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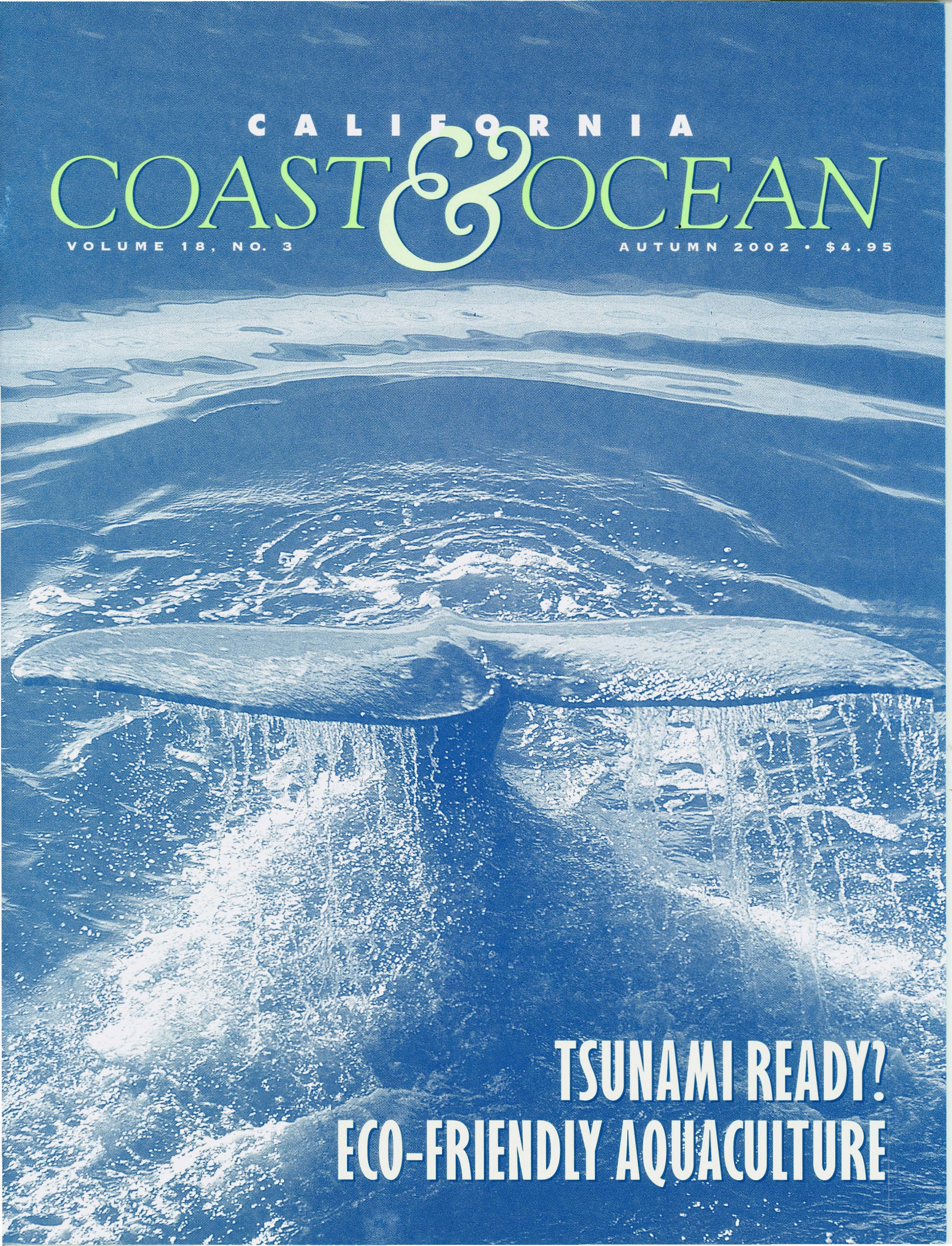

TSUNAMI READY?
ECO-FRIENDLY AQUACULTURE

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Alan Justice is a behavioral neuroscientist who moved to Del Norte County three years ago to pursue a new career as a nature photographer. He earlier lived in the Bay Area, working to find ways to treat Alzheimer's disease, multiple sclerosis, and other neurological conditions.

Cover photo: Gray whale in San Francisco Bay. Alan Justice caught this rare sight looking south from the Dumbarton Bridge in 2001, during the winter migration to Mexico.

Back cover: Bull elephant seal, one of the crowd that gathers at Point Piedras Blancas in San Luis Obispo County during the winter mating and pupping season.

Coastal Conservancy

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

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VOLUME 18, NUMBER 3 AUTUMN 2002

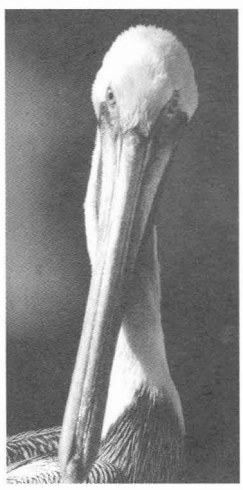
DAVID M. BARRON

WATERS WILD AND GENTLE

REFLECTIONS ON NATIVE PLANT GARDENING

INTERNATIONAL YEAR OF ECOTOURISM

DEPARTMENTS



OLD BLUE EYES ©BILL OLSON

COASTAL VIEWPOINT

A Historical Landmark

MAYBE IT'S HUMAN nature to appreciate what we love only after we've lost it. Had it not been for some inspired citizen action in 1972, we might have lost our coast as we know it. People might now have been telling nostalgic stories about what once existed: natural sand cliffs glowing in the late afternoon sun, wide open ocean views from Highway 1, sandy beaches, wetlands alive with shorebirds, and public access to the shore nearly everywhere.

Fortunately, most of that is still here because 30 years ago some Californians saw what was ahead, seized the wheel, and turned away from a destructive course, just in time. Frustrated by the failure of the Legislature to protect what they cherished, citizens took the future into their own hands and, in November 1972, passed a voter initiative, Proposition 20, which established the Coastal Commission and laid the foundation for the 1976 California Coastal Act. The people of California thus created a powerful planning and regulatory agency to do what was important to them, and they have defended it ever since.

This is not to say that the Coastal Act is perfect or that all damage to the coastal commons has been averted. "It's the interpretation of the law that's the problem," notes Phyllis Faber, a veteran coastal warrior. "The big battles are political: the make-up of the Legislature and the Coastal Commission."

As Peter Douglas, executive director of the Commission, puts it, "The coast is never finally saved, it is always *being* saved. The public has been critically important in its watchdog role, as has the free press. The greatest threat to the coast is public ignorance and indifference. Citizen activism has been the key. The politics of the coast continue to be contentious and are in large part the politics of money. People must be involved, opposing efforts to weaken the coastal program and supporting its strengthening."

It's a matter of values, and of acting from the heart. When visitors from other parts of the country first see this coast, some ask: How is it that such prime real estate has not already been built up? "Ah, but that's not real estate," I reply. "Sure, a lot of people have property along the coast, but in a very legitimate sense we all own it. State law requires that the coast be protected for the benefit and enjoyment of future generations." Then I often tell the story of the 1972 Coastal Initiative. I'm especially glad to tell that story now, when many citizens no longer believe in their own power.

Many community-based organizations work to defend coastal streams, forests, marshes, and headlands. But do today's younger activists know about Proposition 20, which makes much of that defense possible? Faber recently led a group of 37 environmentally concerned women on a tour of Marin County. Most were in their 30s, and not one had heard of that historic ballot measure. I mentioned this to Janet Adams, a dynamic leader of that campaign. "Why *should* they know of it?" she responded.

I was thinking about that in late October while standing on a wide beach in Santa Barbara shortly after sunrise, watching seven dolphins playing just offshore. The joy of that sight was part of the legacy of Proposition 20, and that's good to remember when the horizon gets fogged over by dreary current events. Beyond the dolphins, in the distance, I took note of some oil rigs and thought of Lois Sidenberg, who organized GOO! (Get Oil Out!) after the big blowout on Union Oil's Platform A on January 28, 1969. Since then, no sensible politician has dared propose new oil drilling in state waters. Some of the threatened sites have been enshrined within National Marine Sanctuaries—created, it so happens, in areas where oil exploration had been proposed.

The Santa Barbara oil spill fueled the movement for Proposition 20, although the biggest catalyst was the privatization of the coast, which blocked public access at Sea Ranch in Sonoma County, Malibu, and elsewhere. "Where's the beach?" was a campaign slogan.

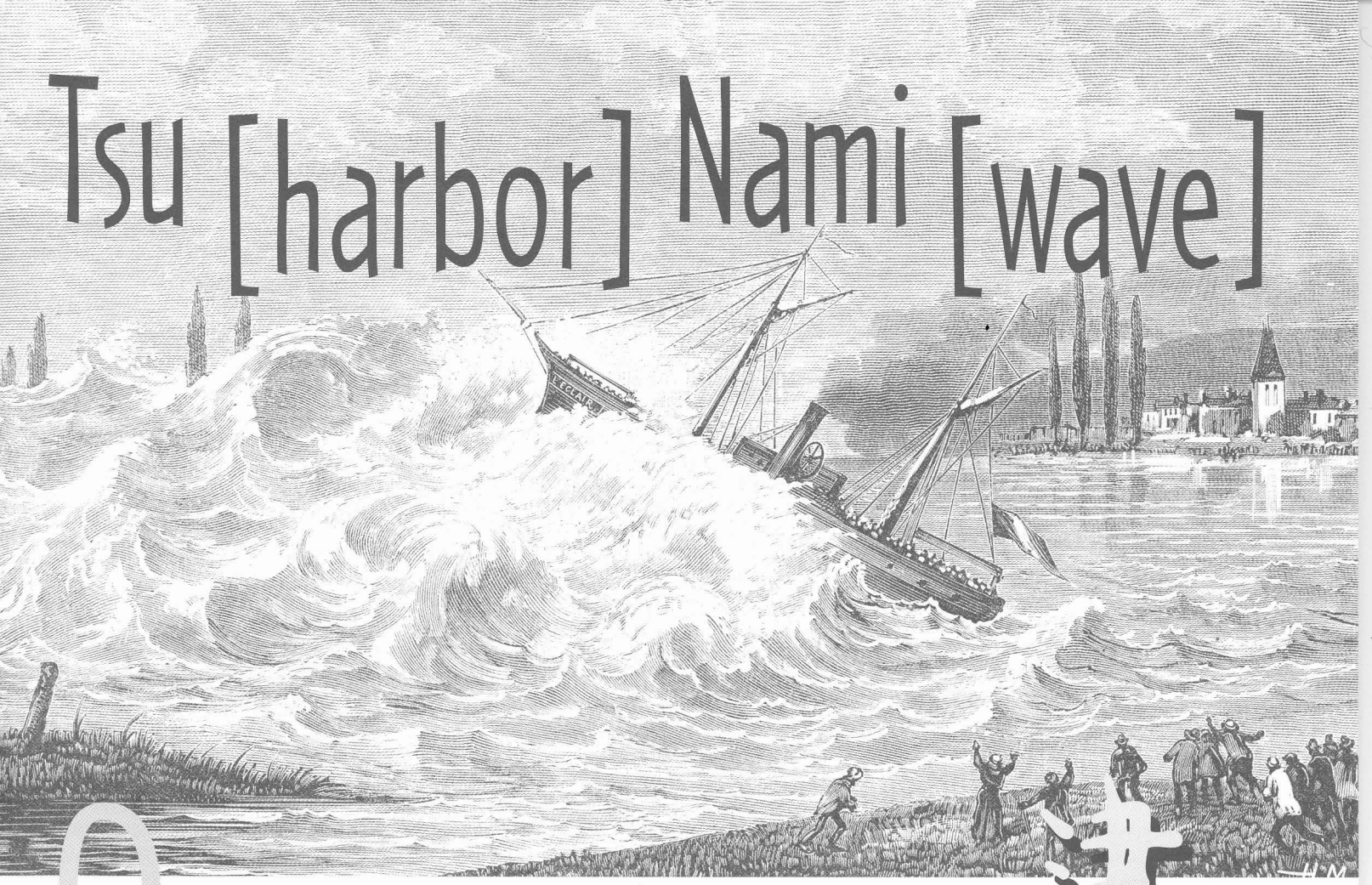
Since that time it has become increasingly apparent that coastal resources are inseparably linked, from the top of the watershed to the edge of the continental shelf, and the coastal agenda has broadened. I was in Santa Barbara to attend the three-day California and the World Ocean '02 conference, which brought together some 900 people to hear hundreds of speakers on ocean-related and coastal subjects ranging from invasive species to the complexities of water pollution, the plight of commercial fishermen, and issues facing National Marine Sanctuaries.

Recent good news was discussed as well, especially the first West Coast network of marine reserves, established in October by the Fish and Game Commission. As of January 1, 2002, all taking of marine life is forbidden in 11 designated areas, totaling 175 square miles, around the Channel Islands. Non-consumptive recreational activities will still be permitted. This is expected to benefit both marine ecosystems and fishermen, as has happened with no-take reserves elsewhere.

The more we lose, the more we value that which remains. In upcoming issues of *Coast & Ocean* we will bring you new ideas and knowledge that emerged at the Oceans conference. We will also interview some leading elders in the "Save Our Coast" movement, to shed light on its origins.

—Rasa Gustaitis

Tsu [harbor] Nami [wave]



津波

KEVIN KNUUTI & LESLEY EWING

On March 28, 1964, a tsunami slammed into Crescent City, California. A series of waves pushed buildings off their foundations and into other buildings, and swept cars and structures out to sea. So strong were these walls of water that a 50,000-pound concrete tetrapod was knocked from its base by the force of a timber being carried along in the rushing tumult (this tetrapod is still on display at the south entrance to the city). The inundation extended 800 to 2,000 feet inland in the commercial and residential areas of the city, and a mile inland along a low intermittent stream. Water depths reached up to eight feet in city streets and 13 feet along the shoreline. Overall, Crescent City sustained more than $7.4 million in damage and 12 people lost their lives.

We've all heard of tsunamis. We think of them as being colossal, powerful, and unpredictable, much like earthquakes: coming as if from nowhere and capable of causing great devastation within minutes. Is it possible to anticipate these destructive events and take action? The National Oceanic and Atmospheric Administration (NOAA) thinks so and, as a result, in September NOAA certified Crescent City as California's first official "Tsunami Ready Community." Key elements of this designation are knowledge about tsunamis and a carefully developed plan that will be implemented when the next tsunami occurs.

Tsunamis are often improperly called "tidal waves." Tidal waves do exist. They are generated by the gravitational pull of the moon and sun, and we experience them as the daily rise and fall of the sea along our shores. A tsunami, in contrast, is a series of very long waves generated by a sudden dramatic event, such as an undersea earthquake (the most common cause), landslide, volcanic eruption, meteorite impact, or other event that causes a rapid rise or fall in the ocean surface at a specific location. In the case of an undersea earthquake, the ocean floor moves up or down, causing a bulge or depression in the water surface. As the bulge or depression comes to equilibrium with the surrounding water surface, it sends out a series of wave crests and troughs. In deep ocean, these waves are visually undetectable, being up to hundreds

A steamer in the Seine estuary, France, by Henri Meyer, 1881.

ILLUSTRATION: MARY EVANS PICTURE LIBRARY
CALLIGRAPHY BY JUN ISHIMURO

WEST COAST TSUNAMIS

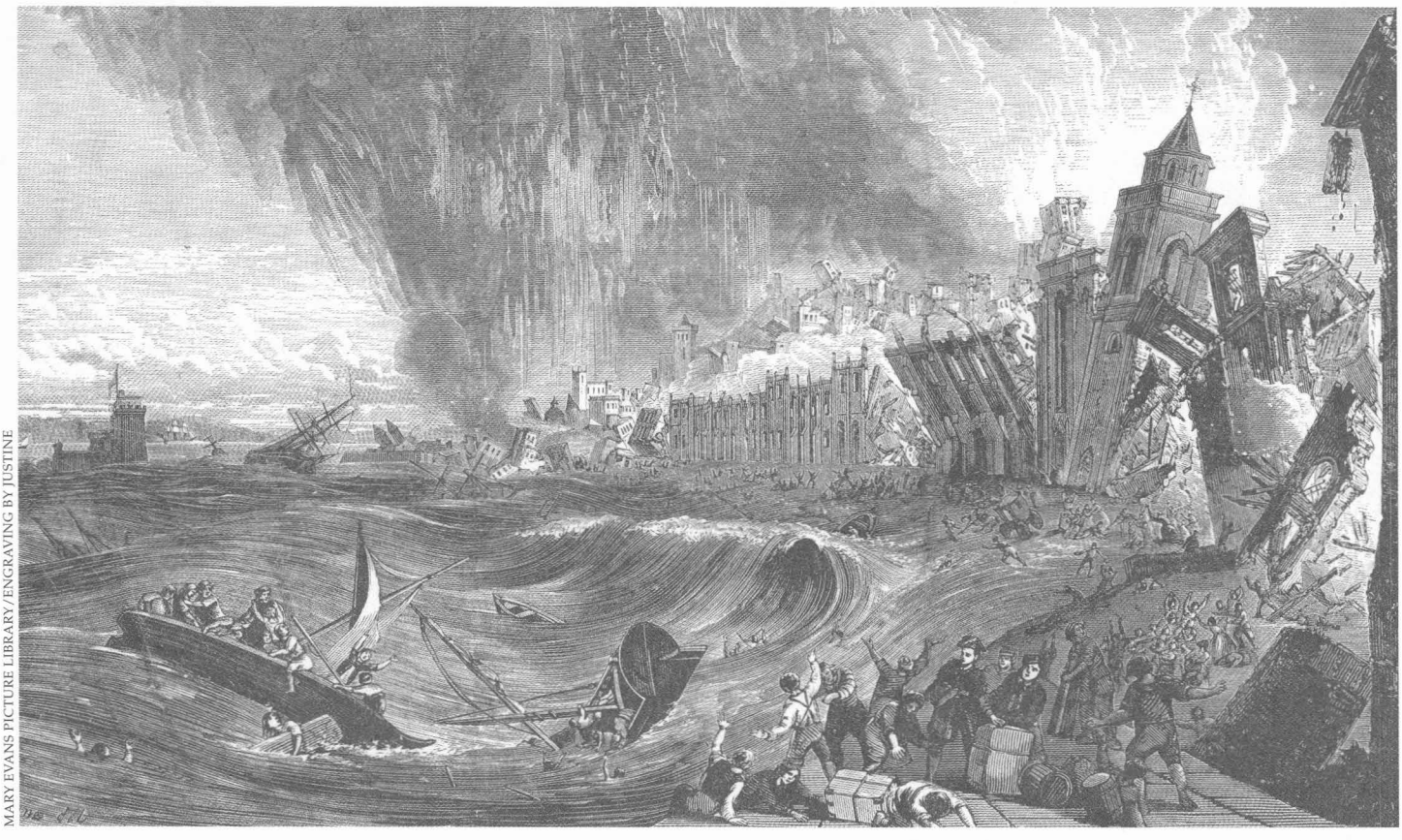
AT LEAST 64 tsunamis have struck the West Coast of North America over the last 265 years.

Time period	Number of recorded tsunamis
1737–1799	3
1800–1849	1
1850–1899	11
1900–1949	13
1950–1999	34
2000–02	2
Source: NOAA	

of miles long, often less than three feet high, and traveling at speeds up to 450 miles per hour.

As each wave of the tsunami moves away from its generation area, it bends according to changes in the ocean floor bathymetry, orienting its wave front closer to parallel with the shoreline. At the same time, it begins shoaling, or slowing down and growing higher. Because of the tremendous wavelength of a tsunami, a wave that was less than three feet high in the deep ocean could rise to more than 50 feet in shallow water. The form of the tsunami at the shoreline could be a series of bores (a rapid rise of the water surface in which the advancing water is preceded by a step-like turbulent face), a simple rise and fall of the water surface (similar to a rapid tide) or, in rare cases, a series of breaking waves.

Certain predictions can be made about tsunamis. For example, because tsunamis are generated by a rapid rise or fall in the ocean surface, we know the earthquakes that generate tsunamis are generally those that occur on vertical displacement (dip-slip) geologic faults. Thus, the tectonic convergence (subduction) zones along the southern coast of Alaska (the source of the 1964 tsunami that struck Crescent City) and the Aleutian Islands, the northwest coast of South America, and southeast of Japan pose significant threats to California. Closer to California, the Juan de Fuca plate converges with and dips beneath the North American plate off the coasts of California, Oregon, and Washington. The area where these two plates also meet the Pacific plate (the Mendocino Triple Junction) is particularly prone



About 90 minutes after an earthquake in 1755, a tsunami swept up Portugal's North Tagus River and crashed into Lisbon's waterfront.

MARY EVANS PICTURE LIBRARY/ENGRAVING BY JUSTINE

to earthquakes. When seismic activity occurs in any of these areas, the risk of a tsunami goes up. Along the central and southern California coasts, the majority of the major fracture zones, including where the Pacific and North American plates meet, form transverse (strike-slip) faults that do not pose as great a threat.

Depending on the force of the generating event, as well as the nature of offshore bathymetry, shoreline geometry, and onshore topography, local tsunami inundation can vary greatly. At the shoreline, tsunami effects can range from a barely noticeable change in the water surface to astonishing rises in water level of over 90 feet, and can push inland thousands of feet. Tsunami waves cause damage by the obvious mechanisms of flooding and the force of the rapidly moving water, but may cause even more damage by the debris they forcefully carry.

Since 1737, according to NOAA data, 64 tsunamis have struck the west coast of the United States with 36 of these occurring in the last 52 years. The three most destructive occurred in 1946, 1960, and 1964. While the 1946 tsunami was barely noticed in California, both the 1960 and 1964 tsunamis left their marks on the state's northern coast. Each time a tsunami makes landfall, visual markers are left by the receding waters: debris lines, water marks on buildings and trees, matted vegetation, and so on. Researchers rely on clues like these to help vulnerable coastal communities prepare for the next large tsunami.

Orville Magoon grew up in Hawaii and witnessed the 1946 tsunami from a precarious perch in a palm tree. Years later, he was an engineer with the U.S. Army Corps of Engineers in San Francisco when both the 1960 and the 1964 tsunamis made landfall and both times he traveled to Crescent City, Eureka, and Fort Bragg to survey inundation contours, set high water markers, and do general damage surveys. During his surveys, he spoke with as many people as possible to get eyewitness accounts. His advice to future tsunami surveyors is to get to the site as soon as possible, as the inundation zones can be hard to map once visual clues have been disturbed. He also advises interviewing eyewitnesses as close to the time of the tsunami as possible, when their accounts are the most reliable.

Recent researchers have heeded Orville Magoon's advice. "Tsunamistas" worldwide have begun to coordinate their survey efforts in hopes of better understanding the general nature and impact of tsunamis and of helping affected areas prepare for these natural disasters. The International Tsunami Survey Team (ITST), composed of 40 scientists and more than 20 students from 15 different countries, has responded to all

IT HAPPENED DURING THE 1964 EARTHQUAKE AND TSUNAMI

ROBERT B. ATWOOD, editor and publisher of the *Anchorage Daily Times,* was practicing his trumpet when the earthquake struck. "It was quickly obvious that this earthquake was no minor one. . . . Things were falling that had never fallen before. I headed for the door, carrying my trumpet. . . . I saw walls weaving. . . . I watched my house scream and groan. . . . As I started to climb the fence into my neighbor's yard, the fence disappeared. Trees were falling in crazy patterns. . . . A chasm opened beneath me. . . . I was quickly on the verge of being buried. I couldn't pull my right arm from the sand. . . . I let go of my trumpet and my arm pulled free easily. . . . My neighbor's home slowly collapsed and slid into the chasm."

In Crescent City a young boy watched an elderly couple struggle against the flood waters. An empty car floated down the street and ran them over—they were never seen again.

An elderly woman was asleep when the waves demolished her house. Her bed floated up into an air space under the still-intact roof. She was found alive eight hours after the waters subsided.

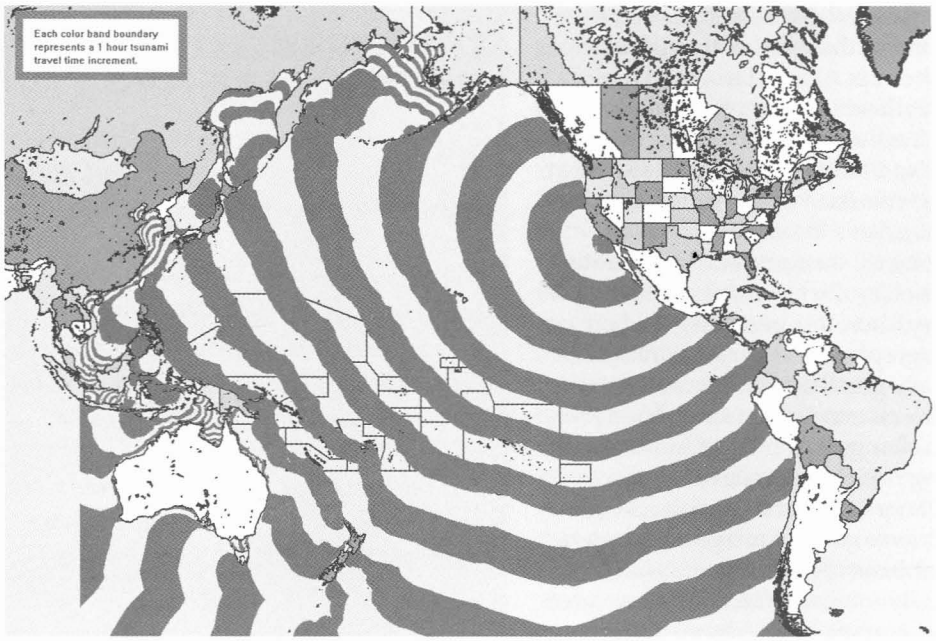
Chester Stygar and his wife and baby were also asleep when his wife heard a noise at the door. "I put my feet on the floor and there was a foot of water in the room. . . . I opened up the back door and all I could see was the ocean. The last time I saw the ocean out the back door it was a quarter of a mile away. I felt the whole building float up, like it was on a cloud. We didn't dare go out. . . . The house was rocking around and it was black and the gas started smelling. . . . A few minutes later we felt the house settle down. . . . This was like a bad dream and I just didn't know I was awake."

—from newspaper and wire service reports

Tsunami damage in Crescent City, 1964. Photo from the Oakland Museum of California's exhibit, "State of Emergency: Disaster Response in California," which continues through March 2003.

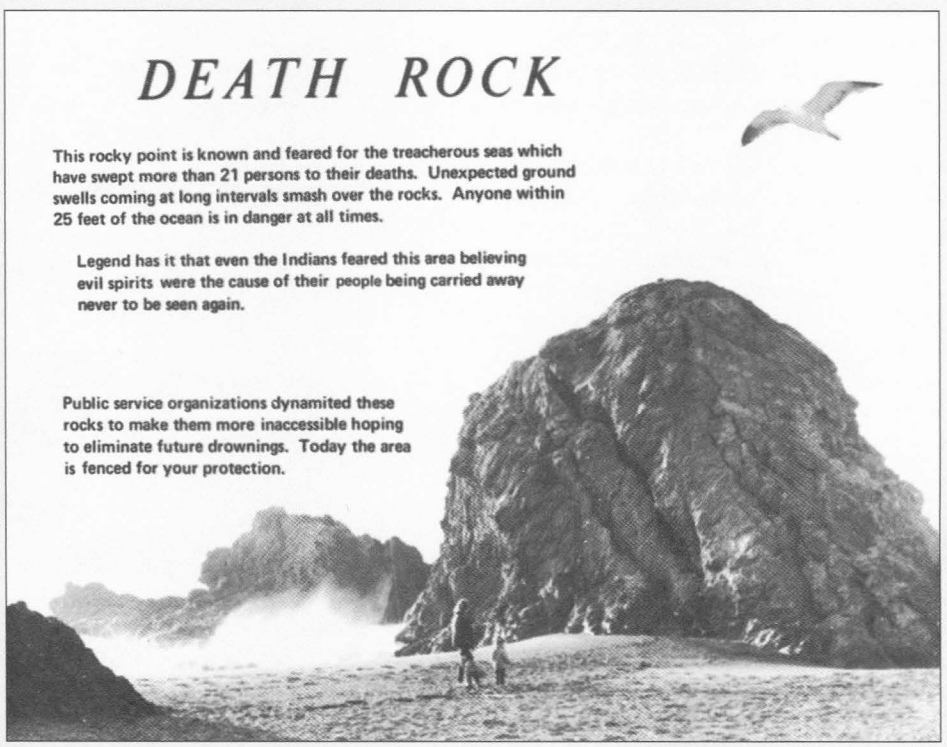
Scientists estimate how long it will take tsunamis generated in specific locations to reach other locations by calculating the speed with which the waves propagate over the varying ocean depths. They then use tsunami travel time maps to depict the results. This travel time map shows the length of time it would take a tsunami generated near Los Angeles to reach locations throughout the Pacific. Each band represents one hour of travel time.

Source: National Oceanic and Atmospheric Administration (NOAA)



NOT SO PACIFIC

ALTHOUGH THE VERY WORD "TSUNAMI" may evoke nightmarish images, far more people perish from other beach hazards. Off Sonoma Coast State Beach alone, 128 people have drowned since 1950. "In the south the dangers are more from riptides and underwater dropoffs; in the north, from sleeper waves," according to Rex Grady, who has many years of experience as a lifeguard in California. As Elizabeth Terwilliger, a beloved naturalist and teacher, repeated to generations of schoolchildren: "Never turn your back to the ocean!"



major tsunami disasters that have occurred since 1992. Lori Dengler, a professor of geology at Humboldt State University, has participated in several ITST surveys. According to Dengler, the team observes and documents tsunami effects, collects perishable data, and makes recommendations to both the affected country and the international community on future research, planning, and preparedness. The ITST surveys provide valuable information on what tsunamis can do.

Photographs of cars suspended in trees, rail ties driven through truck tires, etc., are powerful reminders of the forcefulness of these events. Even more important for future preparedness are the other survey results. The information on the extent of inundation can be used to anticipate impacts from similar tsunamis in other locations. However, we still are not able to predict when or where a tsunami may occur. Instead, scientists and engineers are identifying extreme inundation zones. Costas Synolakis and engineering students at USC are developing projections of the areas that could be at risk from a tsunami, and areas that would be safe. Projections have been completed for San Francisco, San Mateo, Los Angeles, and San Diego Counties, and the Santa Barbara–Ventura coast; projects for Monterey Bay will be completed soon. The state's Office of Emergency Services has funded this work and will use it for emergency response purposes and to provide information on safe areas and evacuation routes. These products are important in preparing for the next tsunami and for making communities Tsunami Ready.

So, what if a tsunami *is* generated out in some distant part of the ocean? Do the residents of coastal towns such as Crescent City really have a chance to escape in time? Often, yes. NOAA is currently deploying a network of ten offshore buoys (to be fully functional by 2003) to measure water surface elevation. While tsunamis cannot be detected easily by ships at sea, they can be detected by these buoys. If a slight increase or decrease in water level is observed over several monitoring intervals, these buoys automatically switch to tsunami-monitoring mode and begin sending frequent water-surface elevation information to Tsunami Warning Centers in Alaska and Hawaii. Once a tsunami is detected, these centers issue alerts or warnings to state Offices of Emergency Services and through the

LESLEY EWING

A tsunami warning sign in Crescent City

HOW TO SURVIVE A TSUNAMI

- If you feel an earthquake in a coastal area, duck, cover, hold, and watch for falling objects, then move to high ground. The earthquake may be your only warning that a tsunami is coming.
- If you see the ocean recede, do not go out to save stranded fish or sea life, since the incoming wave will move faster than you can run. There are two parts to any wave—the crest and the trough. Sometimes the trough of the tsunami will arrive first and a large withdrawal of water from the shore is a clue that a large wall of water may follow.
- If you hear an unusual roar or rumble, something like a freight train coming from the ocean, it may be a tsunami and you should go to higher ground.
- If lifeguards and emergency personnel tell you to evacuate the beach because of a possible tsunami, follow instructions immediately. Do not return to the beach until you are told it is safe to do so. A distant earthquake may have generated a tsunami. You might not feel the earthquake, but emergency responders will have been alerted by a tsunami watch.
- Do not try to surf a tsunami wave. These waves can carry tons of trash and floating debris that can be as dangerous as the waves themselves.
- When you think a tsunami may be coming, go to high ground. Do not return to low-lying areas until there is an official "all clear."

weather channel of the National Weather Service.

For tsunamis generated many miles from the shoreline, people in California localities such as Crescent City will have several hours to learn about the coming waves and should be able to move away from high-risk areas onto higher ground. For locally generated tsunamis, however, the first large wave may arrive soon after the generating event and well before a community-wide alert or warning can be announced. In these cases, local education and preparedness are essential. The main thing to do if you are in a tsunami-prone area and an earthquake strikes is to "duck, cover, hold," then immediately seek higher ground (see sidebar, "How to Survive a Tsunami").

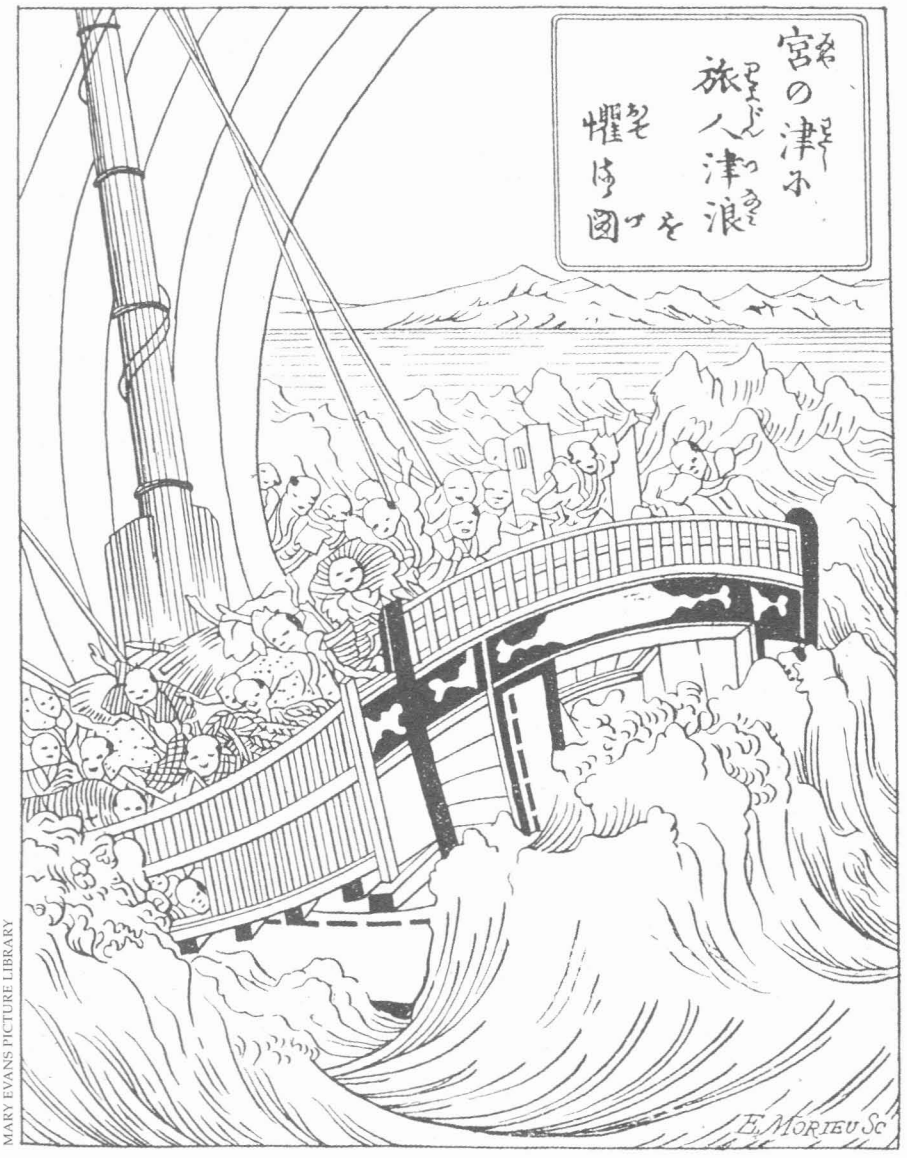
Evidence from the 1960 and 1964 tsunamis, such as inundation contours and high water marks, have allowed scientists to predict where the greatest flooding might occur in Crescent City, and what areas will be less affected, should a tsunami hit again. The city was smart after the 1964 tsunami, in that it developed the area closest to the harbor as a park (permanent open space) and allowed reestablishment of downtown businesses mainly inland of Front Street. The city also erected tsunami evacuation route signs on many streets. Recently, when a new hotel was being considered for an area of Crescent City that may be at risk from tsunamis, the Coastal Commission required that the developer prepare a tsunami safety plan. An information sheet is to be placed in each guest room, and hotel staff is to be trained on how to respond to a tsunami warning or alert. Thus, when (not if) another tsunami hits, the destruction should be less serious than in past events.

While tsunamis are rare events, the "Hollywood" accounts of their destruction are based on the fact that tsunamis have occurred throughout history and have repeatedly caused great devastation and loss of life. Tsunamis have struck California in the recent past and will do so again in the future. Though they are difficult to predict, scientists have developed an international tsunami warning system and are actively working to map areas at risk. The tsunami warning system and maps, along with awareness, education, and well thought out plans of action will help minimize the damage caused by the next tsunami to strike California. Crescent City has relied on these key steps in its program to become the first Tsunami Ready community in California. Hopefully it will not be the last community to recognize and plan for this type of natural disaster. ■

Kevin Knuuti is a research hydraulic engineer with the Coastal and Hydraulics Lab, U.S. Army Engineer Research and Development Center; kevin.knuuti@erdc.usace.army.mil.

Lesley Ewing is a coastal engineer with the California Coastal Commission; lewing@coastal.ca.gov.

A tsunami hits a 19th century Japanese sailing ship. Artist unknown, engraved by E. Morieu



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Daylighting Strawberry Creek

PHOTOS THIS PAGE: DAN ROBBIN

BILL O'BRIEN

The "stream" we were following was a thin blue line running down the middle of Center Street in downtown Berkeley. It represented Strawberry Creek, which flows in an underground culvert through this busy commercial part of the city. As about 50 of us trooped past fast food joints, a movie theater, a bank, and coffee shops, it was hard to conjure up images of water sparkling in the sun. Yet that was the intent. Friends of Strawberry Creek hoped that this walk would advance an ambitious, even radical goal: to "daylight" this stretch of the creek, bring it back into the open.

Later some of us would join the crowd gathered at Civic Center Park, directly above a buried section of the creek, to hear Robert Hass, Homero Aridjis, Michael McClure, and other poets. It was all part of this year's Watershed Poetry Festival, held on Saturday, September 7. We would also hear the latest news about local issues including Strawberry Creek—a landmark in the history of the creek restoration movement.

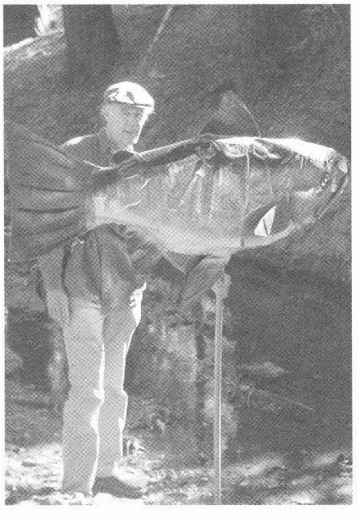
As most creek walkers were well aware, Berkeley is the place where the word "daylighting" was coined and the state's urban stream restoration movement was launched in the early 1980s, when the first stretch of this creek was unearthed. It is now the main feature of Strawberry Creek Park, at Allston Way and Bonar Street. On this warm autumn afternoon, a family was setting up for a picnic there, children played with pebbles along the stream bank, and a young couple sat beside the flowing water, quietly talking.

Twenty years ago, the site of Strawberry Creek Park was an abandoned railway yard, which the City of Berkeley planned to turn into a recreation area that would accommodate active sports. At that time, the notion of digging up the stream there was as radical as the proposal to dig it up in downtown Berkeley seems today. But the idea was proposed, pursued by local visionaries for five years, and eventually realized. The stream was released from its concrete straitjacket within the new green park.

That first success inspired others. By 2000, according to a report by the Rocky Mountain Institute, 18 projects had daylighted over 4,000 feet of streams in this country and work was under way on two

Top: Strawberry Creek as it flows through the University of California Berkeley campus

Bottom: A symbol of hope for salmon along the creek walk



DAN ROBBIN

At the edge of the campus the creek goes underground.

dozen more. In Zurich, Switzerland, nine miles of previously buried waterways had been brought back to light. It was only natural that the Friends should move toward further goals.

History and Challenges

From its headwaters in the hills above UC Berkeley's Memorial Stadium, Strawberry Creek flows mostly aboveground through the campus, with shady groves along its banks. As it reaches downtown, it disappears into a culvert, not to be seen again—with the exception of the stretch across Strawberry Creek Park, about 600 feet, plus one shorter stretch—until it empties into the Bay south of the Berkeley Marina.

By no means the largest among dozens of creeks that flow from the East Bay Hills into the Bay, Strawberry Creek has significance in Berkeley's history. In 1860, the University of California relocated its campus from Oakland to a spot near the confluence of the creek's north, middle, and south forks to take advantage of its year-round, spring-fed water supply.

As the university and the town surrounding it grew, however, the creek was allowed to become degraded. Sewage flowed directly into it, as did storm water. "From a public health and aesthetic standpoint, it must have been disgusting," said Bob Charbonneau, coordinator of environmental protection services at the University's Office of the President. Buildings were erected in its flood plain, with the predictable results. In 1882 the middle fork was buried to accommodate new construction. Later, other sections were lined with riprap, channelized, or straightened for the sake of flood control and public safety.

In the 1970s and 80s, the University began to use more nature-friendly techniques to stabilize the banks. Along one reach, a retaining wall of redwood logs, rather than concrete, was constructed. The wood will slowly rot away, and its function will be taken over by the native vegetation planted behind the retaining wall. The University published a guide to Strawberry Creek, co-authored by Charbonneau.

Beyond the campus, meanwhile, activists were trying to bring more nature back to the city. When the City decided to put an old rail yard site to new use as a recreation area, planner Doug Wolfe, founder of Wolfe Mason Associates, noted that the creek ran under the property and suggested digging it up. It was Wolfe who coined "daylighting."

At that time, urban streams were still treated as nuisances. But neighborhood residents supported Wolfe's idea. Even then, some creek advocates were looking toward downtown.

To open the creek downtown would be a major creative, engineering, and financial challenge. But Richard Register, president of the nonprofit planning firm Ecocity Builders, points to San Luis Obispo, San Antonio, Texas, and Boulder, Colorado, as models of what river and creek restoration can do for a city's downtown. In these cities, revived streams enliven successful commercial centers and offer recreational amenities. Register sees the area along Center Street as ideally suited for daylighting because it already has foot traffic from the University.

In 1999, Wolfe Mason did a preliminary study for the City, outlining possible scenarios for the downtown daylighting project. These ranged from building a three-block-long lined canal along one side of Center Street between Oxford Street and Martin Luther King Jr. Way, to restoring a "full flow" stream through downtown and Civic Center Park. Cost estimates ranged from $1 million to $9 million. Both of Berkeley's mayoral candidates endorsed the idea

this year, but the City Council has yet to fund a more detailed study.

Not all those who have worked to achieve the initial Strawberry Creek daylighting agree that the downtown project is practical. Charbonneau said that he's "totally supportive, in principle," but has questions about feasibility. The creek runs across Shattuck Avenue, a main thoroughfare for cars and buses, and a route for BART and numerous utility lines. Crossing Shattuck could be "a daunting task," Charbonneau said.

Ann Riley, executive director of the Waterways Restoration Institute, a leading creek restoration advocate for over 30 years, pointed out that Strawberry Creek takes a wide meander through the downtown district. It couldn't be "restored," to anything resembling a natural state, she said; only a "dead canal, " could be achieved.

"It can happen in many different ways," counters Janet Byron, founder of Friends of Strawberry Creek. Friends displayed computer-simulated images of potential alternatives at the Watershed Festival. One showed a shallow channel running straight down the middle of Center Street. Another, the most ambitious, showed a much more natural looking channel with a wide meander and riparian vegetation. (This alternative would require removal of several buildings.)

Meanwhile, Byron, Register, and others are looking even farther than downtown. They envision a "greenway" extending along Strawberry Creek from the hills to the bay, with walking and bicycle trails. They believe this could be accomplished by means of a land trust that could be established to acquire properties near the creek from willing sellers.

In an odd way, their cause may be helped by the culverts. Many were built nearly a hundred years ago, and some are falling apart. Byron discovered one such culvert while pulling weeds near Strawberry Creek Park. She alerted city engineers, and inspection revealed numerous cracks up to a half-inch across, as well as structural weaknesses in some sections. On March 12, consulting engineers submitted a report to the city in which the culvert is shown to be directly under several houses.

Some creek advocates think the culvert problem presents an opportunity. Costly repairs will surely be needed. Perhaps it's the right moment to consider investing in some daylighting projects instead, Friends of Strawberry Creek suggest.

Yet another unrealistic idea from a city famed for its radical notions? "It's ragtag armies like us that give Berkeley a bad name," joked Robert Hass as the creek walk was getting under way. As more and more communities have followed Berkeley's lead in reviving buried creeks and fighting to keep living creeks from being culverted for new development, some of yesterday's crazy notions, borne forward by "ragtag armies," might perhaps become mainstream ideas. ■

Bill O'Brien, a freelance writer who lives in Oakland, reports frequently on local creeks, wetlands, beaches, and other natural areas.

ART THIS PAGE: STEVE PRICE

Top: Center Street today

Above: A computer simulation of Center Street with a daylighted Strawberry Creek

Our Lady of Black's Beach

THOMAS WANG

I was orphaned as a child. Not that my parents died, but they divorced, as many do. My father disappeared into the mist. I was left with my mother and brother, who whirled in their worlds of Catholicism and disco, places where I felt uncomfortable and ill at ease. ➛

The last memory I had of my dad was snorkeling, catching fish off the Taiwan coast. Spiny puffers, long thin trumpet fish, rainbow wrasses, and parrot fish. Manta rays and hammerhead sharks on the docks. When we returned to live in California, I went to the ocean to look for him. In Cemetery Beach at Monterey I wandered in giant kelp forests and met tiny gobis. In the turquoise waters off Catalina Island, I befriended horn sharks, octopuses, and sleeping garibaldis. At Santa Cruz harbor, there were sea anemones, urchins and starfish, but no papa.

I ended up in San Diego, balancing between the pulses of crests and troughs at Black's Beach. Every dawn, I ran down the hill to play with her blue green tresses. She took me in with kindness and generosity, bestowing sparkling gifts of waves, rainbows, and laughing dolphins even as tears drained into her.

In the still dark waves of early morning I met regulars who loved the sea as I did. Party Boy and Dr. Harding, the halfmen kneeboard brothers. One of them sat at the edge of the world, and scored dozens of deep tubes. The other was a green suited gambler who charged speedily on a yellow fish. Bob the seal incarnate glided effortlessly through liquid cracks, while his dog Corona waited patiently on the shore. Shambles came late, still wearing a wetsuit full of adventures from the night before. Smiling boys from Poole Street were sunburnt from standing too long in watery barrels; shred heads etched and carved fat lines in the faces of waves. Barb'n skate, my companion in getting caught inside, and source of inspiration.

Along the morning run to Black's were many treats. On Farms Road, the drunken perfume of a wintersweet tree filled the asphalt path. We picked lemons off abandoned trees, and laughed at the garbage cans full of cheap wine in front of some UCSD professor's house. A common landscape plant was the South African natal plum, from which I made sweet and tart jams, no pectin needed. We paused in the dark to see falling stars, and to see which cars had arrived before us. Then we passed through the metal gates that led down to Black's. The aura of the coastal canyons took over.

The birds sang for the arrival of the sun! The smell of artemisia and sages filled the canyon; spines and hairs of opuntias and cholla cacti glistened and stood on end. Bare feet scraped the cold gravel. There were ripe red tunas to eat, and clear fruits of the lantern plant to light up the corners. After heavy rains, succulent lady's fingers tumbled from the eroding hillsides. Foxes and rabbits followed one another on the twisted trails in games of hide-and-seek. Lemonadeberry was the perfect face-twisting, mouth-puckering, trail snack.

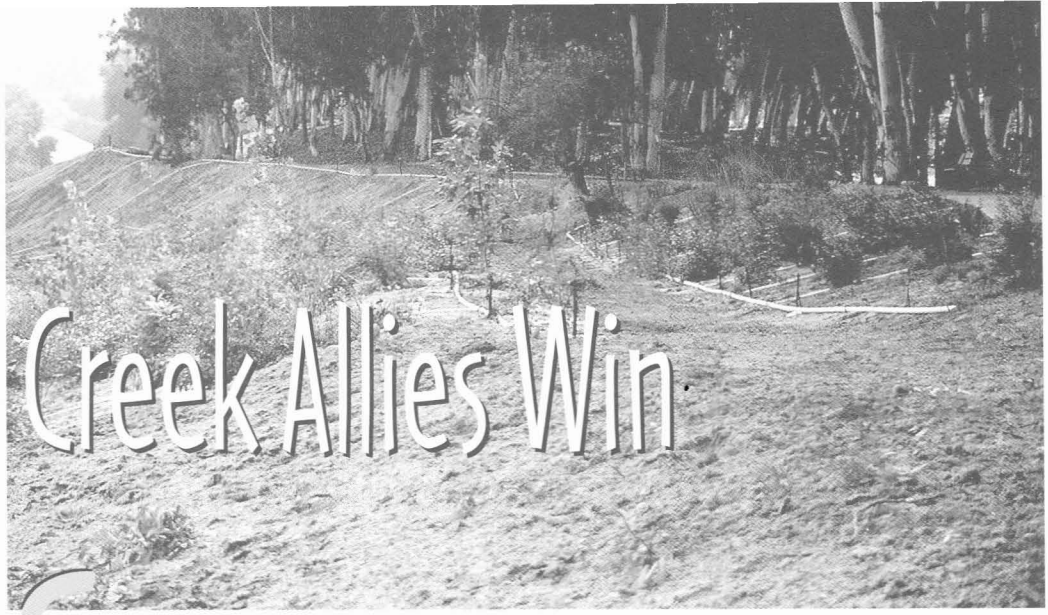
At the overlook we checked for wave activity. If waves were breaking consistently, the fallen foam formed a white triangle between the rocky lookout. Keep running! Turn the second curve and brr! This was refrigerator corner, where cold air sat in ambush. Some days, the winds blew so hard that the surfboard became a kite, and one turned into a helicopter. At the bottom of the hill lingered the memory of California fan palms we planted, chewed to bits by the winds. Ah to touch the water finally!

In the water, there are places where waves like to break. They have different names like north peak, voracious, and hungry for waves. We eyed the horizon, and paddled for priority like wolves on a kill. Luckily, at dawn we had the place to ourselves! Lines on the sea, pleated envelopes of energy, collapsing to the right and to the left. Methodically and powerfully.

Black's is a special place for surfers. She is well known on the California coast for her high cliffs, underwater contours, and the waves she generates. A deep submarine canyon funnels far traveling swells from New Zealand, Polynesia, and Alaska up towards the sandbar. South and west swells that roam across the Pacific Ocean emerge as fast cavernous lefts. Northwest swells carried Aleutian juice and arctic winds. Black's has the ability to maintain the integrity of her wave shape during these large swells. Her shape is the classic A frame, with a steep top to bottom takeoff. Wide shoulders, hollow armpits. There, in the water folds of her muscles, sinew, and fat, I found the comfort of a mother. ■

Thomas Wang works as a gardener for the City of San Francisco. His happiest moments are sunny days at the beach with his family and some two-to-three-foot waves.

Orange County Creek Allies Win



RASA GUSTAITIS

Serrano Creek intruded into Matt Rayl's life rather rudely ten years ago by ripping out a large chunk of the parking lot at his stable in Lake Forest, where he boards horses. Five years later, in the El Niño winter of 1997–98, it took out more of the lot and damaged other creekside properties. "About 5,000 homes and businesses are adjacent to the creek," Rayl said. "Something had to be done."

The behavior of this six-mile Orange County stream had changed in recent years. As the watershed was developed and some reaches were lined with concrete, runoff patterns were affected and the watershed was destabilized. The creek flows naturally from Whiting Ranch Wilderness Park, among willows, sycamores, and other riparian vegetation, but it is a concrete-encased channel through two residential developments. In Lake Forest it is mostly natural again. It continues through Irvine and empties into San Diego Creek, the principal tributary of Newport Bay.

With more ground paved and built over, storm water that earlier would have been absorbed by the soil and vegetation was rushing at accelerated speed into the stream, scouring the banks and creekbed, tearing out plants and trees, and carrying away massive amounts of soil. During the winter of 1997–98 an estimated 400,000 cubic yards of sediment were carried into the bay by Serrano Creek.

The problem confronting Rayl, his neighbors, and the City of Lake Forest was, therefore, also a problem for Orange County and all those concerned with Newport Bay, where costly dredging has repeatedly been required. Yet the stretch running through Lake Forest was of greatest concern to those who lived near it.

Rayl and his allies wanted flood control, but not the standard kind. "'No grouted rock' was our mantra," he said. "In Orange County, the desired surface still seems to be either concrete or riprap. Creeks aren't called creeks here. They are 'channels.' On maps, Serrano Creek is 'F19'."

In 1997, at the urging of residents, the City launched a planning process to assess options for flood management, recreation, and habitat improvements along the creek.

To make sure he could participate in an informed way, Rayl traveled to a conference on erosion and creek restoration "to learn the vocabulary." He came away with fresh ideas and information from other watersheds and then, using his own funds and resources, organized a conference in his own community in 1998, featuring an innovative hydrologist, Robert Delk. A second conference was held in 2000, with two more creek experts.

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The badly eroded creek bank below has been stabilized and restored. The photo at top shows the site 3 1/2 months after planting.

PHOTOS BY MATT RAYL

Imagine that every coastal homeowner with a backyard swimming pool replaced it with a native plant garden. What would you see through the window of a plane as it descended toward a neighboring metropolitan airport? The familiar aquamarine rectangles would be gone. A softer patchwork would emerge within the gray grid of roads, parking lots, and buildings.

Seen from the air, this change might not be impressive. At ground level, however, you might discover that scraps of the native wild landscape had been stitched together into a loose tapestry, a remnant—frayed, to be sure—of California as it was before European settlement. Birds and other small wild creatures would find food and shelter, the demand for water would be far less than it is now, air quality would be improved.

Ecotopian fancy? Sure. The naturalization of backyards isn't likely to happen. We Californians are too diverse, too individualistic to join unanimously in such a revolution. Gardening is a highly personal activity, as the articles on these pages make clear. "There are as many kinds of gardens as there are gardeners," writes **Margot Patterson Doss,** *whose patch of ground in coastal Marin County includes native and other plants, as well as some geese.*

But gardening exclusively with natives appears to be increasingly popular. If this trend continues, the many new small landscape fragments could add up to a significant amount of restored habitat. Among the most passionate advocates of native plant gardening is **Judith Lowry.** *In her essay, she reflects on the challenges and pleasures of cultivating her patch of coastal scrub and chapparal, "a dense, vibrant, glorious mass" not far from the Doss home.*

For the past couple of decades, native plant restoration has engaged more and more people on lands both public and private. This work is undertaken to help control erosion and flooding, provide habitat for wildlife, and repair damage to natural resources from a variety of human impacts. Meanwhile, invasive alien plants continue to spread inexorably, threatening what has survived or been restored. Pampas grass now dominates many stretches of shoreline; Scotch broom has overtaken yellow lupine habitat required by endangered butterflies; Atlantic cordgrass continues to outcompete native cordgrass along the San Francisco Bay shoreline. While not everyone has a personal patch of ground to work on, opportunities abound for those willing to work out in the open air by pulling weeds and planting seedlings in our great California coastal commons. It's a job that will never end.

—RG

Reflections on Native Plant Gardening on the Coast

In My Minute

JUDITH LARNER LOWRY

PENCIL DRAWINGS BY JILL STROHN

My neighbor provided me with an interesting perspective recently. I made a visit to inquire tactfully if the weasel-shaped killer kitty that has decimated this season's first crop of baby California quail might belong to her family. (It did, a recent birthday present for her daughter.) As we talked, I stood on her deck and looked at her garden backed up by mine. In so doing, I saw my garden from her point of view.

She has a pretty little border of lavender and roses, set against an old-style wooden fence. Behind the fence, serving as backdrop, foil, and privacy corridor, is a section of the patch of coastal scrub and coastal chaparral I have worked on for the last 20 years. It is a dense, vibrant, glorious mass, now that the poison hemlock, Himalayan blackberry, vinca, and French broom are almost eradicated. Things that rustle, chirp, and slither live there. Together, my neighbor and I admired the view.

Just on my side of her garden fence grows a handsome coffeeberry, an elegant small tree, with rounded form and lustrous, dark-green leaves. At the far end, toward my house, two coast live oaks almost block her view of the eucalyptus grove at the end of the block. Hairy honeysuckle growing up through the coffeeberry sends pink, articulated blossoms dancing over the fence to join her roses. Toyon is almost in full mid-summer bloom, while the fragrant lilac and white blossoms of

Judith Lowry's garden gate

shrub lupine are beginning to form blackish seed capsules. The gray-green silky leaves of California sagebrush lend contrast, while coyote bush, molded by the wind to a perfection of symmetry, strikes a unifying chord with its medium green, fine-textured foliage.

My first immodest thought was, "She is so lucky to have me as a neighbor." My second thought was that her conventional garden was made palatable for me by this rich background of locally native species. The usual frequently used garden plants, given context by the local flora, did not, for a change, annoy me. I saw that I might even be able to enjoy non-native gardens, if they were little islands set within that which belongs here, rather than the other way around.

It would be a relief to be able to enjoy such gardens. Because sadly, there are some people in my town whom I avoid simply because of the way they garden. I am sorry to realize that I may even faintly dislike some of my neighbors for such a reason. Just three blocks away, a different perspective on gardening is provided by another woman with a plant-related business. She works out her ideas about plants and gardens on a piece of land about the same size as mine. She also, as do I, sells plants and gives classes. Our styles, our plant palettes, our philosophies, are diametrically opposed. She paints a picture with plants, and each pictorial ingredient is scrutinized, evaluated, and visually assessed. Composition, rather than habitat, is all.

Interestingly, our yards are often featured on the same garden tours. Have we ever visited each other's gardens? No, never. Maybe each of us fears that we would be turned to a pillar of salt should we look upon the other's work. When we run into each other in town, we smile politely, then look away.

Returning home from visiting my cat-owning neighbor's garden, I changed perspectives, looking from my garden back to hers. The background she provides for my garden is a Canary Island palm, a liquid ambar from the forests of the southeast, lavender and rosemary from the Mediterranean, pampas grass from Argentina,

echium, seedling cherry plums, and behind it all, of course, our gift from Australia, blue gum eucalyptus.

I'm glad to know how things look from my neighbor's vantage point and that, though she does not want to "limit" herself to local natives, she appreciates the sumptuous mass of coastal scrub, with its various foliage, the privacy it provides, and the habitat for all kinds of creatures. With all I could still bring into my garden that might once have grown here, I never feel that my gardening efforts are limited by my focus on local natives.

Not so easy, of course, to say what that focus was. It's all patches and pieces now, and as I take a clue from here, a hint from there, I know that nowhere on this 350-acre marine terrace surrounded by National and State Parks land is there a real model with all the parts intact. Impacted first by grazing and then by gardeners, this land at the southern end of the Point Reyes National Seashore is sadly degraded, though it looks to most visitors like a sweet and rural place. The wrentit feasts on poison oak berries, the west coast lady butterfly lays its eggs on checkerbloom, quail call from coyote bush, and solitary bees enjoy gumplant's yellow blossoms in late summer, but every year these creatures hold a little less territory, till the real possibilities of local extinctions loom. In my search through the years for the way it once was, I've drawn some conclusions. I know that much of this marine terrace was wet, seasonally or year-round, before our ditches, culverts, and roads interfered with drainage patterns. There were swales and flowing creeks and, once, vernal ponds, where perhaps meadowfoam and other showy spring-blooming wildflowers thrived, with their attendant insects. There were quantities of California oatgrass, which in some places still survives the onslaught of invasive grasses and other weeds.

Though we call this piece of land "the Mesa," it is not really flat like a table. Dips and rises abound, and were probably more plentiful before the strange checkerboard subdivision of the land in the 1920s. I postulate that some of the low, protected places had oaks, buckeyes, Pacific wax myrtles, and California bays, because I still see a few of these trees, here and there. The presence of one California buckeye in a canyon that is otherwise filled with eucalyptus and Monterey pine leads me to conclude that these trees made springtime redolent with the scent from their white flowers. One tiny Pacific reedgrass clump at bluff edge allows me to imagine that masses of that large, striking grass once occupied damp ground. Some say that the Mesa was a barren, windswept plain, a bleak place where no one could comfortably live until the planting of Monterey pines and cypresses and eucalyptus tamed the wind. Old photographs show how empty and unappealing the land was. Before the first photographs were taken, however, much had happened. From an oral history tape, I know a massive cutting of oak occurred throughout the 19th century, both for firewood and for the production of charcoal. The relentless, year-round cattle grazing practiced by the Spanish and other early ranchers transformed the prairies, which were once rich with native bunchgrasses and both annual and perennial wildflowers. They can still be found here and there: coast lotus, California fescue, horkelia, sword fern, chocolate lily, purple needlegrass, June grass, blue-eyed grass, Douglas iris. Annuals that might have been here include ruby chalice clarkia, hayfield madia, goldfields and tidy tips, cream cups and redmaids. The list is long, and sightings always exciting.

Once, in a nearby pasture, I saw a single Johnny-jump-up, the charming yellow and brown violet that used to be everywhere, a favorite for gatherers of nosegays. When I returned to this spot the following year, these appealing flowers had vanished, swamped by a tall non-native fescue. Peppermint candy flower by the lagoon has been taken over by vinca, harvest brodiaea across the street by French broom, California oatgrass on the bluff by capeweed.

So it has seemed to me a satisfying endeavor, to give as many of these plants as I can a place in my garden, to sell their seeds and starts, to promote their use in gardens. I counted recently, and there are now about 35 native plant gardens in this town of 600 houses. That is 35 more than there were 20 years ago. Are these plants gaining territory through gardening efforts? Or losing territory through the encroachment of non-native invasive species? A constant cutting of non-native trees goes on, even as they continually reseed. Someone restores coastal scrub here, someone else bulldozes it there. The scale tips one way, then the other.

At a town meeting held to discuss eucalyptus removal, a fan of eucalyptus suggested the formation of a "Non-Native

"...it is a dense, vibrant, glorious mass...."

Plant Society," as though the non-natives—the poor eucalyptus, broom, veldtgrass, sorrel, Bermuda buttercups—were the underdogs. My town favors underdogs, and I like them myself, though I have a different list, one that partly dictates my gardening schemes. As one native plant species becomes secure in my small domain, I move on to the next.

First there was coyote bush, an undervalued shrub essential to many creatures, but I had none in my yard. Now I have many; we grow them pruned and unpruned, and people ask, "What is that handsome plant?" We offer them in the nursery, and they actually sell.

The next underdog was the lemon yellow coastal form of the California poppy. I diligently removed the non-local, orange version from Antelope Valley, widely planted throughout California. Now I have many of the coastal subspecies, reliably reseeding throughout my garden.

Next I focused on our local clarkia, called "ruby chalice," whose seed I collected a few miles down the coast, grew in pots, then planted into the garden. Now, I am happy to see it turn up here and there, in places that it finds compatible. These and other former underdogs are with me now, reseeding and spreading, meeting me more than halfway, requiring little from me.

Others have not taken hold here, for one reason or another. I have yet to establish June grass in the prairie, or coast lotus, except in containers, or mule's ears, chocolate lily, pussy ears, or California plantain. California plantain must be the greatest underdog of all. A tiny annual whose flower bears close inspection, and whose minute and narrow leaves are one of the two host plants required by the bay checkerspot butterfly, it is easily overcome by more exuberant plants. I can hardly believe it when I come across a patch in the middle of a weedy pasture.

Many of these plants foster an appreciation of seasonal change. Seasonality in the native plant garden is a thing of subtle wonders: the dry rustle of bunchgrasses going dormant, the sharp snap of lupine and poppy seed capsules dehiscing in the sun. Gardening as it is practiced by many Californians tires me, with its "on and on forever, bloom, bloom, bloom" creed. It says much about our culture that we cannot let go of spring.

By June, I long to let down, give the garden a rest. I'm ready for a long quiet spell, with time to tune into the subtleties of what David Rains Wallace called "the fifth season." To be enveloped by the forms and shapes of the plants, immersed in their tones of green. To compare the shade provided by oaks to the shade provided by elderberries, or the leaf litter of Pacific wax myrtle to that of blue blossom ceanothus.

But I am not immune to the pressures to prove my skill as a horticulturist—or to prove that natives are as garden-worthy, as stunning, as beautiful, as "visually interesting" as regular garden plants. I ran into an acquaintance who had just installed a rock pool and waterfall. Out of a giddy desire to experiment with tules and horsetails and sedges, creek monkeyflower and golden-eyed grass, I urged him to plant it with native plants. He seemed pained by my suggestion. "Native plants are visually uninteresting to me," he said.

I felt devastated. Later, he narrowed his indictment to only coastal scrub and, admitting that as a shortcoming, agreed to try to overcome his blind spot. I, meanwhile, admitted to sounding like the native plant police. Then we could go on.

Another perspective was provided by a West African shaman, brought to town by a

friend. When he walked in my gate he said, "This garden is a shrine to the Old Ones." When I heard this comment, something in me unclenched, and I rested in the notion. I could easily let go of proving myself as a garden designer, or of proving that natives are as good as, showy as, garden "worthy" as the whole host of exotic plants. Or of calculating to a fine degree their superiority as habitat, which should be as self-evident as the truths mentioned in the Declaration of Independence. Whether it be honoring the Old Ones, respecting the genius of the place, or making a home for alligator lizards and the San Francisco garter snake, working with these plants and having them close by is a joyful privilege.

My daughter asks me how she will keep the garden going when I am gone to my reward. What she wants to hear is that, after all these years, after this gargantuan effort, it will take care of itself. Because it is "natural."

I wish I could reassure her on this score. But veldtgrass, which wasn't here when I arrived, is waiting under the porch to take over the places where our local clarkia grows, or where California phacelia is reseeding. Another neighbor planted capeweed, that scourge of San Francisco, and it is heading this way. My daughter will be a physician, and not inclined toward the devotion necessary to hold these borders. I can't know how things will shake out, or which perspective will prevail in this town.

Once I went to a conference where indigenous Californians discussed efforts to keep their languages alive. In some cases, the tribes had only a handful of fluent speakers, even as few as one or two. One woman taught herself Rumsien from old recordings, speaking it with nobody but herself. But the language won't die in her lifetime. As one of the native speakers said, "Not in my minute, it won't."

Which is all that any of us have, of course: our minute. I only know, as I fend off cape ivy one more time, finally getting my neighbor to cooperate, that coyote bush will continue to be a generous companion to yerba buena, mugwort, and woodland strawberry, to bushtits, quail, and tachina flies. These things, and the life they bring, won't disappear from right here, right now.

Anyway, not in my minute, they won't. ■

Judith Larner Lowry, author of Gardening with a Wild Heart *(UC Press 1999), owns Larner Seeds in Bolinas, Marin County, and designs and cultivates native plant gardens.*

Other Gardens, Other Views

MARGOT PATTERSON DOSS

Gardening is the favorite outdoor sport of more people than baseball, football, or soccer. There are, thank heavens, as many kinds of gardens as there are gardeners. In the last 10 or 12 years, while writing a column called "Garden Gallivanting" for the *Point Reyes Light*, I had the privilege of visiting more than 100 coastal gardens. I wouldn't change a one of them, not even the garden that represents in miniature an entire railroad line, and certainly not the wonderful garden I saw that approximates Monet's Giverny estate, outside Paris.

The range of gardens is, as the kids say, awesome. There are cactus gardens, rose gardens, lavender gardens, herb gardens, veggie gardens, gardens for the blind, white gardens, collectors' gardens, sculpture gardens, gardens of Shakespeare's flowers, tulip gardens, Zen gardens, wine gardens, holly gardens, permaculture gardens, medicinal gardens, children's gardens, gardens centered on mazes, and gardens surrounding golf courses, to name just a few. Their variety is infinite, as varied as the gardeners themselves.

Certainly there have been many fads in gardening, beginning perhaps with the Mogul gardens of India. They gave us the notion that gardens must feature water, whether in streams, fountains, waterfalls, ponds, or even birdbaths. Most gardeners still try to do that, lo these 2,000 years later.

Old pepper tree encircled by a bench made by the Doss's sons from cobblestones found on San Francisco beaches

In the 1700s, tulip mania overcame Europe and people ripped out roses to plant tulips. Now in coastal California, native plant gardens are one trend.

My own garden is eclectic. It is made to be lived in and enjoyed. Just before we bought the place it was used for breeding Afghan hounds. The front third of our little acre was filled with eucalyptus, broom, rebar, discarded metal building wire, and other traps for the unwary. Instead of a garden, close to the house there was a lawn; we found patches of 17 kinds of mowed grass. (Dogs eat grass when they are sick, the dog breeder explained.) This third of our acre is becoming a native plant garden.

Quince and salvia

The other two-thirds of an acre was fenced because the law requires that swimming pools be secured against possible invasion by unchaperoned children. Within that fencing we now have an orchard by the driveway, a raised-bed vegetable garden in the southeast corner, a cactus garden by the patio, a memory garden of plants we brought from our former city garden, a revised dog run where our watch-geese live, a work yard where composting occurs, and, near the solar-heated pool, a number of citrus trees, various perennial cultivars, two benches made of cobblestones our sons rescued from San Francisco beaches (one encircles an old pepper tree), and an antique San Francisco street light. Our garden is an idiosyncratic series of garden rooms, and we are frequently asked to make it accessible for tours. Only once have I succumbed to that temptation, for I have nothing to sell or promote.

I like native plants too and have installed seven toyons in the front third of my garden after ripping out 21 eucalyptuses. Nearby I planted agaria (coast silk tassel, a native of Marin County), and also flannel bush and matilija poppies, just because I like them. This is considered a mistake by native plant mavens because these plants are natives of Santa Barbara, which is as alien to Marin as Fiji. Great Britain's premier garden writer, Christopher Lloyd, would laugh at me. He thinks planting natives is an excuse for not gardening and would call me lazy.

Still, he doesn't live here, where many gardeners have learned the good sense of xeriscaping, the planting of drought-tolerant plants that don't shrivel up and die during the seven months of California's long dry summers. To plant gardens that need little water is an admirable aim—an aim that, as one of the founders of the Golden Gate National Recreation Area (GGNRA), the huge garden that stretches from Point Reyes to Point Montara, I heartily approve.

The GGNRA has its own native plant nurseries, hidden away here and there, whose purpose it is to reseed native grasses and flowering plants in places that have long been degraded by man's uses of the land. I recall that when we were setting the boundaries for the GGNRA, I sat down at Fort Mason to a table full of maps with Jack Wheat, a very senior park planner. Nine villages were encompassed within the potential boundary in Marin County alone: Bolinas, Stinson Beach, Muir Beach, Olema, Inverness, Inverness Park, Point Reyes, Marshal, and Tomales. Out of long experience—for this was not the first park he had planned—Jack Wheat drew a generous perimeter around the seven larger villages, which he called buildout. "We'll leave a mile around each commercial center and let the villages come to the park, instead of bringing the park to each village's doorstep," he said. "It will take about 20 years. This is a form of gardening."

Those 20 years have passed, and from the upstairs window of my Horseshoe Hill house in Bolinas I have watched Stinson Beach ooze up along Panoramic Highway and the homes of five neighbors materialize in the chaparral below me. At least one neighbor is creating a garden of native oaks, filberts, and coffeeberry. There are a couple of native plants she'd like to get rid of, though. Hedge nettle, for one. If you've traveled along Highway 1 this fall, you've seen the gorgeous fiery red of another nuisance: poison oak. Another unwelcome native sprawls over the fence of the nearer

neighbor in brilliant orange: dodder. Did it crawl up from the Bolinas lagoon? A fourth unwelcome native plant greeted me the last time I picnicked at the south end of Tomales Bay. The parking lot was empty, to my relief, and so was my favorite bench. We soon learned the reason. The smell of skunk was prevalent on the path toward the water. "Maybe we should find another spot," my husband suggested. "Wait," I said and looked around. Sure enough, not a mangled road kill but a lush growth of the native skunkweed adorned the path's edges.

So whatever native plant aficionados, or other gardeners, want to do is fine with me. As Granddad used to say, "As long as they don't scare the horses." Nature has its own agenda. Walk along any remote beach and you get a hint of it. Underfoot there may be New Zealand spinach. Some seed washed all the way across the Pacific? Or floated in from the place where the garbage scows disgorge? Or bird dropped? Clinging to the cliff overhead, you may spot clumps of an echium, the Pride of Madeira, which may have made its way here from the Canary Islands, or its seeds in dunnage used to ship wine. There is really no pristine place left in the world. Mankind, animals, and the evolved methods of locomotion of seeds themselves preclude it.

For perspective on the matter, I can't help thinking of my old professor on day one of Geology 101. He held up a basketball. "Imagine this is the world," he said; laying a nickel on top of it, "and this is its mantle." Then he put a piece of paper atop the nickel. "This, in comparison, is the span of mankind on the earth's surface."

The poet Robert Herrick said it well in the 16th century:

O gather ye rosebuds while ye may
Old time is still a-flying
And this same flower that smiles today
Tomorrow will be dying.

Good words and true—in any kind of garden you can plant. ■

Margot Patterson Doss wrote a column on walking for the San Francisco Chronicle *for 30 years and also served on the Citizen's Advisory Commission for the Golden Gate National Recreation Area during the GGNRA's first 15 years. She lives in Bolinas. Her books include* San Francisco At Your Feet *and* Bay Area at Your Feet.

Our Native Plant Defense Forces Need You

Almost anywhere you look along the coast, invasive exotic plants are spreading across wild lands. If you treasure California's native landscapes, and enjoy a good workout outdoors, you might want to join some of the volunteers who are extracting invasive aliens and replacing them with native plants in our great California coastal commons. The list below is by no means complete, but it may help you find a group near you. The statewide organizations have local chapters or projects in most coastal regions.

- **Statewide:** California Native Plant Society, (916) 447-2677 or www.cnps.org; California State Parks, www.parks.ca.gov; Caltrans Adopt-a-Highway Program, (510) 286-4433 or http://adopt-a-highway.dot.ca.gov; National Park Service, www.nps.gov/volunteer; The Nature Conservancy, (415) 777-0487 or www.tnccalifornia.org; Sierra Club, (415) 977-5500 or www.sierraclub. org

- **North Coast:** Redwood Community Action Agency, Natural Resources Section, (707) 269-2063 or www.racc.org/nrs/contact; Friends of the Dunes, (707) 444-1397 or www.friendsofthedunes.org; Point Cabrillo Lightkeepers Association, (707) 937-6123 or (707) 937-0816; Sonoma Ecology Center, (707) 996-0712 or 996-0516 or www.vom.com/sec; Circuit Rider Productions, (707) 838-6641 or www.crpinc.org; Stewards of Slavianka, (707) 865-0180 or www.stewardsofslavianka.org

- **San Francisco Bay Area:** Aquatic Outreach Institute, (510) 231-5655 or www .aoinstitute.org; Bay Institute, (415) 506-0150 or www.bay.org; Golden Gate National Park Association, (415) 561-3000 or www.ggnpa.org; Audubon Canyon Ranch, Cypress Grove Research Center, (415) 663-8203 or www.egret.org; San Francisco Bay National Wildlife Refuge Complex, (510) 792-0222 or http://desfbay.fws.gov; Save San Francisco Bay, (510) 452-9261 or www. savesfbay.org; East Bay Regional Parks District, (510) 544-2515 or www. ebparks.org; San Bruno Mountain Watch, (415) 467-6631 or http://64.87.109.56; San Bruno Mountain Stewardship Project, (650) 355-6635 or www. heartofthemountain.org; Acterra, (650) 962-9876 or www.acterra.org

- **Central Coast:** Pescadero Conservation Alliance, (650) 879-1441 or www .gazos.org; Wildlands Restoration Team, (831) 423-2801 or www.wildwork.org; Elkhorn Slough Foundation, (831) 728-2822 or http://elkhornslough.org/esf; Fort Ord Volunteers, Kate Handrich, Bureau of Land Management, (831) 394-8314; Estero Conservation Alliance, www.esteroconservationalliance.com; Guadalupe Nipomo Dunes Center, (805) 343-2455 or www.dunescenter.org; Land Conservancy of San Luis Obispo, (805) 544-9096 or www.special-places.org

- **South Coast:** Wishtoyo Foundation, (805) 382-4540 or www.wishtoyo.org; Palos Verdes Peninsula Land Conservancy, (310) 541-7613 or www.pvplc.org; Friends of the Los Angeles River, (323) 223-0585 or www.folar.org; Arroyo Seco Foundation, (626) 584-9902 or www.arroyoseco.org; Newport Bay Naturalists and Friends, (949) 690-6746 or www.newportbay.org; Bolsa Chica Conservancy, (714) 846-1114 or www.bolsachica.org; Laguna Greenbelt, Inc. (949) 494-9352 or www. lagunagreenbelt.org; Batiquitos Lagoon Foundation, (760) 943-7853 or www. batiquitosfoundation.org; Torrey Pines State Reserve (858) 755-2063 or www.torreypine.org.

In Search of Eco-Friendly Aquaculture

STORY AND PHOTOGRAPHS BY WESLEY MARX

The image of aquaculture has been tarnished lately by the environmental shortcomings of certain kinds of marine aquaculture. Disease outbreaks in salmon pens from Norway to Maine, as well as mass escapes of penned salmon, have repeatedly threatened wild fish habitat and genetic vitality. Shrimp farms in Asia and Latin America have destroyed mangrove habitat and polluted coastal waters. To feed captive shrimp and salmon, forage fish are being processed into fishmeal, reducing the food supplies available to commercial fish stocks, marine mammals, seabirds, and other wild creatures. Consequently, the National Audubon Society and Monterey Bay Aquarium now caution against eating farmed salmon and shrimp.

Yet other forms of aquaculture—some of them centuries-old—are proving to be more compatible with the environment. In California, Baja California, Oregon, and Washington, several varieties of seafood are being produced without harming wild marine life or wild waters. "Eco-friendly" entrepreneurs are growing oysters, sturgeon and caviar, striped bass, tilapia, and saltwater shrimp. Some farm leased tidelands, others cultivate their stock in closed land-based systems. Such sustainable aquaculture promises to play an important role in our seafood future.

In the northern part of Humboldt Bay, Coast Seafood Company raises oysters on longlines, polypropylene ropes that wind around vertical plastic pipes set in the substrate. Unlike farmed shrimp and salmon, these shellfish don't require artificial feeds. They filter their food source, phytoplankton and nutrient-rich detritus, from the surrounding water column.

Coast used to grow on the bay bottom, as many oyster farmers still do, harvesting with hydraulic dredges. One of the major oyster growers in California, the company currently farms 370 acres of tidelands it owns or leases from the Humboldt Bay Harbor and Recreation District. Hydraulic dredging tears up valuable eelgrass beds, critical habitat for many bay creatures, and otherwise disturbs life on the bay bottom. Silt raised by dredging can reduce water clarity and clog gills of fish. Six years ago, as tighter federal and state regulations were imposed in an effort to prevent such habitat damage, Coast decided to shift to longlines. By so doing, Coast not only avoids harming eelgrass, it has also gained a significant economic advantage. The longlines put the oysters out of reach of rays, crabs, and other predators that feast on bottom-grown oysters. "We used to lose up to half our crop to bat rays," recalls Coast operations manager Greg Dale. "We put a lot of effort into erecting underwater fences to deter the rays. With the longlines, we don't worry about rays or underwater fences."

The economic survival of oyster growers depends on clean water, because oysters are filter feeders. When excessive pollution is detected, harvesting is shut down. Oysters were cultivated in San Francisco Bay early in the last century, until sewage flows contaminated the crop and shut down the industry. Today growers only cultivate oysters in areas that the California Department of Health Services (DHS) has certified as

safe. Growers in Humboldt Bay, Tomales Bay, Drake's Estero, and Morro Bay work closely with DHS and with State regional water quality boards to identify and clean up sources of pollution, from leaky sewage lines to sloppy storm drains.

"The cities of Arcata and Eureka now use video cameras to spot leaks in sewer lines that can contaminate our oyster crop," says Cole. "In a process called sliplining, they insert plastic liners in old clay sewer lines to stop damaging leaks." By working together to maintain a high level of water quality, the growers, regulators, and bayfront communities like Arcata and Eureka ensure that California can produce over ten million pounds of farmed oysters annually, with a value of $7.5 million.

(State and local officials have not been as successful in controlling bacterial contamination in Carlsbad's Agua Hedionda Lagoon. Farmed mussels and oysters harvested from this lagoon must be placed in trays and immersed in purified seawater for 44 hours to purge contaminants. In a March 2002 report, DHS recommended increased monitoring of storm runoff into the lagoon to see if further harvest restrictions, including rainfall closures, may be required.)

Oyster and mussel growers outside of California are just as interested in protecting water quality. Last year, thanks to a crackdown on polluting storm drains, Washington State growers regained a 30-acre shellfish-growing area in Puget Sound. On the Pacific coast some 180 miles south of the California-Mexico border—where you know you're in oyster country when the dirt road becomes paved with oyster shells—growers recently teamed up with a cross-border environmental organization, Pro Esteros, to stop approval of a proposed massive resort that threatened to pollute the pristine waters of San Quintín Bay. One of the would-be developers was a U.S. realty firm, Century 21. "With our bay protected, we produce 1,200 metric tons of oysters each year," says Vicente Guerrero of Agromarinos, one of the largest oyster growers. "We employ 120 people. We are one of the main employers in the San Quintín area. And our jobs are permanent, not temporary."

Oyster farmers mainly raise two Japanese species, the Pacific and the Kumamoto. They used to depend on seed imported from Japan, thus risking the inadvertant introduction of alien "hitchhiker" species.

Top: The longline method of mussel aquaculture used in this project in Puget Sound requires good water quality.

Above: An oyster grower sorts Pacific oysters harvested from San Quintín Bay.

The oyster drill, a snail, established itself this way in the 1930s, and quickly set about feeding on bottom-grown oysters in California's bays. Now, however, Coast and others use oyster seed cultivated under controlled conditions in hatcheries in Washington State. By eliminating the need to import seed or broodstock from overseas, local hatcheries reduce the risk of alien introductions and transmission of foreign infections.

Efforts to protect coastal water quality are paying off for West Coast growers. With disease and pollution plaguing native oyster grounds along the Atlantic coast and the Gulf of Mexico, the demand for farm-grown Pacific coast oysters has been rising. To capitalize even more on clean growing areas, Puget Sound growers are now branching out to other shellfish species. They are cultivating the world's largest burrowing clam, the native geoduck (pronounced *gweeduck*), whose range extends into northern California. Wild stocks of this creature, which weighs up to 20 pounds, are under pressure from commercial divers and from illegal poaching rings, mostly for the Japanese market, where the geoduck fetches $10 a pound. Washington growers are also learning to cultivate a smaller oyster native to our Pacific coast, the Olympia, on a small scale.

Meanwhile, another form of eco-friendly aquaculture is flourishing amid the arid desert expanses of California's Imperial County. In the shadow of the Chocolate Mountains, Pacific Aquafarms raises tilapia, a tropical freshwater fish native to Africa, in self-contained ponds of geothermal water. The use of this warm water not only "reduces the demand for Colorado River water," says Aquafarms president Bill Engler, but also extends the growing season into the cooler winter months. Because tilapia is an herbivore and does well on feeds that use soybeans and other plant proteins, it costs half as much to feed as salmon and shrimp, which require feeds high in marine-animal proteins.

Down the road from Pacific Aquafarms, near the town of Niland, Fish Producers raises another natural herbivore, catfish, also in desert ponds. Although catfish growers in Mississippi and other southern states have been hit hard by cheaper imports of frozen basa fillets from Vietnam, (basa is a fish that tastes and looks like catfish) the cheaper imports have "no impact on us" according to George Ray of Fish Producers.

The desert growers sell their product live to some 100 Asian markets throughout southern California. Customers in these markets like their fish as fresh as possible. They even like to view their prospective meal live in display tanks before making a selection. Typically, the Asian markets have stocked their display tanks with Pacific rockfish. Now, however, with severe fishing restrictions making rockfish hard to get, the Asian markets are turning increasingly to farm-grown catfish, tilapia, and striped bass, another fish raised in desert ponds near the Salton Sea. Fish Producers and Pacific Aquafarms supply a combined two million pounds of live fish each year to the Asian markets. As Pacific rockfish winds up in the "avoid" column on environmental seafood lists, farmed catfish, tilapia, and striped bass earn a place on the "best choice" column.

Also in these display tanks and on "best choice" lists is farmed sturgeon raised in California's Central Valley. For 15 years, Ken Beer of the Fishery has been raising white sturgeon, a California native, in tanks on his 600-acre farm complex 20 miles south of Sacramento. By reusing well water pumped into and then, as wastewater, out of his sturgeon tanks, Beer also raises catfish and carp. The wastewater is carried by canal from the tanks into the catfish and carp ponds. In some ponds, catfish and carp are raised together in a process called polyculture. The carp subsist on algae nourished by nutrient-rich catfish wastes. "The polyculture ponds have the highest production rates, but they are harder to harvest by net. You have to sort out the different fish species," explains Beer. Wastewater that remains after the trip through the tanks and

A geoduck (pronounced *gweeduck*) clam grown in Puget Sound by members of the Puyallup tribe

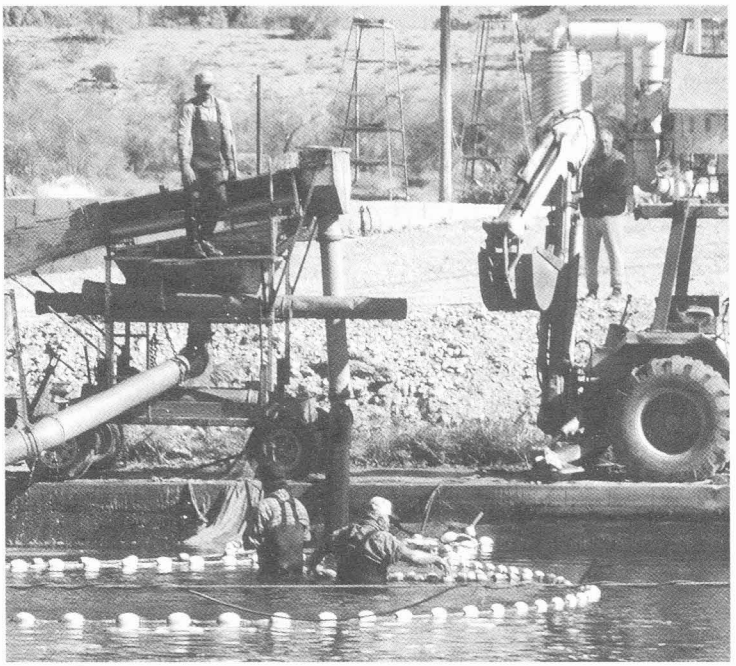
the ponds is used to irrigate and fertilize nearby corn and alfalfa fields. Besides selling to Asian markets, Beer sells his sturgeon to processors that distribute to restaurants.

More recently, in an agreement with nearby Stolt Sea Farms, Beer has been producing caviar from eggs harvested from his mature female sturgeon. Currently, his sturgeon produce about three tons of caviar a year, which Stolt processes and markets. (We will revisit Stolt below.) California's farmed caviar now competes with imported Caspian Sea caviar that is produced from endangered wild stocks. Articles in *Gourmet* magazine and the *New York Times* have mentioned California farmed caviar as an eco-friendly alternative to the imported version. In San Francisco, upscale restaurants such as Jardinière will only serve the farmed roe. Russian caviar producers can expect increased competition. "In the near future, California growers expect to produce 75 tons of caviar, which is roughly equal to the amount the United States imports," says Beer.

One problem plaguing fish ponds (and fish hatcheries) is predation by birds. Pursuing fish is, of course, natural behavior for some of our most popular and visible seabirds and shorebirds. Besides sharing in part of the fish crop, the birds can carry diseases and parasites that afflict the remaining fish. They also pick up and transmit pathogens among fish farms. To deter avian visitors, Beer uses scarecrows and stretches lines of plastic twine across his ponds. "Most birds zero in on ponds with our smaller juvenile fish so we concentrate our control efforts on these ponds," he says.

Double-crested cormorants, which tend to outwit "bird-dissuasion" tactics, are enjoying a population boom stimulated in part by the nationwide proliferation of nutritious fish ponds. Beer has a federal permit to shoot up to 50 cormorants a year if other control methods fail. (In 13 southern states, catfish farmers no longer need to obtain such permits from the U.S. Fish and Wildlife Service. The Service estimates that cormorants here consume about $20 million worth of catfish fingerlings each year.)

Land-based fish culture is an ancient practice, in which China has long been the leader. It has been raising fish in farm ponds and flooded rice paddies and dealing with cormorants for centuries. (Rather than shooing the seabirds away, Chinese fishermen have trained cormorants to dive underwater after prey and return their



Top and center: Farmed catfish, sturgeon, and tilapia are replacing threatened California rockfish in Asian markets.

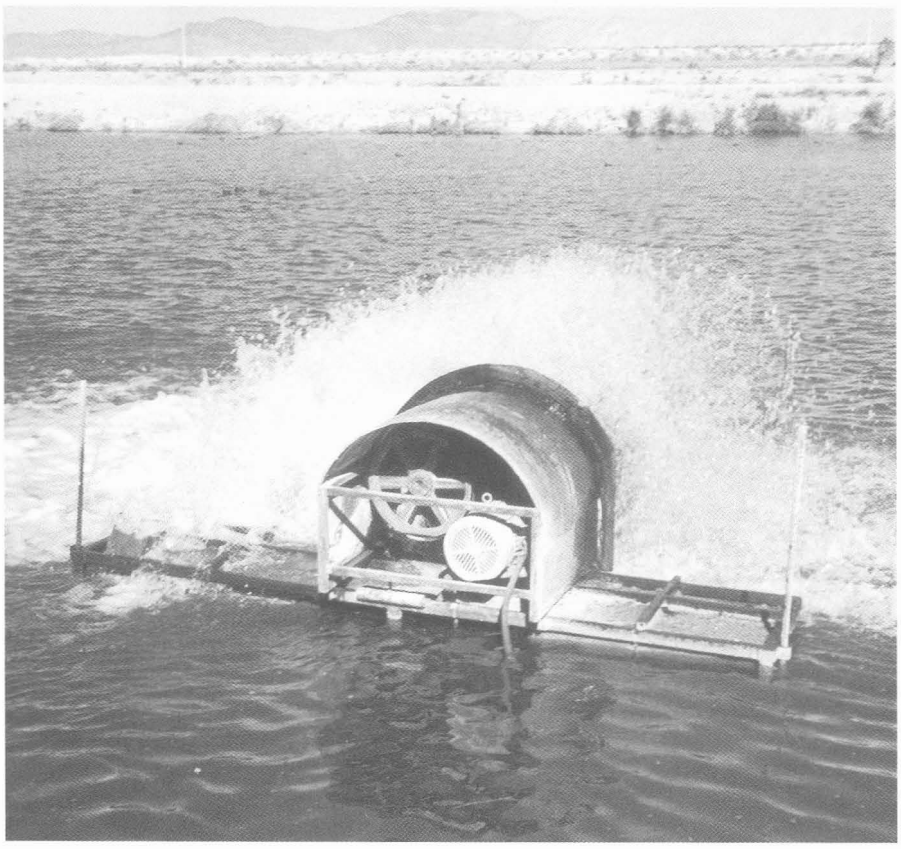
Bottom: Harvesting farmed tilapia at Pacific Aquafarms

catch to their human handlers.) Today 65 to 70 percent of the world's annual aquaculture production is in China.

Taking a cue from China's experience, several U.S. states besides those already mentioned are learning to become players in aquaculture. Landlocked Arizona is growing saltwater shrimp in desert ponds. Growers there have learned to acclimate Pacific white shrimp to moderately saline groundwater. The shrimp pond effluent is then used to irrigate olive and citrus groves, instead of winding up in coastal waters. The isolated nature of the desert ponds and use of pathogen-free broodstock helps these growers avoid the disease outbreaks that plague coastal shrimp growers. The Aquatic Pathology Laboratory at the University of Arizona has assisted growers in developing pathogen-free stocks. To extend the growing season into the winter, the Laboratory is developing a pathogen-free coldwater shrimp stock originally imported from China.

Kentucky encourages its farmers to grow catfish, tilapia, and freshwater shrimp in ponds, as an alternative to growing tobacco. And in Florida, saltwater shrimp ponds are popping up next door to inland citrus groves and sugarcane fields. Using pathogen-free groundwater pumped up from limestone strata, OceanBoy Farms is producing a million pounds of shrimp annually. One enthusiastic OceanBoy customer is Wegman's, one of the state's large supermarket chains. David McMahon, a former Army ranger and investment banker, is principal investor and CEO of OceanBoy. He stocks his shrimp ponds with tilapia that graze on plankton nourished by shrimp effluent. He is also working with a major feed company to develop a shrimp feed that contains no marine-animal protein. (Soybean growers in the United States would benefit handsomely if plant protein displaced fishmeal in feedstocks.) McMahon's goal is to become owner-operator of the largest shrimp farm in the United States by 2003.

This aerator maintains oxygen levels in a catfish pond in the Imperial Valley.



Land-based Fish

Some of the biggest investors in salmon net-cage culture are beginning to appreciate the advantages of land-based aquaculture. As farmed salmon production soars and salmon prices decline, salmon growers find themselves in a financial squeeze. Stolt Sea Farms, a subsidiary of the Norwegian conglomerate Stolt-Nielsen, operates a global network of salmon farms. Because of the price squeeze and disease outbreaks in its farms in Canada, Maine, and Chile, Stolt Sea Farms reported a loss of $11 million during its second business quarter in 2002. However, its sturgeon farm venture near Sacramento is turning a modest profit. (On its website, Stolt extols its farmed sturgeon caviar as an eco-friendly alternative to Caspian Sea caviar.) Also doing well is a tank farm in Spain that grows a premium marine flatfish, turbot. To offset its big-time losses on salmon, therefore, Stolt plans to expand its land-based farm ventures.

A high-tech version of aquaculture promises to encourage the shift to sustainable land-based fish farms. In an industrial building in Huntington Beach, Scientific Hatcheries produces up to 20 million fish a year in a closed-cycle or recirculating system. In this system, water flows through fish-growing tanks and then into biofilters that cleanse the water of fecal material, feed particles, and other pollutants; the purified water is then re-oxygenated and returned to the growing tanks. A recirculating system conserves water, avoids wastewater discharges, and minimizes the transmission of disease. By being indoors, this system

avoids the problem of fish-eating birds. The system, however, requires more energy than pond culture. To help pay for rising energy bills, Scientific Hatcheries specializes in a niche market. "We raise ornamental fish for the aquarium trade and small fish used in research and science education," explains owner Dallas Weaver. What happens to his indoor fish crop during a power blackout? "We have an emergency system to pump oxygen into the tanks to keep our fish alive," says Weaver.

Closed-cycle systems are being used worldwide to raise seafood that fetches a premium price. In the Netherlands, growers raise marine eels, a European delicacy, in closed-cycle systems. In Australia, growers have adapted the Dutch system to raise a popular saltwater fish, the barramundi. In June 2002, Agrimarine Industries of Campbell River, British Columbia, sold its first harvest of salmon raised in a land-based, closed-cycle system to a supermarket chain on Vancouver Island. The 28,790 tank-raised salmon fetched a premium price—20 percent more than salmon raised in ocean pens. In California, UC Davis researchers are rearing juvenile California halibut in a closed-cycle system. A larger prototype system that could foster commercial culture of this popular fish will be built at the UC marine laboratory on Bodega Bay in 2004, according to UC Davis Professor Douglas Conklin. The environmental advantages of closed-cycle systems even impress leading seafood buyers. Bill Herzig, a vice president of Darden Restaurants (the Red Lobster chain), writing in a trade publication, the *Advocate* (August, 2000), observed, "It would appear that an industry evolution toward closed systems is the solution to eliminate pollution and reduce the risk of disease."

Regulatory reforms that crack down on the environmental shortcomings of marine aquaculture will soon make closed-cycle systems and pond culture even more competitive. The Environmental Protection Agency is developing national guidelines to regulate aquaculture discharges into our waterways. Some governments are even putting up the "Not Welcome" sign to salmon net-pen operations. In California, commercial salmon farming is banned by law in the Smith River watershed. Elsewhere, no suitable sites have been identified that do not conflict with existing uses such as recreation, navigation, and fishing. As a result, there are no commercial salmon pen operations in the state. To protect its wild salmon stocks, Alaska has enacted a total ban on such operations. The Pew Oceans Commission, an independent group of leaders in marine policy, is planning to release a report in early 2003 that will recommend policies to better protect marine life. The Commission chair is Leon Panetta, a former California congressman and White House chief of staff. One draft recommendation being considered by the Commission is development of national standards to ensure that marine aquaculture does not jeopardize natural ecosystems. Pending development of these standards, a nationwide ban on new pen operations would be instituted. Other draft recommendations would encourage development of closed-cycle systems, polyculture systems that reduce nutrient loading, and feed substitutes for fishmeal and fish oil.

Aquaculture officials say that tighter regulatory standards on U.S. growers will only lead to more imports of cheaper seafood from countries without such standards. Another draft recommendation being considered by the Pew Commission would have the United States seek modifications in international trade agreements such that an importing nation could bar trade in aquaculture products that are not grown in a manner consistent with that nation's own environmental regulations. Under current global trade rules as propounded by the World Trade Organization, nations can block imports based on product safety (contaminated seafood) but not product processes (habitat damage and coastal pollution). By being able to apply environmental standards to the seafood it imports, the United States—which currently brings in $10.1 billion worth of fish and shellfish each year—can play a more constructive role in encouraging sustainable fish production practices at a global level.

As America's taste for seafood expands, so does the need for sustainable aquaculture that can help meet this demand. As shellfish growers along the Pacific coast and fish growers in the desert demonstrate, we can grow healthy seafood without sacrificing critical habitat and polluting our waterways. ■

Wesley Marx enjoyed barbecuing live oysters from San Quintín Bay on an impromptu beachside grill while preparing this article. He is author of The Frail Ocean, *rev. ed. 2000. His e-mail address is wmarx@primenet.com.*

Top: Vicente Guerrero holds oysters grown on longlines in San Quintín Bay.

Bottom: A San Francisco diner enjoys California-farmed oysters.

International Year of Ecotourism

JIM KING

On the Road to Guerrero Negro

We were up and out in the predawn dark onto a humming San Diego freeway, bound for central Baja California and worried about obtaining a tourist card at the border at 6:00 a.m.—they're now required for trips beyond the border cities, a requirement enforced at checkpoints all along the peninsula by soldiers with rifles. At the San Ysidro Gate we were shuffled among various offices for 30 minutes until, cards in hand, we were free to hit the road, passing long lines of Mexican commuters going to work in San Diego.

DAVID M. BARRON

Herring gull

I was traveling with friends to see gray whales halfway down the Baja California peninsula, but it was the road trip, more than the destination, that had prompted me to come. I was looking forward to camping in the desert in winter, and seeing something of Mexican culture, which is such a vital part of our own culture here in California Alta. I was also curious about the landscape. Maps show mountains that rise from the sea, natural harbors, and ruins of old settlements. Although I had been working for years in the San Diego border area, I had never been beyond Tijuana and Ensenada. The rest of the 800-mile-long peninsula was terra incognita to me. Our five-day journey would add a thousand miles to the 330,000 already recorded on my friend's old Montero.

Our destination was Laguna Ojo de Liebre (Eye of the Hare Lagoon), one of several Mexican nurseries for the gray whale and site of a simple ecotourist camp. It's some 440 miles from San Diego—one long day's drive—in the state of Baja California Sur. Known to most norteamericanos as Scammon's Lagoon, it is part of a large estuary that opens to a great arm of the Pacific, the Bahía de Sebastian Vizcaíno. Of the estimated 25,000 gray whales that migrate along the West Coast, some 900 were believed to be in residence here this February, including lots of moms and calves.

Some in our group slept most of the way, but I kept my eye on the road. Beyond Tijuana's buzz, a limited-access toll highway serves a jumble of development southward almost to Ensenada. The coastal terraces are filling up with small towns and suburban enclaves, including lots of modest retirement homes inhabited by U.S. citizens. Lobster restaurants compete for billboard space with real estate.

On one ocean-facing ridge stands a string of ramshackle houses, some made of discarded plywood and sticks, all with bright green gardens and pastures. They speak of another world, one of making do with limited means. Our driver, an archaeologist who has spent much time in this region, pointed out that the greenbelt parallels the open wastewater canal that traverses the ridge above the highway and leads to the regional treatment plant. Local residents are irrigating crops and grazing land with Tijuana wastewater!

Just north of Ensenada, a steep mountain ridge sweeps down to the sea at El Mirador, toward Todos Santos Bay and Punta Banda. The cliffs, the panorama, and a rustic beach camp all hint at the majesty farther south. There has been a surge of population in the Ensenada area since I visited just four years ago. By this time we were moving through

BOB GARRISON

Ecotourism and Marine Mammals —Too Much of a Good Thing?

Marine mammals enjoy more protection in U.S. territorial waters than anywhere else in the world—but that may not be enough protection as ecotourism begins to touch these creatures in ways never considered when the Marine Mammal Protection Act (MMPA) of 1972 was enacted.

That legislation brought an end to commercial whaling in U.S. waters and set the framework for the laws and guidelines that protect marine mammals today. At that time, whale watching and ecotourism were just beginning. Today, whale and dolphin watching alone has grown to a $1 billion industry involving more than 80 countries and territories and over nine million participants annually.

Wildlife viewing and ecotourism could play an important part in the work of providing long-term protection for the world's wildlife and wild places. The National Marine Fisheries Service, which implements the MMPA, takes its job very seriously. Yet some disturbing trends are forcing regulatory agencies, the tourism industry, and ecotourists themselves to

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dense morning traffic. San Diegans come by the busload to sample ceviche, mariscos, margaritas, and local arts and crafts.

South of town Highway 1 narrows, and we began to pass parched ranchland and hardscrabble rural settlements. At San Telmo a bedraggled sign by a rutted road announces the Parque Nacional Sierra San Pedro Mártir some 40 miles to the east. Picacho del Diablo, one of Baja California's several "sky islands," is in this park. On this 10,154-foot peak isolated flora and fauna have formed distinct ecological communities at various elevations. Aspen and pine grow here, far from others of their kind. I

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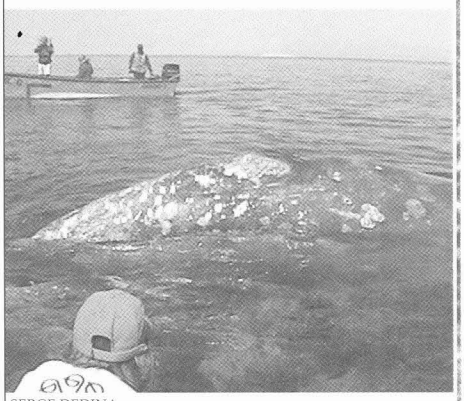


SERGE DEDINA

Above: A friendly gray whale in San Ignacio Lagoon, Baja California

Below: Bottlenosed dolphins play in Bahía de los Angeles, Baja California, where a major development is planned.

DAVID M. BARRON

BIRDS, WHALES, AND WETLANDS

Wildlife Festivals through March 2003

Morro Bay Winter Bird Festival, January 17–20, 2003, Morro Bay; (800) 231-0592 or www.morro-bay.net/birds. See some of the 200-plus bird species in this outstanding birding area on the Pacific Flyway.

Cabrillo National Monument Whale Watch Weekend, January 20–21, Point Loma, San Diego; (619) 557-5450 or www.nps.gov/cabr. Speakers, exhibits, presentations, and festivities at an enclosed whale-watching station.

Northern San Francisco Bay Flyway Festival, January 24–26, Mare Island, Vallejo; (707) 557-9816 or www.sfbayflywayfestival.com. Celebrate the annual return of a million shorebirds and hundreds of thousands of waterfowl that migrate through or winter in the San Francisco Bay Area.

Snow Goose Festival, January 25–26, Chico Masonic Center, Chico; (800) 852-8570 or www.chicochamber.com. View flocks of lesser snow geese and other waterfowl that winter in Central Valley wetlands. Discover this unique habitat and its varied wildlife through workshops and field trips led by birding experts, educators, and ecologists.

San Diego Bird Festival, February 6–9, San Diego; (619) 516-0139 or www.sandiegonaturefestivals.org. Celebrate southern California's diverse habitats and wildlife with field trips to see more than 170 pelagic bird species and rare coastal sage scrub habitat.

California Duck Days, February 14–16, Veterans Memorial Center, Davis; (530) 758-1286 or www.duckdays.org. Experience the sights and sounds of 10,000 snow geese in the Central Valley through over 40 field trips and activities.

Salton Sea International Birding Festival, February 14–17, Barbara Worth Country Club, Holtville; (760) 344-5FLY or www.imperialcounty.com/birdfest. Learn about the Salton Sea and its arid habitats that host more than 100 bird species.

Bald Eagle Conference and Festival, February 14–16, Oregon Institute of Technology, Klamath Falls, Oregon; (800) 445-6728 or www.eaglecon.org. Celebrate the largest concentration of wintering bald eagles in the lower 48 states. Workshops, speakers and field trips to Klamath Basin National Wildlife Refuge, Lava Beds National Park, and Crater Lake National Park.

WhaleFest, February 22, Ventura; (800) 333-2989 or www.ventura-usa.com. Educational booths, presentations, Chumash Indian cultural displays, art work, and marine life touch tank make this celebration of the gray whales' winter migration a family event.

Mendocino Whale Festival, March 1–2, Mendocino; (800) 726-2780 or www.mendocinocoast2.com. Excellent opportunities to watch whales traveling south to their mating and calving lagoons in Mexico.

Wild on Wetlands Weekend, March 8–9, Los Banos; (800) 336-6354 or www.losbanos.com/wow.htm. Discover this Grassland Ecological Area in the Central Valley and view many migrating bird species as well as rare vernal pool plants.

Celebration of the Whales, January–March, Channel Island Harbor; (800) 269-6273 or www.oxnardtourism.com/whatsnewwhales.html. An eight-week celebration of the gray whale migration features daily excursions and activities for all ages, culminating in a Sunday festival in March.

Fort Bragg Whale Festival, March 15–16, Fort Bragg; (800) 726-2780 or www.mendocinocoast.com. Lighthouse tours and excellent whale-watching opportunities.

Santa Barbara Whale Festival, March 28–30, Santa Barbara; (805) 897-3187 or www.sbwhalefestival.com/whale. Learn about the 27 species of cetaceans that travel through the Santa Barbara Channel. Enjoy food, music, and hands-on activities.

Below: J. Nichols of Earthwatch Institute holding a black sea turtle, Baja California

DAVID M. BARRON

GUERRERO NEGRO *continued from page 29*

looked carefully at the junction, as I intend to go up this mountain someday. My guide commented that he and the Montero had been there, and that the ascent is not for the faint of heart.

Onward Highway 1 leads to the Valle de San Quintín, where many immigrants from the mainland have recently settled and developed a substantial agricultural community, irrigating crops with water drawn from the local aquifer. Alas, I've since learned that saltwater is now invading the groundwater here and that these settlers' dreams may vanish soon.

South of San Quintín, the familiar coastal sage landscape of our southern counties and northern Baja California yields to the sere lands of the Vizcaíno desert. Without roadside call boxes and short on gas stations or cafés, the road is empty for mile upon mile. Although the trans-peninsula highway is relatively gentle on tires, the side roads still provide a true "Baja road test," and tire troubles remain a big part of the Baja California experience. Where there are settlements there are lanteras (tire shops). At a few crossroads, gas is sold from five-gallon containers by enterprising locals aware that people will wander too far off-track and miscalculate their fuel capacity. At the highway junction for Bahía de los Angeles gas is dispensed this way at an abandoned PEMEX station and restaurant. The desert wind whistles through its empty shell.

Too far south for our Alaska-born winter rains and out of range for most of the southern monsoon, the Vizcaíno desert is dry, but this year it is bone dry. Slope, aspect, elevation, and proximity to the

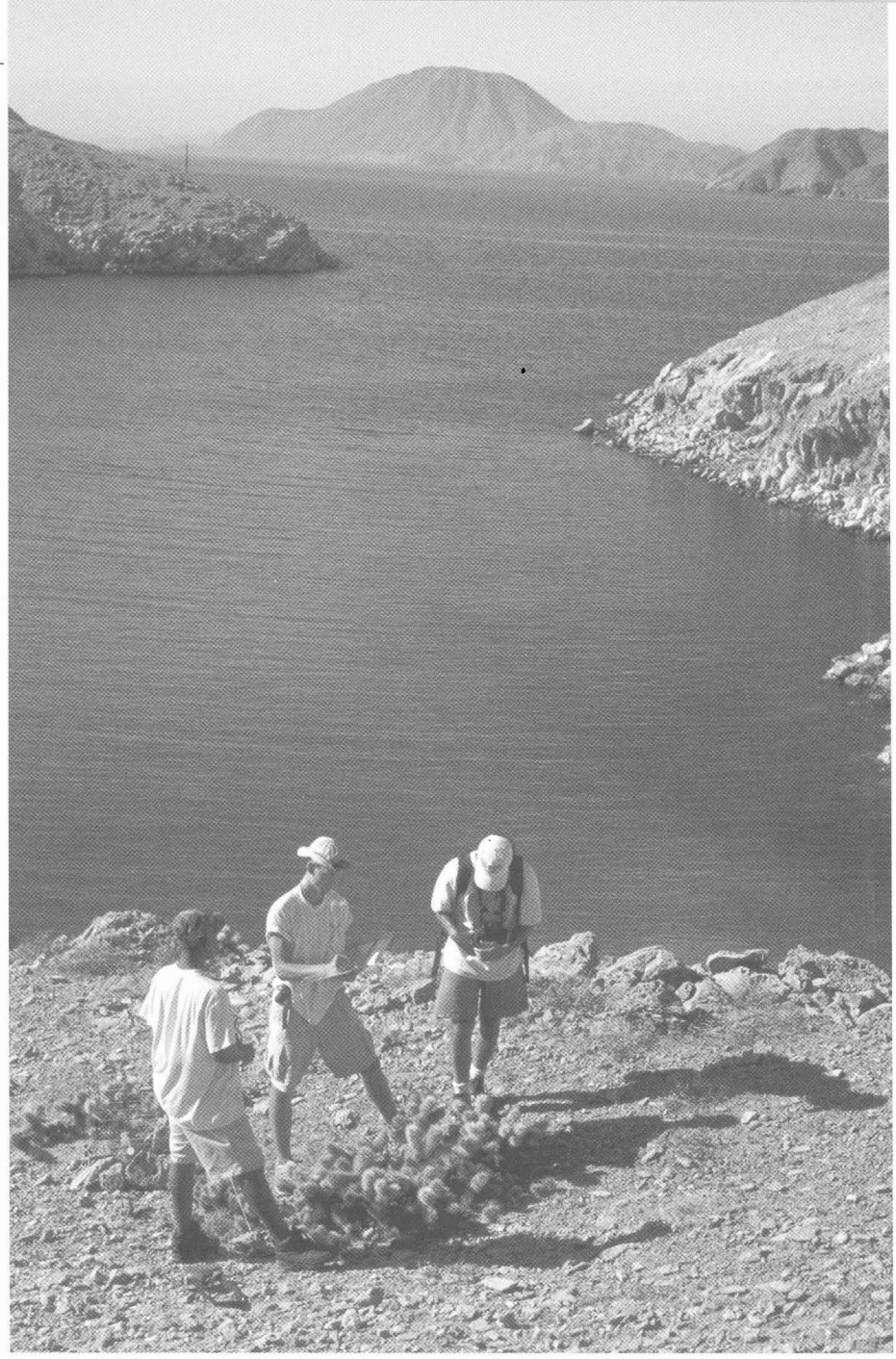
ocean mean everything here, where nature surprises us with exotic plants including elephant trees, giant cardon cactus (similar to Arizona's saguaro), and a distinctly blue fan palm in the occasional riparian canyon. But these are the exception along this long desert highway.

Stir-crazy and bent to the shape of the seats, we arrived at Guerrero Negro's army checkpoint just as the sun was setting. Our tourist cards got us through inspection, and soon we were setting up camp in the breezy night. The total blackness beyond concealed the austerity of the place, pressed hard between ocean and desert.

Morning light revealed the vast landscape, and the largest estuary south of San Francisco Bay. Before us lay mile upon mile of calm open water, the opposite shoreline backed by hazy mountains. Hundreds of shorebirds were wandering the beach flats, and far out over the water we saw the unmistakable spray of spouting whales. To our delight, there was a café at the whale camp serving tasty Mexican dishes and a wide selection of Mexican beers.

Whales jump and dive in the shallow waters of Ojo de Liebre, breaching the surface then plunging down, down. You have to get out on the water for a good look at them. We went out in a twelve-person skiff *(panga)*, and weren't disappointed. Close encounters with mothers and calves brought predictable glee. It was thrilling to be out in a boat in the fresh wind near these great creatures of the sea. Except for the salt works and tourist camp behind us, all views were of wild seascape, desert, and mountains. Giant dunes forty to fifty feet high line the lonesome beach, their sandy tops in constant motion as they guard the estuary from northwesterly gales. And such whales, these big grays! They paid us little mind. To me this was ecotourism at its best.

In the afternoon we left the camp to tour the area. Guerrero Negro is a desert outpost, a company town for the giant industrial salt works and, ironically, the tourist center for the Vizcaíno Desert Biosphere Reserve. It has the feel of an authentic workaday town—there's nothing touristy about it. Most everyone works in salt. Beyond the town and saltworks are only desert and vast undisturbed coastal wetlands. Laguna Ojo de Liebre lies to the west and south, and to the north are the pristine salt marshes of Estero de San José and Laguna Manuela. A road leads far out into the Estero to an abandoned wharf and lighthouse. Here we saw huge congregations of willets and marbled godwits huddled against the wind, and other birds seldom seen up north, like the reddish egret and little blue heron.



DAVID M. BARRON

A team of scientists from Earthwatch Institute surveyed spider populations at Bahía de los Angeles, 1997.

I visit the wild places that remain on the planet with every opportunity, for solace and inspiration. Just as we've sacrificed wilderness to build our great cities and farms, so goes much of the world. Humans are certainly encroaching on the wildness of Baja California too. The salt works at Laguna Ojo de Liebre are massive; I'm saddened to think what was lost there. A similar salt works was proposed for the next lagoon south, Laguna San Ignacio, by Mitsubishi Corporation and the Mexican government. That proposal was defeated by a

Escalera Ecológica?

As the Escalera Náutica moves ahead, a competing vision for this fragile and wondrous peninsula has been offered by Mexican poet Homero Aridjis and geographer Serge Dedina, director of Wildcoast, a binational group based in San Diego. They propose an alternative, Escalera Ecológica, to sustain natural ecosystems while improving the lives of local people.

"The Escalera Náutica represents 1950s thinking rather than 21st-century needs," Dedina argues. "It's a concept developed in Mexico City, without regard to local communities or natural resources." The alternative Wildcoast envisions would support ecotourism, sport fishing, and sustainable commercial fishing and would link the peninsula's protected areas with local, national, and international outfitters. "People in the U.S. love Baja California because it's rustic adventure land. Many people are willing to pay a lot to experience this," Dedina contends.

Campers, hikers, birders, whale watchers, surfers, mountain climbers, rock hounds, desert rats, and other low-impact tourists are in Baja California now. Yet aside from the green patrol (roving assistance units that ply the peninsula's highway looking for travelers in distress), it seems the government hasn't done much to bolster the existing tourist economy. There are few signs to help tourists, and information on where and how they might spend their dollars is skimpy too. It should be noted that "community development"—roads, sewage systems, solid waste management—enhances tourism too.

—*JK*

SERGE DEDINA

Above: Escalera Náutica construction site near Santa Rosalillita

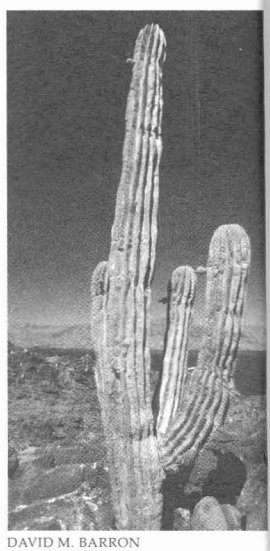
Right: Cardon cactus

Ernesto C. Enkerlin Hoeflich, president of the National Commission for Protected Areas of Mexico, said in late October that the location of all but "three or four" of the proposed Escalera Náutica developments was "not written in stone" and that the government is now "paying more attention to ecological considerations." Efforts are under way to shift the complex in the works for Bahía de los Angeles. "We do see a benefit to Escalera Náutica—if it's done right," he added. "It's an opportunity to regulate tourism and development."

coalition of local fishermen and Mexican and international environmental organizations (see *Coast & Ocean*, Summer 1997). That Herculean battle already stands as a landmark victory for the Mexican environment. Will San Ignacio be a model for other successful environmental protection efforts?

Unavoidably, we turned toward home after only four days in Baja California. Another long day's journey and we were back in San Diego, where there is now discussion of the Mexican government's new plans for developing Baja California tourism: the Escalera Náutica (Nautical Stairway), a series of 22 ports and marinas designed for the Yankee mariner, complete with hotels and golf courses, to be built on both the Pacific and the Gulf of California coasts of the peninsula. Private investment is expected to lead the way.

Now we understood the "Escalera Náutica" signs that had mystified us along the highway, and the ominous sight of a barge working offshore during a side trip to the remote coastal hamlet of Santa Rosalillita. Construction had already begun. At Bahía de los Angeles, a pristine and spectacular bay where sea turtles come to lay their eggs, a permit for dredging and filling the wetlands has already been issued (see sidebar).



DAVID M. BARRON

This big-scale development will inevitably destroy much of what my friends and I came for. And what would it do to the local people, I wondered, thinking of the communities near Acapulco and Cancún, which are struggling with pollution, shrinking water supplies, and other side effects of megatourism. On the long trip home I was inspired by what I had seen. Now I wonder about my next trip to Baja California and what I might find there. ■

Jim King, a project manager for the Coastal Conservancy, works in San Diego County's Tijuana Estuary and adjoining border communities.

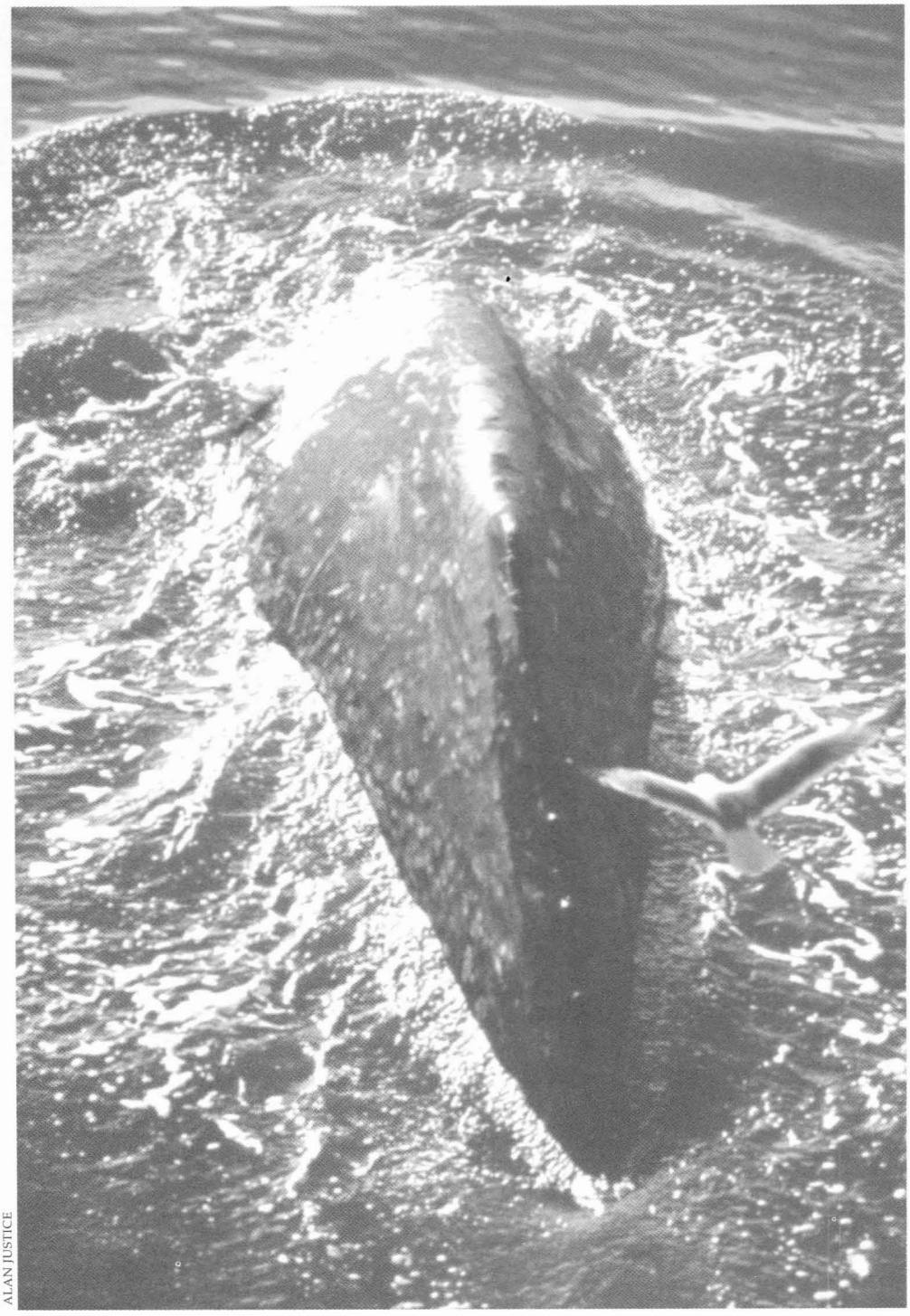
TOO MUCH? *continued from page 29*

ask whether ecotourism can be sustained at current levels without harming marine mammal populations. While it is currently unlawful to harass or feed marine mammals in the wild, that is not the only way animals living in coastal waters and on nearshore islands are adversely affected by friendly human visitors. For example:

- Sea kayaking, a popular activity along the California coast, may seem environmentally friendly, but harbor seals that rest on nearshore rocks, sandbars, and islands are sensitive to disturbance and will abandon their haulouts when kayaks approach within 50–120 meters. At one haulout alone, roughly one-third of all kayakers flushed seals.
- Guidelines for tour boats operating in U.S. waters help protect California gray whales from close encounters, but in their calving lagoons in Baja California tour boats frequently get close enough to allow people to touch the animals without violating any federal laws. Some guides and tour operators keep self-imposed limits on their distances from the whales, but most are more interested in pleasing their clients than protecting the whales.
- In Hawaii, groups of spinner dolphins enter shallow bays during the day to rest, socialize, nurse their young, and avoid predators. A growing number of people interested in swimming with wild dolphins converge on these resting areas. While it is illegal to have any interaction with spinner dolphins, limited law-enforcement presence and growing demand are reducing the dolphins' use of these resting areas.
- Pods of orcas living along the south coast of British Columbia and around Washington's San Juan Islands have attracted whale watchers (some 81,000 in 1997, paying $4 million). Scientists have noted such a significant decline in the region's orca populations in recent years that they have petitioned to have the orcas listed under the Endangered Species Act. While they are still studying the causes of the population decline, some fear increased boat traffic could be a contributing factor.

We face challenges when trying to connect people with wildlife, and these require improved coordination and communication between agencies and countries, more research on the impacts of ecotourism, stronger guidelines and regulations, and most importantly, education of people who come in close contact with marine mammals. In the end, the cumulative impact of many individual actions, expenditures, and votes can help raise the bar on optimum practices for the industry as a whole. ■

Bob Garrison owns a nature tourism planning firm based in Sacramento. He was previously responsible for wildlife viewing programs and aquatic education in the Department of Fish and Game. He may be contacted at rwg@inreach.com.



ALAN JUSTICE

A gray whale in San Francisco Bay, seen from the Dumbarton Bridge

Getting to the Coast

CALIFORNIANS LOVE the coast. We love its spectacular beauty, we love to hike over its bluffs and dunes, kick back on its sandy beaches, and play in the surf. All this is central to our heritage and identity as Californians.

One of the Coastal Conservancy's core purposes is to help people get to the shore and enjoy its varied pleasures. For 25 years we've worked with local communities to build trails, buy parklands, open beaches, construct parking lots and restrooms, preserve scenic open space, and reduce water pollution. Right now, with funding from Propositions 12 and 40—the parks and resources bond acts passed by the State's voters in 2000 and 2002—we're working harder than ever to open more of the coast to the public.

A key Conservancy goal is completion of the California Coastal Trail, slated to run along the coast's entire 1,100-mile length. This trail is now more than half completed, with segments open in every coastal county. We are working with Coastwalk, a nonprofit organization dedicated to the trail's completion, with the Coastal Commission, the State Parks Department, and many other public agencies and citizens' organizations to prepare routes and plans for all unfinished sections. The plan will be completed in early 2003 and submitted to the Legislature.

The Conservancy is also a key partner in building the San Francisco Bay Trail and the Bay Area Ridge Trail, which will one day encircle the state's largest estuary, running through the diversity of Bay Area environments—urban centers, ports, beaches, marshes, grasslands, and mountain forests. A little over half of each trail is now open. The San Francisco Bay Trail Project and the Bay Area Ridge Trail Council are overseeing the concentric trails' planning and construction, and volunteers from every community around the Bay have swung pickaxes and lifted shovels, often working with the California, East Bay, Marin County, and San Francisco Conservation Corps and other organizations to put the trail in place.

Even in places where new access is a tough proposition, we have success stories to tell. In Malibu this year, the Conservancy funded the purchase of Lechuza Beach, the first new public beach in that city in 18 years. A year earlier, and after a 10-year effort, we helped open the first public stairway to Malibu's Escondido Beach.

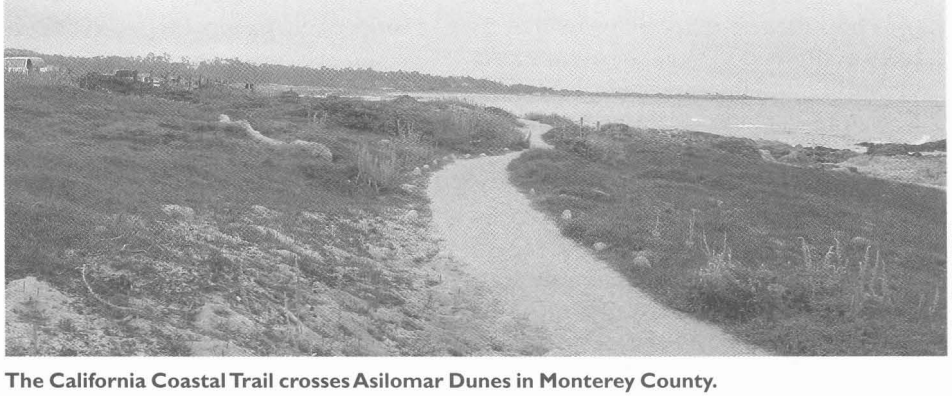
There is no time to lose. California's population is growing fast, and with it the demand for access to beaches and coastal parklands. Recognizing this, within the last year the cities of Laguna Beach and Oceanside agreed to accept and open several coastal accessways within their respective boundaries—easements originally made available to the State as conditions of permits granted by the Coastal Commission. The Conservancy is prepared to accept scores of similar access easements in other areas to ensure that the public does not lose opportunities to reach the beach. We will work with local communities to turn accepted easements into open pathways.

The obstacles blocking coastal access projects are many and varied. Some are physical: where steep and eroding ocean bluffs rise above rocky shores and surging surf, nature itself makes beach access impossible. Some are financial: buying beaches and building trails is expensive. California voters have demonstrated their willingness to put their tax dollars to work for this purpose, so we're moving ahead. Other obstacles are legal and political, raised by beachfront landowners who want the public to stay away, and local governments who side with them. The Conservancy will continue grinding away at this opposition.

What's in the future? The Conservancy intends to open new beaches and pathways wherever we can. We will continue to improve existing accessways so that they can be used by wheelchair riders and others with impaired mobility, and are more enjoyable to the public in general. We will work with our partners to complete the Coastal Trail, the San Francisco Bay Trail, and the Bay Area Ridge Trail—not tomorrow but piece by piece—and to build other trails that connect to these systems. We will continue to foster the efforts of local communities to expand public access to California's shoreline.

The coast belongs to the people of California. It's only right that they should be able to get to it and enjoy it at its best. ■

Sam Schuchat is the executive officer of the Coastal Conservancy.



CARLA CHENAULT

The California Coastal Trail crosses Asilomar Dunes in Monterey County.

COASTAL CONSERVANCY NEWS

PHOTOS THIS PAGE COURTESY EBRPD

RECENT COASTAL CONSERVANCY ACTIONS

THE COASTAL CONSERVANCY met in Huntington Beach on September 26 and approved projects in all coastal regions and on San Francisco Bay. Much of the funding for these projects was made available through Propositions 12 and 40, the parks and resources bond acts passed by voters in 2000 and 2002.

Among projects approved and funded are these:

BLACK DIAMOND MINES PRESERVE

CALIFORNIA'S LARGEST coal field lies near Suisun Strait in Contra Costa County. In the last half of the 19th century and the early years of the 20th, 13 mines were active here, supplying industry and home needs in the San Francisco Bay Area. The mines were closed after higher-quality coal became available from Washington State and oil began to supplant coal as an industrial power source. The 5,717-acre Black Diamond Mines Preserve was created in 1974. Managed by the East Bay Regional Park District, it allows today's Californians to look at a chapter of the region's history.

This preserve includes the Hazel-Atlas Mine, which produced silica sand for glass making and sand for steel casting from the mid-1920s to the mid-1940s. It also includes the Rose Hill Cemetery, where Protestant mining families are buried.

To enable the East Bay Regional Park District to make needed improvements, the Coastal Conservancy approved $522,050 in Proposition 12 funds. Of the total, $492,500 will be used to stabilize mines for public safety, to add to museum exhibits, and to increase visitor-serving capacity.

The remainder, $29,550, will be used to restore damaged graves and gravesites, and to survey the cemetery with ground-penetrating radar to identify undiscovered gravesites and historical artifacts. The Park District is contributing $20,000.

Top photos: Rose Hill Cemetery

Left: Inside the Hazel-Atlas Mine. See www.ebparks.org for information on tours.

MARTINEZ WATERFRONT

THE CITY OF MARTINEZ, in Contra Costa County, hopes to reinvigorate its waterfront by building new boat-docking facilities, restoring existing facilities, and making other improvements in keeping with its Waterfront Marina Master Plan. It also intends to upgrade trails and bike paths to connect to regional trail systems, including the San Francisco Bay Trail. First, however, the City must protect its public plaza and marina from flooding during storms and high tides. To help pay for this project, the Coastal Conservancy approved $250,000 in Proposition 12 funds for the construction of a 433-foot shoreline retaining wall. Construction is expected to begin in spring 2003.

BAY AREA RIDGE TRAIL

TO ENABLE THE Bay Area Ridge Trail Council to dedicate 11 miles of trail in Santa Clara County, the Conservancy authorized the Bay Area Ridge Trail Council to use $175,000 in Conservancy funds for the purchase of two properties in the Sierra Azul Open Space Preserve southeast of Los Gatos.

The Midpeninsula Regional Open Space District, which owns and manages the preserve, will purchase the two properties, adding $175,000 of its own funds to the Conservancy's funds, which were made available through Proposition 12.

The two privately owned properties total 64 acres and are surrounded by preserve lands. Both are on the Ridge Trail, which has been open informally along this stretch but has not been officially dedicated because permanent public access could not be guaranteed. The Conservancy previously granted over $3 million from Proposition 12 funds to the Ridge Trail Council, subject to Conservancy approval of their use for specific projects.

The two parcels offer views of Mt. Umunhum, Mt. El Sombroso, Lexington Reservoir, the Bear Creek Redwoods, and other open space lands. They contain evergreen forest, scrub oak, and chaparral that are habitats for mountain lions, coyotes, deer, and bobcats. The Sierra Azul Open Space Preserve contains almost 15,500 acres. Limited access to its Mt. Umunhum portion is available from Mt. Umunhum Road. Hikers are asked to contact the open space district for more information before visiting.

More than 230 miles of the proposed 400-mile Bay Area Ridge Trail are now open to the public. The nonprofit Bay Area Ridge Trail Council promotes the trail's completion and organizes a network of volunteers to help plan, design, construct, and maintain segments of the trail. Contact the Council at (414) 561-2595 or www.ridgetrail.org. The Midpeninsula Regional Open Space District acquires and preserves open space lands to create a regional greenbelt. Through district purchases, the scenic backdrop of midpeninsula communities is being permanently preserved. Contact the District at (650) 691-1200 or www.openspace.org.

SAN FRANCISCO BAY TRAIL

THE CONSERVANCY authorized the Association of Bay Area Governments (ABAG) to disburse $88,000 of previously authorized funds for three San Francisco Bay Trail projects:

- $60,000 for an alignment feasibility study in Corte Madera, Marin County, to be matched by $15,000 from the Town of Corte Madera
- printing 5,000 copies of trail maps in six-map sets; these maps were updated with prior Conservancy funding and made consistent with maps in the Conservancy's *San Francisco Bay Shoreline Guide*
- $3,000 for 300 signs to indicate new Bay Trail segments. With approval of these projects, about $1 million remains of the $7.3-million block grant the Conservancy authorized to ABAG in December 2000 for Bay Trail projects.

STEELHEAD HABITAT IN SANTA BARBARA COUNTY

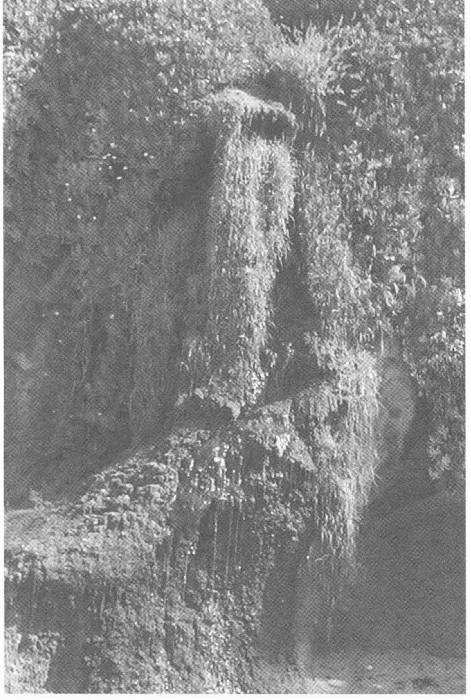
THE SOUTHERN CALIFORNIA population of steelhead trout, a federally listed endangered species, will benefit from habitat improvements to be undertaken on Mission Creek, Carpinteria Creek, and the Sisquoc River with the help of $240,000 approved by the Conservancy in September. The funding was provided by Propositions 12 and 40. The Community Environmental Council (CEC) will use the money to prepare plans and designs for habitat improvements in each of the three waterways.

On Mission Creek the CEC will work with the Mission Creek Restoration Partnership to design the restoration of a 1,200-foot reach on the grounds of the Santa Barbara Museum of Natural History. The stream channel has retained much of its natural character here, but habitat is compromised by stormwater runoff from the museum's parking lots and by non-native vegetation in creekside woodlands. Exotic plants will be replaced with natives, and erosion and runoff controls and educational exhibits will be installed. This work will also improve water quality downstream.

On Carpinteria Creek the CEC will work with the Carpinteria Creek Watershed Coalition. This creek was recently identified as offering the highest potential for steelhead recovery of all creeks between Point Conception and the Ventura County line. A road crossing that severely impedes fish passage will be removed, exotic plants will be replaced with natives, and erosion controls will be installed. The project site is on property owned by the Cate School and contains a century-old avocado orchard. The restoration will demonstrate techniques that can be used in other orchard properties in the county.

On the Sisquoc River the CEC will study habitat conditions and barriers to fish passage in the watershed, which drains into the Santa Maria River in northern Santa Barbara County. The primary purpose of the study is to identify fish-passage barriers for their possible removal. The Sisquoc River is one of the least altered steelhead streams in southern California, and its upper watershed contains high-quality spawning and rearing habitat. Removing barriers to fish migration would unite the upper and lower reaches of the river, greatly expanding available steelhead habitat.

The CEC is a community-based environmental organization active in Santa Barbara County since 1970. It is engaged in a wide range of environmental health programs, including watershed restoration, environmental education, trash recycling, community gardens, and sustainable energy.



COURTESY CITY OF LAGUNA BEACH

A drainpipe of still undetermined origin empties high on the seabluff in Heisler Park, causing erosion and undercutting below.

HEISLER PARK, LAGUNA BEACH

HEISLER PARK, which extends for half a mile atop seacliffs and down to beaches in the City of Laguna Beach, has been seriously damaged by bluff erosion. The Conservancy approved $225,000 in Proposition 40 funds to the city to design bluff protection improvements, expand visitor facilities, and improve pathways for use by people with impaired mobility. The city is matching the Conservancy's grant equally.

OTHER NEWS

PROJECTS FUNDED along the coast in September also include:

- To plan and develop projects throughout the North Coast Region, $95,000 to the Conservation Fund
- To assess steelhead trout habitat in the Santa Monica Mountains and to develop a strategic plan to implement the Santa Monica Bay Plan, $200,000 to California Trout, Inc.
- For the Wetland Recovery Project Small Grants Program, $30,000 to Environment Now
- To conduct an invasive and exotic fish-reduction program in the Cleveland National Forest in San Diego County, $50,000 to Trout Unlimited.

San Francisco Bay projects include:

- To build overlooks and public access improvements at three street ends along the Bay shoreline, $60,000 to the City of Richmond
- To acquire 1.64 acres along Baxter Creek in Contra Costa County, $350,000 to the City of El Cerrito
- For a study to identify means of providing passage for steelhead in lower Alameda Creek, Alameda County, $100,000 to the Center for Ecological Management and Restoration
- For planning related to San Francisco Bay salt pond restoration, $100,000 to the Conservation Fund.

View of the DeJoria Family Tuna Canyon Preserve in the Santa Monica Mountains. A major donation by the DeJoria family, and assistance from the Coastal Conservancy, enabled the Mountains Restoration Trust to acquire and protect 417 acres of sensitive wildlife habitat.

MOUNTAINS RESTORATION TRUST

CREEK ALLIES *continued from page 14*

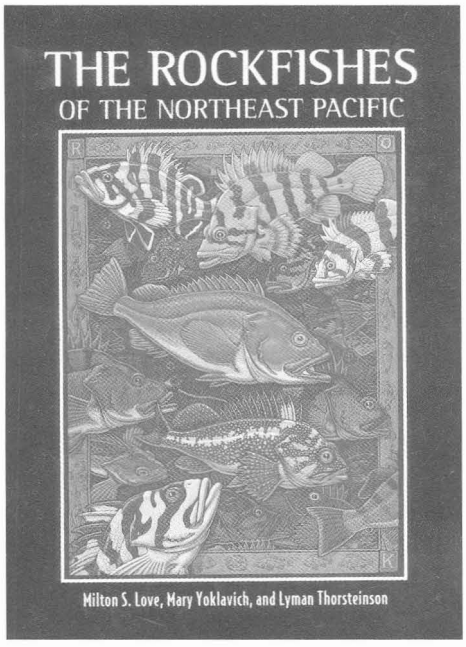
City officials and engineers from the Orange County Flood Control District attended, and new ideas gained currency, according to Kathie L. Matsuyama, senior landscape architect in the Watershed and Coastal Resources Division of the Public Facilities and Resources Department of Orange County. The planning process evolved into the Serrano Creek Collaborative Use Plan, a key objective of which was to keep the creek as natural as possible. Riprap would be necessary in some places, but native plantings, not grout, would fill spaces among the rocks.

The Plan led to the $2.79-million Serrano Creek Stabilization Project, which is designed to restore 1.1 miles of the creek in Lake Forest through the installation of innovative stabilizing features and planting of native riparian vegetation. Funding has been secured from city, county, federal, and state sources, including the Coastal Conservancy, which contributed $500,000 to the project in January 2002.

Meanwhile, Rayl and a group of business people and homeowners with properties near the creek formed the nonprofit Serrano Creek Conservancy to preserve and restore natural reaches, and to remove alien invasive plants and replace them with natives. They joined the city and county on the Stabilization Project, but even before it was finished they began to work on the ground. "These projects take years to pull off—funding, studies—and some people panic," Rayl explained. "I have construction equipment that I used for two restoration projects." At one spot where erosion had left a barren, almost vertical bank, the results are clearly evident: the slope has been compacted and reinforced with rocks, and native plants now grow on the bank.

All this, Rayl said, has had good coverage in the local press. Serrano Creek—though it may still be F19 on some maps—is now far more widely known and appreciated. Most of the Stabilization Project's restoration work has also been completed.

Matt Rayl's achievement has influenced flood control planning in Orange County, Matsuyama said. She loves to tell the story because "it shows that individual action can make a difference." ■



MEET THE ROCKFISHES

The Rockfishes of the Northeast Pacific, *by Milton S. Love, Mary Yoklavich, and Lyman Thorsteinson. University of California Press, Berkeley, 2002. 550 color illustrations, 100 black & white photographs, 120 line drawings, 75 maps, 414 pp., $60 (hard cover), $24.95 (paper).*

THE ROCKFISHES *of the Northeast Pacific* is interesting, entertaining, beautiful, and scientifically outstanding. It tells you everything you would ever need to know if you had an opportunity to talk rockfishes with the likes of Julius Phillips (1904–1995), the authority to whom the book is dedicated.

Every page stands out as a leaf of knowledge, and the volume is replete with excellent photographs, drawings, maps, tables, and graphs. If you wish to know the evolution, life history, location, or uses of these "inspired and magnificent" fishes, this volume is a must.

The paperback edition is an exceptional value, and the hard-cover copy (limited edition) is a must for the permanent library of anyone interested in fishes of the west coast of North America, ocean ecology, or clear and concise scientific information. The format of the book is handsome and very usable.

The almost 180 pages devoted to species accounts are wonderful. I must caution the reader not to evaluate a species range based solely on the map for that species; the text often contains significant qualifications. An example is Pacific Ocean perch *(Sebastes alutas)*, the extreme southern range of which is now defined by one observation "hundreds of miles" south of the former southern limit. Perhaps the next edition could color the primary range (abundance of 90 percent and greater) more clearly.

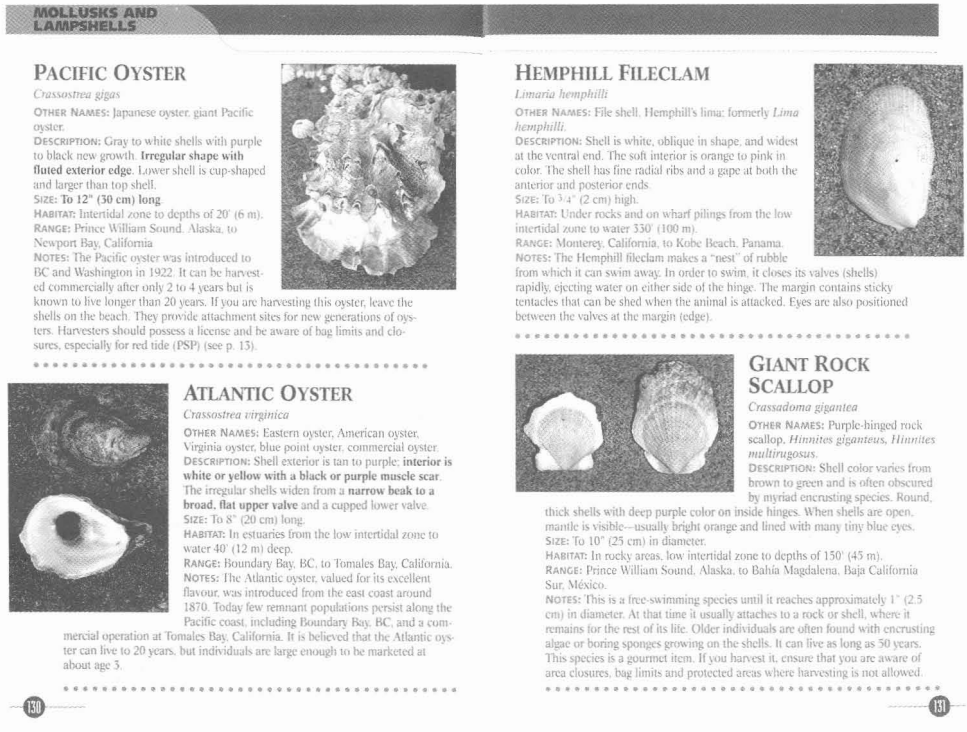
This volume is unequaled by other works on ocean fishes, anywhere! The scientific thoroughness is exceptional; the graphics, clear writing, and mix of humor and fact make it enjoyable and easy to read. Every page, including the front and back covers, is worthwhile. Obtain, read, learn, and enjoy.

Ed Ueber is the manager of the Gulf of the Farallones National Marine Sanctuary.

BEACHCOMBING, ANYONE?

The Beachcomber's Guide to Seashore Life of California, *by J. Duane Sept. Harbour Publishing, Madeira Park, British Columbia, 2002. 400 color photos, 312 pp., $17.95 (paper).*

THIS COLORFUL BOOK has become one of my favorite references in the short time it's resided on my desk. At last there's a resource that shows and describes the beautiful and intriguing life forms one finds on California beaches, just the way they look when you find them in the sand or observe them on rocks and in tide pools. Too often I've carried pocketfuls of shells home only to find that many were impossible to identify from available guides. This book solves that problem, and gives lots of information about the creatures that created and inhabited those shells. It also identifies seaweeds and other beach plants, as well as other animal phyla one might encounter—fishes, worms, sea squirts, moss animals, anemones, jellies, and sponges.



Well-organized, printed on high-quality paper, with color on almost every page, this guide is dense and sturdy, as if made for years of seaside use. A solid chapter on best beachcombing sites increases my eagerness to further explore our shores.

—*HMH*

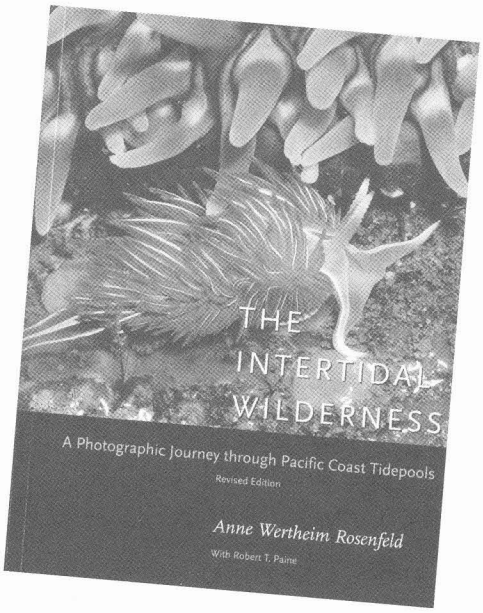
INTERTIDAL WILDERNESS

The Intertidal Wilderness: A Photographic Journey through Pacific Coast Tidepools, *revised edition, by Anne Wertheim Rosenfeld with Robert T. Paine. University of California Press, Berkeley, 2002. 119 color photographs, 185 pp., $45 (hard cover), $24.95 (paper).*

THIS BOOK STYLISHLY captures the beauty and dynamic nature of Pacific Coast seashores, with an emphasis on the Pacific Northwest. These are among the most diverse and physically impressive of temperate shores, and are graced by a remarkable diversity of marine life. Using extraordinary photographs and informative essays, Rosenfeld and Paine have collaborated to offer both an artistic and a highly educational representation of Pacific shores and marine life.

An informative first chapter introduces the reader to wave action and tidal flow, the distributional patterns of marine life, and the importance of ecological interactions. In ensuing chapters, *Wilderness* focuses on the processes of competition, predation, and recruitment, highlighting many of Paine's scientific contributions, before offering a unique discussion of color. The book's final and too brief chapter addresses marine conservation. Information needed to prepare the casual visitor for a trip to the tide pools, and short synopses of the types of shore life appear in the appendices, followed by a very good list of references.

Besides being artistic, *Wilderness* is filled with interesting and scientifically accurate information. Unlike many



books of this type, species are accurately identified, up-to-date nomenclature is employed, and a superb balance between plant and animal life is provided. Without tables, graphs, and fancy statistics, *Wilderness* explains complex ecological relationships and processes that shape the patterns of biodiversity on rocky shores. Clearly, the authors have fused art and science in producing a book of value to both knowledgeable students and the casual seashore observer.

Steven N. Murray is a professor of biology at California State University, Fullerton.

WETLAND LOSSES

Compensating for Wetland Losses Under the Clean Water Act, *by the National Research Council. National Academy Press, Washington, DC 2001. 348 pp., $49.95 (hardcover).*

THIS BOOK EXAMINES the adequacy of wetland science and technology for restoring and creating wetland functions and evaluates the effectiveness of the U.S. Army Corps of Engineers' compensatory wetland mitigation program under the Clean Water Act. The Council presents several recommendations on how to better achieve the "no net loss" goal, including determining appropriate mitigation on the basis of wetland function rather than wetland acreage.

—*Trish Chapman*

PESTS

Invasive Plants of California's Wildlands, *edited by Carla C. Brossard, John M. Randall, and Marc C. Hoshovsky. University of California Press, Berkeley, 2000. 133 color photos, 76 line illustrations, 79 maps, 360 pp., $29.95 (paper). Available as a PDF file on-line at www.caleppc.org.*

THIS BOOK SYSTEMATICALLY addresses the 78 species of invasive alien plants that the California Exotic Pest Plant Council (CEPPC) considers the greatest threats to biodiversity in the state. Photographs and line drawings of each plant, habitat photos, and text descriptions will help identify these species. Species accounts also describe the origins and habits of the plants, the problems they cause, methods for controlling or eradicating them, and ways to restore infested areas.

CONSERVANCY PUBLICATIONS

Available from the Coastal Conservancy:

- *San Francisco Bay Shoreline Guide* ($16.18 includes CA sales tax and shipping. Make checks payable to Coastal Conservancy.) Though published in 1995, this is still the most comprehensive guide to the Bay Trail and nearby shorelines.
- *A Wheelchair Rider's Guide: Los Angeles and Orange County Coast* (free)
- *Happy Trails to You: How to Accept and Manage Offers to Dedicate Access Easements* (free)
- *Limitations on Liability for Nonprofit Land Managers* (free)
- *Wetlands of the Los Angeles River Watershed: Profiles and Restoration Opportunities* (free)

BALANCED ROCKS DECRIED

Editor:

Usually, I really enjoy your magazine; however, I found the articles on rock-stacking horrifying. You see, last year I saw one of these creations on the American River. I had mixed feelings about it. Part of me thought it was cool. Part of me was offended that someone chose to rearrange what mother nature provided.

What really struck me about the rocks was how very very dangerous this sculpture was. I had to walk by it to get to where I was going. I was distinctly aware that a minor earthquake or just gravity could bring these large boulders down on my head or one could tumble onto my leg and snap it.

A couple years ago, I read a news clipping about a young boy in Castro Valley who was lying down on a creek bank. Suddenly, for no apparent reason, a rock had become dislodged, tumbled down, and cracked his skull. He died.

It seems to me that these sculptures are as dangerous as a landmine or a steeljaw trap. I'm shocked that you presented this subject so gingerly without regard to the safety of these works of art, as you call them. Such a treatment of this subject could encourage others to follow suit, creating hazards for animals and children.

Even a minor tremor could send a rock descending onto some child's skull. Yuck! I hope this doesn't catch on. Isn't nature just fine the way it is? Why do we have to constantly muck it up with evidence of our presence? This is just another muck job, in my opinion. Probably even as bad as, or worse than, spray paint graffitti. At least spray paint graffitti won't kill you.

Paulette Kenyon
Pleasanton

Yes, rocks can be dangerous. That's why Bill Dan keeps people at a safe distance from his sculptures and always takes them down before leaving the site. Other rock stackers would be wise to follow his example. As for "what mother nature provided," please note that he's working with riprap on an urban shore.

—Editor

BILL DAN

SAME ROCKS ENJOYED

Editor:

My family and I are big fans of the new park at the old Crissy Field. As it has developed, people have been finding ways to use it creatively without being destructive. Kite surfers there have been developing this new wonderful sport. Hundreds of volunteers have planted the newly created wetlands. The naturalist who explains the wonders of crabs and fish and habitats has added a richness. The opportunity to walk or bicycle on the bridge is quite special.

For us, watching Bill Dan do his wonderful feats of rock balancing has topped off great days at Crissy. There is elegance and beauty in his delicate, wondrous sculpture. He is so careful and respectful in his handling of the stones, returning them to nature when he is done, that his ritual leaves no mark on the life of the beach. Even his footprints are washed away by the tide. Seeing this man simply find the balance of the rocks is very beautiful and moving. He has created an art form that does not generate more stuff in the world to be saved, bought and sold, displayed and guarded. It is beautiful and transitory like the waves and the tides, a great addition to the life of the park. Bill Dan is a friendly, warm guy, open to the people who are drawn to be with him as he creates beauty.

How lucky we are that the park remains open to this kind of spontaneous free creativity.

Wendy Oser
Berkeley

The North Coast

Those picnics covered with sand
No money made them more gay
We passed over hills in the night
And walked along beaches by day.

Sage in the rain, or the sand
Spattered by new-falling rain.
That ocean was too cold to swim
But we did it again and again.

Gary Snyder (early 1950s)

"The North Coast" goes back to the days I lived in North Beach, the late 1950s, and at 2 a.m. at Gino and Carlo's when the bar was closing, somebody would say "let's go to the beach," so we would go pack up a few things and drive out to the Pierce Ranch, and walk down to McClure Beach, arriving at dawn, and then sleep in the sand until noon. . . .

—GS

Coastal Conservancy

CALIFORNIA COASTAL CONSERVANCY
1330 BROADWAY, 11TH FLOOR
OAKLAND, CA 94612

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