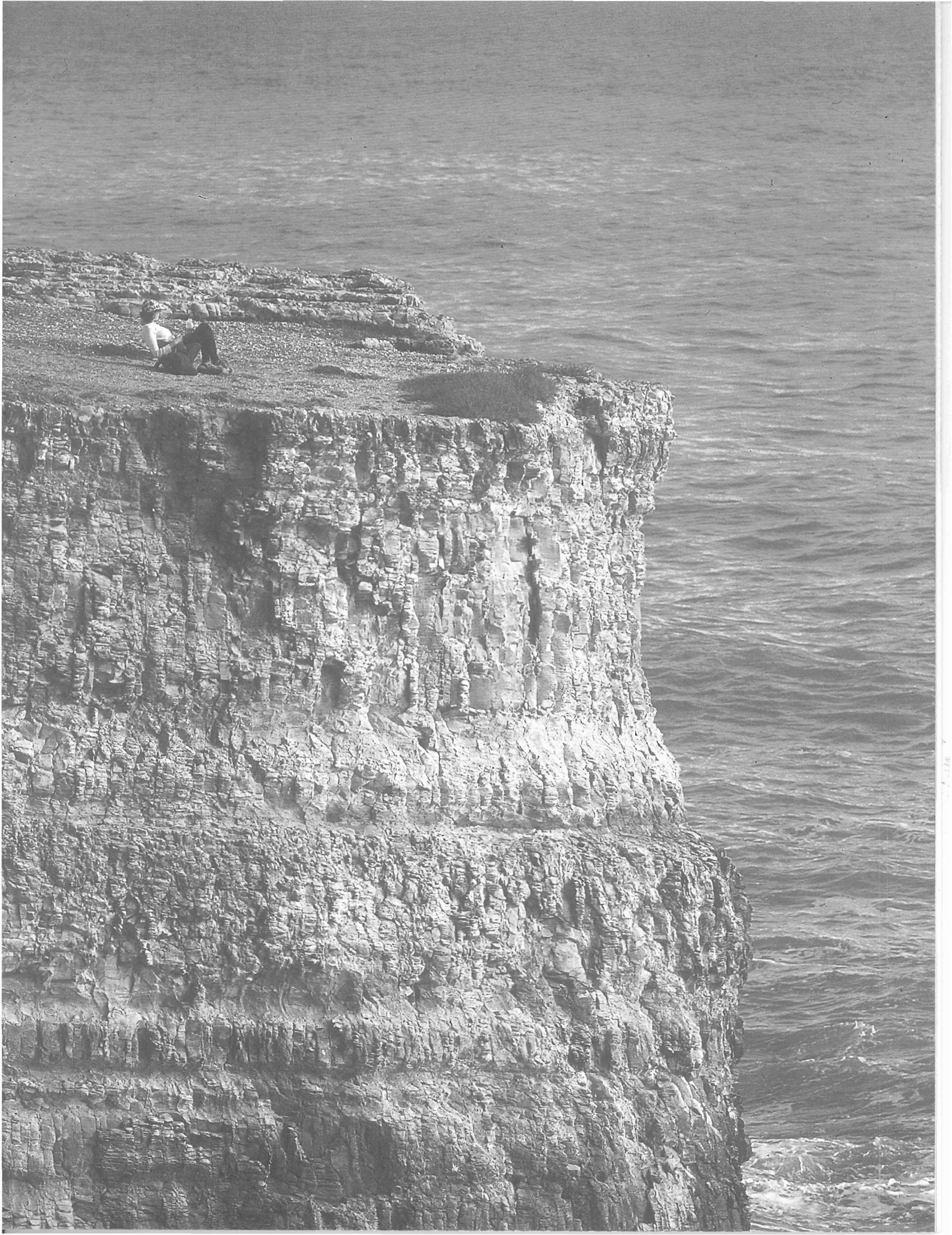
The challenge for conservationists and residents of coastal Baja California will be finding a balance between the desire for progress and growth that drives the modern economy of Mexico and concern for preserving coastal habitats that exist nowhere else on earth. For Raúl López, the president of Ejido Echeverría, who helped broker the deal to preserve San Ignacio Lagoon and who makes his living fishing and running Kuyima, a local ecotourism company, the goal is not simply protecting a world-class coastal wetland.

"I am very proud of what we did," he told me. "We helped preserve the right of local people to work their land, and we have made sure there is access to the public. There are no fences keeping people out. There are some people who think that the only option is to build mega-resorts. But I think that those of us who live in rural areas surrounded by natural beauty have an obligation to preserve these areas for everyone."

Hopefully, López's vision of a coastline on which people can live sustainably with nature can be exported to other areas of the peninsula. Otherwise there is little hope for preserving much of Baja California's truly wild coastline. ■

Serge Dedina is the executive director of WiLDCOAST, a nonprofit organization based in Imperial Beach, California, that works to preserve coastal ecosystems and wildlife in the Californias and Latin America. He is the author of Saving the Gray Whale *(University of Arizona Press, 2000), and wrote his first article for* Coast & Ocean *in 1990.*

TOP: ALAN HARPER. BOTTOM: DAVID MAUNG. OPPOSITE PAGE: TIM PALMER



Orange County beach at low tide, c. 1930

THERE ARE MANY WAYS OF BEING COASTAL, varying by time and by place. If one takes the time to seek them out, traces of all these ways can be found on the shores of San Francisco Bay. Names like Shellmound Street call to mind the Ohlone way of coastal life that once flourished there; China Camp offers a glimpse of bygone immigrant fishing communities, while the fortifications on the Marin Headlands tell of the coast's military past. Remaining bits and pieces of an authentic San Francisco working waterfront sit next to the San Francisco Maritime National Historical Park, whose splendid collection of ships from earlier periods evokes a fabled era of deep-sea sailing. Angel Island reminds us how some coastal islands were used as migration and quarantine centers, while Alcatraz, site of the first lighthouse on the West Coast and later a fort, military prison, federal penitentiary, and now national parkland, adds yet further layers to this complex coastal archeology. Yet no

EDWARD W. COCHEMS (CITY OF SANTA ANA PUBLIC LIBRARY LOCAL HISTORY ROOM)

Being Coastal

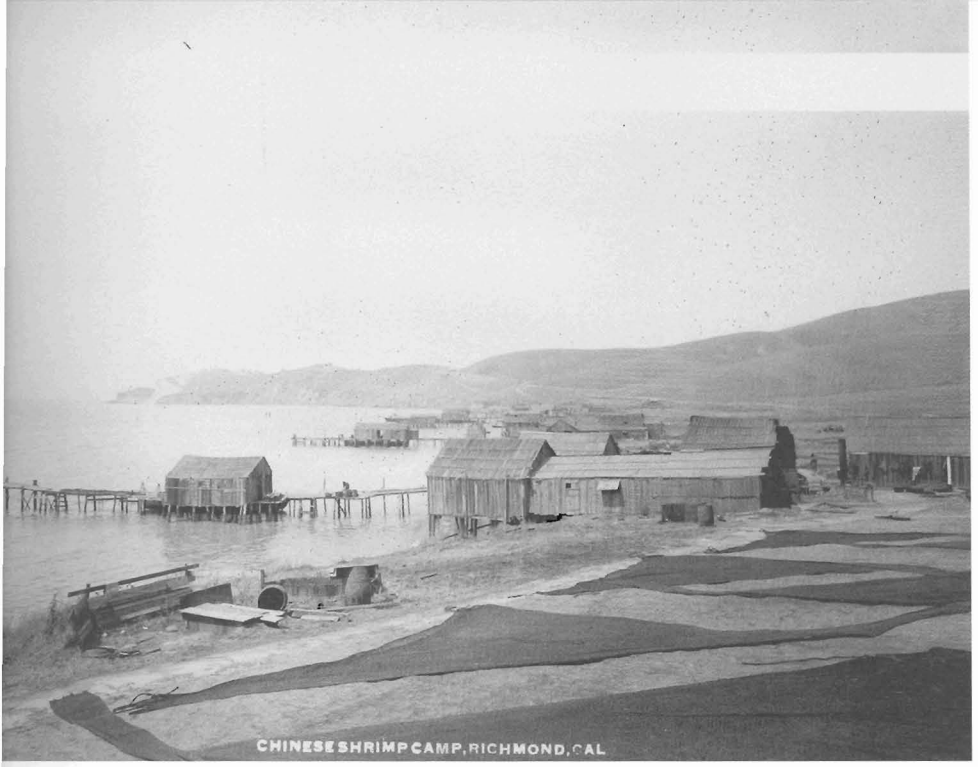
JOHN R. GILLIS

less authentically coastal are new high-end shopping precincts, marinas, and luxury residences like Emeryville's Watergate that now crowd the shores around the Bay. Look carefully and you can find evidence of all the phases that coasts around the world have gone through over the past 300 years.

Coasts are the most rapidly changing of all American landscapes, and the transformations that have taken place since World War Two are breathtaking in their scope and consequences. Everywhere we see a movement toward the sea. Today 80 percent of all Californians live within 30 miles of the ocean, but living *on* the coast is not the same as living *with* the coast in the manner that the Ohlone or the immigrant Chinese shrimpers once did. They were amphibious, living off both sea and land, moving between them. For them, the coast was not a line where land and water met, but a broad zone where they mixed. The shore was not an edge or barrier, but a place of transit and circulation. They were more likely to be part-time fishermen than full-time seafarers, and they moved alongshore rather than very far offshore.

Coastal societies like these exist today only in a few developing countries. They have largely disappeared from Europe and North America, along with the working waterfronts that are the last vestiges of an amphibious way of life. Of the 5,300 miles of Maine's coastline, only about 20 can now be described as functioning as a nexus between land and sea. Coves and headlands that were once home to active fishing and clamming communities are now lined with the residences of summer people. Everywhere traces of the old coastal life are fading, and even our best maritime museums are not very good at preserving its memory. San Francisco's Hyde Street Pier displays deepwater ships rather than the more numerous small craft that did a much greater volume of fishing and transportation. It plays to romantic conceptions of the sea as a world apart, ignoring the constant exchanges between land and water that sustained the Bay's numerous coastal communities. Reconstructed sailortowns leave the impression that those who made their living alongshore were footloose unmarried men, when in fact coastal work involved women as well as men who returned home each night, living lives that were deeply embedded in family and community. In reality, coastal societies were different from both maritime and inland populations, constituting a buffer between the two but also having their own unique history and geography, which deserve our recognition.

Earlier coastal societies knew how to live *with* a shore that gave them their living but also frequently took from them their property and their lives. They knew not to build too close to the sea, but to erect temporary housing that could be shifted alongshore or inshore when necessity dictated. Those who now insist on building on the



Top: This Chinese shrimp camp, c. 1900, was at what is now Point Molate Beach Park, just north of the Richmond–San Rafael Bridge.

Above: Chinese shrimpers, c. 1900

seaside ignore their experience. Today we have coastal dwellers who no longer know how to live with the sea.

We talk loosely of America as being bicoastal, using stereotyped notions of East and West Coasters to differentiate them from the inlanders of "flyover country." But both are actually inlanders who have chosen to bring their interior habits to a new place. Coasts have become the last frontier for interior populations, overwhelming the last remnants of older coastal communities and making the coast itself an extension of land—a mistake which we repeatedly pay for after major storms and tsunamis. The effort to extend the land to the edge of the sea, as if there is some line in the sand that the forces of nature will not cross, has been catastrophic not only environmentally but socially and politically.

Linked by Water

If we would only look, America has a rich coastal past to learn from. While it is rarely acknowledged in standard historical accounts, what became the United States began as a gaggle of coastal societies, more attached to the sea than to land. The English, French, and Dutch were not initially interested in the interiors. They were themselves littoral, riverine, and island peoples, who were past masters of living with coasts. European fishermen exploited the coastal waters of North America without even taking up permanent settlement. When they eventually decided to plant colonies, northern Europeans did so first on islands—Roanoke, Jamestown, Manhattan, St. Croix—turning their backs to the land to face the sea which was their lifeline. Initially they were quite successful in establishing lucrative exchanges with Native American coastal peoples. As long as Europeans did not take possession of lands, relations remained quite friendly. As in Europe itself, coastal peoples were very good at establishing peaceful trade among themselves.

Even when Virginia and Massachusetts colonists pushed inland in the early 17th century, the settlements remained quite dependent on the coast, linked more by water than land, still tied more closely to other shores around the Atlantic rim than to their own interiors. The first American cities were all sea or riverports. Virginia survived only when it discovered a viable export crop, tobacco, and a labor supply, African slaves, that tied it ever more firmly to the sea. Puritan farmers, lacking an export crop, invested heavily in the fisheries as a crucial source of income to pay for their imports from England. To do so, they imported a body of English fishermen, who constituted a coastal societey quite distinct culturally as well as economically from the Puritan agrarian interior. As Samuel Eliot Morison put it: "God performed no miracle on the New England soil. He gave the sea."

For two centuries, destiny's arrow pointed seaward. Until the mid-19th century, the economic and political strength of the United States was coastal in character. The nation became a continental power not because of its overland prowess, but because of its maritime capacities. Like its eastern counterpart, the West Coast was explored and settled by water. When Thomas Jefferson instructed Captain Merriweather Lewis in 1803, he told him to find the "most direct and practical water communication across the continent for the purpose of commerce . . . ," saying nothing about settlement. And it was the search for safe harbors rather than arable lands that justified the possession of Oregon and California. The West Coast was first prized as giving access to the Pacific, and for a very long time it would

PHOTOS THIS PAGE, COURTESY THE BANCROFT LIBRARY, UC BERKELEY

remain more important as a way station than as a place to be. Thus it was the sea, not the land, that gave the United States its identity and shape in the early 19th century.

The coastal cultures of the Asian Pacific as well as the European Atlantic were easily transferred to the West Coast. Chinese fishermen felt at home on the shores of San Francisco Bay, while Boston merchants made Monterey and later Honolulu into little Bostons. Coastal societies have always been diasporic and cosmopolitan in nature. Belonging exclusively to neither land nor sea, they are more open and permeable than the interiors. Coastal people are defined more by the routes they travel than by their roots to a particular place, one of the reasons that for centuries they have been seen as somewhat alien by inlanders.

Hardening Land's Edge

It was not until the mid-19th century that Americans turned their backs to the sea and began to treat their coasts as points of vulnerability rather than opportunity. It was then that they began to arm the shores, establish fixed points of immigration, and transform both the East and West Coasts from relatively open borderlands into strictly policed borders. By the end of the 19th century the United States had defined itself as a continental nation that stretched "from sea to shining sea," giving far more symbolic importance to its coastal than its than its land boundaries. Having now become the hard edge of the land, coasts took on a very different meaning. Coastal communities lost their quasi-autonomous quality, becoming peripheral for the first time.

In the period roughly 1850–1970, America turned away from the sea, transforming its coasts and coastal islands into extensions of the land. This was due in part to the industrial revolution, which gave precedence to production over trade as the basis for the nation's wealth and privileged the great heartland cities. Linked to the interior by road and rail, seaports became more connected to both the deep interior and overseas than to the contiguous coasts. The coasting trade declined, smaller ports decayed, and coastal and island populations precipitously declined, leaving the shores to be recolonized in the late 19th and early 20th centuries by inland folk seeking not employment but leisure, pleasure rather than profit.

The urban industrial masses found at the shore a last frontier, a new kind of wide-open space to colonize during weekends and vacations. The shore's promoters presented it as an empty space, the last refuge of wild nature. The old coastal communities suffered a fate not unlike that of Native Americans. They were doubly displaced, not only losing their place on the shore, but also becoming in the minds of the newcomers the last vestiges of a lost way of life. Many a fishing village and working waterfront first became a tourist attraction and later a maritime heritage site. In the early 20th century, hotels and boarding houses encroached on the coast, but only the very wealthy sought private residence there. The automobile age ultimately brought the shore within reach of a much wider urban and suburban population. At first the surge to the sea was mainly seasonal, but today more and more people are making it a permanent residence, especially in retirement.

World War Two brought unprecedented militarization of America's coasts, but in the age of intercontinental bombers and missiles they ceased to be the country's first line of defense, opening up the shore to civilian uses. The real transformation came in the 1970s with the reconstruction of the global economy, shifting industrial production overseas, largely to Asia, and changing America's function from that of the world's dominant producer to the globe's greatest consumer nation. With the advent of the container ship and the supertanker, world trade boomed and the sea took on an importance it had not had since the 19th century. Commerce no longer flowed through New York, San Francisco, and other old seaports but through a whole new set of mechanized terminals located in places like Bayonne and Oakland. The shift to air travel accelerated the decline of the old waterfronts, whose piers quickly rotted and seafaring populations virtually disappeared.

Below: Sahaptian surf fishing with a traditional dipnet just north of Redwood Creek in Humboldt County, 1928

Bottom: Desmond "Merkie" Oliver, Yurok, caught chinook salmon with his dipnet in the Klamath Estuary, 1996.

TOP: THOMAS T. WATERMAN, COURTESY P. A. HEARST MUSEUM. BOTTOM: MARK WHEETLEY

Top: Smelt fishing on Long Beach

Above: Viewing the ocean from 17-Mile Drive, Monterey County

Right: "Down at the Beach, 1895"

Yet it would not be until the 1980s that the possibilities of this empty space dawned on developers. Once they did, cities on the sea would be transformed beyond recognition. Today the sailortowns are gone. Few who live in the new waterfront high-rises have any material connection to water. It is for them entirely a space of leisure, of visual experience. They live on the coast, but have no experience with the ocean, except when storms and tsunamis bring it crashing into their otherwise wholly landed existence.

"Coast of Dreams"

There is one other way of being coastal. For millions who do not live anywhere near the shores and may never have even visited them, coasts occupy a prominent place in their mindscapes. Coasts are now a defining feature of national identity for all Americans, treated as an inalienable heritage and precious natural resource to be defended against all enemies, natural as well as human. After Hurricane Camille in 1969, American flags were seen flying everywhere on the Mississippi coast; people responded to the Alaska oil spill as if it had happened in their own backyards. Whole inland regions now identify with coasts, which unceasingly provide them with a collective identity. Maine touts its Lobster Coast, New Jersey has its Shore, and California is defined by its beaches, with what Kevin Starr calls its "Coast of Dreams." People have become possessive of coasts for personal reasons as well, associating them with precious childhood memories, youthful vitality, and comfortable old age.

To understand why people crowd the coasts the way they do, it is necessary to know how they live *by* them mentally. In recent years Americans have come to identify with coasts as with no other geographical feature. They are considered a kind of national commons where everyone has a right to that which lies below the tide line. Coastal access is everywhere a major issue as the value of shorefront property rises to astronomical levels and those who build on the shore claim it as private property. Fishermen struggle to maintain their shore rights against developers, but so do surfers and divers. For the most part, the struggle over access is driven by reasons other than employment of the traditional kind. Coasts are now a place of consumption rather than production.

The surge to the shore also reflects a massive shift in leisure patterns, which has made the coast a site of a range of activities—swimming,

TOP AND MIDDLE: COURTESY THE BANCROFT LIBRARY, UC BERKELEY. BOTTOM: CITY OF SANTA ANA PUBLIC LIBRARY LOCAL HISTORY ROOM

pleasure sailing, and surfing—that scarcely existed two centuries ago. But we also need to consider the existential functions of the coast for those who come to the beach to do nothing except stare out to sea, to be moved by its grandeur and thrilled by its power. Herman Melville puzzled over this phenomon in the opening pages of *Moby Dick,* when he noted at the water's edge of Manhattan "thousands upon thousands of mortal men fixed in ocean reveries. . . . How then is this? Are the green fields gone? What do they here?"

To answer Melville's question, one must consider the place of the sea in American culture, a largely neglected subject but one that begs for our attention. The editors of this journal made a step in the right direction when in 1990 they added the ocean to its title, thus casting their lot with those who believe that coasts cannot be understood apart from the sea. They were also right in noting in 2006 that "we can't see the present or prepare for the future without a perspective that includes the past." (See *Coast & Ocean,* Vol. 22, no. 3, p. 2.) The coasts as we know them today are the product of many forces, some emanating from the interior, others generated offshore. But they are also the product of the coasts' complicated, multilayered histories. While the numbers who know how to live with coasts are now small, their past and current experience with littorals is invaluable if we are to understand how people can relate to this unique environment. Those who live on coasts also need to know their own histories, if only to prevent the repetition of the disasters that occur when people resident there fail to respect the nature of the shore itself. But those who live by coasts must also examine the origins of the images they hold so dear, for their mindscapes play a very significant role in determining the national and transnational policies that now shape the future of coasts around the world. ■

John Gillis is a cultural historian who lives in Berkeley, and is the author of Islands of the Mind: How the Human Imagination created the Atlantic World *(Palgrave/McMillan, 2004). He is now exploring the history of coastal peoples and landscapes from a global perspective.*

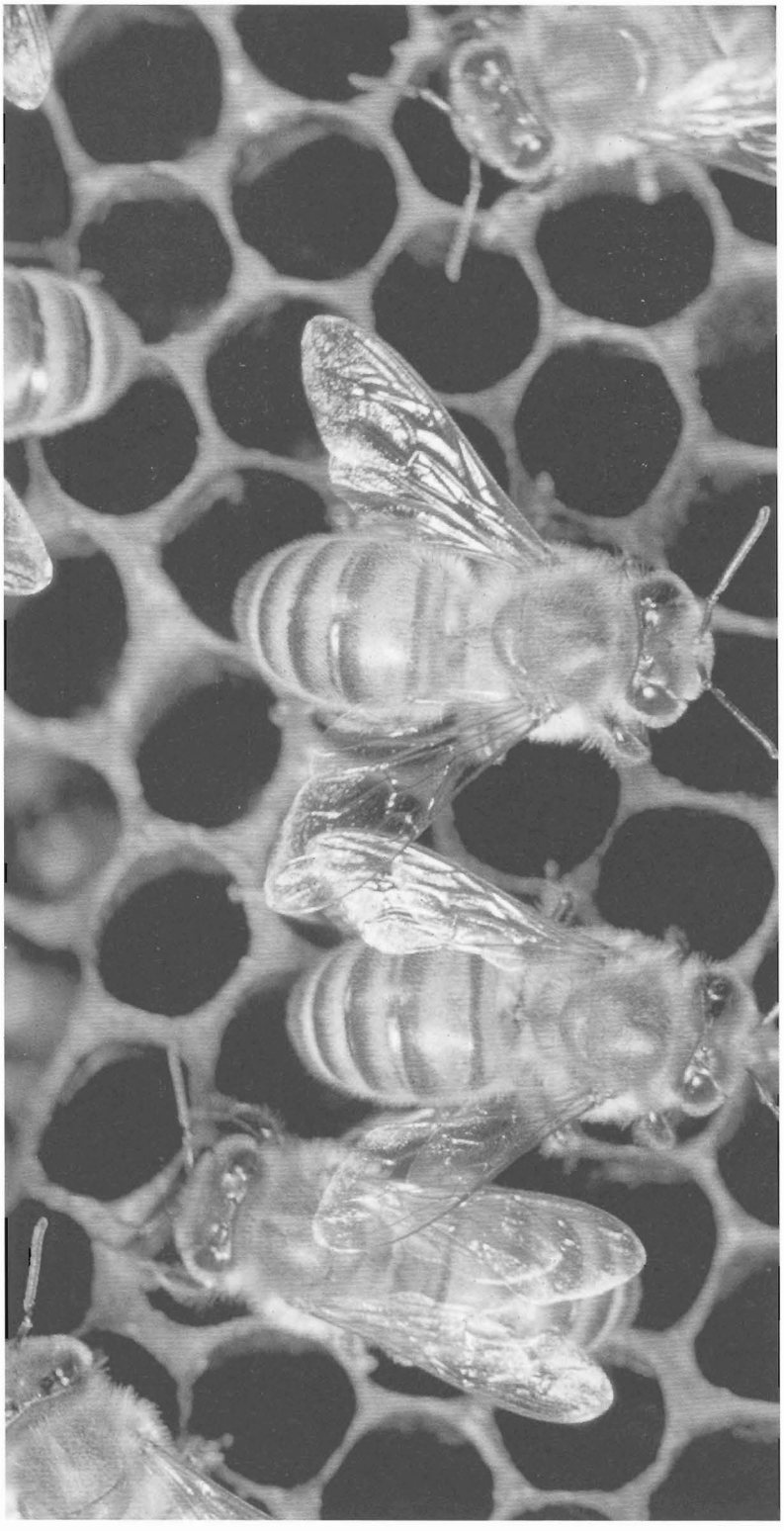
Top: These fishing boats tied up at Terminal Island in Los Angeles Harbor in 1942 belonged to residents of Japanese ancestry who were confined to War Relocation Authority camps during the war. Note the "For Sale" signs.

Above: This cheery scene conceals a munitions factory near Long Beach Airport during World War Two.

TOP: COURTESY THE BANCROFT LIBRARY, UC BERKELEY. BOTTOM: COURTESY LONG BEACH AIRPORT

Going to Bat for Bees

EILEEN ECKLUND



IT'S A WARM, SUNNY DAY IN APRIL, and the California lilac *(Ceanothus)* bush in my San Francisco backyard is humming. Hordes of fat, fuzzy bumblebees swarm its blue blossoms, collecting a good dusting of pollen to share as they bumble from flower to flower. If I rouse myself to look around a bit, I might find a tiny solitary bee or two curled up in a checkerbloom flower, lounging after a good meal, or some leaf-cutter bees carefully excising *Clarkia* leaves to use as nesting material. A bright orange California poppy flower might sport an equally brilliant green sweat bee. All this bee bliss going on under my nose is a lovely harbinger of spring, but it has been carefully orchestrated: my husband, a conservation biologist and bee booster, has chosen plants specifically to attract bees to our little backyard ecosystem.

The larger world has not been so kind to bees in recent years. Last October, the National Research Council of the National Academy of Sciences (NAS), in its report "Status of Pollinators in North America," warned that populations of bees and other pollinators, including butterflies, bats, and hummingbirds, are declining. Honeybees have suffered periodic mass die-offs from diseases and parasites, and most recently have been abandoning hives for reasons that are not understood. This phenomenon, now known as Colony Collapse Disorder (CCD), has afflicted about a fourth of all bee colonies across the country, Troy Fore, executive director of the American Beekeeping Federation, estimated in late April. "A lot of beekeepers have lost 40 to 50 percent of their hives," he said, and some have reported losing 80 to 90 percent.

Between 1947 and 2005, the number of honey-producing commercial honeybee colonies (a colony is the population of a hive) in the United States dropped by more than 40 percent, from 5.9 million to 2.4 million, according to the NAS report. Other pollinator losses are largely undocumented, but nevertheless were reported as "demonstrably downward" for some species. The decline has been recognized since at least 1996, the year Stephen Buchmann and Gary Nabhan's book *The Forgotten Pollinators* was published. The authors stated that "a pollination crisis has now become obvious in rural as well as urban settings not only in North America but on other continents as well."

TOP: JOYCE GROSS. LEFT: GEORGE W. ROBINSON © CALIFORNIA ACADEMY OF SCIENCES

Buchmann and Nabhan also pointed out that pollination is "a process that not only keeps us fed and clothed but feeds our domesticated animals and their wild cousins as well." Honeybees and other pollinators are essential to about three-fourths of the flowering plants in the world, some 250,000 species, including many of the fruits and vegetables that are most important to us.

But as more agricultural and wild lands disappear under pavement, less and less habitat remains for bees to forage and nest in, and what is left is often fragmented, so that it's difficult for bees to move among habitats as different plants come into bloom. Modern agricultural practices such as monocropping—growing just one crop from fencerow to fencerow—and intensive chemical use have made large swaths of the remaining green space hostile territory for the tiny pollinators.

Honeybees' Stressful Lives

In the 1980s, two deadly parasitic mites spread across the United States, wreaking havoc on both managed and feral honeybees. Between 1981 and 2005, the number of commercial honeybee colonies dropped by about a third, with many of the losses attributable to the mites. Other diseases and pests have also taken their toll, as has competition from aggressive Africanized bees, which have spread through several southern U.S. states, including southern California, since the early 1990s.

In fall 2006 beekeepers began reporting another calamity: they were finding many hives empty except for the queen, a few young adult bees (and then only sometimes), and the brood—eggs, larvae, and pupae. Plentiful food remained, however, and no dead bees were found either in the hives or nearby. Normally, other insects would immediately move in to take the food of a severely weakened or dying colony, but with CCD this "robbing" is delayed, suggesting that other insects were avoiding the abandoned hives.

Sporadic incidents of hive abandonment have occurred in the past, but nothing on the present scale has been reported. "This is the worst," Fore said. So far it seems that the beekeepers suffering the heaviest losses are large-scale commercial operations that truck their hives from state to state to pollinate various crops.

Shortly after the first reports of CCD, a working group was formed to study the phenomenon, develop strategies to address it, share and disseminate information, and raise funds for research. The Colony Collapse Disorder Working Group brought together university researchers, agricultural extension educators, and state regulatory officials. Researchers are looking at several possible causes, including parasites and diseases, pathogens, poor nutrition, lack of genetic diversity of bees, increased levels of stress in adult bees, and chemical contamination.

One theory gaining ground among researchers is that a combination of causes has pushed bee colonies beyond their ability to recover. "We think this could be the 'perfect storm' for bees," said Kevin Hackett, who leads the research programs on bees and pollination for the U.S. Department of Agriculture's Agricultural Research Service (ARS). "It could be the tipping point, where the colonies just can't fight back."

Many commercially managed honeybees live stressful lives. Commercial beekeepers today often have thousands of hives—the biggest have as many as 60,000—and a healthy hive may house 50,000 to 60,000 adult bees in summer, at the peak of their population. During pollination season (which varies depending on the crops being served), many beekeepers pack their hives onto trucks and transport them for hundreds, sometimes thousands, of miles. "They're never really in one spot for long," said Rodney Gubbels, a small-scale beekeeper who has 2,000 or so hives based near Livermore, in Contra Costa County, and trucks his bees to crops in California and Oregon.

In transit bees go without food or water and may suffer from both hot and cold weather. If conditions are poor when the bees arrive—if there's been a drought that's reduced the floral resources, for example, or weather conditions are bad—the colonies can be further weakened by malnutrition. Added to that are the pesticides and other chemicals that bees are often subjected to, which may not kill them outright but can contaminate nectar or pollen in the hive. "Bees are always picking up something—whatever people spray," Gubbels said. A newer class of nicotine-based pesticides is suspected of interfering with the bees' ability to forage and navigate.

All these factors can weaken the bees' immune systems and leave them more vulnerable to disease. Beekeepers have always lost colonies over the winter, when the bees' populations are at their lowest and most vulnerable, according to Fore. "Bees die all the time. But 10 percent winter loss used to be bad; now 15 to 20 percent isn't unusual."

Far left: Western honeybees *(Apis mellifera)*

Above left: Yellow-faced bumblebee *(Bombus vosnesenskii)*

Above: A painting from Cueva de la Araña near Valencia, Spain, shows that humans collected honey thousands of years ago.

WIKIMEDIA COMMONS

"The bottom line is that this shows us how fragile all pollinator systems are," said Laurie Davies Adams, executive director of the Coevolution Institute, which promotes conserving biodiversity through land stewardship, and coordinator of the North American Pollinator Protection Campaign, a coalition of researchers, conservation and environmental groups, private industry, and state and federal agencies that works to conserve and protect pollinator populations.

Pollinators Feed People

The relationship between humans and honeybees goes back a long way. Cave paintings in Europe, Africa, Asia, and Australia show prehistoric people gathering honey. The art of beekeeping dates to at least 2400 B.C., and honey, beeswax, and propolis (bee "glue," composed mainly of resins collected from plants and used to seal cracks in the hive) have been used medicinally since 2700 B.C. Bees and honey have figured in mythology and religion. In one Egyptian myth, the tears of the sun god Ra fell to earth as bees.

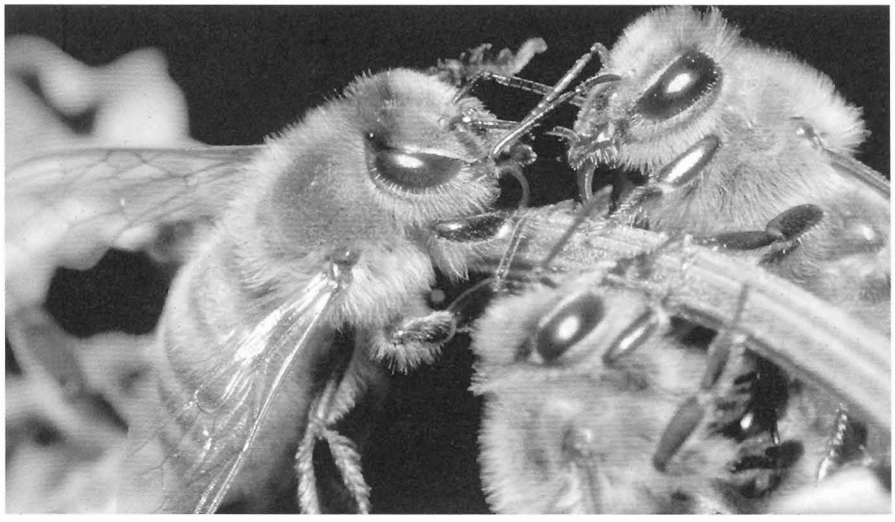
The bee everyone knows best is *Apis mellifera,* the Western or European honeybee, which humans have domesticated and transported around the globe. "It's virtually everywhere humans have gone, except Antarctica," said Robbin Thorp, professor emeritus of entomology at the University of California, Davis, who studies native bees. It's one of only about seven species considered to be true honeybees (the exact number is disputed), among more than 20,000 known bee species worldwide. Brought to North America by settlers some 400 years ago, it is now one of the most valued species, although there are more than 4,000 native bee species on the continent, some 1,600 of which can be found in California.

Close to 100 flowering crop species in the United States rely to some degree on honeybees to reproduce. Among them are almonds, apples, avocados, peaches, strawberries, citrus, broccoli, cauliflower, carrots, and squash. A report released by the Congressional Research Service in March 2007 placed the value of these pollination services to agriculture at almost $15 billion.

California grows nearly 100 percent of the nation's almonds and some 80 percent of the world's. The state's $2.3-billion almond crop, its fourth-most-valuable farm commodity in 2005, grows on 580,000 acres and depends on the services of about 1.4 million honeybee colonies, almost three-fourths of the commercial bee colonies available for pollination in the entire United States. Many colonies must be trucked to California for the bloom in February and March, some coming from as far as North Dakota. California's almond acreage already requires the services of billions of individual honeybees, and is expected to grow by another 100,000 acres by 2010, requiring more pollinators even as the bee population declines.

Agriculture in the United States does not wholly depend upon honeybees for pollination services, but their loss would be "absolutely devastating to agriculture, no doubt about it," Adams said. No one is suggesting that the honeybee might disappear from this continent, but "they certainly aren't on a healthy trend."

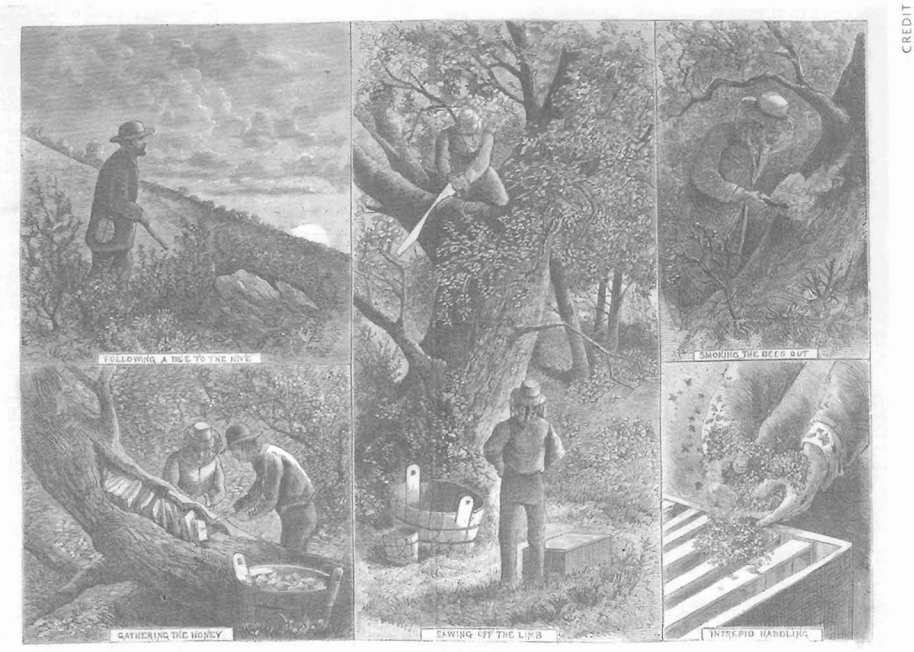
Settlers brought Western honeybees to North America 400 years ago.



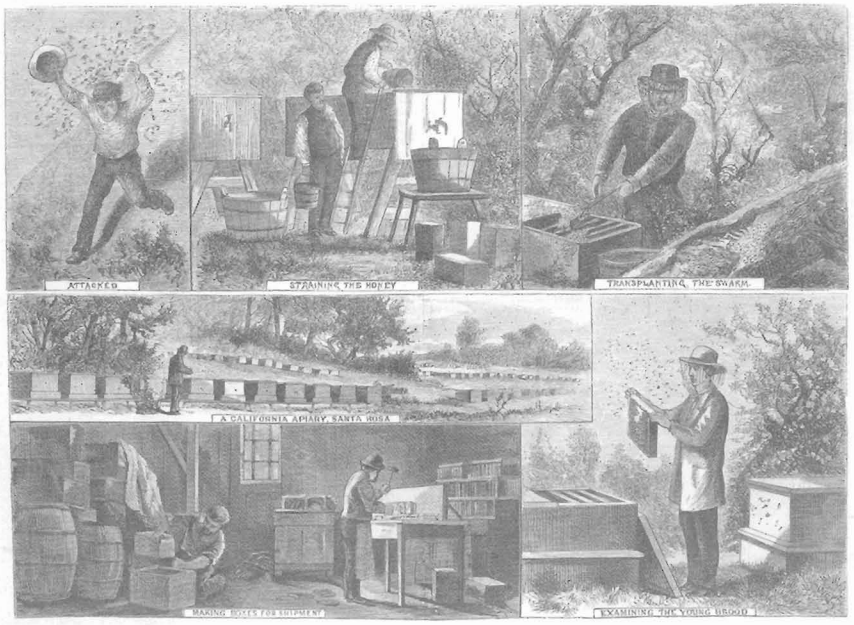
JOYCE GROSS

Attracting Bees to Your Garden

- Choose plants that bees prefer. They are particularly attracted to native plants, but also love some non-natives. They avoid showy garden hybrids, which don't have much pollen and nectar. Some favorite bee plants: daisies, asters, sunflowers, California poppies, mint, lavender, sage, buckwheat, geraniums, and snapdragons. See the box on p. 20 for websites with lists of bee-friendly plants. Many nurseries can also provide recommendations for your region.
- Provide variety. Bees prefer gardens that have ten or more species of plants that are attractive to them. They also like a variety of colors, and are particularly attracted to blue, purple, violet, white, and yellow.
- Plant flowers in clumps, preferably four feet or more in diameter, and plant similar flowers in close proximity.
- Plant flowers that will bloom successively over spring, summer, and fall, to provide food for bees of all seasons.
- Let your garden grow a little wild. Bees nest in the ground or in trees and prefer to build nests in areas that aren't disturbed frequently.
- Don't use pesticides. If you must, use fast-acting ones and apply them in the evening or at night, when pollinators are least active.



HUNTING WILD BEES.



BEE-CULTURE.
A CALIFORNIA BEE RANCH.—[See Page 274.]

CREDIT

LEFT: WIKIMEDIA COMMONS. RIGHT: COURTESY THE BANCROFT LIBRARY, UC BERKELEY

Return of the Natives

As the problems affecting honeybees have multiplied, scientists and farmers are realizing that it's dangerous to rely too heavily on them for crop pollination. "There's a lot of interest now in looking at our native bees and seeing which ones can be managed as pollinators," said Thorp. Commercially managed native blue orchard bees, *Osmia lignaria,* are increasingly used for fruits and almonds. Alkali bees, which are native to North America, and alfalfa leaf-cutter bees, which were brought here in the first half of the 20th century, are used to pollinate alfalfa for seed.

Honeybees are good generalists—meaning they will pollinate a large variety of crops—but they're not always the best pollinator for a particular crop. Bumblebees, for example—both native and non-native—typically pollinate greenhouse tomatoes because they are better than honeybees at the vibration or "buzz" pollination the plants require. Introducing exotic species of any animal or plant has potential pitfalls, however: Thorp and others fear that the virtual disappearance of two species of native bumblebee once common in western states may be due to a disease introduced by bumblebees imported from Europe for greenhouse pollination.

Although most of the U.S. Department of Agriculture's $9-million bee research program is devoted to issues concerning honeybees, researchers at its Bee Biology and Systemics Laboratory in Logan, Utah, study other bees in North America, all but one species native—their dispersal and diseases, as well as how they can be managed for crop pollination. Entomologist James Cane helps farmers build up and manage populations of various native bees for pollination, and to improve land-management practices so as to encourage more bee visits—for example, by maintaining habitat for wild bees and guiding insecticide use with bees in mind. Right now he is looking at bees in the genus *Osmia* (there are about 140 species just in the United States) because many should be relatively easy to manage, and they pollinate a variety of crops. He's found that *Osmia aglaia,* a cavity-nesting bee, for example, is a good, readily managed pollinator for raspberries and blackberries. He is helping two California start-ups build up to mass production

Above left: Honeybee hives depicted in the 14th-century health handbook *Tacuinum sanitatis*

Above: Early California bee culture, from *Harpers Weekly*, 1881

Bee Information and Resources

The Great Sunflower Project: http://sunflower.sfsu.edu—Information on Gretchen LeBuhn's upcoming project (see p.21)

North American Pollinator Protection Campaign: www.nappc.org—Information about the Campaign and its partners

Pollinator Partnership: www.pollinator.org—Lots of information about bee-friendly practices, including gardening for bees, as well as general pollinator information

Urban Bee Gardens: http://nature.berkeley.edu/urbanbeegardens—U.C. Berkeley professor Gordon Frankie's site, with information about his Urban Bee Project and many resources for gardeners who want to attract bees

Xerces Society for Invertebrate Conservation: www.xerces.org—General information about pollinators and Xerces' conservation programs, as well as fact sheets and other publications on pollinator-friendly practices

***Agapostemon virescens* is one of many species of bee commonly referred to as sweat bees because they are attracted to the salt in human perspiration.**

of *Osmia lignaria*, the aforementioned blue orchard bees, for almond pollination.

Cane also works with alfalfa seed growers in the Pacific Northwest, who he says have had tremendous success managing alkali bees and alfalfa leafcutter bees to pollinate their crops. "There are 17 million nesting alkali bees in 60 square miles of Washington State, with some individual aggregations more populous than for any other bee on the planet," all managed by private alfalfa growers, he said. "When you get down to ground level, you can't even see through the bee bodies; it looks like heat waves. It's just dizzying."

Bee-Friendly Practices

Given the right conditions, wild bees could provide more of the pollination needed by agricultural crops. On farms that can attract a diverse and abundant population of wild bees, they can pollinate even such demanding crops as watermelon, which requires several insect visits, studies by University of California, Berkeley assistant professor Claire Kremen have shown. Now Kremen is involved in a habitat restoration effort on farms in California's Central Valley that may help increase populations of wild native bees.

The Valley can be an inhospitable place for bees. Many of the farms there are conventional, growing one crop at a time with a lot of chemical inputs, whereas bees prefer floral variety and are highly sensitive to chemicals. Nevertheless, Kremen is optimistic that the landscape can be made more friendly to pollinators. In collaboration with Audubon California, the Xerces Society for Invertebrate Conservation, USDA's Natural Resources Conservation Service, and the Center for Land-Based Learning, she is adding bee-friendly plants and practices—such as providing buffer strips and hedgerows around fields and planting cover crops—to riparian restoration projects on six conventional farms in Yolo County. Her research has shown that the food resources for bees on or near a farm are more important to their survival than whether or not the farmer uses pesticides. "We think we can make a pretty big difference by providing a variety of floral resources for the bees," she said. If monitoring shows these practices are successful, the partners plan to help spread them to other farms in the Valley.

The Xerces Society and the Natural Resource Conservation Service are already working to include pollinators in programs that provide incentives for farmers to practice land stewardship and conservation. Implementing conservation projects on their land is "a lot of extra work for growers to take on," said Mace Vaughan, Xerces' conservation director. "We have to make sure there are as many reasons for them to do it as possible. Pollinators are one great reason."

Meanwhile, Gretchen LeBuhn, an assistant professor of biology at San Francisco State University, is helping vineyard owners make their land more pollinator-friendly. The extensive destruction of oak woodlands to make way for vineyards in Napa and Sonoma Counties has fragmented bee habitat and meant a big loss of food resources for pollinators. But LeBuhn has found that vineyards can be made more inviting to bees by planting certain kinds of native plants in gardens or as cover crops and making sure that

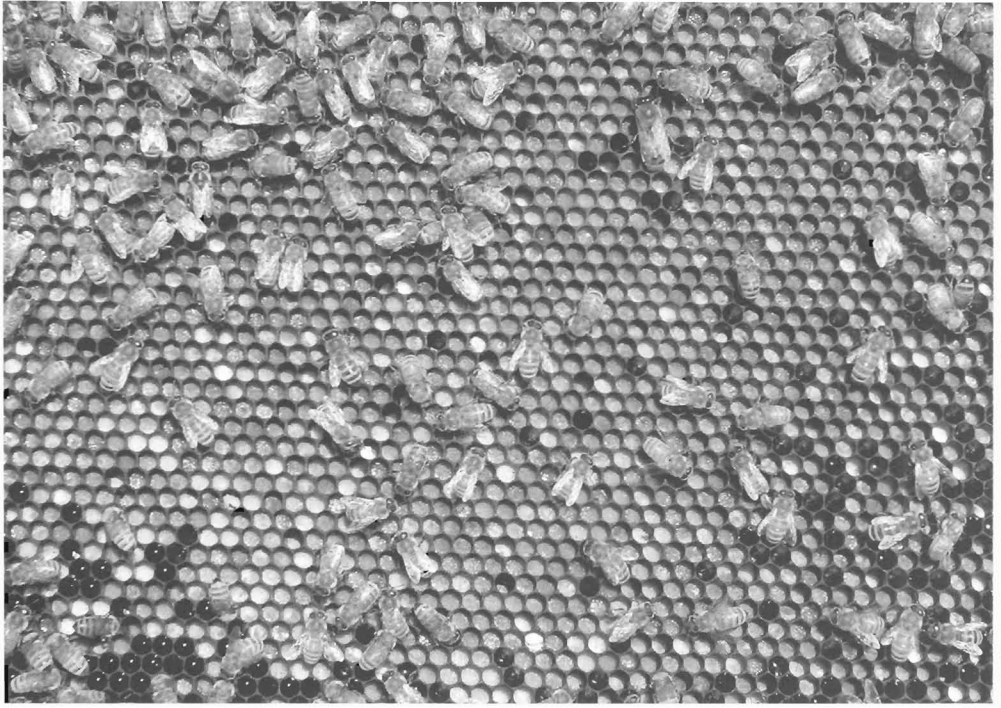
flowers are available to bees from spring through early fall. She also suggests tilling carefully—less often or less deeply, or leaving some areas untilled—to avoid disturbing the nests of ground-nesting bees, and putting native plants in available niches, such as along farm ponds. She has collaborated with several wine-grape growers on her research and has been invited to speak to groups of vineyard owners interested in adopting sustainable practices.

As meadows, fields, and woodlands continue to disappear, LeBuhn thinks urban parks and gardens might also be important habitat for native pollinators. "The potential is huge," she said. Two of her graduate students have studied bee populations in San Francisco's parks and natural areas to determine which characteristics are most important to the types and numbers of bees the parks support. One student tallied 70 species of native bees in 24 natural areas—an amazing number, considering San Francisco's urban density, though fewer than the 87 species noted in historical records of the California Academy of Sciences.

In 2008 LeBuhn will launch "The Great Sunflower Project," handing out sunflower seeds and seedlings to people and organizations around the San Francisco Bay Area who agree to plant them and record bee visits. "It really will contribute to our understanding of where bees are and how dense they are," she said. "What we're looking at [in all these projects] is how we can take lands that are being used by people and give them more resources for wildlife."

Gordon Frankie, a professor in U.C. Berkeley's College of Natural Resources, is pursuing similar goals. He has recorded 82 species of native bees in the city of Berkeley, and has attracted at least 40 to the research garden he and his students planted. Frankie also surveys bee populations in other urban areas around the state, including Ukiah, Sacramento, San Luis Obispo, Santa Barbara, and Pasadena, where he counts the frequency of bee visits and evaluates the bee-attracting potential of various plants people choose for their gardens. "We've found that the same plants seem to attract the same bees all over the state," he said.

Using this information, Frankie and his collaborators have been giving presentations at schools and museums about how to plant bee-friendly gardens, and are developing a website with extensive resources. He's also working with Robbin Thorp and botanist Barbara Ertter on a book on gardening for bees for the natural history series of University of California Press.



TOP AND MIDDLE: CHRIS CROSSLEY. BOTTOM: WIKIPEDIA. BEE MIGRATION 9045

Center: A Bay Area beekeeper checks his hives.

Bottom: Migratory beekeepers load a tractor-trailer to haul bees from South Carolina to Maine to pollinate blueberries.

Taking Bees Seriously

Meanwhile, both the Xerces Society and the North American Pollinator Protection Campaign are helping to translate researchers' findings into user-friendly informational publications. Xerces has put out a series of fact sheets and booklets on pollinator-friendly practices for farmers, gardeners, and park and golf course managers, and produced the *Pollinator Conservation Handbook*. The Pollinator Protection Campaign is producing bioregional planting guides aimed at a variety of readers, with specific plant lists for 13 regions of the United States.

Both organizations also collect pollinator data from researchers and other sources—a critical task in an area where little data has been compiled. The NRC's Committee on the Status of Pollinators found what its chair, May Berenbaum, described as an "extraordinary paucity" of information on pollinator populations—even honeybees, despite their importance to agriculture. European nations have much better information than the United States on historic populations of native bees, said Laurie Davies Adams of the Pollinator Protection Campaign, because they "have had an army of citizen naturalists since Victorian times. We didn't have that, so it's going to be very hard for us to know what's been lost here." The NRC report was a first step toward addressing this lack. It is "a baseline assessment of what we don't know as well as what we do know," said Adams.

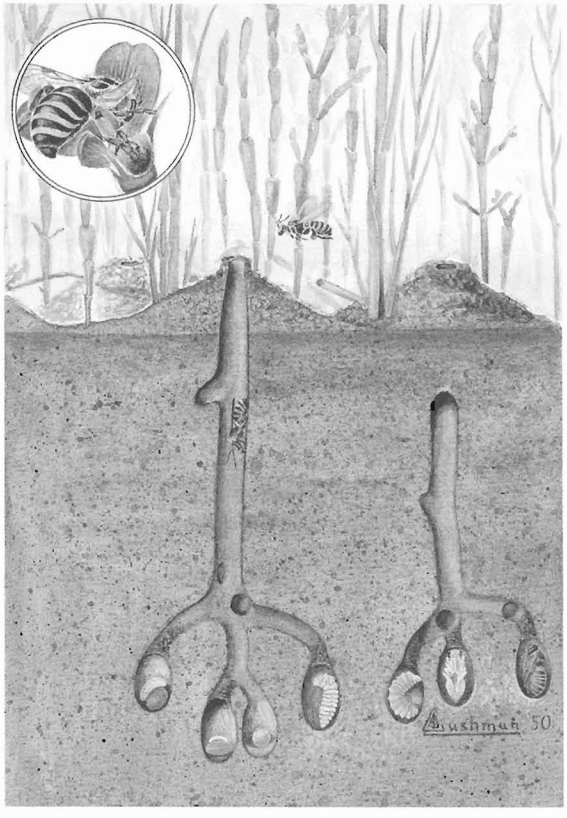
"We don't have all of the facts to really know what is happening to the majority of native bees in the United States," agreed Xerces' executive director Scott Hoffman Black. "But there's more information than you'd think. For our Red List [of endangered pollinators] we reached out to scientists who work on bees and found that many of them have lots of data that just isn't getting out there."

Many others are also sounding the alarm about the need for better and more research. At a hearing before a subcommittee of the House Agricultural Committee in March 2007, Berenbaum joined other scientists, farmers, beekeepers, and conservationists in urging Congress to fund more research and conservation for both managed and wild bees. The 2002 Farm Bill will expire in September 2007, providing Congress the opportunity to make pollinator needs a high priority in the new legislation.

The attention now being paid to the problems of bees may be the proverbial silver lining to CCD's storm cloud. Bees have been having a hard time of late, but it seems that a lot of people are going to bat for them now. "The good news is that people are really taking this seriously." said Adams. "It's long overdue." Said Black: "People are finally getting it, that this is important." ■

Below left: Below-ground nests of alkali bees *(Nomia melanderi)*

Below right: A bumblebee

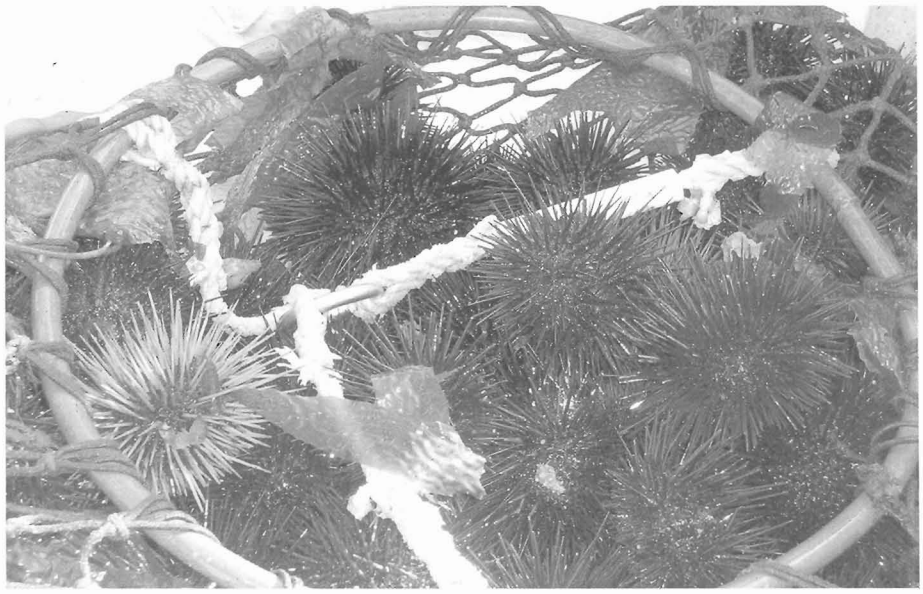


LEFT: ART CUSHMAN, USDA/SMITHSON AN INSTITUTION/WWW.INSECTIMAGES.ORG. RIGHT: JOYCE GROSS

A DAY WITH THE SEA URCHIN FISHERY

Seafloor to Sushi

REBECCA POLLOCK



REBECCA POLLOCK

UNTIL THE EARLY 1970S, red sea urchins in California were mainly known as pests that chewed up kelp beds—while in Japan they were a delicacy. The five strips of gonad (known as uni or roe) that line the inside of the shell (called the test) are valued for sushi. Then Sus Kato of the National Marine Fisheries Service came up with an idea that now seems obvious. "He got processors from Japan together with abalone divers in California," recalled Christopher Dewees, statewide marine specialist at California Sea Grant Extension.

Before long, a commercial sea urchin fishery was thriving in southern California, exporting nearly its entire catch to Japan. "By the 1980s, with the favorable exchange rate—the yen was strong, the U.S. dollar weak—it was going full speed," said Dewees, "and in 1985, that made it profitable to open the fishery on the North Coast too," in Sonoma and Mendocino Counties. Then the value of the dollar against the yen rose and exports slowed, but sushi had become popular in this country. Now about a third of the market is domestic.

At the height of the fishery's prosperity, in the late 1980s, sea urchin divers petitioned the Department of Fish and Game (DFG) to institute size limits, permit restrictions, and other management measures to prevent this fishery from going the way of the sardine fishery, which had collapsed in California by the 1950s. Legislation was passed that established a tax and an advisory committee to distribute funds to carry out the science that was needed for management. All of these regulations were developed through a co-management process in which DFG worked with the urchin divers. Now commercial fishermen in the San Diego area are taking further steps to ensure a future for the urchin, which not only earns them a living but is also important ecologically as food for sea otters. Sea urchins should be managed so they don't overgraze kelp beds and cause barren areas.

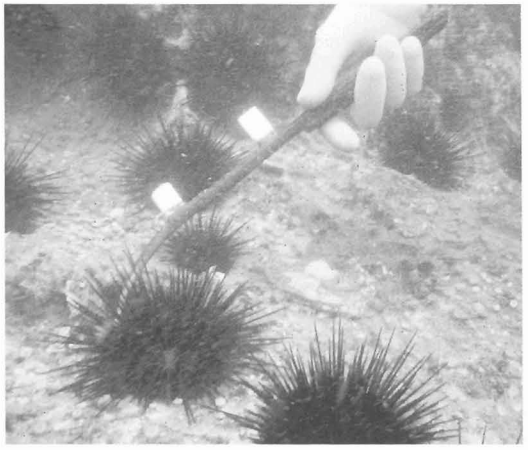
Through a project funded by the California Ocean Protection Council and the Coastal Conservancy, the San Diego Watermen's Association (SDWA) is taking steps toward sustainable management for the sea urchin fishery based on science, community-based governance, and value-added markets. SDWA, a 501(c)5 nonprofit corporation made up of commercial sea urchin fishermen, will work collaboratively with other commercial fishermen in the San Diego area, as well as with researchers and DFG, to collect and share data, develop an accurate local stock assessment, and consider various management strategies.

More than half of the California urchin harvests come from Santa Barbara County, around the Channel Islands, according to Dewees. There are only 15 commercial fishing boats in the San Diego area, but they bring in a steady supply of quality sea urchins.

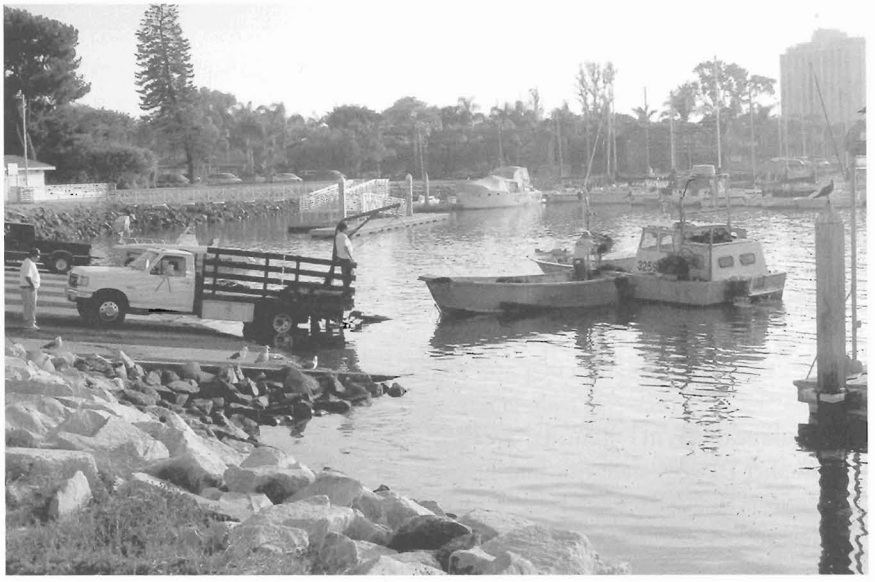
On a beautiful blue-sky morning, Mike Neil graciously welcomed two Ocean Protection Council project managers aboard his boat, the *Desperado,* for a glimpse of a sea urchin fisherman's working day. Like most urchin divers, he usually goes out alone.

Before jumping in, a fisherman dons a heavy wetsuit (or dry suit), hood, gloves, and fins. Underwater, he breathes air from the surface through a hooka—a hose attached to a compressor on the boat, powered by a generator. Most harvesting occurs in water between 20 and 60 feet deep.

Red urchins are measured to ensure they are a legal size for harvesting. The minimum is a 3.25-inch test diameter. There are no size limits for purple urchins.



After being measured, the urchins are scooped into a net or wire basket with a special rake. Once the bag is full, it is raised onto the boat and covered so the urchins stay cool and moist.



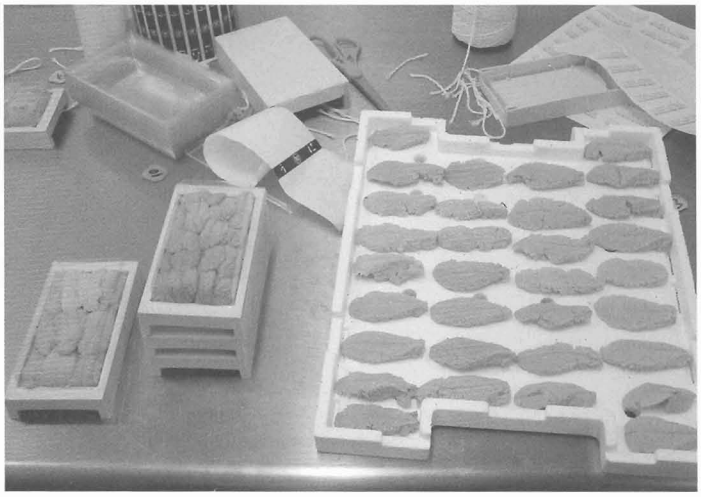
Back at the dock, the bags are weighed and transported to the processing facility. Seasonal restrictions on urchin harvesting vary throughout the year and permits are required for both red and purple urchins.

At the Catalina Offshore Products processing plant, urchin tests are cracked open with special pliers. This particular processor sells uni fresh and not frozen, salted, or steamed, which would require a different process.

BOTTOM AND MIDDLE LEFT: BARRETT WALKER. ALL OTHER PHOTOS (BOTH PAGES): REBECCA POLLOCK

The uni is carefully scooped out by hand with spoons, placed in stackable sieve trays, and cleaned in brine to remove debris. The trays are labeled with the name of the vessel that brought in the catch, and are chilled briefly until the uni can be finely cleaned with small forks and sorted.

Not all urchins grow equal uni. Based on the reproductive season and the food they ingest (certain kelp is preferred but urchins will improvise if it is not available), sea urchins may produce high-quality uni, which is plump, firm, and golden. Poorer quality uni is pale or off-colored, and thinly lines the inside of the test. The uni is sorted and labeled by its quality. The fishermen are compensated based on the amount of high, medium, and low-quality urchin that is shipped.



Finally, the uni is placed in various containers—stacked in small wooden trays or laid flat on larger foam trays—for sale to restaurants, grocers, or other vendors.

The sea urchin harvest does no harm to the ocean, so it might be better to eat them and avoid some other kinds of sushi. ■

Arundo donax

Plant from Hell or Green Energy Solution?

HALLIE GARDNER

Attack on the giant reed

JASON GIESSOW PULLS HIS JEEP ONTO a dirt road off College Avenue in Oceanside and parks in front of a thicket of towering reeds that look like corn stalks on steroids. I can hear the San Luis Rey River flowing, but it's completely screened from our sight. Here, as in many places along California streams and rivers, the invasive *Arundo donax* (giant reed) has taken over the streamsides almost completely.

Giessow is project manager of the Santa Margarita and San Luis Rey Watersheds Weed Management Area in northern San Diego County. With his wife, Jesse, he is coordinating a $7-million multi-agency effort, led by the Mission Resource Conservation District (RCD), to eradicate arundo on these river systems. They've been working toward that goal since 1994, but in light of what we're seeing in front of us, it's obvious there's still a long way to go.

Among the alien plants that have invaded coastal watersheds, Giessow ranks arundo as the worst because "its impacts are so varied and far-ranging." It is dry and highly flammable, uses about three times as much water as native riparian plants, exacerbates flooding by choking waterways, and destroys habitat for native wildlife. It grows rapidly—several inches per day in spring and summer—reaching a height of 35 to 40 feet, and reproduces easily from both the stems and the underground rhizomes. It seems not to have any natural enemies or be susceptible to diseases. Its densely clumped canes, up to 200 in a square yard, are nearly impenetrable and tough to remove.

Many biologists and land management professionals consider *Arundo donax* to be one of the primary threats to the health of streams and waterways in the western United States. Arundo is listed as an invasive species in California, Nevada, Arizona, New Mexico, Texas, Georgia, Virginia, and Maryland. California has been hardest hit, with over 40,000 acres along the state's major coastal drainage systems infested.

To date, state and federal agencies have spent over $70 million trying to rid California of arundo. Within the next decade, more than $100 million more is likely to be required, Giessow says. That may seem like a big bill for taxpayers, but the cost of doing nothing would be far higher. The current cost of arundo damage in California is estimated at about $25 million a year.

As we travel along the river, stopping at other heavily infested spots, Giessow explains how he and his crew attack the giant reed. First they climb ladders and use their body weight to compress the massive stalks, pushing them away from

JASON GIESSOW

other vegetation. Then they spray the leaves and stalks with an EPA-approved glyphosate herbicide. Three to four months later, after the plants have turned brown and died, they bring in tractors to mow them down. Then they immediately replant the area with native vegetation. The decomposing arundo serves as mulch, saving water and keeping other weeds out. Every 1,000 acres of arundo removed and replaced with native plants saves enough water to supply the annual needs of almost 20,000 urban residents.

No treatment method is 100 percent successful, but this labor-intensive approach gets a much higher initial kill than most other methods, says Giessow. Subsequent monitoring and retreatment is essential, in case there are new sprouts. Arundo has earned its reputation as the plant from hell.

Meanwhile, in Florida . . .

In light of all that has been learned in California, many of those involved in the war against *Arundo donax* were appalled when they heard that in Florida a utility had signed a contract with a private startup firm that intends to grow it as a crop on agricultural land, harvest it, digest it in a compost-like process to make methane, and burn it in a gas turbine to generate about 130,000 kilowatts—enough to power 83,000 homes. The 25-year contract, signed in May 2006, commits Progress Energy to purchasing the entire energy output of Biomass Investment Group (BIG), of Gulf Breeze, Florida, at prices below the price of natural gas, according to Robert Niekum, director of wholesale power at Progress Energy.

The very qualities that have made arundo a monster in California have led its promoters in Florida to view it as an ideal biofuel crop: It is large, resilient, flammable, easy to propagate, and seems to have no natural enemies. "We've been amazed to see people being opposed to it," Niekum said. "In Florida it's not classified as an invasive species. You can buy it in nurseries."

Progress Energy wanted to include renewables in its energy portfolio, but "Florida doesn't have as many opportunities for renewable energy as California," Niekum said. "The yield per acre with arundo is outstanding." He said that as a regulated utility, Progress Energy is required by federal law to negotiate in good faith with small power producers. "We have been talking with them [BIG] for four years."

Scientists in California are shaking their heads. "Planting it intentionally, in a warm climate that has a lot of aquatic resources like Florida, is just asking to open a Pandora's box," said Deanne DiPietro, a specialist in environmental conservation and research at the Sonoma Ecology Center who has played a leading role in California's efforts to eradicate the plant. "Because the nature of invasive plants is that if you don't prevent them, you have a problem that you can't solve, you can only mitigate. If arundo's in a place, it'll get out of that place, you can be sure, and there's no turning back once you've planted it."

Joseph DiTomaso, a Cooperative Extension specialist engaged in arundo research at University of California, Davis, agrees. "There's no reason why it couldn't become an invasive species in Florida," he said. "It likes warm climates and it likes to be around lots of water. Florida has both."

The project is not yet off the ground. Allen N. Sharpe, BIG's chief executive officer, said in late April: "We're still working on putting the project together, finding the land, financing." He hopes to lease "probably 10,000 acres in southern Florida" soon—agricultural land that he believes is now in sugarcane. "We're looking at several places in the Southeast, also Latin America, the Caribbean, and the Pacific," where countries are searching for alternatives to costly oil, he added. "We have something that we think is ideal."

BIG has coined and trademarked the term "e-grass" for *Arundo donax* and any other biomass energy crops it might grow, Sharpe said. It is promoting arundo as environmentally friendly and carbon-neutral, explaining that it produces carbon dioxide when burned but absorbs it through photosynthesis as it regrows. Generating energy from a home-grown biofuel would also be a national security benefit, BIG says. The Florida Public Service Commission has already granted a permit for the project. A planting permit from the state agriculture department will also be required.

As for arundo being an invasive species, Sharpe blames California's problems on "man's stupidity," because, decades back, it was used widely for erosion control. "Because something is invasive that is planted on a river in California does not mean that it will be invasive if planted as a crop somewhere else," he contended. He and his team first found arundo on a farm in northern California, where it had been growing for 15 years, he said.

In fact, arundo had been present in California for over 100 years before its population exploded. It is believed to have been imported

from the Mediterranean by early Spanish settlers, who used it for fencing, roofing, and musical instrument reeds. Only recently did it start wreaking havoc. It is not uncommon for introduced species to be present for some time before they become invasive.

"We have a great fear that if arundo were planted anywhere in south-central Florida, a hurricane could easily take chips of the plant and distribute them into the Everglades," said Doria Gordon, senior ecologist and associate director of conservation science for the Florida chapter of the Nature Conservancy. In 2000, Congress approved an $8 million restoration program for this great wetland complex, home to more than 1,500 species and the primary source of clean water for six million Florida residents. "Much of the restoration work that's been done could be undone if an invader like arundo takes hold there," Gordon said. "If it moved into the Everglades and mixed in with our native species, it would be difficult to impossible to eradicate."

Lessons Unheard?

Arundo isn't the first fast-growing, water-slurping plant from the other side of the globe that Florida has imported. Early last century, developers brought the paperbark tree *(Melaleuca quinquenervia)* from Australia to help dry up wetlands and cut down on mosquitoes. Today melaleuca covers hundreds of thousands of acres of Florida's grasslands and has pushed out almost all of the native animals and vegetation in its path. Attempts to remove the tree with fire, herbicides, and predatory insects have been unsuccessful.

As we walk upstream, Giessow tells me more of what he knows about arundo, and of his work with the resource conservation district to eradicate it. The San Luis Rey and Santa Margarita river systems encompass 1,308 square miles in San Diego and Riverside Counties. In 1994, 1,400 acres were infested. Now all but 350 acres have been cleared, and the project is scheduled to be completed within five years. The RCD intends to monitor the region indefinitely, however.

At least a dozen endangered and threatened species are jeopardized by the plant in this state. In the region where Giessow is working, the endangered southwestern willow flycatcher, least Bell's vireo, and southwestern arroyo toad are at risk. "The toad really gets the short end of the stick," Giessow says. Not only does arundo displace insects that the toads eat, it also occupies the sandy areas where they burrow, dries up the ephemeral pools where they breed, and physically blocks the toads' movement in and out of the habitat.

Because stands of arundo don't provide the shade a native riparian canopy offers, water temperatures rise in rivers and streams, oxygen concentrations drop, algal growth increases, and fish populations diminish.

In a functioning ecosystem, riparian areas stop or block fires. Arundo actually exacerbates them. Unlike native vegetation, it is dry and ignites easily. Each conflagration opens new acreage that arundo colonizes, resprouting and spreading quickly. One arundo-fueled fire burned 250 acres of riverbank in Riverside County in 2002. A month and a half later, the resprouted arundo had grown to three feet in height, according to a 2002 report by the Southern California Integrated Watershed Program.

Adding to a record that could land it a role in *Little Shop of Horrors,* the plant's long, fibrous, interconnecting root mats are easily undercut by streamflow, so they often break off streambanks, taking soil with them. Heavy rains wash debris dams of arundo downriver, which clog drainage pipes and river channels. In 1995 arundo caused the Santa Ana River in Riverside County to flood, washing away the River Road highway bridge. The plant was cleared from the region and the bridge rebuilt at a cost of $700,000, but three years later the reed was back and took out the new bridge. A $20-million state and federal eradication effort is now under way.

As large quantities of the plant move downstream, they eventually find their way to the ocean. Massive amounts of arundo are currently washing up on beaches all along the California coast—resulting in costly cleanups for the public.

Can arundo ever be eradicated from the state? Not completely, in Giessow's opinion. With extreme effort it may be possible to eradicate it from individual watersheds, he says. Elsewhere it probably can only be managed. Like others on the frontlines of California's arundo battle, Giessow is incredulous that Florida is looking at it as a green energy solution. He is certain that if the project proceeds, "the plant will spread in Florida over time."■

Hallie Gardner, who has a master's degree in environmental policy from the University of Southern California, is a freelance environmental writer based in San Francisco.

JASON GIESSOW

California's reputation for environmental leadership jumped up several notches recently because of pioneering measures to reduce carbon emissions. Yet one of the state's prime natural assets—its 1.5-million-acre park system—is underfunded and in severe decline.

Our Priceless but Forlorn State Parks

STEVE SCHOLL

DOLLARS CONTINUE TO POUR into development on the California coast. If you drive along the shoreline highway in southern Orange County, you'll pass the oceanfront Ritz-Carlton Laguna Niguel, the elaborate St. Regis Monarch Beach Resort and, nearby on the bluff, the Dana Headlands hotel and residential project now under construction.

In Los Angeles County, on Carbon Beach near the Malibu Pier, old beachfront shacks now worth millions of dollars are being replaced one by one with edifices spanning several lots and worth tens of millions. In Monterey County, in cozy Carmel-by-the-Sea, two-bedroom, two-bath homes change hands for $2 million.

The coast is a magnet for private investment in part because its natural treasures are unique and spectacular. You can find many of these treasures in our state parks. Yet today, many parks are in a sorry state, with facilities in disrepair and a noticeable scarcity of rangers and maintenance crews.

It's hard to overstate the value of California's state parks. They protect sand dunes, pygmy forests, coastal prairies, and other ecological resources of a variety and richness found in no other state, as well as significant cultural and historical sites. They attract between 70 and 80 million visitors a year, and these visitors spend billions in nearby communities and support over 100,000 jobs statewide.

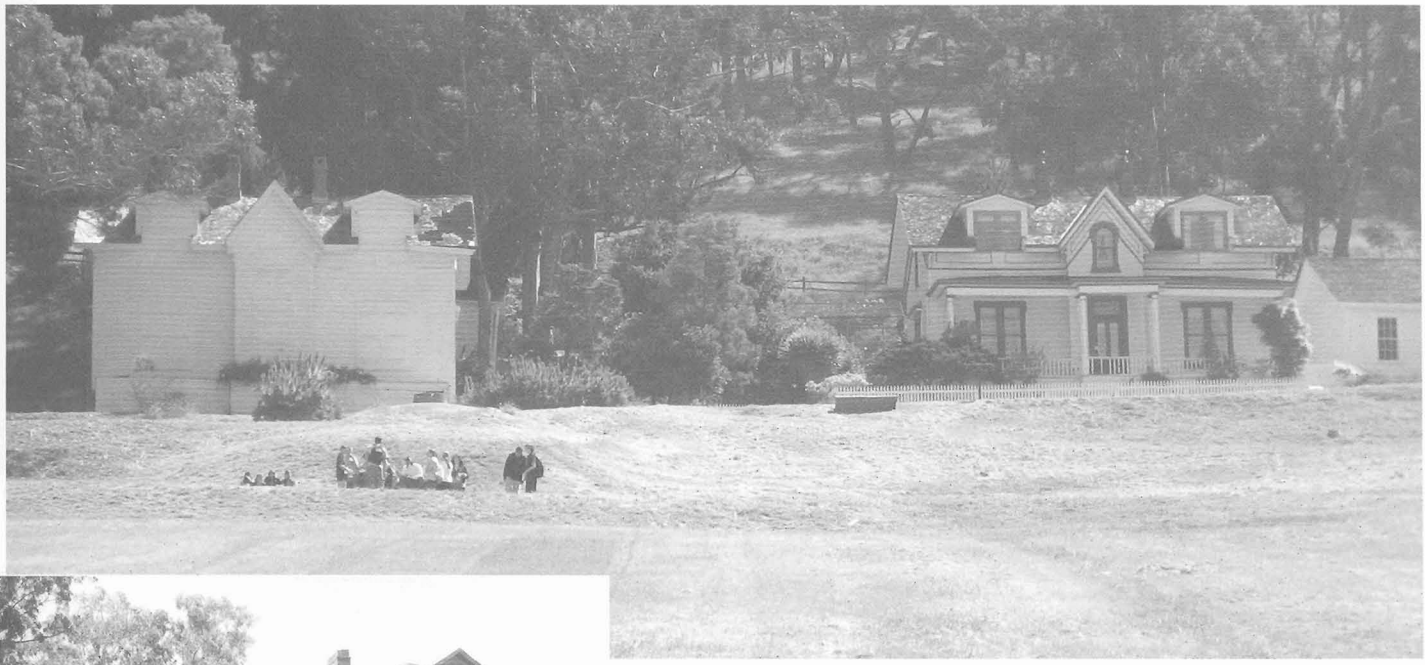
Yet because of a dearth of public investment, the state's 1.5-million-acre park system—an irreplaceable public asset and essential part of the state's infrastructure—is in grave jeopardy.

It doesn't take much searching to see what's amiss. In Angel Island State Park, and Benicia Capitol Park, for example, historic buildings are deteriorating, vacant, boarded up. Along the coast, parklands acquired years ago still lack basic facilities. Rangers are rarely sighted because their ranks have thinned. Some parks are almost incognito.

Driving south from Monterey, as you enter the stunning coastline of Big Sur, you might stop at a gravel pull-out to admire the view of the offshore Lobos Rocks and not even realize that you're standing in Garrapata State Park, created three decades ago along four miles of

STEVE SCHOLL

People come to Garrapata State Park because of its natural beauty, but the four-mile-long park lacks basic visitor facilities.



Camp Reynolds, Angel Island

Top: These officers' quarters were built on Yerba Buena Island in 1867 or 1868, then barged to Angel Island in 1882. The building on the right has been restored by volunteers, but the other is badly deteriorated, especially the roof.

Above: State Parks would like to restore this old hospital above Camp Reynolds for use as a visitor center.

this world-renowned shoreline. This park has virtually no visitor-serving facilities. Trails overgrown with poison oak that lead to the bluff's edge may be your only clue that you are on public land. Below the bluffs, Garrapata Beach—the main attraction and the only large, publicly accessible sandy beach within miles—has no restroom, not even a pit toilet.

In San Luis Obispo County, on Estero Bluffs, north of the little beach town of Cayucos, miles of oceanfront land have been acquired by the State Parks Department since 2000 but not even roadside parking has been constructed. North of Monterey, at Marina State Beach, a boardwalk through rolling dunes was built years ago to accommodate wheelchairs, but it has buckled, and part of it is covered with sand. Anything built on dunes and exposed to salt and wind requires constant maintenance, but State Parks has a huge maintenance backlog. It needs about $900 million to catch up on repairs, according to the California State Parks Foundation.

"Deferred maintenance is like car maintenance; you can save $50 by not doing a regular oil change, but it will end up costing you more in the long run," observed Gail Sevrens, president of the California State Park Rangers Association. (Many park employees interviewed for this article while off duty declined to be identified by their job titles and made clear that they were not speaking officially for State Parks.)

When Nobody Is Watching

Perhaps more serious than deteriorated structures or missing park facilities, however, is the dire shortage of park staff. Since 2000, the number of State Parks personnel has remained nearly the same, about 3,000, while the state's population has grown by 3.8 million and the park system has increased in size by nearly 100,000 acres. In essence, State Parks is called on to manage a large and growing system of world-class parks and protect our natural and cultural heritage while depending on fixed or even declining staff.

There are fewer California state park rangers and lifeguards in the field now than there are state parks. As of 2005, a mere 250 rangers and lifeguards were spread across the 278 units that make up the California state park system. Up to 130 positions were vacant, while some rangers and lifeguards hold administrative and supervisory positions rather than field assignments.

"In some parks where there used to be eight rangers, now there are maybe only two," said Sevrens. Ten years ago, State Parks had nearly twice as many rangers and lifeguards as it does now, said Richard Bergstresser, chapter director of the State Parks Peace Officers Association of California (SPPOAC).

The field staff shortage affects visitors' experience. "If only one ranger is on duty in a park, there can't be a campfire program," Sevrens

PHOTOS THIS PAGE: EILEEN ECKLUND

said, because "if a law enforcement issue comes up, the ranger would have to stop the program."

"During the summer of 2003," Bergstresser recalled, "we were so short-staffed I was the only ranger from Eureka to Usal Beach [in Sinkyone Wilderness State Park, more than 100 miles away by road], with 700 campsites and 5,000 to 8,000 visitors. One of those days I had a Code Three [emergency] call and drove over one hour to near Bear Harbor. A hiker had a broken ankle. That left no one available for the rest of the area."

In a recent incident at Sonoma Coast State Beach, a ranger was dispatched in pursuit of a stolen vehicle, Bergstrasser said. "When there's a pursuit, a supervisor must be on duty, at least on the radio. The nearest on-duty supervisor that day was at Millerton Lake, near Fresno [250 miles away]. Someone from so far away wouldn't be familiar with the area in Sonoma Coast State Beach."

Bill Kortum, a longtime coastal activist, recalled that during a volunteer trail building project on the Sonoma County coast, "The ranger showed up with all the [work] equipment, but he had a radio, too. Within 15 minutes he was called away to cure some fracas elsewhere. We're stretching these rangers too thin."

Rangers have traditionally played an important role in promoting stewardship and educating people, especially campers, about natural features, plants, animals, and appropriate behavior. Now, visitors may encounter only a park aide collecting an entrance fee or an occasional volunteer docent.

According to SPPOC president Sal Goshorn, one reason for the ranger shortage is low pay compared to jobs in law enforcement agencies. "We are full sworn peace officers in the state but cannot seem to match either city, county, or even other state peace officer classes for pay and benefits," said Goshorn. "So if we train someone to be a peace officer, he or she can easily turn that training into a much higher-paying position with another agency. Our aging class of rangers and lifeguards has put a dent in our numbers via retirements, and with the pay disparity we have the problem of just getting individuals to apply for these jobs."

Low pay, however, is not the only explanation. Former State Parks Director Don Murphy observed in an interview published in the Autumn 1996 issue of *Coast & Ocean* that when rangers were required to become peace officers and State Parks began to train them in law enforcement, in the 1970s, "a different kind of person" began to be drawn to the job: people from a criminal justice background rather than from education in natural resource protection, and rangers began to compare their salaries with those of police officers.

The bottom line is that the State Parks budget simply has not allowed staff to grow in size to match the increase in park acreage and useage.

The lack of parks personnel not only affects people, it also allows harm to be inflicted on natural resources. Outright theft and vandalism happen with impunity if nobody is on guard. "Rangers find marijuana farms and mountain-bike damage, and archaeological sites have been looted," said Sevrens. "Maybe four years ago, the burials of sailors were looted on the San Mateo coast before archaeologists were able to come along." At Tolowa Dunes State Park, near Lake Earl in Del Norte County, there is a long history of illegal off-road vehicle use, with damage to sand dunes and vegetation. "It's difficult to police with only one officer," Bergstresser said.

In Northern California's redwood state parks, "people will go carve off shingles [from redwood trees or fallen logs] and drive away in the night with a pickup-truck load worth several

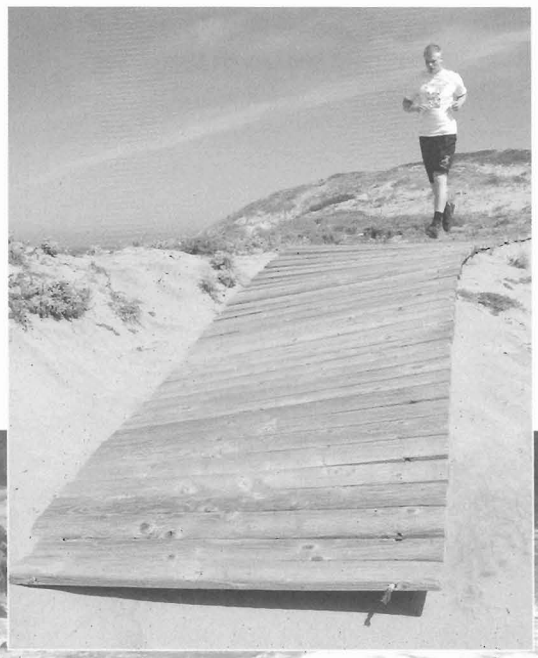
To learn more or get involved

THE STATE PARKS WEBSITE, www.parks.ca.gov, offers information on 278 state parks, copies of many park general plans, and "Decisions Pending and Opportunities for Public Participation." Camping reservations can be made through ReserveAmerica at www.reserveamerica.com or by calling (800) 444-7275.

The California State Parks Foundation website, www.calparks.org, has information about issues facing the parks, including threats from roads and other incompatible uses, and the deterioration of historical and cultural resources.

Watsonville's Castro Adobe, listed on the National Register of Historic Places, was added to the state parks system in 2001. It must be restored and seismically retrofitted before it can be opened to the public.

LAWRENCE ROBBIN



Right: A rickety boardwalk at Marina State Beach

Below: A stairway at Garrapata State Park is useless due to bluff erosion.

hundred dollars," Bergstrasser said. "Rangers are there to protect the people from the park, the park from the people, and the people from the people. We're not doing so well on the second one."

Shabby by Comparison

Both because of inadequate staffing and insufficient investment in upkeep and structural improvements, facilities in some of our most beautiful coastal parks fail to do justice to them. On the rural Santa Barbara County coast west of Goleta, the rugged Santa Ynez Range towers over unspoiled canyons, bluffs, and a chain of state parks and miles of beaches. At El Capitán State Beach, a wooded coastal terrace overlooks a long strand of sand and cobbles. This park has family and group campsites ($20 to $25 a night), and accommodates self-contained recreational vehicles on an expanse of pavement ($25 a night). It has a camp store that faces the beach—in a drab, virtually windowless cinderblock building. A visitor is led to wonder why there couldn't have been a deck here, with beach umbrellas, so one could look out comfortably over the sand, sipping a cool beverage, eating a sandwich. And why couldn't there be some lively displays about the park on the walls?

Meanwhile, across Highway 101, the private El Capitán Canyon resort and neighboring private Ocean Mesa Campground have a store in a rustic wooden building, selling organic foods and offering catered meals to guests. A whole array of overnight options is available: tent camping ($45 a night) and RV sites ($85 a night) as well as platform "safari" tents, yurts, and cedar cabins with bathrooms and linens ($145 and up). Prices at this private facility reflect the higher level of amenities, which include a swimming pool, hot showers, free bicycles, and activities ranging from botanical hikes to stargazing.

"The public loves the [private El Capitán Canyon] campground," said Mark Massara, director of the Sierra Club's Coastal Program. "And then you go across the street, and you've got maybe three people trying to run a state park. We're not treating these parks as either an investment or as a pleasant experience for people." In addition, he said, "We're dramatically inadequate on the sheer number of coastal campsites." The first new ones to be built in 15 years are scheduled for Crystal Cove State Park in Orange County, to be completed in 2008.

TOP: STEVE SCHOLL. LEFT: LAWRENCE ROBBIN. OPPOSITE PAGE: STEVE SCHOLL

A Long Downward Slide

"This is a long-term downward trajectory," said State Parks Director Ruth Coleman, when asked about the shortage of operating funds for the parks. "Operations spending per visitor has declined steadily since the early 1980s," she said, adding that under Governor Arnold Schwarzenegger spending has been modestly higher than it was under Gray Davis.

The State Parks Department operating funds budget is $466 million. It needs roughly $200 million more than the $382 million it now expects for 2007–08, according to Traci Verardo, the California State Parks Foundation's legislative and policy director, "just to support what exists in the parks now: adequate restrooms, staffing, cataloging of cultural resources, and so on." That will not fund more rangers and lifeguards.

To fill in for budget shortages, State Parks has drawn heavily on volunteers and nonprofit cooperating organizations to help run the park system. Nearly one million hours of volunteer time supported park operations in 2005. Volunteers staff visitor centers, serve as camp hosts, maintain trails, and lead nature walks. Nonprofit cooperating associations raise funds for educational programs and special events. But no matter how dedicated and knowledgeable the volunteers, and how creative the other efforts, they can not fill many of the gaps left by lack of professional staff. Nor can they make up for insufficient funds from Sacramento.

At this time, it appears that most long-delayed maintenance needs will also continue to be deferred. In his 2007 State of the State address, the governor committed to work with the Legislature to rebuild the state's infrastructure. He did not mention state parks infrastructure, however. Although a one-time augmentation of $250 million for deferred maintenance was in the 2006–07 state budget signed by the governor, the proposed 2007–08 budget would take away $160 million of this approved amount, according to the State Parks Foundation.

Proposition 84, approved by voters in November 2006, allocated $400 million for park needs, including acquisition, development,

These cottages at Crystal Cove will be renovated.

Access to this section of trail along San Francisco Bay at Candlestick Point State Recreation Area has been blocked since waves undercut the asphalt. State Parks staff wants to remove old asphalt and rebar and restore the area, but no funds are available.

and restoration. "We got $400 million, and this year [2006–07] we are spending $90 million, mostly for wastewater infrastructure," said Coleman. At this writing, only a few improvements are proposed for the 2007–08 budget year, including new day-use facilities at Pfeiffer Big Sur State Park and the new campground at Crystal Cove State Park. Also coming soon at the new Fort Ord Dunes State Park in Monterey County will be public access to a beach long off-limits as part of a military base. The outlook for the rest of the deferred, as well as ongoing, maintenance needs is bleak.

Income-Generating Options

Could more money or services be generated for State Parks from other sources, such as its concessions? More than 190 concession contracts in the 278 park units contribute a total of over $10 million a year in rents, with about $7 million of that coming from the 76 coastal parks. Most concessionaires are small businesses. They provide horseback-riding tours at Andrew Molera State Park in Big Sur, yellow beach umbrella and bicycle rentals at San Buenaventura State Beach in Ventura County, and hot showers at Leo Carrillo State Park north of Santa Monica and at MacKerricher State Park in Mendocino County.

The two biggest and most lucrative concessions—Asilomar Conference Grounds at Asilomar State Beach, and many of the shops and restaurants at Old Town San Diego State Historic Park—are operated by Delaware North Company, one of the largest privately held firms in the United States. Delaware North runs gaming enterprises and holds concessions in airports and convention centers, as well as in Yosemite National Park and other parks. It does not disclose its earnings, other than to report a "more-than-30-percent increase in the last few years alone." Is this the best deal for State Parks?

Within the past year, for the first time, State Parks signed two contracts with nonprofit organizations. Unlike the other concessionaires, which pay a set amount of rent and keep any profits, these two will plow funds back into the parks where they operate. The first is the Crystal Cove Alliance, which rents out restored beach cottages to overnight visitors at Crystal Cove State Park in Orange County. The second is the Point Cabrillo Lightkeeper's Association, which manages the Lighthouse Inn at Point Cabrillo in Mendocino County.

At Crystal Cove, a clutch of unique historic beach cottages lies at the base of a bluff, out of sight of the Coast Highway and, seemingly, of 21st-century southern California. During minus tides, a rocky reef and tidepools are exposed on the nearby beach. Strangely shaped circular rock formations are scattered across the sand.

Laura Davick grew up here; her parents met at the cove beach and later settled in one of the cottages, most of them built between the 1920s and 1940s. In 1979, the State acquired Crystal Cove State Park, but long-term leases kept the cottages in private hands until 2001. Today Davick runs the first partnership between State Parks and a revenue-generating, but nonprofit, concessionaire. Under a contract signed in May 2006, the Crystal Cove Alliance rents out 14 of the beach cottages, and also manages the Beachcomber Café and Crystal Cove Shake Shack and interpretive store.

"We're doing really well," said Davick, "and $150,000 in profit from the park interpretive store this year will go into restoration in the park." The Alliance pays rent based on a percent-

EILEEN ECKLUND

age of gross receipts, some of which are also allotted toward future improvements. "So far, $400,000 has gone into the facilities improvement account," said Davick. Any proceeds that remain after paying rents and costs go toward the Alliance's long-term goal to restore the remaining beach cottages.

The cottages have been phenomenally popular. "We had 100,000 hits on the website the first day," said Parks Director Coleman. "A month at a time is booked, and within minutes they are all gone." Rates start at $31 per night for one person in one of the dorm-style cottages; the two-bedroom Painter's Cottage sleeps four to nine people and rents for $179 to $334 (prices effective July 1, 2007). These rates are moderate compared to $20 to $35 family campsites at Orange County's Doheny State Beach and a $795 ocean-view room at Laguna Beach's Montage Resort.

Could the Alliance be a model for other state parks? "It requires a certain level of expertise," Davick said, "but there are certainly other parks where this model could be used." The Alliance was born out of opposition to an earlier State Parks plan to convert the 46 historic cottages at the cove into 73 luxury resort units. "We felt that would be a terrible precedent for state parks," said Davick.

Under a more recent—and controversial—contract, however, State Parks approved the conversion of a historic lighthouse keeper's house on Point Cabrillo, in Mendocino County, into a bed and breakfast inn that now advertises rooms starting at $177 a night. Handicapped-accessible rooms go for $267. The inn is managed by the Point Cabrillo Lightkeepers' Association. The Coastal Conservancy spent nearly $12 million over 12 years to acquire the Point Cabrillo headland and restore historic structures and habitat, then turn the property over to State Parks. Earlier visions were of more affordable accomodations, including a hostel and campground.

Could State Parks raise money for upkeep of other parks and historic structures if it used other historic buildings for overnight accommodations, perhaps with nonprofit organizations as concessionaires? According to Ruth Coleman, such opportunities are limited, "but we're always on the lookout for more." How the public is served may depend on whether the model set at Crystal Cove or at Point Cabrillo is emulated.

One potential opportunity may exist in Topanga State Park, in Los Angeles. At the mouth of Topanga Creek, a scruffy collection of old motel units and low-end roadside businesses face the ocean, empty. Los Angeles District Superintendent Ron Schafer said he plans to renovate the units as moderate-cost overnight accommodations. "This project is my number-one priority for Proposition 84 funds," he said.

What's Next for Parks?

To protect irreplaceable resources and to accommodate a growing population, the state park system needs to grow. Voters have approved a series of bond issues for state parks, clearly signaling their commitment. But occasional bond issues do not pay the monthly bills, nor have they eliminated the backlog on upkeep. The question remains: can state government adequately support the system that the people of the state, over generations, have worked for, volunteered for, paid for, and that they continue to cherish and enjoy?

"There needs to be a blend of user fees, along with government funds and support from the private sector and nonprofit sector," said Coleman. She noted that some institutions, such as public universities, have endowments. "In the 1940s and 1950s, the state's oil revenues supported the parks' operation," she said. "Tidelands oil revenues were always intended to be used for natural resources." Now those funds are directed into the General Fund, which supports all kinds of agencies, instead of just those concerned with natural resources. In fiscal year 2005–06, the Department of Social Services got $8.7 billion from the General Fund, the Department of Corrections got

The Van Laanen farmhouse at Sunset State Beach is falling down. It was meant to be turned into an interpretive center.

LAWRENCE ROBBIN

$7.6 billion, the University of California got $2.8 billion, and State Parks got $101 million—1.33 percent of Corrections' share.

Recognizing that our park system desperately needs assistance, the Parks Foundation convened a Fiscal Sustainability Task Force in July 2005. "We have been working with stakeholders including nonprofits that support various state parks, for-profit concessionaires, land trust partners, and think tank–type participants," said Traci Verardo. "It has been a new event, to get all these together in the same room, which really hasn't happened before." A report by the task force is expected soon.

Of California's total area, 1.5 percent, or some 1.5 million acres of land, belong to the people in the form of state parks. In most of these parks, including Garrapata State Park, the most precious asset is the value of the natural resources—the quiet, the plants and animals, and the relatively wild setting—and nothing but the most basic facilities, such as water supply and toilets, are needed. But other parks, including El Capitán, are well-suited to an expansion of recreational offerings.

The Sierra Club's Mark Massara envisions a day when the state beach at El Capitán will offer more activities, more choices, more resource protection, and less pavement. "Why don't we sell organic foods in the park store?" he asked. "Why not have live music on Friday nights?" Indeed, why not sparkling restrooms, solar panels on the roof of a "green" visitor center, camping opportunities both plain and fancy, state-of-the-art native plant restoration projects, naturalist-led walks, and campfire programs for all? California's diverse population needs to be served in diverse ways at parks. In a state known as a fountain of creativity and an environmental leader, our state parks deserve to be models of their kind. ■

Steve Scholl wrote and edited the first two volumes of the California Coastal Commission's Experience the California Coast *guidebook series and is working on the third volume. He is a member of the California State Parks Foundation.*

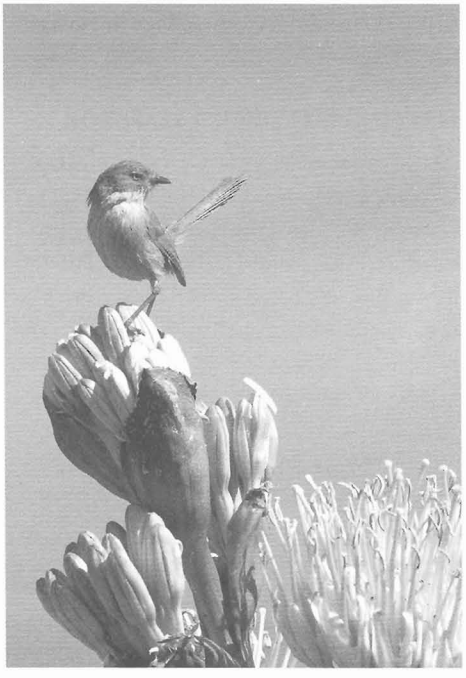
The beach at Crystal Cove

Invisible Artistry

I SPENT A GOOD PART OF MY TIME in college, much to my father's dismay, in the theater. There I rose from a lowly follow-spot operator to a full-fledged lighting designer, in demand by my classmates for their senior drama honors projects. I even considered a career in lighting design, until I found out just how itinerant a lifestyle technical theater demands.

Of all the theatrical arts, lighting is by far the least noticed. Actors, costumes, and sets are all right there for the audience to see and hear, but lighting is generally invisible. It was a truism among my colleagues that "no one notices the lights unless we screw up." Stop and think about the last movie or play you saw. Do you remember anything about the lighting? Of course not.

Yet lighting is an essential discipline, and not just because without it the audience would see nothing. On the stage lighting is an actor: It moves and communicates emotions—revealing and concealing, creating and releasing dramatic tension. Almost every play, and certainly every movie, starts when the lights dim and ends when they come up again. Lighting is just about as old as theater; the Romans shined candlelight through glass globes filled with colored water to light their stages at night.



A wrentit *(Chamea fasciata)* sits on a cactus flower bud in Baja California.

OPPOSITE PAGE: STEVE SCHOLL. RIGHT: ALAN HARPER

Despite my love of the craft, I ultimately decided to forgo getting a master of fine arts in lighting design. Instead I moved to California in 1983 to pursue other dreams. Ironically, I am once again in a business that no one notices unless we screw up. Most Californians are blissfully unaware of how our magnificent system of coastal parks, open spaces, accessways, and trails came to be, and what our coast would look like if the Coastal Conservancy and the Coastal Commission and the San Francisco Bay Conservation and Development Commission didn't exist.

This is especially true for our comrades-in-arms at the Coastal Commission and BCDC. Their successes are more often than not invisible, in projects that don't get built, or houses that are built out of sight, or hotels that aren't as big as originally planned, or public amenities that quickly seem as if they'd always been there. At the Coastal Conservancy we have the satisfaction of being able to do things. We buy land, or build a trail, or reconstruct a wetland. My colleagues at the regulatory agencies mostly get to stop bad things from happening, and the public usually only notices when they fail.

Ever wonder what our coastline would look like if there were no Coastal Commssion or BCDC? You need to look no further than "Baja California Land Rush" in this issue of *Coast and Ocean* to find out what a coastal real estate boom without a strong regulatory system looks like. Author Serge Dedina vividly describes the frenzy of development taking place in Baja California without most of the protections and processes we in California have long taken for granted. Hopefully Baja California Norte and Sur will choose a more sustainable path than Cancún, but the jury is still out. We in the Golden State have a big stake in Baja California's development. Their environmental problems have a way of washing ashore on our beaches, and southern California is really the northern end of the range for a lot of plants and animals that call Baja home.

Later this year, *Coast and Ocean* will report on the latest happenings at Hearst Ranch. Although the focus now is on the next steps after public acquisition, the acquisition itself probably would not have happened without the Coastal Commission. If the Commission hadn't turned down the Hearst Corporation's development proposal for San Simeon in 1998, the company would probably not have sought a conservation deal in 2004. The fact is that Californians are lucky to have a strong regulatory system for their coast, one that is the envy of and frequently a model for the rest of the world.

So the next time you are walking along a California beach at sunset, admiring the golden light of the setting sun, stop and think about all the things that could have gone wrong and kept you off the beach, or even destroyed it. There is a story behind every beach and every trail and every park, and it often involves a lot of people who only get noticed when they fail in their jobs.

Sam Schuchat is the executive officer of the Coastal Conservancy.

COASTAL CONSERVANCY NEWS

FUNDING FOR SUSTAINABLE FISHERIES, OCEAN RESEARCH

THE CONSERVANCY APPROVED $2 million in March to help make the state's fishing practices more sustainable, and $1 million for scientific research into California's ocean and coastal ecosystems and ways to improve their health.

The $2-million grant is seed money for Environmental Defense's new California Fisheries Fund, which will offer loans to fishing communities, groups, associations, and businesses attempting to make their fishing practices more environmentally and economically sustainable. When the Fund is fully capitalized, loans will be offered to:

- existing fishing cooperatives or other entities that represent a single product or geographic area, and that want to develop detailed plans for making their fisheries more sustainable;
- ports, communities, and other organizations for investing in fisheries infrastructure such as off-loading capacity, processing, and cold storage;
- individual businesses that want to add value to their seafood products, create new products, change to more sustainable equipment or gear, or improve their marketing.

Environmental Defense (ED) will manage the Fisheries Fund with the assistance of ShoreBank Enterprise Pacific, a nonprofit community development financial institution. ED will use Conservancy money to help raise an additional $6 million from private sources, for a total $8 million in capital for the Fund's start-up phase.

The Conservancy's $1-million grant for research, authorized by the Ocean Protection Council (OPC), is to the California Sea Grant College Program and University of Southern California Sea Grant Program for studies on climate change impacts on the state's ocean and coastal resources. Proposals that might qualify for funding include studies on the effects of sea-level rise on coastal habitat, or how changes in ocean conditions such as acidity, temperature, and circulation might affect ocean food webs. Projects selected for funding will begin in 2008 and run through 2010.

This is the second round of OPC-related research funding to be administered by Sea Grant; the first round, also totaling $1 million, was provided by the Conservancy in 2005 for projects running from 2007 to 2009.

"GREEN SOLUTION" STUDIED

A PROPOSAL TO USE PARKS and open space to help abate Los Angeles County's serious water-quality problems is being studied with the help of $50,000 approved by the Conservancy in March, as well as contributions from the Santa Monica Bay Restoration Commission, Rivers and Mountains Conservancy, Santa Monica Mountains Conservancy, and Trust for Public Land. The county's thousands of square miles of pavement leave little open ground to absorb and filter runoff from storms and daily water use. Whenever it rains—or a sidewalk is washed—contaminants flow via storm drains into lakes, rivers, creeks, and ultimately the ocean. As a consequence, nearly every water body in the county is in violation of the federal Clean Water Act, and Los Angeles-area beaches are among the state's most polluted. The Los Angeles Regional Water Quality Control Board has adopted strict water-quality standards that local governments must meet within the next few years.

Community Conservancy International (CCI), a Los Angeles-based nonprofit organization, has proposed a "Green Solution" that would remove concrete and asphalt and retrofit existing parks to create a network of unpaved areas onto which runoff could be diverted to allow soil and plants to filter and naturally clean toxins. These areas could either be existing green space in parks and open spaces where water filtration technologies like underground cisterns could be installed, or publicly owned land that is now paved but could be restored to green space. A parking lot inside a park, for example, could be replaced by materials that allow water to filter into the ground. Paved lands along creeks and rivers could be restored and planted. The areas comprising the Green Solution network would not only mitigate water-quality problems but also diminish flood hazards, provide more green space for nearby residents, and allow for new trails and other recreation features.

CCI is conducting a study to quantify how much land is needed in each watershed to maximize the effectiveness of the Green Solution. The organization is working with hydrologists, engineers, digital mappers, regional and state agencies, and others to identify how much land would be required to make a measurable difference in water quality, and where that land would need to be. The study is under way now and expected to be completed by the end of this year. The March allocation is added to $100,000 from the Conservancy in November 2006.

MAPPING MAVERICK'S SEAFLOOR

SOMETIMES WHEN WINTER storms come howling in from the north Pacific, waves as high as 50 feet pound ashore just north of Pillar Point Harbor, near Half Moon Bay, at a place known as Maverick's. Surfers come from all over the world to try their luck against the monster breaks. Now, extremely detailed new images of the surrounding seafloor show clearly the topography that helps shape the waves into giants at this precise spot, funneling already powerful winter storm waves onto a reef shaped like a long, narrow ramp. The reef lies between deep troughs, which bend and focus the waves as they move toward shore. As the waves hit the reef and travel up the ramp, they slow down and begin to stand

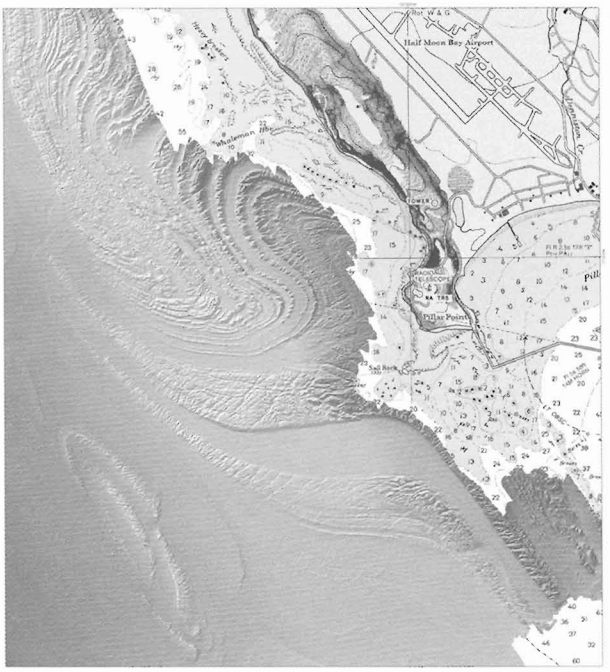
up, rising as they decrease in length, until they "trip," pitching forward.

The images were created by the California Coast State Waters Mapping Project using technology that bounces sound off the seafloor, revealing a level of detail that has never been captured before (see *Coast & Ocean* Vol. 21, No. 3). They document underwater habitat types and geological formations, and can be used by researchers to study natural processes such as underwater faults and sediment transport systems, which play an important role in coastal erosion and beach formation. The images can also be used to identify potential hazards, such as which areas are most at risk for tsunamis, and—perhaps most important—will serve as a baseline against which researchers can measure changes in habitats and formations.

The State Waters Mapping Project was initiated to survey all of California's coastal seafloor out to the three-mile state waters boundary, to identify habitats, and help determine which areas should be set aside for protection under the Marine Life Protection Act. The Project's first survey, which covered much of the area between Año Nuevo and Point Arena (the nearshore portion of the seafloor from Bolinas north to Point Arena has not yet been surveyed), generated the Maverick's images and also documented the position and physical features associated with the marine segments of the San Gregorio fault, a major branch of the San Andreas fault system.

Research for the Mapping Project is being conducted collaboratively by Fugro Pelagos, Inc., California State University, Monterey Bay, Center for Habitat Studies Moss Landing Marine Labs, and the U. S. Geological Survey. It is supported by the California Ocean Protection Council, the Conservancy, Department of Fish and Game, U.S. Geological Survey, Monterey Bay Sanctuary Foundation, and NOAA National Marine Sanctuary Program.

Mavericks - Half Moon Bay, California



SPARTINA INFESTATION CONTAINED

THE TIDE MAY HAVE turned in the struggle against one of San Francisco Bay's worst invasive species, non-native cordgrasses of the genus *Spartina*. "The heart of the infestation is now under control," said Maxene Spellman, the Conservancy's project manager for the Invasive Spartina Project (ISP). "The 2005–2006 control program was very successful, thanks largely to the much longer time allowed for treatment by the U.S. Fish and Wildlife Service, a new, more effective herbicide [imazapyr], lessons learned from previous years, and increasingly stronger partnerships."

TOP: SEA FLOOR MAPPING LAB, CSU MONTEREY BAY. BOTTOM PHOTOS: PRENTISS WILLIAMS

In March, the City of San Clemente completed the San Clemente Railroad Corridor Pedestrian Beach Trail, which runs along the entire three-mile San Clemente shoreline in the railroad right-of-way. The new wheelchair-accessible trail, designated as part of the California Coastal Trail, follows the route of an old informal path. New fences and landscaping separate trail users from the railroad tracks, and two new at-grade track crossings with signals allow the public to cross to the beach safely. More pedestrian track crossings are planned.

Katy Zaremba points out a new shoot of invasive *Spartina alterniflora* growing among native spartina near Bolinas Lagoon.

Since 2000, the Conservancy has spent $7,772,507 on ISP, most of which came from various grants. In March it approved an additional $1,250,868 grant of Wildlife Conservation Board funds for treatment projects. The Conservancy also approved $949,907 to operate and manage the regionally coordinated project through spring 2008.

Native California cordgrass, *Spartina foliosa,* is an important component of marsh ecosystems. But the three species that were introduced to San Francisco Bay starting in the 1970s are highly invasive, spreading at a greater than exponential rate and altering the physical structure and biological composition of marshes, mudflats, and creeks. Non-native invasive spartina converts mudflats to cordgrass meadows and fills in channels and sloughs, destroying habitat for native plants and animals and disrupting marsh hydrology. One species in particular, *Spartina alterniflora,* hybridizes with the native *Spartina foliosa,* and has invaded every marsh restoration project in the south and central San Francisco Bay Estuary in the past 15 years. (See *Coast & Ocean* Vol. 16, No. 2 and Vol. 19, No. 2 for more about the history and impacts of the spartina invasion.)

In the 1990s biologists began to realize the extent of the invasion, and in 2000 the Conservancy established ISP to coordinate eradication efforts among federal, state, and local agencies and organizations. In 2004, ISP partners began to apply mechanical and chemical treatment to infested acres. The following year, 1,010 acres—67 percent of the infestation at that time—were treated in just over a month. In 2006, 94 percent of the acreage estimated to be infested with spartina was treated. Early observations suggest that the 2006 effort killed 70 to 90 percent of the weed in treated areas.

Now that invasive spartina's spread has been contained, ISP partners can focus on eradication. All remaining untreated stands—most of them in hard-to-reach areas—will be treated, and sites will be revisited as necessary.

LETTERS

Editor:

Hi—just wanted to let your writers know how much I enjoy reading the quarterly print edition of *Coast and Ocean.* Just found your website today, too.

Very encouraging to read about bond monies put to good use for the future benefit of all Californians. The articles are well-written and full of concrete details so readers can understand the yardsticks for measuring progress and completion of projects.

There is so much bad news every day that your publication shines like a bright light in the gloom. I am very pleased with the integrity and scientific objectivity of the Coastal Conservancy in researching and selecting projects to fund that yield real results for a cleaner California.

Nice to know the Coastal Conservancy has enough clout to attract supplemental funding. I love reading that it is leveraging its impact with other reputable environmental groups that I also support—like Environmental Defense and Surfrider.

Your articles do a great job of making me feel I was there at the discussions. Keep up the good work!

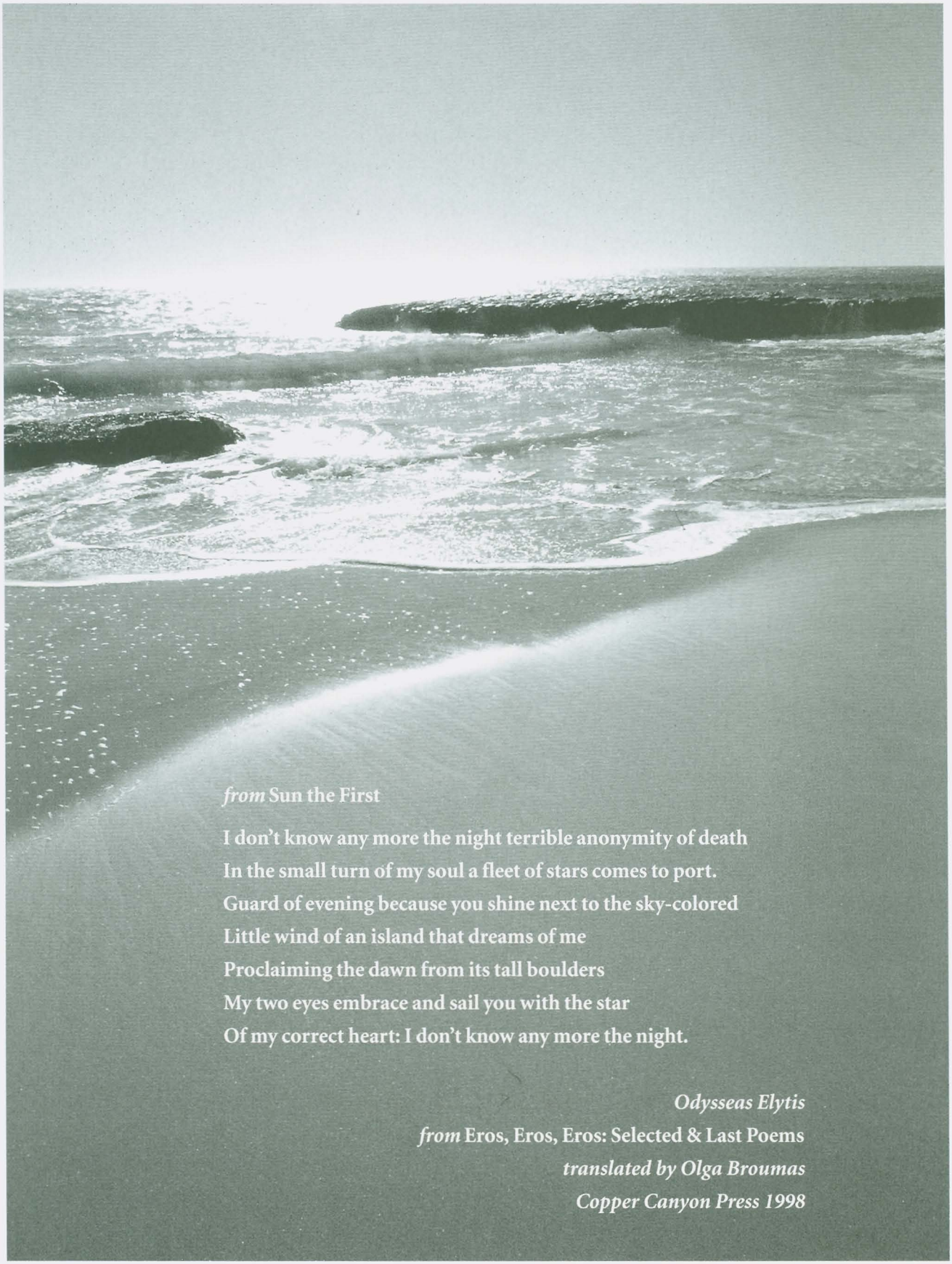
Eileen Tsai, Irvine

TOP: MALCOLM LUBLINER. LEFT: SONOMA LAND TRUST

RUSTY OLD SPHERE IDENTIFIED

ON PAGE 2 OF THE LAST ISSUE of *Coast & Ocean,* we asked readers to tell us if they could identify the object below, which had washed ashore in the restored Sonoma Baylands. Wes Farmer, lifetime docent at the Torrey Pines Reserve in San Diego, wrote to say it looked like an old propane gas container, then wrote again: "Also looked at the possibilities that the rusty device might be connected to anti-submarine netting. Couldn't find a picture, however."

That's right, confirmed Ed Ueber, ocean superintendent for the National Park Service, who was manager of the Farallones and Cordell Bank National Marine Sanctuaries for 15 years. Such buoys held in place a heavy steel cable with four-inch mesh strung across the Golden Gate during World War II. Two tugboats pulled it into place, and opened it when a ship had to pass. "There used to be at least 20 of these at the Navy net depot in Tiburon in the 1940s," Ueber said. "In 1983, there was erosion during heavy storms and some were lost."



from Sun the First

I don't know any more the night terrible anonymity of death
In the small turn of my soul a fleet of stars comes to port.
Guard of evening because you shine next to the sky-colored
Little wind of an island that dreams of me
Proclaiming the dawn from its tall boulders
My two eyes embrace and sail you with the star
Of my correct heart: I don't know any more the night.

Odysseas Elytis
from Eros, Eros, Eros: Selected & Last Poems
translated by Olga Broumas
Copper Canyon Press 1998

LAWRENCE ROBBIN

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