

CALIFORNIA

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coast & ocean

Muir Woods Revival
Chipping Concrete,
Finding Water

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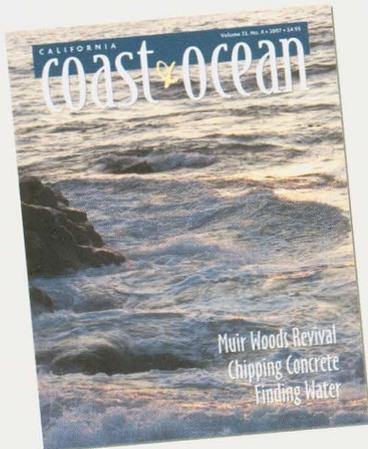
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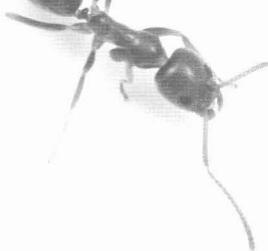
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Maybe Government Is Obsolete

NEARLY ANYONE SHOWING first-time visitors around the San Francisco Bay Area has heard amazement at the vast gorgeous parklands around the Bay. How did these scenic lands come to be protected against profitable development? In the recently published, inspiring memoir, *New Guardians for the Golden Gate: How America Got a Great National Park*, (University of California Press), Amy Meyer, with Randolph Delehanty, answers that question. She was a key leader in the citizens movement that made it happen. She notes that “the GGNRA came into being at a time when many people believed in the power of government to do good, and when there was great optimism about the opportunities—and the necessity—for individuals to contribute to the betterment of society, the nation, and the world.”

Yes, I reflected, back in the 1970s we believed we could get our government to act in keeping with its Constitutional mandate to “promote the general welfare,” which requires clean air and water, and the protection of our natural heritage. Congress responded by passing the necessary legislation. Some people look back on that time as almost utopian, yet it was also wartime. The U.S. withdrew from Vietnam only in 1975.

Now people in high places in Washington are trying to dismantle the Clean Air Act, the Endangered Species Act, and agencies established to protect our natural resource commons. They are squandering the nation’s natural wealth, pouring money into the hands of people who already have a surfeit, while taking it away from public services that benefit everyone else. We seem to have rulers now, while earlier we had government that collaborated with those governed. If so, our government has become obsolete.

As I ruminated along these lines, my mind began to fill with gloom the way lungs fill with carbon monoxide in a car rigged for suicide. Then, out of necessity (a friend visiting from far away was leaving the next

morning), I took the afternoon off to go for a walk along Pillar Point Bluffs. This is one of my favorite places, not much more than half an hour south of San Francisco, yet wild, with views of pelicans at eye-level and harbor seals lounging on the rocks below.

It was a gorgeous sunny day, after many gray ones. I breathed in the cool salt air, tasting its flavors. The tide was very low and the intertidal shale reefs lay exposed, like the rough hide of huge creatures emerging from underwater. We followed the path close to the edge, carefully because huge hunks of ancient compressed sediment had fallen recently and more were about to go. To the landward side, yellow dots of blooming mustard brightened the brown dry grassland. Each time I had been here I’d wondered: Is this land protected? Today the answer appeared in the form of a wooden sign: Nature Conservation Area. The Peninsula Open Space Trust. (The Coastal Conservancy had provided \$1 million toward the \$3.7-million purchase of most of the blufftop land, the rest came from POST.) What a relief.

We descended to the beach sheltered by Pillar Point. The sand was smooth, we saw no human footprints. My friend, filmmaker Andrej Zdravic, hunkered down between two intertidal boulders to record the surge of water and the crash of waves. He would be far from this ocean he loves in a few hours. The recording might later appear in one of his film poems. He has worked for years to find the voices of nature—water, forest, lava pouring into the ocean—and transmit them, without words, through his films. There are ever-fewer places where natural sounds can be heard without mechanical and human intrusions. Today, this is one of them.

The tide was turning. Before long it would submerge kelp, surfgrass, and seapalm, and the boulders covered with mussels. I saw no trash in the wrack line. This beach is within the state Fitzgerald Marine Reserve, offshore waters are protected within the Monterey

Bay National Marine Sanctuary, created recently by the government—national, state, and local—because many groups of citizens and government officials worked together intensely to make it happen.

I realized that my mind had become befogged and polluted by the propaganda against government that has been bombarding us for years. As I drove home, we passed the tunnel under construction through Montara Mountain. Caltrans had intended to put a highway through a state park here but citizens fought for this tunnel. It took more than 30 years, but the citizens won. Last month, in a similar struggle, citizens scored another victory when more than 3,000 people showed up before the Coastal Commission to oppose a tollroad that would have cut through San Onofre State Beach.

When fear rules, our vision shrinks. Californians’ devotion to their coastal treasures has continued. Some of those who once were activists are now in government jobs. There’s a photograph in Meyer’s book of Mia Monroe as a college student volunteer in 1978. She is now supervising ranger at the Muir Woods National Monument (see p. 16).

Many changes required for the survival and well-being of our society and the planet can only be made when people and governments work together. Let’s participate—by going to public meetings where issues we care about are debated, by voting, and also by being willing to pay taxes. Some politicians would have us believe that taxes are evil. Perhaps that’s in their self-interest. But tax money, properly used, is essential for protecting the common good from plunder. I myself recently found it useful and energizing to reread the Constitution, the Declaration of Independence, and the Gettysburg Address. In 1863, on a tragic battlefield, President Lincoln pledged himself and us to a sacred duty: “. . . that government of the people, by the people, for the people, shall not perish from the earth.”

—Rasa Gustaitis



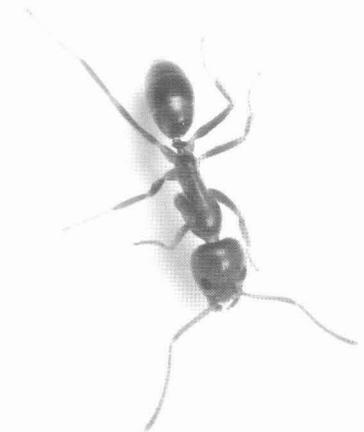
Ants!

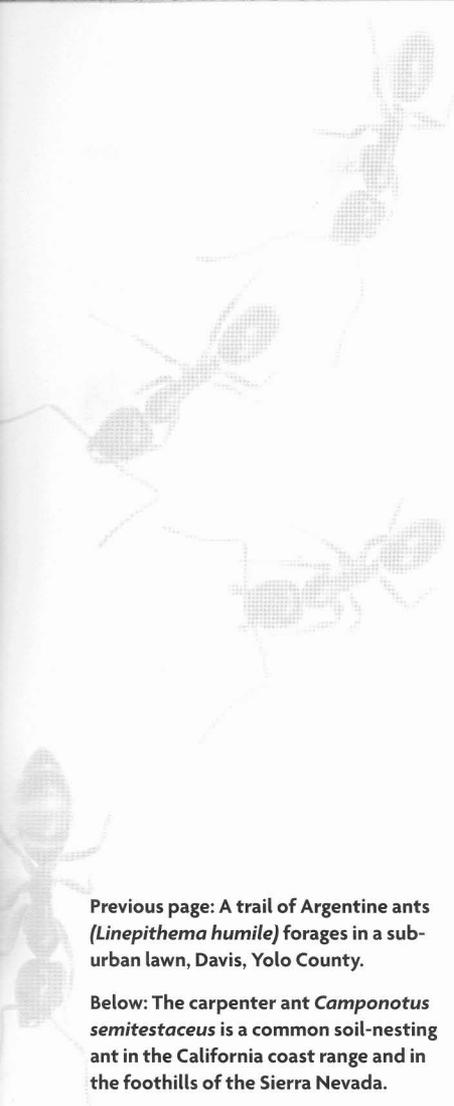
NOW THAT THE OAK MOTHS have abated in my yard, having picked clean my sad little coast live oak for the second time this year, I have a few weeks' breathing space before the next cyclical pest makes its move. Once we get another spell of heavy rain, I can be expecting their visit, en masse.

You know what I'm talking about. Ants. Most of the time, we go about our business, they go about theirs, and everything's fine. In a cold, wet winter, though, they like to be indoors as much as we do. And our houses suit them just fine, thank you very much. That's when we spring into action with ant sprays, baits, and traps.

ANNE CANRIGHT

PHOTOGRAPHS BY
ALEX WILD





The ants that come to call aren't just any ants—and they're not native Californians, either. These are Argentine ants (*Linepithema humile*)—light to dark brown, smooth-bodied, without a sting. They arrived in this country in the 1890s, in shipments of coffee or sugar that were offloaded in New Orleans. From there they spread across the southern states, most likely by train, arriving in Baja California around 1907. Ever since, they've been on the move, conquering territory as far north as Chico and eastward into the foothills of the Sierra Nevada—with sporadic forays into our homes as they go.

The climate of coastal California is pretty near perfect for the Argentine ant, which thrives in regions with moderate temperatures and moderate moisture levels. It is now found in 21 U.S. states and on six continents. It does especially well in areas characterized by a Mediterranean climate of dry summers and wet winters, such as South Africa, southern Australia, Spain, and Portugal. Drier parts of Hawaii, too, such as Maui's Haleakala Crater. It also does very well in human-modified environments, where moisture and temperature balances are somewhat regulated. Although its natural habitat is the ground, where it establishes nests just beneath the soil surface, it also happily inhabits cracks in concrete walls, spaces between boards and timbers,

and even personal belongings tucked safely away inside our houses. This ant is a bold survivor.

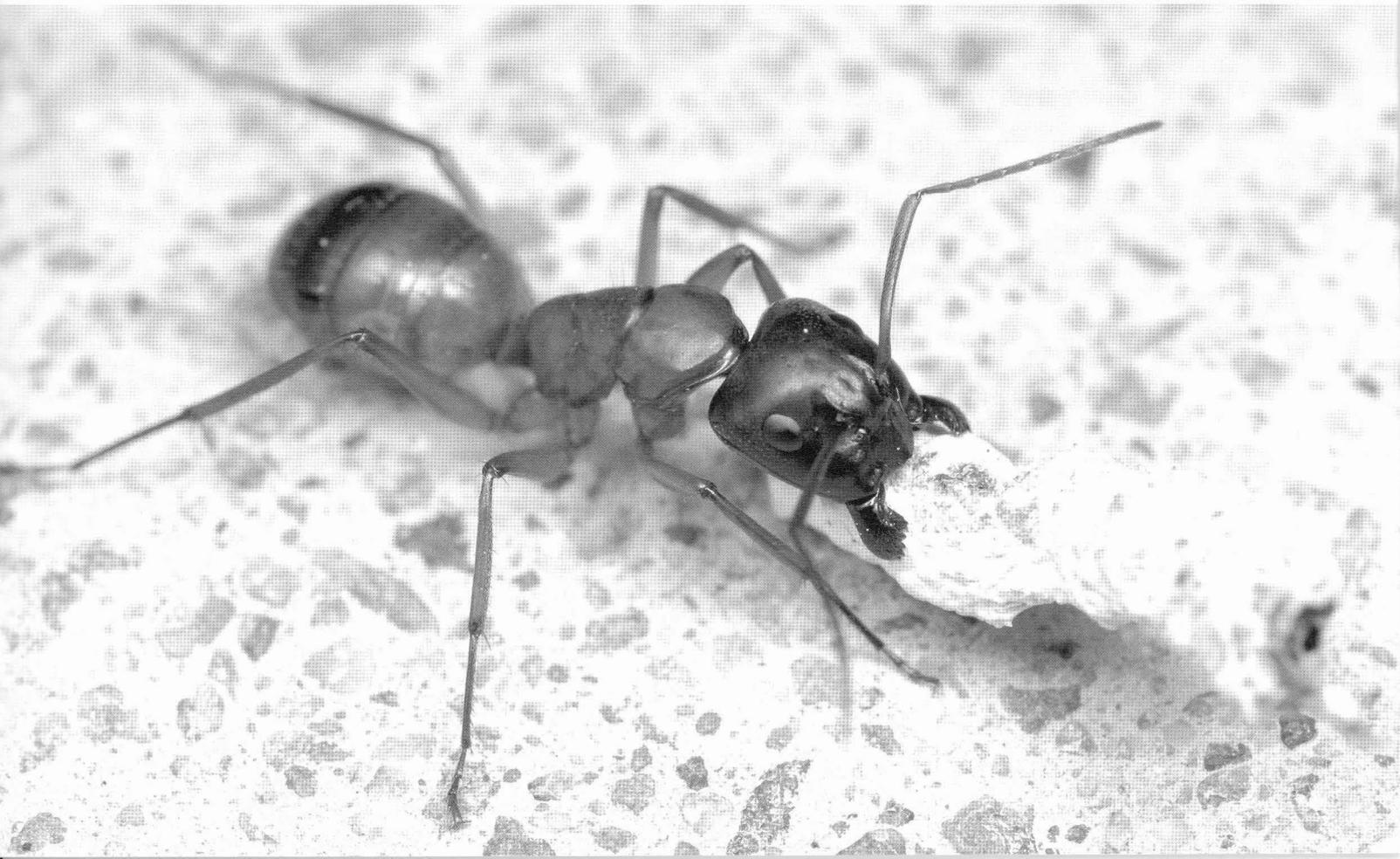
Intruders Overcome Natives

California has about 200 species of ants. Over a dozen of those live in Stanford University's Jasper Ridge Biological Preserve, a hilly expanse of grassland and woodland just upslope from the main campus. There, for the past 15 years, biology professor Deborah Gordon has been surveying the distribution of Argentine ants and native ants (and other arthropod species), trying to understand population dynamics and patterns of aggression and competition.

"We find that the Argentine ants are much more abundant around the edges [of the preserve] where there are residential areas, partly because people provide refuge where there are houses, but also because people carry Argentine ants in landscaping plants, including natives," she said. In those areas where the Argentine ant has become established, it has completely changed local ant distributions. "In places where the Argentine ant hasn't reached there are certain configurations of ants that tend to go together," Gordon said. The harvester ant (*Messor andrei*)—the big black ant that collects seeds and adorns its nest with piles of chaff—and the

Previous page: A trail of Argentine ants (*Linepithema humile*) forages in a suburban lawn, Davis, Yolo County.

Below: The carpenter ant *Camponotus semitestaceus* is a common soil-nesting ant in the California coast range and in the foothills of the Sierra Nevada.





carpenter ant (*Camponotus semitestaceus*), which feeds on dead insects, sugar-producing vegetation, or decaying substances, for example, often share higher-elevation territory. Each species moves out from a central nest to forage, remaining separate from other ant species in a manner consistent with competitive dynamics. Wherever the Argentine ant has been introduced, however, the previously distinct populations begin to mill around together, forming a random aggregation that weakens each group's competitive advantage.

This disruption is not only bad for the ants; it affects the entire ecosystem. Native ants carry seeds around and, "when the Argentine ant comes along, it eliminates the other ants that are dispersing the native-plant seeds," Gordon said. This can benefit invasive plant species such as star thistle, which, she pointed out, does better in areas where there are Argentine ants, possibly because there is less distribution of the native grass seeds that compete with the thistle. And although we think of bees and butterflies first when it comes to pollination, ants participate in that crucial activity too. So when their patterns

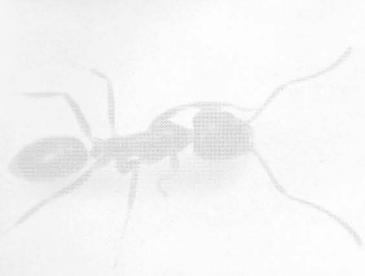
of movement are disrupted, vegetation patterns follow suit.

The Argentines tend to establish long highways off which they forage. They work together so well that they are formidable opponents to any native ants in their path. Although they are relatively small—the wingless workers are 2–3 millimeters long, compared to the native harvester ant at 4.5–6 millimeters—size doesn't impede them. They've got numbers on their side, as well as efficiency.

"It seems as though the Argentine ant isn't succeeding because it's more aggressive," said Gordon, "but only because it's such an effective searcher. So it finds the food first," before the native species. "And once it gets there, the native ants don't try to take it away from them."

The invader ants will eat anything, and they're relatively tolerant of both higher and lower temperatures; as a result, they can cover a wider range of seasonal conditions and habitats than native species. "The native species have evolved to deal with each other, but they haven't evolved to deal with these intruders," said Gordon.

A harvester ant (*Messor andrei*) returns home with the bounty of a seed, Mt. Tamalpais, Marin County.



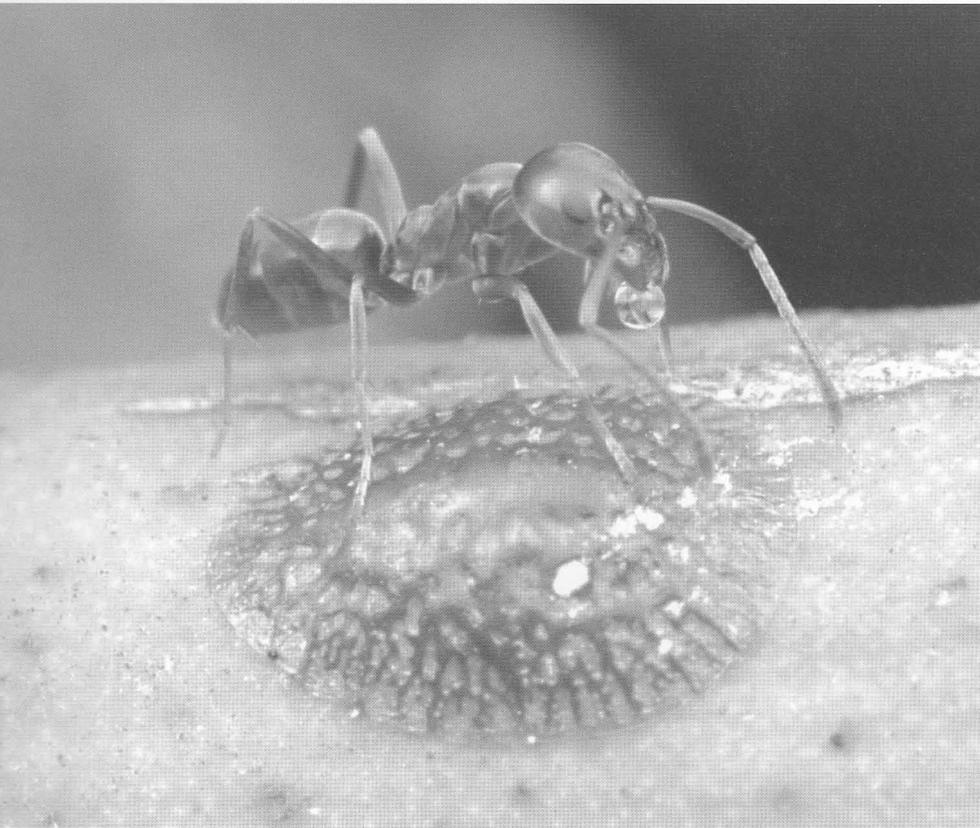
Both Argentine ants (top) and winter ants (*Prenolepis imparis*) harvest honeydew from scales, aphids, and other sucking insects.

Native Winter Ant Resists

There's a lot we don't know about Argentine ants—including their natural history in their lands of origin. In Argentina and Brazil, they are hard to find and little studied. Yet they do seem to be very territorial, forming discrete colonies with limited range. Intraspecific aggression helps them keep these lines drawn.

In California, in contrast, "Argentine ants from different nests don't fight with each other much," Gordon said. "It was thought that that meant they were all genetically related and the whole coast of California was essentially one big super-colony." Through genetic and behavioral study, Gordon's team has refined that understanding, observing that they maintain dispersed nests seasonally: during the wet months they live in one large colony, all together, and in the dry season they fan out and establish multiple nests, often with multiple queens. "We don't know how they decide who ends up in which nest," said Gordon. It does appear that even when they've established satellite nests, they are not strongly territorial. Ants still move around, contributing to colony maintenance. And they still get along just fine.

Gordon has a theory for the Californian population's easygoing ways. When ants eat, they incorporate hydrocarbons into their bodies, chemicals that are then used to signal colony



odor. In their South American homeland, each colony may have a discrete diet, and so each colony will signal “difference” through its smell. In California, Gordon said, this sensitivity to smell seems to be diminished. “That may have something to do with diet,” Gordon said—specifically, “the extent to which they are all eating McDonalds out of garbage cans. Maybe their diet is so homogeneous in the urban places where they are living because *our* diet is so homogeneous.”

One native species on the Jasper Ridge preserve, however, does seem to be withstanding the foreign onslaught. The winter ant (*Prenolepis imparis*) looks a lot like the Argentine ant, but it's a little bigger. Like the Argentine ant, it is a dietary generalist, and it also tends aphids. (The aphids suck sugars out of the plant and then secrete “honeydew,” which the ants eat; in return, the ants defend the aphids from potential predators.) “It may be,” said Gordon, “that the winter ant can resist the Argentine ant. What we see is places at the edge that blink back and forth from year to year, where the Argentine ants move in and then get pushed back. By looking over the climate data for the last 14 years, it looks like wet years are better for Argentine ants.” Last year was dry, and sure enough, the winter ant's range has expanded. Gordon's team is watching this rivalry with interest, hoping to learn more about interspecific competition and the invasive-native balance of species.

They're On Their Own Time

What about us humans? Can we push the intruders back when they come streaming into our territory—namely, our houses?

First, said Gordon, we have to understand what's going on. They don't come looking for food—though if we leave crumbs and food scraps on our kitchen counters, they won't ignore them. Instead, in the winter (December through March) they come in looking for a warm, dry place—shelter from the rain and cold; and in summer (July and August) they come in looking for water.

In 2001, Gordon conducted an 18-month survey of 69 households around the Bay Area asking

Fire Ants on the Move

FOR DEBORAH GORDON, the big question now is what will happen when the Argentine ant meets the invasive fire ant (*Solenopsis invicta*), which arrived in Orange County about eight years ago and has been moving north.

The fire ant was accidentally introduced into the United States in the 1930s, hitching a ride to the port of Mobile, Alabama, with Brazilian cargo. They became well established in the Southeast.

Here's what Gordon had to say about this ant, which flies and inflicts painful stings:

“The invasion of the fire ants was created by the response of people. There's a great book, *The Fire Ant Wars: Nature, Science, and Public Policy in Twentieth-Century America*, by Joshua Blu Buhhs (University of Chicago, 2004). A congressman from Mississippi who had a pesticide plant in his district talked up the dangers of fire ants and persuaded the USDA [U.S. Department of Agriculture] to spray a really potent, really carcinogenic pesticide called Myrex around the whole Southeast to kill them off. It killed off a lot more than just the fire ants: there were dead animals lying in the road. It killed off all the ants, including the Argentinian ants, which were already there, but the fire ants came back better than anything. They spread.

“When they showed up in California—they traveled in nursery plants in Orange County—the State gave \$12 million to the County to kill them off, and they were not

able to do that. They had a campaign where instead of aerial spraying they went around injecting pesticide into the soil. So it was the same thing, because it kills off all the ants. They've pretty much failed to contain the fire ants, who don't reproduce by walking around like the Argentine ants do but by flying. So both species will spread and we'll finally have a chance in California to see how the fire ants and the Argentine ants interact.

“People in the Southeast think that fire ants are going to specialize in golf courses because they like open, hot, irrigated, wet places, whereas the Argentine ants don't like hot so much, so they might be at the edges of the golf courses but not actually in the golf courses. So it'll be interesting.

“It's hard to say how the fire ants interact with native species. Although in the beginning it looked like they made the native ants go away, in the end it was the people who made all the ants go away. The pesticides did that. Actually, one paper out of Texas that's very controversial has shown that in places where the fire ant has gotten established, the native ants have come back. So it's not really clear what will happen. It was such a drastic ecological intervention to kill off all the ants.

“Of course, where the fire ant meets the Argentine ant, the Argentine ant will already have diminished the populations of native ants, so the native ants that the fire ant will have to deal with will be the ones that have stood up to the Argentine ant.”



***Solenopsis invicta* is a fire ant native to South America. This worker is shown in typical defensive posture, her sting extruded, waving a droplet of venom in the air.**



about ant infestations, and she learned something surprising: they came into people's houses at precisely the same time, and they left at the same time, regardless of what measures people took to keep them out. "That means that putting out pesticides—well, you might as well pour them directly into the Bay. It really does no good against the ants. They come in when they're ready, and they leave when they're ready."

Nevertheless, we do want to think we have control, don't we—even if it's an illusion? And so we take action. Some of the measures that people resort to, however, are downright toxic, such as malathion. Gordon mentioned a so-called chalk powder that is sold in Asian

flea markets, "and it's sold *there* only because it's illegal—it's such a potent carcinogen that it's actually been banned by the EPA. It not only kills ants, but it's not good for people or pets or anything else."

There are more environmentally friendly, healthful actions that can be called into play. Plugging up holes in walls with petroleum jelly or poster putty is an option. "People use clove oil or lemon oil," Gordon said; "or I use Windex: anything that's strong-smelling. If you wipe down the place where they're putting down a chemical trail, you can stop them for a while." Until they find another way in.

Or until they decide it's time to leave on their own. Because that's the good news: "They would really rather be outside," in their own nests, doing what Argentine ants do so well: foraging food out from under the noses of the native ants, trying to survive. ■

Left: Invasive red fire ants build distinctive dome-shaped mounds, especially after rains. When the soil dries, the mound hardens into a protective shell that also captures heat from the sun, speeding the development of the ants' brood.

Bottom: Battle of the invaders! Argentine ants and red fire ants are native to the same flood-plain habitat of South America's Paraná River. Both species are aggressive and fight over resources. Here the much smaller Argentine ant is the attacker.





SINCE 1998, WHEN THE JOURNAL *Nature* published the first documented report linking mass strandings of whales with the use of sonar in military exercises, the public has increasingly come to understand that the sounds humans make in the sea can harm the creatures that live there.

But while dramatic incidents involving military sonar have received extensive media attention, a much more widespread and potentially more insidious source of ocean noise has stayed below the radar: the huge cargo and tanker ships that haul ever-increasing loads of goods across the world's oceans.

Over 90 percent of world trade is transported by ship. In one year, 2004, about 6.7 billion metric tons of cargo were hauled over a distance of about 4 million miles, according to the Round Table of International Shipping Associa-

tions. The noise from individual ships is not as loud as sonar or the seismic air guns used to explore for oil and gas, but the cumulative noise from cargo vessels pervades wide swaths of the oceans, particularly near shores, which is also where much marine life is concentrated. Because it also occupies the low-frequency bandwidth in which many whales and fish produce and perceive sounds, some scientists fear that vessel noise may be creating a diffuse aural "fog" that can mask crucial natural sounds—such as those that animals use to navigate, find food, communicate, or detect the approach of predators.

"I believe shipping is far and away the one [noise] source that has the potential to affect whole marine animal populations," said Brandon Southall, director of the Ocean Acoustics Program of the National Oceanic and Atmospheric Administration

EILEEN ECKLUND

Chronic Ocean Noise

TURN DOWN
THE VOLUME—
ANIMALS
PASSING

A container ship in the Port of Los Angeles. The number of container units moving through the ports of Los Angeles and Long Beach nearly tripled during the past decade, and is expected to double or triple again in the next 15 to 20 years.



**TraPac Container Terminal,
Port of Los Angeles**

(NOAA). “It’s an everyday, chronic source of noise in many places.”

A continuing increase in shipping noise is all but certain. The boom in global trade is driving demand for more and bigger ships; ports are being expanded in China, Korea, the U.S., and elsewhere, and new ones are being planned. New sea lanes are being considered along shorelines and also, as the polar ice melts, through sensitive Arctic marine habitats. In light of this expansion of ocean traffic, some people in government agencies, research institutions, and the shipping industry have begun to explore ways to quiet ship noise as soon as possible, rather than waiting for unquestioned evidence of a problem to emerge—something that could take decades, if not longer.

A Cacophony

Jacques Cousteau’s characterization of the ocean as “the silent world” was more poetic than accurate: the undersea realm is actually a noisy place. Waves, wind, rain, lightning strikes, earthquakes, and other natural processes produce sounds underwater. Dolphins make clicking noises to help them navigate and find food, whales and seals sing, and colonies of snapping shrimp can be so loud that they drown out sonar. Even some types of fish make noise. The oyster toadfish, for example, produces a sound similar to a foghorn by contracting the muscles of its swim bladder.

Sound is a vital sense for creatures that live in the ocean. It travels much faster, and potentially much farther, through water than it does through air, while vision, smell, touch, and taste are impeded. Marine animals have evolved not only to take advantage of the special properties of sound in water, but also to accommodate the cacophony of the ocean’s natural sounds.

In the past several decades, human activities have been generating ever more mechanical and technological noise in the underwater world. Sonar noise has come to public attention, but there is much more: seismic airguns used to search for oil and gas, drilling, explosives, underwater construction, and shipping all add to the din, particularly in coastal waters. Two studies conducted in the mid-1990s to early 2000s along the California coast—one off San Nicolas Island, the most remote of the Channel Islands, and one off Point Sur—found that underwater noise at low frequencies had increased by about 10 decibels since the Navy made sound recordings in the same areas in the mid-1960s. That means that the sounds may be more than twice as loud to some marine animals as they were then, according to Southall. Both studies suggested that steep increases in international shipping traffic and gross tonnage might explain the rise in sound volume in ocean waters.

“Underwater ambient noise has just about doubled every decade since World War II, and

by far and away the biggest increase has been in shipping noise," said Richard Steiner, a professor and marine conservation specialist with the University of Alaska's Marine Advisory Program. "There are about three times as many ships as there were 50 years ago, and seven times the gross tonnage."

Although it is difficult to determine how many commercial ships ply the oceans at any one time, Lloyd's Register of Shipping put the world's commercial fleet (which includes cargo and cruise ships, tankers, dredges, tugs, and fishing boats) at approximately 91,000 as of 2006, according to the Colton Company, maritime consultants. In California, the number of container units moving through the ports of Los Angeles and Long Beach nearly tripled during the past decade, increasing from 5.8 million in 1996 to 15.8 million in 2006. Both ports estimate that current numbers could double or triple in the next 15 to 20 years. A new port has been proposed near Ensenada in Baja California, in part to serve as an alternative to busy L.A. and Long Beach.

A 2003 report by the National Academies, "Ocean Noise and Marine Mammals," stated that "vessel traffic is a major contributor to noise in the world's oceans," especially at low frequencies, and that distant traffic contributes significantly to background noise. "Very large geographic areas are affected," the report noted. Some studies have found that vessel noise can be heard as far as 1,000 miles from its source.

"Underwater noise from shipping is the most pervasive unregulated pollutant on earth," said Steiner. It's likely to become even more pervasive, especially in the Pacific Basin, with global trade booming and more and ever bigger commercial ships traveling between Asia and the United States.

"Cumulative Nightmare"

Scientists concerned with the effect of shipping noise on marine animals are careful to point out that little specific evidence exists on how it affects them. It's difficult to observe marine animals, much less conduct controlled experiments with them. Researchers discovered that sonar affects certain types of whales only because several high-profile strandings correlated closely in time and space with military exercises. Even in those cases, they haven't determined precisely what caused the animals to strand or what killed those that died.

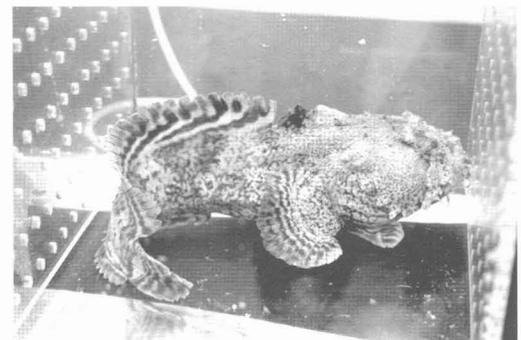
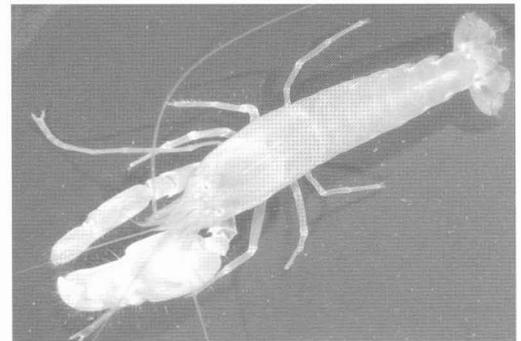
"We can't necessarily identify whether or how many animals have been harmed [by shipping noise], or to what extent their reproductive behavior has been compromised," Southhall said. "We also don't know precisely how some animals can adapt to noise, though we believe they can, to some degree. They may simply tolerate shipping noise, trying to get by as acoustic animals in an ever more cluttered acoustic environment."

Studies have, however, determined that loud noises within an animal's frequency range can cause hearing loss; they can also cause marine animals to avoid breeding or feeding grounds, or to change course while migrating. In a 1998 study performed for the U.S. Navy by researchers Peter Tyack of Woods Hole Oceanographic Institute and Christopher Clark of Cornell University, gray whales migrating along the California coast avoided playbacks of low-frequency sonar. Another study published in 1984 in the book *The Gray Whale* (Academic Press, Orlando) found that whales stopped gathering to breed at Guerrero Negro Lagoon in Baja California during a period of increased dredging and commercial shipping activity from 1957 to 1967. After the activity declined, they gradually returned.

Exposure to loud noises has also been shown to alter animals' patterns of communication. "There have been cases where whales made louder and longer sounds when noise levels were increased," said Dave Mellinger, an associate professor at Oregon State University who specializes in analyzing whale sounds.

One of the potential effects that concerns scientists the most is masking, where the level of background noise increases to the point that it drowns out animals' ability to communicate and hear key sounds within their frequency range. "Shipping noise tends to be a pretty low frequency, so animals that make their calls in that range are probably getting drowned out at a distance," said Mellinger. The phenomenon has the potential to affect a large number of animals. "The area over which masking would occur is almost surely significantly greater than it is for disturbance of behavior," said Southhall.

Noisy sea creatures: Colonies of snapping shrimp (*Alpheus* sp.) (top) can drown out sonar, and oyster toadfish (*Opsanus tau*) produce a sound similar to a foghorn.



Marine animals as varied as whales, fish, and invertebrates already suffer from myriad human-caused impacts, including overfishing, vessel strikes, red tides, pollution, marine debris, and the effects of global warming. Noise from shipping traffic—and other sources—is yet one more stressor. “At some point, it becomes a cumulative nightmare,” Steiner said.

“To me, it’s not really sufficient to say ‘We don’t know if it’s a problem’ and then not do anything about it,” said Douglas Nowacek, an assistant professor of oceanography at Florida State University who studies marine mammals’ use of sound. “Given how important sound is to marine mammals, there’s a very good chance that [shipping noise] could be a problem.”

Building Quieter Ships

Some shipping industry representatives also believe that the issue deserves serious consideration now rather than later. Kathy Metcalf, direc-

tor of maritime affairs for the Chamber of Shipping of America, which represents owners and operators of large commercial vessels of all flags that have offices in the United States, has participated in gatherings where scientists, engineers, and others have met to discuss the scope of the problem and possible responses. “While we recognize there is some impact now, we just don’t know the degree and whether it rises to the level of ‘significant,’” she said. “One thing is certain: at some point, with the expected increase in the number and size of vessels, there will be a significant impact.”

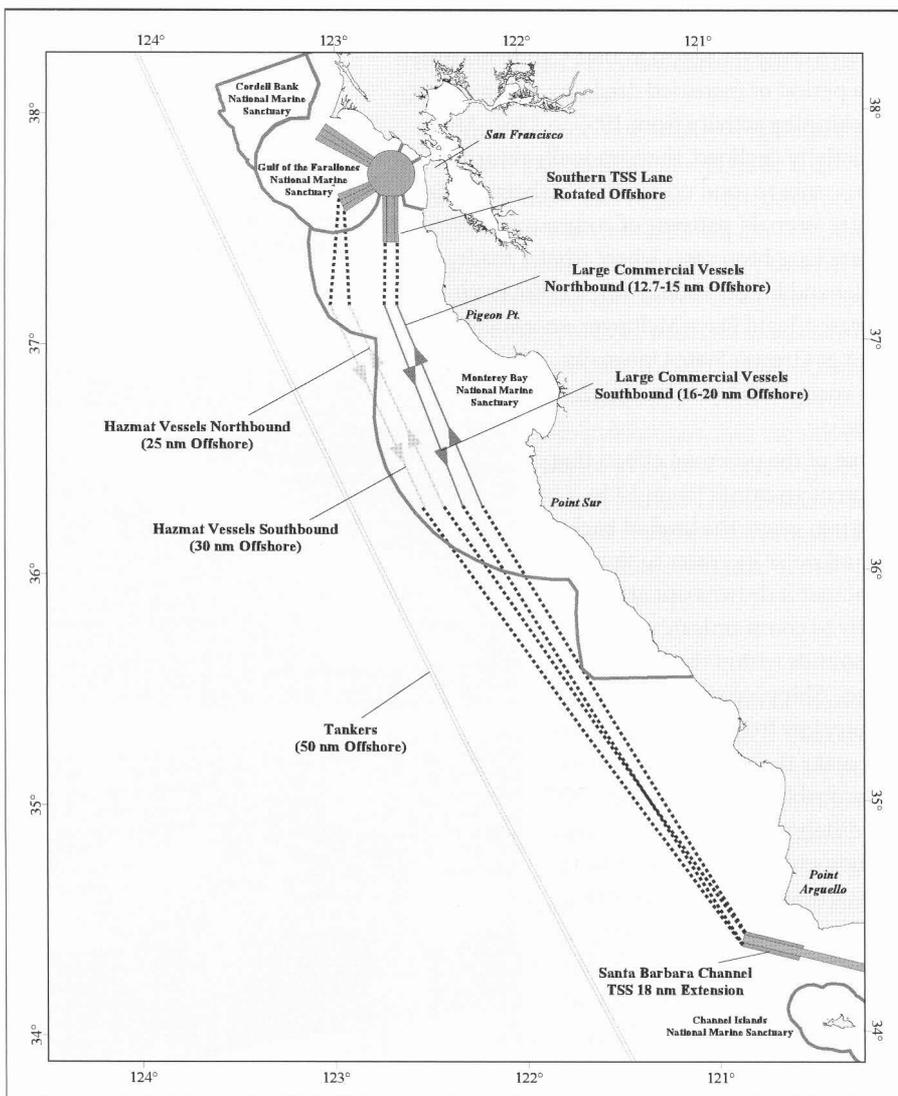
Vessel-quieting technologies already exist, developed by the Navy to hide its own ships and by others for use on research vessels, though not all of these technologies are relevant to commercial ships. To be widely adopted, quieting technologies must be cost-effective for shipowners, Metcalf said. “We’ve had naval architects that said yes, it can be done economically, and others that say no, it can’t,” she said. “At this point, it’s too early to tell whether or not it’s feasible.”

Most of the technologies developed to reduce ship noise have focused on ways to decrease propeller cavitation, a process that is the biggest source of underwater noise from ships. As they spin, propellers generate vacuum bubbles in the water. The bubbles collapse almost as fast as they are generated, making a loud rumbling sound. “It is my hope that you can reduce propeller cavitation in a way that increases fuel efficiency,” Metcalf said. “In that case, we’d be stupid not to do it.”

In May 2007, Southall coordinated a NOAA-sponsored international symposium of scientists, engineers, industry representatives, and others in Silver Springs, Maryland, to assess the feasibility, costs, and benefits of various vessel-quieting options. The evidence presented suggests that “there are certainly technologies that could be applied, and they very likely could quiet really big ships to some degree,” Southall said. “The question is, how much do you want to quiet them, and how much do you want to spend?” Some quieting at a fairly reasonable cost seems possible. The key will be to give shipbuilders and -owners incentives to adopt them.

Sharon Young, marine issues field director of the Humane Society of the United States, who led a working group at the symposium, said afterward that she was “very heartened by the reaction of the engineers and other industry representatives. They were very receptive [to working on solutions]. Many of them just had no idea

In 2000, commercial vessel routes off the coast of northern and central California were shifted 10 miles further offshore and organized into north-south lanes to reduce the risk of spills in sensitive nearshore waters.





that vessel noise was such a problem. I thought it was a very promising beginning.”

Metcalf, who also participated in the symposium, said that her next step will be to bring together some private-sector experts to see how they might spur action at the international level. “If you’re really going to do something about ambient noise, it has to be international,” she said. “The International Maritime Organization (IMO) is the only entity that could feasibly regulate it.”

Shifting Lanes

Global shipping routes often pass through sensitive marine-life habitat, such as feeding and breeding grounds and migratory routes along the coast. Thousands of ships follow the North Pacific Great Circle Route each year, traversing the Aleutian Islands’ Alaska Maritime Wildlife Refuge as they travel between the U.S. West Coast and East Asia. Higher volumes of shipping are expected in many coastal waters as “short sea” shipping—the transport of freight for short distances along coasts and inland waterways—expands in

response to congestion on roads and railways. Many countries are already eyeing new shipping lanes through sensitive Arctic waters as global warming melts the polar ice for longer periods each year. Such increases alarm marine conservationists. “We need to be rerouting these shipping lanes away from sensitive habitats,” Steiner said.

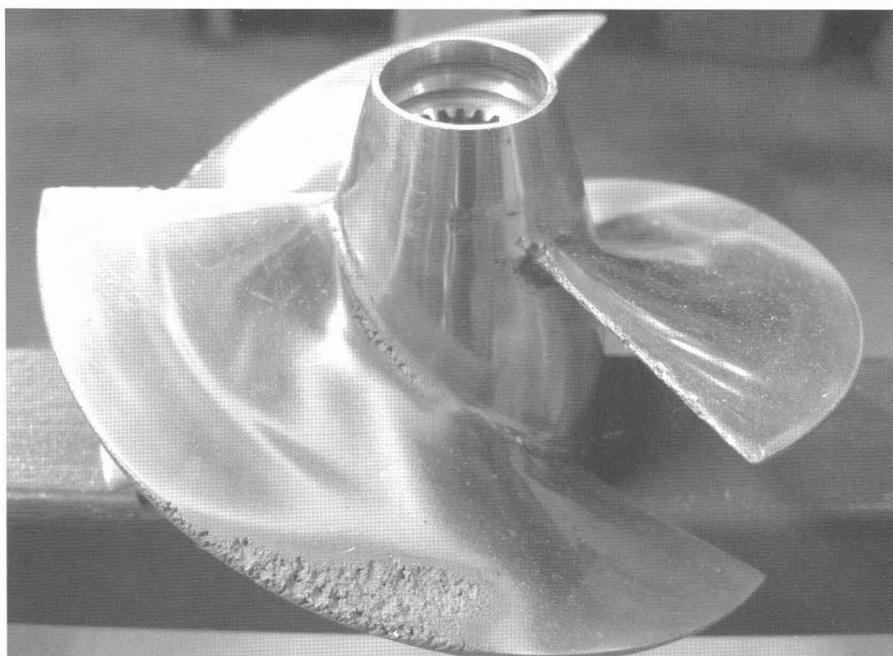
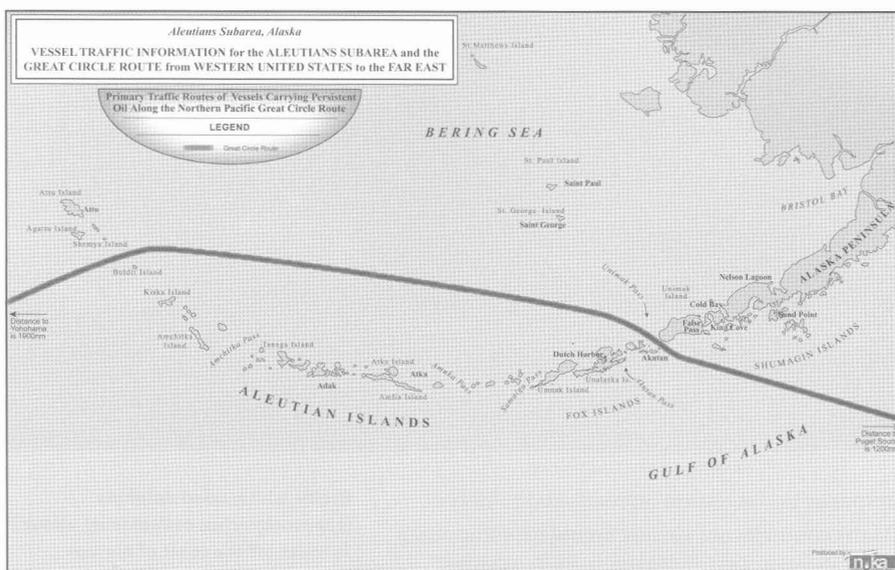
Rerouting lanes is uncommon, but it has been done. The IMO, which has some regulatory authority over shipping, has approved route changes and larger voluntary buffer zones off the central California coast and the Olympic coast of Washington, primarily to avoid oil spills and other catastrophic accidents in protected marine areas. In 2003, Canada shifted the shipping routes in the Bay of Fundy to reduce the risk of vessel strikes on critically endangered North Atlantic right whales, and in July 2007 ship traffic lanes in Boston Harbor were shifted and narrowed to try to reduce collisions with right whales in the area around Stellwagen Bank National Marine Sanctuary.

Moving vessels farther offshore may also make these sensitive nearshore areas a little quieter.

Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), about 25 miles off the coast of Big Sur

Top: Thousands of ships follow the North Pacific Great Circle Route each year, traveling through sensitive waters in the Aleutian Islands' Alaska Maritime Wildlife Refuge. (Map from *Vessel Traffic in the Aleutians Subarea: Updated Report to the Alaska Department of Environmental Conservation*)

Bottom: Propeller cavitation is not just a source of noise—it also damages propellers.



However, Southall said that some scientists fear such shifts could also affect how shipping-lane noise is reflected into deep ocean basins, possibly making the situation worse there.

Regardless, moving shipping lanes is “incredibly complicated and controversial to do,” said Southall, pointing out that the Boston Harbor lane shift required many years and the efforts of many entities, including NOAA and the U.S. Coast Guard. If more shipping lanes are shifted in the future to protect marine mammals, “I think it’s more likely to be connected to mitigation for another issue,” such as vessel strikes or oil spills.

NOAA has also been trying to set speed limits for ships traveling along the eastern seaboard,

varying by location and time of year—again, to try to reduce the risk of vessel collisions with whales. Slowing ships down also reduces propeller cavitation, so this strategy could reduce the impacts of shipping noise along busy coastal routes as well. NOAA’s proposed speed limits have been held up by the White House Office of Management and Budget and the Council of Economic Advisors since October 2006. The shipping industry opposes the limits, arguing that they would increase their costs.

Although Southall affirmed that “if you want to quiet ships down, one clear conclusion in many cases is to simply slow them down,” he isn’t sure how practical that is. “Everything in the industry is going in the other direction, to speed things up and make them bigger—and likely noisier,” he said. “We’re pursuing different voluntary measures at this point, together with forward-thinking members of the industry.” Metcalf agreed that slowing ships down might not be feasible, pointing out that “there’s a point at which, when you slow the ship down, it becomes unsafe to maneuver, especially in a narrow shipping channel—the limit is in the 10-to-14-knot range, depending on the size of the vessel and environmental conditions, including current and wind. And if you just reduce speed a little, how much will that help?”

Michael Jasny, a senior policy analyst with the Natural Resources Defense Council (NRDC), is more optimistic. “It may not be as economically disadvantageous as people have thought,” he said. “Sometimes ships go fast just to sit in port, so there would be nothing to lose by slowing down. You reduce carbon emissions, reduce marine noise, and reduce ship strikes on marine mammals—it’s a win for everyone.” The NRDC is also working to keep shipping lanes as narrow as possible to minimize the territory affected, said Jasny. Methods for achieving this include better enforcement that would keep ships from wandering, and combining multiple lanes.

The Best Hope

California has more regulatory authority over activities within its coastal waters than many other states do, thanks to the California Coastal Act of 1976 and the Coastal Commission, which works with state and local governments to oversee planning, development, and access along the coastline. Underwater noise—particularly in the low frequencies—is one of the factors the Commission considers when reviewing permit

applications, according to Commissioner Sara Wan.

In March 2007, the Commission filed suit against the Navy for rejecting safeguards it requested for protecting marine mammals during sonar testing off the coast. In January 2008, President Bush issued a directive exempting Navy sonar training missions from the Coastal Zone Management Act and other environmental regulations; in February, a federal judge ruled against the administration.

In April 2007, the Commission rejected plans for a new offshore liquid natural gas facility in part because of noise that would be generated by construction and vessel traffic. Noise may be an issue in proposed future uses of nearshore waters, such as wave energy facilities. However, the Commission has no authority over ongoing shipping noise, Wan said. It can only restrict noise related to specific incidences such as testing and exploration, or to new facilities.

Some conservationists see California's new network of marine protected areas (MPAs), which went into effect on September 21, 2007, as a potential vehicle for protecting marine animals from noise and other harmful activities. As currently constituted, the MPAs restrict only activities such as fishing and harvesting of other resources, but it is conceivable that they could adopt vessel traffic and speed restrictions, with the approval of the IMO.

The best hope for reducing the harm to animals from ocean noise is likely to involve a combination of tools—including ship-quieting technologies, speed restrictions, exclusionary zones and seasonal restrictions, and changes to shipping lanes—and a variety of people to enact them, from shipbuilders and -owners to marine reserve managers and agency staff. But the time to start thinking about how to approach noise concerns in our activities in the ocean is now.

“Overall, overfishing, bycatch, and global warming are probably having significantly greater impacts on marine populations than underwater sound,” Southall said. “Animals can do things to get around noise. But there’s a limit to what they can do—these are acoustic animals. It’s the primary sense that they use, and to the extent that you affect that, you affect their ability to reproduce and survive. As consumers, we all ultimately contribute to shipping noise. We owe it to these animals to see if we can find solutions.” ■

To Learn More and Get Involved

Discovery of Sounds in the Sea (www.dosits.org)

Extensive information about the science of sound in the sea, including how sound moves underwater, how it is used and perceived by people and marine animals, and how human sounds affect animals. Includes an audio gallery of underwater sounds, video interviews with marine scientists, and information about underwater acoustic technology. Developed by the University of Rhode Island's Office of Marine Programs and Marine Acoustics, Inc.

California Coastal Commission (www.coastal.ca.gov)

Contains the text of the Commission's extensive comments regarding the effects of anthropogenic sound on marine mammals, submitted to the Marine Mammal Commission's Advisory Committee on Acoustic Impacts on Marine Mammals; also information about the Commission's dispute with the U.S. Department of the Navy's sonar testing off the California coast.

NOAA Fisheries Office of Protected Resources Ocean Acoustics Program (www.nmfs.noaa.gov/pr/acoustics)

Works with the shipping industry, scientists, and others to address the effects of shipping noise on marine animals; sponsors research into ocean acoustics and the effects of anthropogenic noise.

Natural Resources Defense Council, Sounding the Depths II (www.nrdc.org/wildlife/marine/sound/contents.asp)

NRDC's in-depth report on the rising tide of ocean noise and its consequences.

Seaflow (www.seaflow.org)

A nonprofit group dedicated to protecting all marine life from active sonars and other noise pollution. Seaflow is about to launch a campaign advocating stronger protections for marine sanctuaries and protected areas from large vessel traffic noise and other impacts.



A harbor seal (*Phoca vitulina*) hauled out on a rock along Cannery Row, Monterey





Protecting nature in a popular—and crowded—park

MUIR WOODS REVIVAL

EILEEN ECKLUND

IN 1908, SHORTLY BEFORE PRESIDENT Theodore Roosevelt established Muir Woods as a national monument—the nation’s tenth—a U.S. Forest Service official wrote in a report: “There is no other Redwood grove in the world so remarkably accessible to so many people.” He also noted that the grove of ancient coast redwoods was in “absolutely primeval condition.”

Surely neither this official nor Roosevelt foresaw the dilemma these twin attributes of the park would present: How to protect the grove while accommodating crowds of visitors. Throughout the park’s history, its caretakers have struggled to balance the public’s right to use it with the need to protect its natural resources, and they didn’t always succeed. Today, however, 100 years after its founding, Muir Woods National Monument is an inspiring example of how—with much work, creativity, and dedication—it is possible to protect and restore a fragile ecosystem, even in a highly popular park.

Nestled within a steep canyon on the western slope of Mt. Tamalpais, only 12 miles northwest of the Golden Gate Bridge and three miles from the ocean, Muir Woods National Monument is within a metropolitan area of 7 million people. It is managed by the National Park Service (NPS) as part of the Golden Gate National Recreation Area (GGNRA).

The park encompasses 553 acres, which is more than twice its original size but minuscule compared to other highly popular national parks. About a million visitors come to admire the redwoods each year—in some peak years, as many as 1.5 million. Yosemite National Park, with 760,000 acres, and

Yellowstone, with 2.2 million acres, each averages around 3 million visitors per year.

Muir Woods is frequently overcrowded, its limited parking overwhelmed. During the summer, the California Highway Department posts a sign just north of the Golden Gate Bridge when the lots are full, to spare prospective visitors a long ride along a winding two-lane mountain road that would end in disappointment, and to let them know that a shuttle is available. The sheer number of visitors virtually guarantees a certain amount of disturbance of the park’s flora and fauna, not to mention its tranquillity. Despite the crowds, however, today the natural systems in Muir Woods are healthier than they have been during several decades of the park’s existence.

A History of Wear and Tear

Even on a chilly winter weekday, the main parking lot at Muir Woods is nearly full. People wander through the groves in clusters, children race along the boardwalk shrieking and giggling, camera flashes twinkle in the gloom beneath the canopy. Visiting this grove is not a solitary experience, and yet there’s something in the trees that grabs you, makes you look up in wonder, regardless of the distractions around you. They are serene, they are beautiful, they are . . . really, really big. Here in Muir Woods, you cannot help but respect your elders.

Further up the trail, the crowds grow more sparse and human sounds begin to drop away. Now you hear more clearly the rushing of Redwood Creek,

which flows through the park, and the coo of a lone band-tailed pigeon somewhere in the woods nearby. At least to the untrained eye, the forest floor looks lush and healthy, covered with sword ferns and redwood duff and bright green redwood sorrel. Back at the parking lot, the bushes are a-twitter with tiny birds in search of their dinner, seemingly unperturbed by the presence of people.

In its early years Muir Woods had relatively few visitors, but some of them managed to wreak a fair amount of damage. They drove cars into the canyon and even on side trails; trampled the delicate forest understory and

scrambled up steep slopes. They camped, picnicked, built fires, played ballgames, left litter behind, and reportedly even made off with ferns and other plants. By the early 1920s the wear and tear on the park was obvious, leading NPS to close the road into the monument to motor vehicles and horses, and to ban camping.

Park staff unwittingly did their own share of damage. Following what was standard practice at the time, they "tidied" the forest floor and the creek, removing downed trees and picking up branches and other natural debris, thus depriving some plants and wildlife of an important source of nutrients, as well as altering the creek's flow. In the 1930s, the Civilian Conservation Corps channelized Redwood Creek and built riprap walls to prevent flooding.

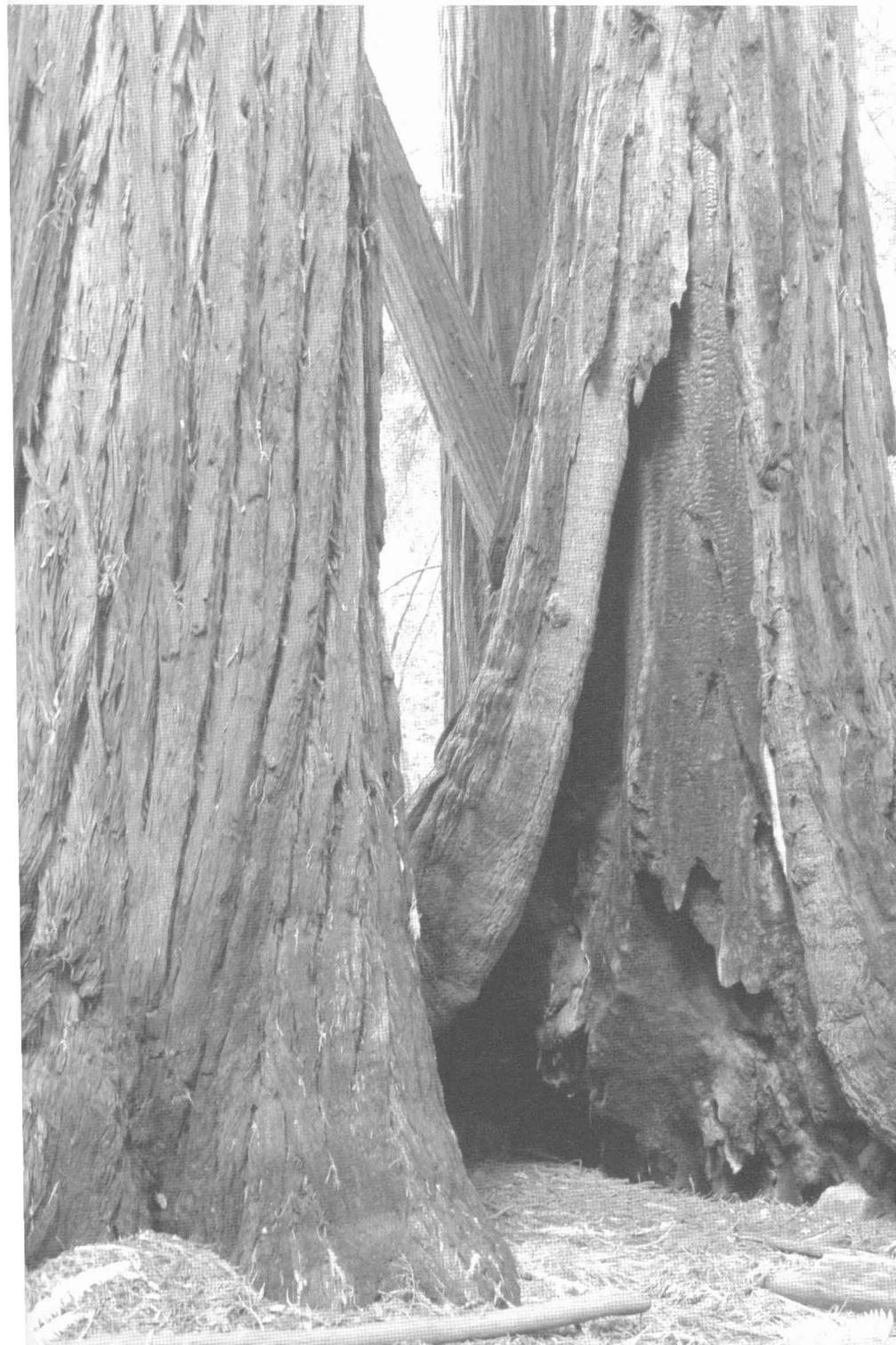
By the time Mia Monroe, now the park's supervising ranger, arrived in 1978, she was struck by the absence of wildflowers, mushrooms, and other wildlife. "There were lots of Steller's jays," she said recently, "but no quail, no chipmunks." Pools where salmon would have been able to lay their eggs had been lost. Clearly, the forest's ecosystem wasn't functioning as it should.

There had been troubling signs long before then. In 1971 one of the big redwoods toppled and park staff realized that its premature death might have been caused by visitors trampling the roots. "That was one of the earliest, biggest wakeup calls," Monroe said. "When a big redwood in a park full of redwoods comes down, you've got to pay attention."

One of the first steps staff took to ease pressure on the forest from its many visitors was to ban picnicking in the 1960s. In the 1970s and 1980s attempts were made to protect the forest floor by paving the main paths and putting up fences to keep people away from trees and the creek. In 1988, volunteers established a native plant nursery and began replanting the trampled forest floor. The compacted soil around the redwoods has been planted with native ferns, redwood sorrel, and other plants that grow in redwood forests. Staff also stopped clearing debris and left fallen trees in place when possible.

In the late 1980s and early 1990s, asphalt was removed from the most heavily used sections of the main trail and boardwalks were built, making the grove more accessible to people with limited mobility while also protecting the trees. An old road and a portion of the main parking lot near the creek were removed. In 1996 and 1998 planned fires were set, returning a key natural process after nearly a century of fire

Hardy survivors: Fire-resistant bark helps coast redwoods survive the periodic conflagrations that the forest needs to flourish.



suppression (though prescribed burns were then halted while NPS reviewed its fire management plans, and have not yet been reintroduced). In a redwood forest, periodic fires make room for new trees to flourish, provide nutrients for redwood seedlings, and check the spread of diseases.

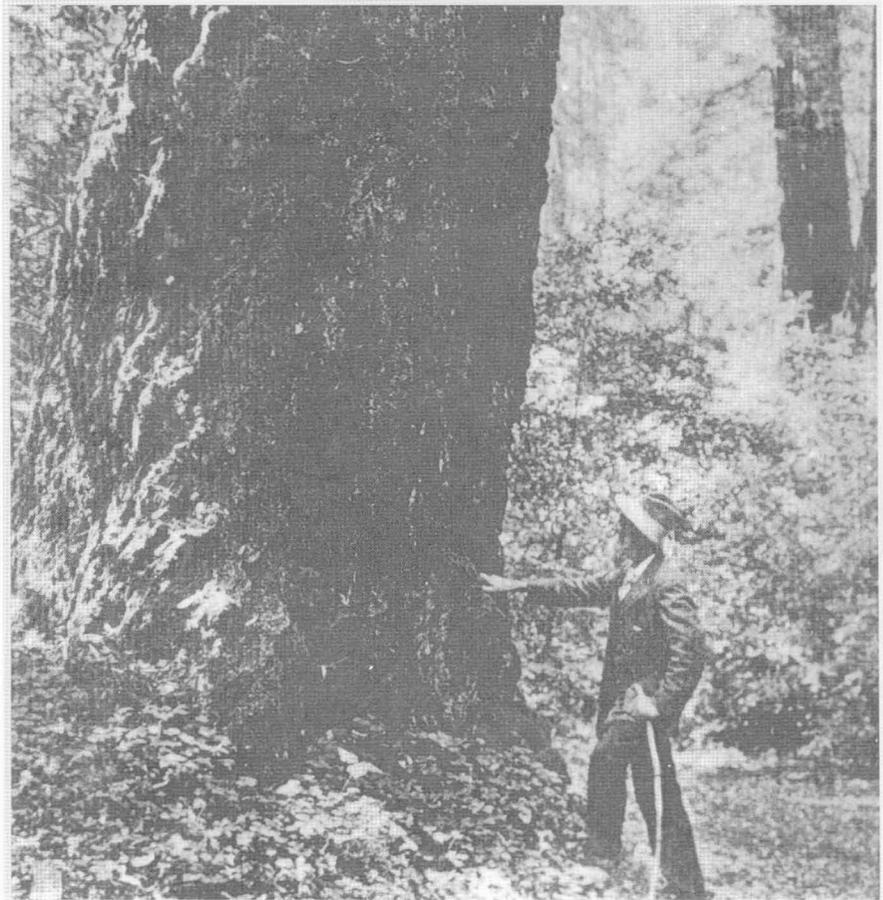
Since the improvements began, plants and animals that had disappeared from the forest have been returning—including a pair of river otters that, to the delight of park staff and visitors, gave birth to a pup last year.

Most visitors to Muir Woods probably have no idea that it took more than two decades of hard work to bring the forest to the relatively healthy state they see today. “It was an eye-opener for me,” said Maribeth Halloran, a Mill Valley resident, of a tour that she and a group of volunteers took with Monroe in the summer of 2007. Halloran had been to the park many times over the years, but “I had no idea that they felt they’d gotten to a point where the redwoods were doing more dying than they were regenerating. Now they’re bringing life back. I was really impressed by what they had done to regenerate the forest, on a limited budget.”

Freeing Redwood Creek

During the 1980s, park staff also began to worry about the health of Redwood Creek and its tributaries, whose once-impressive runs of coho salmon and steelhead trout had dwindled because of upstream flood-control measures and development in the creek’s floodplain. NPS and other government agencies that own land in the creek’s watershed, which extends from the peaks of Mt. Tamalpais to the Pacific Ocean and encompasses just under nine square miles, are now working to restore the creeks to a more natural condition.

One major site that is being restored is a former flower farm, now owned by NPS, in what was once Redwood Creek’s floodplain. The long-time owners, the Banducci family, had planted crops on much of the floodplain, moving and straightening the creek in some places, clearing out woody debris, and building levees to control its flow. One stretch of the creek through the Banducci land was so flat and straight it had been dubbed the Bowling Alley. Straightening the creek eliminated the pools that the salmon needed and caused severe flooding downstream during heavy rains, when the water rushed through unimpeded.



JOHN MUIR WITH THE KENT TREE, C. 1908

On March 18, 2003, at 8:28 p.m., a sound “like prolonged thunder” shattered the peace in Muir Woods. “That was followed by that wonderful smell of Douglas fir throughout the forest,” said Mia Monroe, the park supervising ranger, who was nearby with a group counting spotted owls. The Kent Tree had crashed to the ground.

It had been the tallest tree in the park, estimated to be 700 years old. It stood at 280 feet until 1982, when storms knocked 40 feet off its top. The month before it fell, more people than usual visited Muir Woods. “It’s a peaceful place in these troubled times,” said a ranger. Sixty-three years earlier, for that same reason, delegates from many nations gathered here before the start of the conference that led to the founding of the United Nations. They came to mark the beginning of a hopeful new era.

On the night the old giant thundered down, the moon was full. Two days later, the United States bombed Baghdad.

NPS began restoring the site in 2003, and since then most of the levees have been removed and log structures have been installed to encourage the creek to meander. What was the Bowling Alley is now “a series of pools and gravel bars that are great for salmon,” said Redwood Creek Nursery manager Chris Friedel, who coordinates the restoration work in the watershed, including the efforts of volunteers who do all the planting and weeding. The nursery is now run by the Golden Gate National Parks Conservancy, a nonprofit association created to assist park staff in the GGNRA.

Another, even more ambitious restoration project is scheduled to begin next year at the



Top: Northern spotted owls, a threatened species, nest in Muir Woods.

Bottom: Kissing banana slugs (inset) is all part of the adventure for students on a field trip in the park.

mouth of Redwood Creek. Its goal is to bring back part of Big Lagoon, the estuary that connects the creek to the ocean at Muir Beach. Before most of the lagoon was filled in for agriculture and by the construction of roads, levees, and a parking lot, its brackish waters were important habitat for juvenile salmon that had not yet adapted to the ocean environment. Because restoring Big Lagoon has to be balanced with the needs of neighbors and public access to Muir Beach, park officials have “spent years talking about how much lagoon is feasible there,” Monroe said. Now the conflicts have been minimized and the plans are almost ready, though the funds must still be raised.

Moonlight Walks and Celebrations

Being in the middle of a dense urban area has benefits as well as drawbacks. “We have huge challenges, but we also have this great resource” in the number of volunteers available to help restore and maintain the park, said nursery manager Friedel. “It works both ways; we can offer so many opportunities for urban kids to get out into nature and see how it works. The most exciting thing to me is to show them how to take care of this landscape.” Such close involvement, Friedel said, can help young people overcome the paralysis they feel when faced by big issues like global warming. “You tell them, ‘Here’s this creek, this watershed, get to work.’”

The nursery had more than 400 volunteers last year to help with planting and weeding. A lot of people like to pitch in during big events such as Earth Day, but a small band of regulars shows up each week. Schools send groups of students, and companies sponsor employee work days—some of whom come out year after year and “start to get a sense of ownership of the place,” Friedel said.

Beyond volunteer opportunities, Muir Woods offers a slate of programs tailored to different types of audiences: guided walks where visitors can learn about the park’s history and its redwoods, birds, salmon, and other natural resources; workshops and classroom curricula for teachers as well as field trips for schoolchildren; popular moonlight walks during summer months; and celebrations of both the summer and winter solstices. “They sang and danced, and luminaria lighted the way through the woods,” Maribeth Halloran said of the winter solstice celebration she attended in 2007. “It was very simple, but very

TOP: HEATHER JENSEN/NPS; BOTTOM: GEORGE SU/NPS; OPPOSITE TOP: GEORGE SU/NPS; OPPOSITE BOTTOM: EMILY KACHERGIS

beautiful.” (See www.nps.gov/muwo for information about upcoming events.)

A Rhododendron Returns

A willingness to adapt and change and to learn from experience may well be key to many of the successes at Muir Woods. Staff and volunteers are always on the lookout for early signs that something isn't working, so they can fix it as soon as possible. For example, they quickly realized that their elaborate new critter-proof trash cans were making too much racket and disturbing the visitor experience. “We have an engineer out now looking for solutions,” Monroe said.

Traffic jams and full parking lots are perennial problems, particularly in summer, although shuttles from east Marin, instituted in 2004, are helping. Shuttle connections to the Sausalito Ferry were added in 2007, and the park recently received a special grant to acquire hybrid vehicles for the shuttle service. Another serious problem—one with no remedy in sight, so far—



Top: Education intern Marisa Nordstrom introduces grade-school students to the forest.

Bottom: Chris Friedel maps a point in Redwood Creek where restoration workers will return each year to take photographs and document how the stream is changing.





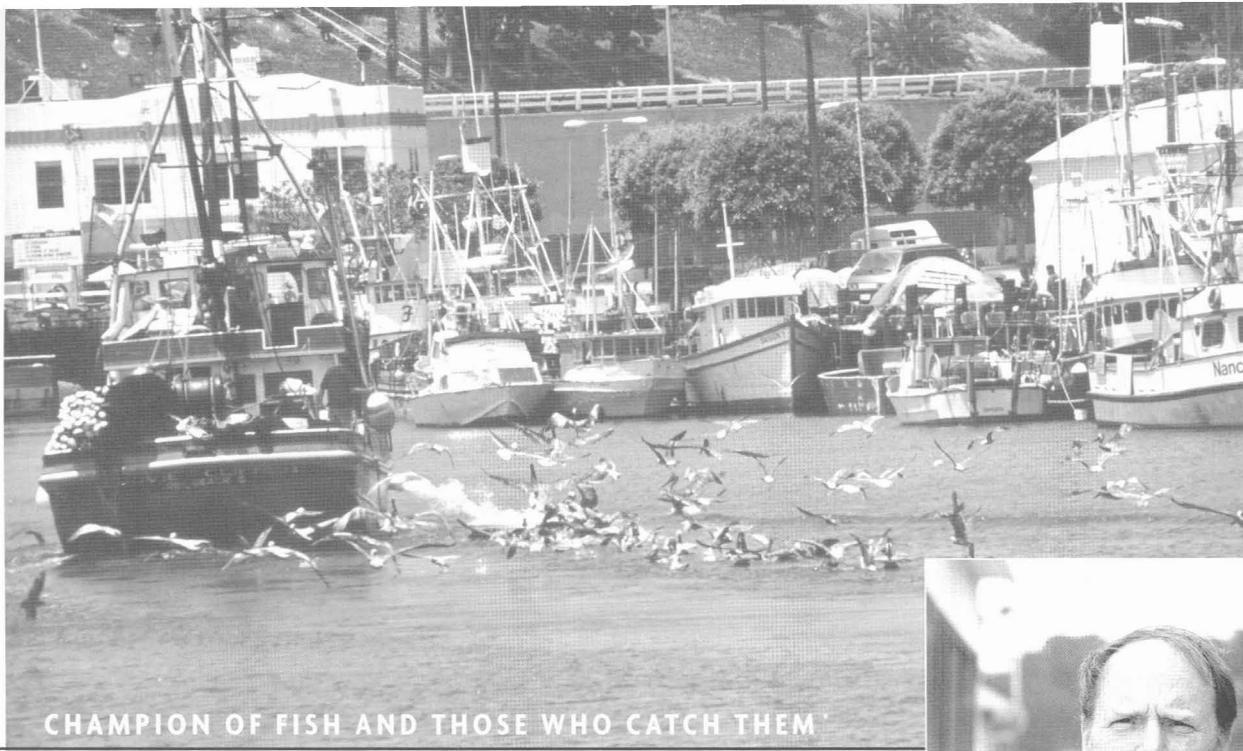
is Sudden Oak Death, which is now reaching epidemic levels. “Our whole understory is dying, and all the old oaks around us,” Monroe said. Climate change will add a whole new raft of problems, not least of which will be whether the redwoods, which need moisture and cool temperatures, can adapt.

There remain many things that the staff would like to learn about the park—for example, how tall the trees are exactly (they recently received funding to measure them), and what life is like in the canopy. Monroe would particularly like to learn more about the bats: An initial survey found that 15 different species use Muir Woods, but because the staff is rarely there at night, they don’t know much about the nocturnal creatures. “The survey showed that they tuck themselves between leaves and even use fire scars in the trees as caves,” she said. “We were surprised at how much of the forest they use.”

Monroe hopes that this centennial year will provide time for reflection about the park’s mission. “We’re hoping that a lot of profound questions will be asked this year—like, can we handle a million visitors per year?” Overcrowding not only wears on the park, it also keeps visitors from experiencing the awesome nature of the forest. Park managers are now considering a range of ways to achieve a healthy balance between people and nature, from requiring reservations to establishing quiet zones.

The challenges are endless, but there is also much to celebrate. Leopard lilies are growing in the forest again, and mushrooms and azaleas. Quail, chipmunks, pileated woodpeckers, and a huge flock of band-tailed pigeons have returned, not to mention the river otters. Bobcats, coyotes, and foxes are common. “There are all these exciting things that are giving us hope,” Monroe said.

As part of the park’s centennial celebration on January 9, 2008, volunteers and staff planted a locally rare Pacific rhododendron (*Rhododendron macrophyllum*) in the forest. The rhododendrons, which can grow to 40 feet, have been found in only three locations in Marin, the southernmost part of its range, but Friedel said that botanists believe it was once much more common locally. This year the nursery will plant more populations in Muir Woods and monitor them. The rhododendron’s return is just one more sign of the regeneration of this park where wildflowers had once all but disappeared—a sign of what can happen when you combine hope with hard work. ■



CHAMPION OF FISH AND THOSE WHO CATCH THEM



AN INTERVIEW WITH ZEKE GRADER

RASA GUSTAITIS

BY THE TIME I ARRIVED for our 7:30 a.m. appointment at his waterfront office at Crissy Field, in the San Francisco Presidio, Zeke Grader had been at work for more than two hours already. Early morning is the time he can get things done here without interruption.

The office is cozy, with a huge desk and comfortable leather chairs, the walls lined with books and photographs. It could easily be the study of a tenured university professor. And Grader is a scholar all right, with a law degree from the University of San Francisco, but he was drawn to a life of action. Having grown up around the boats and the docks in Fort Bragg, helping his parents, who shipped locally caught salmon to New York and Los Angeles to be made into lox, he had an eye for the fishing industry and a liking for the grumpy men and women who live from the ocean. He started at the Pacific Coast Federation of Fishermen's Associations at its founding in 1976 and has been its executive director ever since, navigating through times of major hardship and change with skill, good humor, and unflagging devotion to the 3,000 fishermen and women who work on small and medium-sized boats out of harbors in California, and some in Oregon and Washington as well.

Top: Pelicans follow a fishing vessel, San Pedro.

Inset: Zeke Grader

Coast & Ocean: I've been wanting to talk with you for a long time, but now seems the right moment because of what happened with the crab fishermen after the *Cosco Busan* oil spill. Here we have a disaster just before the season opens, California fishermen agree to postpone the opening until it's clear the crabs they catch won't be contaminated, and then in come some big boats from Oregon, drop their traps outside the Farallones and land their catch in the dark of night. It seemed so wrong. Can you put it into context for us?

Zeke Grader: Well, I think the biggest problem we've had in the crab fishery over the last decade or so is that there is an adequate resource to provide for our fleet but, unfortunately, with the cutbacks in the trawler fleet—particularly after overfishing in the groundfish fishery by some of the large trawlers—a lot of them have jumped into the crab fishery and are really trying to do the same thing to crab which they did in the trawl fishery.

We succeeded in limiting the number of vessels in the fishery over a decade ago. [The California fleet numbers about 600 permitted boats.] Now we have been tackling the issue of the number of traps used per vessel. Keep in mind, trap limits are nothing new, we have them in our lobster fishery in California and they're used in both the Maine and Florida lobster fisheries; Alaska has them and, as of a couple of years ago, Oregon and Washington have them for their crab fisheries. This is prudent in a number of ways: It provides for safer conditions for fishermen. Now, with so many traps out there, people feel compelled to try and fish every day, no matter what the weather, and they take risks. And then, so much crab hits the market at once [that the price is depressed]. If we reduce the number of traps, crab would flow into the market at a steadier pace.

So we are going to attempt to pursue trap limits again this year and we're hoping we'll be met with a different reaction from the governor, who has twice vetoed this legislation—and that's totally inconsistent with his big push for protecting our oceans. We think he vetoed it because of influence from one large Oregon processor, Pacific Seafood. We're hoping that's going to change now.

People with small and large boats now agree on trap limits?

Concessions have been made. Right now people are looking at what Oregon and Washington have done, 300 traps for small boats, 500 for those who have had very large production. A larger boat will still have an advantage because they can work in much tougher weather. And really, when they get over 400 traps it's not about how many they work per day, it's about staking real estate. It's just somebody trying to claim more of the crab grounds for themselves, as opposed to more equitable sharing.

Did the governor explain his veto?

The explanations were pretty lame. The cost, that it should be done through the Fish and Game Commission. But we don't expect the

Commission to take on the regulation of crab for at least ten years, they've got a big backlog of fisheries that they're trying to develop fisheries management plans for that are more pressing biologically—and I don't disagree. But we really need to deal with this particular problem right now before people are getting killed and

we completely destroy our markets by trying to jam all this crab into them at once.

The fishermen want the limits?

Most supported the limits, even many of the larger vessel owners. The problem now is that there are large trawlers from the north who are trying to fish as much crab as they can around the trawl season, really not caring much about the markets. And that's too bad because this is such a good product, it shouldn't be treated as just a common commodity. It's something very special and we need to be sensitive to when the prime market demand is, which is usually around Thanksgiving, Christmas, and New Year's, and try to provide for that.

There are two different markets. One is the fine white tablecloth market, the other is what I call the blue-collar thing, the crab feeds people put on as fundraisers for their volunteer fire departments, churches, scout troops, school

"Maybe we should just go with flavored Styrofoam . . . for those [casino] markets and save the good crab for the white tablecloth markets and crab feeds."

libraries. Those are fun, people enjoy them. Both of those markets are pretty important, we want to maintain both. The problem is [with most of the crab being caught early in the season], much of the crab now goes to the freezer. Much of it goes to the casinos, for their buffets, particularly on the Mississippi River. That's where this one large Oregon company that made the big campaign contribution to the governor has been selling, and that's a waste of crab because after it sits in the freezer for a bit it has the texture and taste of Styrofoam. Of course people who have been smoking and drinking all night and hitting the casino buffet, they probably wouldn't know the difference, so maybe we should just go with flavored Styrofoam or something for those markets and save the good crab for the white tablecloth markets and crab feeds.

So the large trawlers from Oregon were the ones that came in during the oil spill crisis here?

They [these trawlers] were the ones who were fishing when everyone else remained closed.

What happened after the Oregon boats unloaded their crab?

Some of it did reach the markets, but the word we had was that they had a real problem selling it because there was such concern about the safety of untested crab. Our argument was that we shouldn't be putting this crab on the market because we were uncertain about the exact extent of the contaminated areas until we'd done some testing. And that's what happened. After the testing was done and things looked to be clear, then everybody agreed to go fishing.

They were fishing outside the Farallones?

They were fishing inside the Farallones. Nobody was monitoring them that closely. The state closure only extended for three miles and we couldn't understand that. With the Coast Guard overflights we know the oil was out as far as eight miles. Why the Coast Guard did not share this information with Fish and Game, or whether Fish and Game chose to ignore it, we are not certain.

If someone had eaten a contaminated crab and gotten sick . . . ?



It would have basically destroyed our markets. And that's what we were worried about. We tried hard to make sure that crabs were safe and something people enjoyed. We work every year with the Department of Health Services on testing for domoic acid, which is a naturally occurring toxin, to make sure the crab were free of that, and we've had closures, and we asked for the closures [for the spill]. At the beginning of one season, over a decade ago, when crab tested positive for domoic acid, the Department of Health Services said they could do an advisory. [Domoic



Top: Totes of crab at the Caito Fisheries dock in Eureka. Workers will hoist the tubs onto forklifts and trundle them into the processing warehouse.

Bottom: Zeke Grader serving up the fish at a salmon barbecue



The Jenna Lee, docked at the Woodley Island Marina in Eureka, gets brisk business from local crab buyers as soon as the Dungeness season opens. Jenna Lee, 19, minds the boat-side sales after her dad, Kevin Pinto, goes out to sea in the mornings to pull in crab pots, returning in the afternoons with more fresh crab.

acid affects only the entrails, not the meat, but sometimes the entrails (or “butter”) are eaten.] We said no, we don’t want to risk it. Keep it closed, the crab will be there when they’ve purged this toxin out of their system, the season will just begin a little later.

There has been discussion of IFQs [individual fishing quotas] as a way to manage the crab fishery, and it’s said that has been successful in Alaska with halibut.

The only group that’s been pursuing IFQs that I know is Environmental Defense. And their push has always been to drive everything by market demand. For certain fisheries IFQs can work. For halibut and sablefish in Alaska they work, to an extent—but they require a great deal of regulation. For the crab, because of the nature of the critter, we don’t know each year how much is out there, so it makes it almost impossible to set a quota for it.

The way we’ve been able to manage the crab fishery is to go by what’s known as size, sex, and season, which to date seems to have worked. We are only taking male crabs over a certain size—they’ve been through one spawning cycle, so

there’s always a spawning population of male crabs. We do not take female crabs—we only take [the males], or try to anyway, during the time of year when they’re hard-shelled. So if they’re handled carefully and you get one that’s female or undersized, it can be thrown back and survive. That seems to work.

Now we’re increasingly concerned about the sheer number of traps out there, whether that much handling may begin to affect the biology of the crab. There’s also a concern about the recreational fishery: They’re allowed to take undersized crab and female crabs. If that fishery continues to grow and take more and more,

there could be a biological problem.

So IFQs for certain fisheries where we have some idea what the biomass is and we can apportion it, that can work—but even there we have to be careful because there’s been a big push on for processors to

get quotas of the take. What we’ve ended up with, in so many instances with IFQs, is basically sharecropper fisheries, where nonfishing quota owners lease them out. To prevent that from happening in the Alaska halibut and sablefish fisheries, only the boat owner or crew who actually fish may own or use the fishing quota.

“If kids had sardines or anchovies in their school lunch program they’d be a lot healthier, and probably better-behaved.”

So the common resource is privatized for the benefit of the few, as has happened with federal water?

It's somewhat like the situation we find ourselves in with some of the big water districts, which have contracts to buy water from the federal government very cheap and now they're turning around and selling it at a big profit. The water is not going on the land, it's basically being transferred to urban districts. And groups like Environmental Defense will argue water marketing makes for more efficiency. Well, I don't think it's made for more efficiency, I think it's made for some very wealthy people.

I think a better method for managing our fisheries is through community development, to assure local people [coastal fishing communities] retain an interest and benefits from the fisheries. We're now looking at how we might develop community-based management for the groundfish fishery, because it's in the rebuilding stage. It will take a lot of thought, even on how we define community. We

need to begin looking at how we can switch over to more community-based fisheries on a sustainable basis . . . probably at lower catch levels than we have now, but where we can develop more value from

the fish. We've already seen this with squid. With some of what we call the wetfish or forage fish—anchovies, sardines, squid, herring—we need to move from what I'd call industrial-level fishing to a smaller, more artisanal mode.

Rather than having those fish ground up for meal, ideally they should be targeted for fresh-fish markets. That will probably require working with chefs and others to create a consumer acceptance.

If kids had sardines or anchovies in their school lunch program they'd be a lot healthier, and probably better-behaved, because these are oily fish with omega-3s which do help with childhood behavior. Moving in those types of directions will be difficult, because right now there's a big demand for sardines for feeding tuna net-pen "ranches" off Mexico. Absolutely the wrong way to be doing fisheries. Here we are taking fish—sardines, anchovy—that were food for coastal communities for thousands of years in places like Peru. Now these fish are being taken not for human consumption, but

to grind up for fish meal, for either salmon farms or tuna ranches, basically to go into the first-world middle-class or wealthy restaurants—and very inefficiently.

What are tuna net pens?

It started in the last few years, right off Ensenada, and also in Australia, I believe, and a few other places in the world. They're not rearing the tuna, they're capturing them and keeping them in feeding pens—they're called fattening pens; they're like feed lots. It takes a lot of energy, so your conversion ratio is 20 to 1, for 20 pounds of feed you may get one pound of tuna going to prime sushi bars.

Is this part of the ocean farming that's now being promoted?

It's one form. Salmon are more efficient in the conversion of feed than tuna, but their ratio is still three to five to one, and there are all kinds of

problems associated with both types of operations.

Aquaculture utilizing carnivorous stock hits wild forage fish harder to provide the feed for those operations. I think the best use of the smaller wild fish, particularly the oily fish, is to

begin developing them for fresh markets, not to feed aquaculture operations.

As with squid. I remember 30 years ago when squid was bait. The only people who knew [how to prepare it] were some of the Italian fishermen's wives. But that's changed. Having it called calamari—nobody knew what that meant—that helped, I think.

The market for local fresh fish is starting to happen, isn't it?

Yes, we can move in that direction. But it requires continued pushing, getting people to think in that direction, with anchovies, squid, and herring certainly. The herring fishery in the Bay has been hurt by decline in the price for roe [kozonoko]. We should be looking at better utilizing the male herring, maybe looking at old recipes, finding new ways to prepare them. It's transitioning so these fish are not just ground up for other fish to eat, but instead go directly to market [for human consumption].

"I remember 30 years ago when squid was bait, but that's changed. Having it called calamari helped, I think.

It also means we don't have to harvest so much. Remember, these fish are not just eaten by people, they're food for marine mammals, seabirds, and other fish. . . .

Isn't this a good time for these changes, with global warming, and . . . ?

It is, we just have to be cautious of some of the glib solutions—like putting all of our fisheries under IFQs or, with the ocean, protecting only certain areas. To conserve our oceans you've got to protect it all, not just portions of it. A good part of this will depend on people getting more educated.

We're saying: rather than doing aquaculture in the ocean, let's look at places where we can do this ashore. The argument in the past was where do you find the land for that? Well, in the western San Joaquin Valley there are places we know where if we put water on the land, we get a toxic mess. So why not put containerized aquaculture for tilapia or barramundi or some similar fish there? The water [in the fish ponds] recirculates. You have to add some water but not that much. Also [in the San Joaquin Valley] you're midway between two large fish-consuming markets—the San Francisco Bay Area and the Los Angeles Basin—so transportation is not an issue.

Why aren't people doing that now?

That's like saying why are people not doing solar. You need leadership, you need to offer up some carrots as incentives to get people to think that way and do it.

We're also thinking about the Klamath Basin, looking at some fish production there on retired irrigated lands.

Right now there's a big push by the federal government for open ocean aquaculture. We think it's partly driven by the fact that there are so many offshore oil rigs whose useful life is nearing an end, and the oil industry is either going to have to remove them or do something with them. Of course if you can convert them to something like offshore platforms for aquaculture, it allows the existing operators to get out from under removal and cleanup costs.

One more question on salmon aquaculture: Is there a way to grow salmon in pens without contact with the ocean?

Yes. In fact, they are doing some experimenting right now in British Columbia where they called for completely containerizing them.

So then all you have to do is turn the salmon into vegetarians, right?

Not exactly. People say: Well, we'll feed them soy. And I'm a bit nervous about that, that's like saying we'll take all this corn and make fuel from it. That's terribly inefficient. In the case of soy, why would you be taking perfectly good protein and feeding it to another animal that has to convert it?

And then, soy and corn are two of the principle crops being genetically engineered. Mainly Monsanto's pushing it. They're not being genetically engineered to be more drought-resistant or more nutritious, they're being engineered so they're more Roundup-ready. So we're putting more pesticides into the environment with GE crops.

To me that means—step back and think about this—there need to be new ways of developing feeds. One thing we've thought about is fish offal, fish scraps. That's a good use, it's not commonly seen as a protein that feeds humans. Secondly, maybe it's time to look at invasive species. Much of our focus on invasive species has been on prevention, which I think is the correct one. The problem is: What happens when you have invasive species established, how do you control them, and what's the cost of controlling them? So oftentimes we want to poison them. That creates other problems in the environment. Hand-removal costs a lot. However, if we can find something to do with some of these critters, like the quagga mussels and zebra mussels which have now arrived, maybe we can find a way to grind them up and use them for fish feed. In this particular instance you will probably want to develop industries that are [set up to be] unsustainable. You might wipe those invasive species out!

Has anybody experimented with that?

No, they haven't. We'd like to push people in that direction. If you're an entrepreneur, you look at

"We tried to propose something like [grinding up mitten crabs for fish feed] and they said, 'Oh my God, you can't have people profiting from them!'"



Mel Davis, a mentor to Zeke Grader, "splitting" salmon at Grader Fish Company in Fort Bragg, 1965 (see p. 30)

what's available right now. When you have sources of fishmeal coming from Peru or wherever, then you're perfectly content and don't look in any new directions.

And not a single scientist has jumped at this idea?

No, they want to just keep studying it. We tried to propose something like this [a fishery to control invasives] for the mitten crab and they said, "Oh my God, you can't do that, you can't have people profiting from them!"

They said: It could cause it to spread. We said: Bond the individuals doing this. They said: We don't want to get these things in the market. We said: Limit the markets. Let them all go to Asia, where they came from and where there's ample demand. We air ship fish all around the world. That's just one example. I don't think enough people are willing to consider new and innovative solutions to the problems confronting us. We're trying push them into new ways of thinking.

What about the problem of sea mammals eating up the salmon? I've heard you've proposed shipping some of them to Norway to be made into sausage.

[Laughs] We've had fun offering some tongue-in-cheek solutions. Unfortunately, people took

us too seriously, failing to see the humor. I don't know what the answer is. But I get a bit nervous when I hear people, particularly on the Columbia River, or on the Klamath, saying we don't get any salmon back because of the sea lions, and my thinking is—maybe if we operate dams differently, or even remove some dams, like on the Snake River, the fish will rebound. At times I think marine mammals do become a convenient scapegoat for bigger problems. On the Columbia, when I hear the Bonneville Power Authority or National Marine Fisheries promoting these takes of marine mammals, I get a little nervous.

Marine mammals were a part of the overall ecosystem before the white man arrived. We never saw rookeries onshore because of predation by mountain lions and bears, and also native hunters. But at the same time I suspect there were probably large populations out on the islands or somewhere they were protected. So we've changed their behavior.

The question becomes: are there humane ways of dealing with these populations and doing it in such a way that we don't lose sight of where the bigger problems are?

Do you see some hope now on the Klamath, in light of the proposed Klamath Basin Restoration Agreement announced January 15? [See www.nccsp.org/files/water-documents-for-the-press-release-summary.]



Lois Prentice and her husband Zeke Grader in Sydney, Australia, after a fisheries conference in January, 1995

This agreement—depending on what PacifiCorp does with it—could help get us to removing the dams. . . . I think there's some good in the agreement and some things that have to be hashed out. . . . It will take a lot of work.

I told somebody about a year or so ago—they were asking, “When are you going to retire, you’ve been doing this so long?”—and I said, 30 more years. And now this Klamath agreement comes on: 50 years! That’s going to be pushing it. One of my mentors, the old guy in the picture on the wall, who’s cutting fish, retired at 88 or 89, and I might be able to do that, but beyond that it would be really pushing it; even that is going to take a lot of luck.

You obviously are totally committed to what you’re doing.

[Laughs] Mostly, I think, determined. They’re not going to get the better of us.

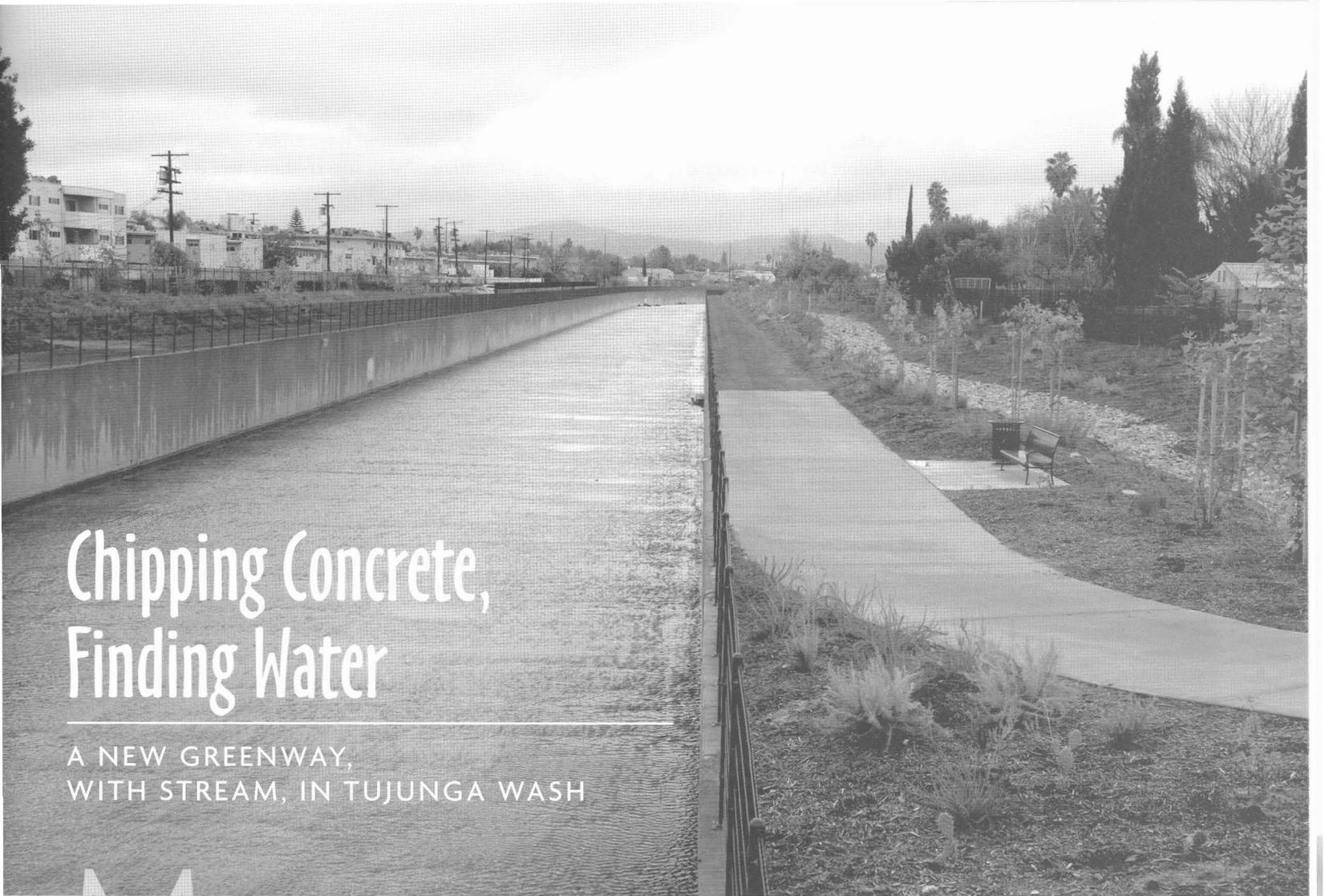
Did you ever consider doing anything else?

I was in college. I enjoyed it but had no direction of where I was going to go, other than that I had to stay in to get out of the draft, and even that I could only extend for so long. I thought about teaching, and about law. I’d gone to law school,

but nothing really excited me. And I got involved in this. You know, I’d been around fishermen all my life, I watched my father and some of the fish politics and had always taken an interest in it, and I enjoyed the fishermen. I still think that as cantankerous as they are they’re probably the best people there are to work for. I felt this was something I could contribute to and something I would probably be better at than anything else where I just wouldn’t have the interest.

Someone told me you considered going into the priesthood.

Oh God, no. I think I jokingly said doing this job is like being in the priesthood—you take vows of poverty and celibacy and everything else. You don’t see your spouse, and when you do they’re angry with you because you’re never home. But my wife has been a good sport. The job takes quite a bit of commitment. But with the commitment comes the enjoyment. I always found that the things I could really get into are the things I really enjoyed. So I can’t complain. It’s been a lot of hard work, but at the same time I’ve loved every bit of it. It’s been very frustrating at times. You see the things that need to be done, and you don’t always have the time or resources to do them. But you just keep fighting. ■



Chipping Concrete, Finding Water

A NEW GREENWAY,
WITH STREAM, IN TUJUNGA WASH

MUCH OF THE LOS ANGELES watershed was buried under concrete in the 1950s, when the freeways opened orange groves to development and the Los Angeles River and its major tributaries were turned into flood control channels engineered to rush water to the ocean at maximum speed. Water that used to feed the aquifers was lost in transit, but back then, few people worried: more could always be imported from the north.

Now, however, in the face of climate change, water quality concerns, and expectations of drought, a movement is afoot to capture as much as possible of the streamflow and rainwater in the county for use in projects that would mitigate pollution while also replenishing depleted groundwater supplies.

A unique new park and greenway, with a natural-looking stream, was opened on November 7, 2007, in the Valley Glen neighborhood of Los Angeles. It runs a mile along both sides of the Tujunga Wash Flood Control Channel, between Vanowen Street and Oxnard Avenue. Each side of the greenway is 65 feet

wide; the rectangular channel in the middle is about the same. The Tujunga Greenway and Stream Restoration Project, created by Los Angeles County and the Mountains Recreation and Conservation Authority (MRCA) and funded by \$7 million from bond acts and other public sources, could well become a model for others.

On an overcast winter day, Anne Canright and I parked on Vanowen, entered through a handsome wrought-iron gate (by Brett Gladstone, who designed most of the gateworks on the Los Angeles River), and strolled along a gravel path, with the fenced vertical bank of the channel to our left, and to our right a friendly little stream. The shallow stream meandered over small stones and gravel, flanked by young alders, cottonwoods, ferns, salvias, and other greenery. Interpretive signs at the trail explained that the stream is fed by water diverted from the channel through a half-mile-long pipe. As the water flows through the greenway, it is filtered and cleaned by sand, gravel, and tree roots. Some percolates into the ground, the rest is

RASA GUSTAITIS

The new stream runs past young trees beside the path, which is mostly gravel.

returned to the flood control channel via another pipe.

Before the flood control channel was built, Tujunga Wash had contributed to the 40-square-mile San Fernando Valley Aquifer. Since the early 1950s, it had been emptying straight into the Los Angeles River. Now, through this new stream, it is again helping to retain water in the ground. According to the MRCA, in a year with average rainfall, 325,000 gallons a day are expected to flow through, as much as is used by the average four-person family in a year.

Soon we were met by three MRCA staff members, Barbara Romero, director of urban pro-

grams, Elizabeth Jordan, project manager for the greenway, and Dash Stolarz, director of public affairs. “Almost everything here is native,” Romero told us. “We’re trying to create a natural system in an unnatural area by letting plants compete.” Some won’t make it, but that’s part of the restoration process. So are changes in the stream, which was built six feet wide, but has expanded to eight feet in some spots. The water is having its way.

Some compromises have proved necessary: at the Oxnard end of the greenway, we came upon a lawn on the other side of the channel. Originally this area had been seeded with native meadow grass, but “it was dead in two weeks,” said Jordan. Ulysses S. Grant High School is across the way and this area gets a lot of use. “So we tried to make it green, and as rugged as we could.” Nor did the fine wood surface on the nearby picnic table survive unscathed for long. As we passed, rangers were at work removing graffiti. Maintenance will be an ongoing concern.

Before the first piece of concrete was broken for the greenway, five years of planning were required and many neighborhood meetings had been held. Many of the local residents are people of modest means. Among older inhabitants, a good number are of Armenian descent, Jordan said, while many of the younger people are Hispanic. As in many other Los Angeles neighborhoods, they have too few parks to enjoy. This greenway cannot provide playing fields but it offers some green space, a place to relax, exercise, and learn about local trees and plants—even while the pleasant new stream supplements the groundwater.

Before leaving, we crossed Vanowen to look at the flood control channel on the other side, with flat, bare, and bleak banks—a blight on the neighborhood. That’s how the site of the greenway looked not long ago. The Los Angeles Flood Control District manages 500 miles of open channels. We had seen the first of what could be many greenways.

“My father asked me what I do and I said I’m in sales,” said Jordan. “I’m selling the idea that parks and greenways provide multiple benefits.”

Meanwhile, upstream in the Tujunga Wash, a much larger water retention project is being planned. Throughout the watershed, other encouraging steps are being taken. Coast & Ocean will report on these in upcoming issues. ■

Top: Before the greenway was built, this mile of the Tujunga Wash Flood Control channel looked like its other 499 or so miles. It was flat, flanked by concrete and gravel, and barren.

Bottom: A closer view of the stream





Mountains to the Sea

THE JOB I AM PRIVILEGED to hold takes me routinely to some of the most beautiful coastal places in our state: Point Saint George, redwood forests, the Monterey Peninsula, Morro Bay, the Laguna Coast Wilderness, and everywhere in between, all the way south to the Border Highlands. When it is time for recreation, however, I frequently head for the top of the watershed: the mountains.

I have loved mountains ever since I started backpacking as a boy in the Shenandoah Mountains of Virginia. Moving to the West Coast in 1983 afforded me the opportunity to meet what Westerners smugly call “real mountains”—the Rockies and the Sierra. For the past 24 years I have backpacked at least once a year in our mountains, and skied almost every winter.

This has been a great winter for skiing, though it had a slow start. I managed to fit three trips into my usually hectic schedule. Moving back and forth between coastal regions and the Sierra Nevada, I have been reflecting on what the two landscapes have in common. Together, they define California: the coast is our western (land) boundary, and the Sierra effectively isolates us from all the country to our east. And of course the mountains are the top of the coastal watershed. Both the coast and the mountains are geologically active, riven with faults and prone to earthquakes. As the shoreline keeps eroding, mountain ranges are growing, forced up by the same tectonic forces that impel wise Californians to stock a week’s worth of food somewhere in their homes. The two regions also share the trio of California’s other big natural disasters: fire, flood, and mudslide.

Conservationists are aware of further common problems: invasive species, an overabundance of endangered species, and land use conflicts among varied recre-

ational groups. Extractive industries like timber and mining operate in both coastal and mountain regions and have a long list of complicated issues associated with them. And then there is development. The very same forces that catalyzed a citizens movement that led to the “Save Our Coast” voter initiative of 1972 and the California Coastal Act of 1976 are now at large in the Sierra Nevada and its foothills.

I was reminded of this on my latest and probably last ski trip of the season. (Never say never!) When we arrived at our rented cabin in the Serene Lakes development in Soda Springs, we found that the landlord had left for us, along with the usual emergency numbers and instructions for operating the woodstove, a flyer entitled “Save Donner Summit” (see www.savedonnersummit.org). It stated that Royal Gorge, where I have been cross-country skiing for years, together with 3,000 nearby acres, had been purchased by a development group that was planning to build a resort complex with two hotels, several ski lifts and runs, two artificial lakes, 600 “share ownership” condominiums, and hundreds of home sites.

I was on vacation. I did not want to hear about this. But the thought that the place where I learned to cross-country ski might be developed gave me pause. Sure, there might be need to accommodate more skiers in the mountains. Heck, I was staying in a four-bedroom cabin with three other families in a development that was probably opposed by the locals when built. But when is enough enough? Serene Lakes is a simple grid of mostly rustic-looking cabins, with a lodge on a lake at one end and the Royal Gorge cross-country ski area at the other. Royal Gorge itself is mostly open space,



with trails in the woods. Everything else is National Forest.

Fortunately, the Sierra Nevada, like the coast, now has its own conservancy. Legislation sponsored by Assemblymen John Laird and Tim Leslie establishing the Sierra Nevada Conservancy was signed into law in 2004 by Gov. Arnold Schwarzenegger, and began operating the following year. Like the Coastal Conservancy, but unlike the seven other State conservancies in California, it has a broad geographical mandate. It can work along the entire extent of the Sierra Nevada from Oregon to Kern County. Its mission statement, which you can read at <http://sierranevada.ca.gov>, declares: “The Sierra Nevada Conservancy initiates, encourages, and supports efforts that improve the environmental, economic and social well-being of the Sierra Nevada Region, its communities and the citizens of California.”

Unlike the Coastal Conservancy, which benefits from the existence of the Coastal Act and the Coastal Commission, the Sierra Nevada Conservancy has no specifically regional regulatory agency to back it up and strengthen its hand. It can do a great deal, however, to sort out conflicts and find appropriate ways to protect our natural heritage while also, perhaps, accommodating some of the growing pressures for development for a variety of conflicting uses. Regardless of what the future brings, we are all better off having a conservancy focused on the mountains that define us as a state, provide us with water, and give us endless opportunities for recreation and reflection. Anytime my friends at the Sierra Nevada Conservancy want to come and catch some rays at the beach, I’ll be happy to show them around.

—Sam Schuchat

COASTAL CONSERVANCY NEWS

CONSERVANCY RESPONDS TO CLIMATE CHANGE

Global climate change will likely have profound effects on almost every aspect of the Conservancy's work, from habitat preservation and stream restoration to coastal access. That is why, in addition to taking steps to reduce its carbon footprint, the Conservancy has now begun to collaborate with agencies and researchers to learn more about the impacts of climate change and what can be done to build adaptation and mitigation into all of its projects.

To reduce its own contributions to greenhouse gases, the agency is offering alternative work schedules and telecommuting opportunities. To cut down on travel, more phone conferences are being held and the option of teleconferences is being developed. The agency will lease a low-emission vehicle for local travel. Staff is encouraged to rent low-emission vehicles when traveling and to use public transit, carpools, or bicycles to commute. An effort is being made to cut down on paper use and to be diligent about turning off lights and equipment at the workday's end. The Conservancy has joined the California Climate Registry and will be calculating its own carbon footprint this year, to provide a baseline for measuring progress.

The Conservancy is working with other state and federal agencies to collect, assess, and make available the most up-to-date scientific information about climate change and its effects on shoreline processes and ecosystems. Projections for sea level rise are being built into all trail, park, and wetland restoration projects. Decisions about which pieces of land to help preserve will take into account the need for corridors that will allow animals and plants to migrate as temperatures rise, and restoration project managers will have to consider how a changing climate may also change the types of habitat within their geographic area. Predicted changes

in rainfall and stream flows will be considered in stream restoration projects to benefit anadromous fish. The Conservancy is also discussing what types of changes, if any, it might require from partner organizations and grant recipients.

"I suspect that the changing climate will dominate our thinking and our work for the rest of our professional lives," said the Conservancy's executive officer, Sam Schuchat. "Although this is a small agency, we play a large role in coastal California, where about 80 percent of Californians live."

The Conservancy is also collaborating with the California Ocean Protection Council and others to help fund some climate-related research, including one study that will assess how high the sea level will rise along different sections of the state's coastline, and how and where the shoreline will be affected by storm surges and erosion rates. Another research project will refine a hydrodynamic and sediment transport model of San Francisco Bay and use it to help scientists understand how climate change is affecting these processes.

TOLAY CREEK RANCH ACQUIRED

The Sonoma Land Trust acquired 1,657 acres of the Roche family ranch in the Tolay Creek watershed on December 21, 2007, thereby opening the way to restoration of the creek's entire main stem and allowing wildlife to move within a much-expanded range of protected areas. The Tolay Creek watershed connects upland seasonal and freshwater wetlands to the tidal lowlands of San Francisco Bay.

The property will be added to Tolay Lake Regional Park, nearly doubling the park's 1,737 acres and linking it to 40,000 acres of protected land along the Sonoma, Napa, and Marin baylands, including the Sears Point, Sonoma Baylands, and Petaluma Marsh restoration projects, and the San Francisco Bay National Wildlife Refuge. A seven-mile trail is planned from the park to

the San Francisco Bay Trail at Sears Point, on San Pablo Bay.

The ranch's oak woodlands, grasslands, and meadows support a number of state and federally listed threatened and endangered species, including burrowing owls, northwestern pond turtles, golden eagles, and California horned larks. Before turning the land over to the County of Sonoma Regional Parks Department, Sonoma Land Trust will conduct a baseline survey, develop an interim plan to allow continued cattle grazing to control invasive plants, put in fences to keep the cattle out of the creek, and plant native plants. During this period, Regional Parks will lead guided hikes onto the property.

The Conservancy provided \$3 million toward the \$13 million purchase price, \$1 million less than the property's appraised value. The Gordon and Betty Moore Foundation, Wildlife Conservation Board, Sonoma County Agricultural and Open Space District, and the Land Trust also provided funding. The family retained 400 acres of the ranch as part of its Roche Carneros Estate Winery, which is on the other side of Highway 121.

CONSERVING TOMALES BAY AND THE WEST MARIN LANDSCAPE

Almost from its inception three decades ago, the Coastal Conservancy has been working in the Tomales Bay watershed, collaborating with dairy ranchers and others on projects to benefit natural communities as well as local agriculture. In fall 2007, the Conservancy approved three grants totaling \$3,000,000 toward those ends.

The Point Reyes National Seashore Association will use \$1.5 million approved in September 2007 to help restore over 500 acres of tidal marsh, riparian habitat, and native grasslands on the 550-acre Giacomini Ranch, a former dairy farm purchased by the National Park Service in 2000 and now part of the Seashore. The estimated cost of the project is \$5.5 mil-

lion. The Point Reyes National Seashore Association has raised \$4 million from other public and private sources.

The Seashore Association will remove levees built in the 1940s and restore the expansive wetlands that existed here at the mouth of Lagunitas Creek before they were drained for use as pasture. Tidal channels will be expanded and new ones created. Riprap will be removed along the banks of Lagunitas Creek and its tributaries, and replaced with riparian vegetation.

If things go according to plan, the restored wetlands will teem with life, from juvenile coho and chinook salmon to tidewater gobies and California black rails. In addition to providing valuable habitat, the wetlands will improve water quality in Tomales Bay, which has deteriorated over the last century because of excessive fine sediment, nutrients, and pathogens from stormwater runoff, failed septic systems, livestock, and recreational boaters. Two-thirds of the bay's freshwater inflow passes through the mouth of Lagunitas Creek, where the wetlands will filter out sediment, excess nutrients, and pathogens. The marsh restoration will also provide flood control for homes along the creek by removing levees and other manmade obstructions and increasing the amount of floodplain available for floodwaters.

Two additional Conservancy grants helped the Marin Agricultural Land Trust (MALT) to purchase conservation easements over 993 acres of rangelands that also drain to Tomales Bay. One grant, \$750,000 approved in September, filled the funding gap needed to secure a conservation easement on 750 acres of the Poncia Ranch and helped the Land Trust raise \$1,250,000 in federal and private funds for the purchase. Eugene Poncia, a fourth-generation Marin County rancher who has lived on the ranch his whole life, used the income from selling the easement to buy out his cousins, who owned 50 percent of the ranch, enabling him to continue farming the land. Without the easement, Poncia would have had to sell the ranch on the open market to fulfill an agreement with his cousins.

The second \$750,000 grant to MALT, approved in November and supplemented by \$250,000 of private funds, purchased a conservation easement on 243 acres of the 505-acre Tomales Farm and Dairy, enabling



its owners to pay for improvements to the land and infrastructure needed to begin organic dairy operations, grow specialty crops on small tracts, and make artisan cheese to sell directly to the public. This type of innovative, specialized agriculture is increasingly necessary for small farmers to survive in areas like Marin County that are highly valued for development. In 2006, the Conservancy helped fund purchase of an easement on 178 acres of the eastern portion of this farm, which allowed the owners to begin an organic cattle grazing business and build fences to keep the cattle out of Keyes Creek, to protect the creek banks and allow willows and other native plants to grow back.

Both the Poncia and Tomales Dairy conservation easements include requirements to protect streams from the effects of inappropriate grazing. Keeping the creeks healthy as they flow through these rangelands enhances habitat for coho salmon, California red-legged frog, and other wildlife, and protects Tomales Bay from the sediments, nutrients, and pathogens that degrade habitat and sometimes shut down the bay's oyster-growing operations.

LAND'S END TRAILHEAD MAKEOVER

The Land's End/Sutro Historic District, in San Francisco's northwest corner, is one of the most popular places within the Golden Gate National Recreation Area, drawing over 1.4 million people a year. The

Poncia Ranch, Marin County

Land's End segment of the Coastal Trail offers walkers a taste of wilderness within the city, as well as spectacular views across the Golden Gate. It runs for roughly 1.5 miles from the Merrie Way parking area northeast to Eagle's Point Overlook near the Sea Cliff neighborhood.

Despite its popularity, Land's End had been neglected for years, until 2006, when the National Park Service and the Golden Gate National Parks Conservancy began to improve trails, thin trees to open views, and replace invasive plants with natives. Now further improvements are under way. With the help of \$850,000 approved by the Conservancy in December 2007, the parking lot at Merrie Way, just above Cliff House and the Sutro Baths, is getting a facelift, and a Coastal Trail "grand trailhead" is being built.

An overlook with seat walls and benches will be built along the entire 415-foot length of the parking lot, a wheelchair-accessible pathway will be constructed, and new interpretive signs will be erected. The existing Land's End trailhead will be expanded and landscaped to provide a place for groups to gather and listen to presentations. The parking lot will be terraced, with native plants between the terraces, and wheelchair-accessible parking spaces will be next to the overlook. There will be a drop-off area and a separate area for tour buses.



Young leaders from the San Francisco Urban Service Project volunteer at Heron's Head Park.

BAY AREA ENVIRONMENTAL EDUCATION GRANTS

In December 2007, the Conservancy approved \$1,774,681 to 20 San Francisco Bay Area nonprofit organizations and government agencies for 21 projects that combine habitat restoration and trail work with environmental education. Students and other volunteers involved in these projects will get hands-on experience in making positive changes to their local environment. The projects range from helping to restore tidal wetlands, stream corridors, and oak woodlands to building or enhancing key regional and local connector trails, and will directly serve more than 22,000 people throughout the nine Bay Area counties. All the recipients reach out to underserved communities, and all are providing some matching funds.

The awards include:

- To Save San Francisco Bay Association, \$125,000 for planting projects at five tidal marshes around the Bay, for the benefit of fish, shorebirds, and other wildlife;
- To Berryessa Trails and Conservation, \$80,000 to remove invasive species, plant native plants, and clear and build trails within the Lake Berryessa Recreation Area;
- To the Bay Institute, \$120,000 to restore streams and estuaries in the San Pablo

Baylands, Laguna de Santa Rosa, Tomales Bay, and Napa River watersheds;

- To the Solano County Resource Conservation District, \$148,680 to plant native plants, install irrigation, reduce erosion, and implement stream biomonitoring to benefit the Suisun Marsh Wetland and the Bay Delta Estuary, and to improve a section of the Bay Area Ridge Trail;
- To the East Bay Municipal Utility District, \$50,000 to restore oak savannah in the flats surrounding creek restoration sites throughout the utility's watershed lands;
- To the Golden Gate Audubon Society, \$90,000 to remove trash and invasive species and plant native plants within the San Leandro Bay watershed;
- To the Golden Gate National Parks Conservancy, \$120,000 to build trails in San Francisco's Presidio and to remove invasive species, plant native plants, and control erosion along Marin's Redwood Creek. Another \$120,000 goes to the Marin Conservation Corps for restoration in and along Redwood Creek at the former Banducci farm site (see p. 16) to help endangered coho salmon;
- To the California State Parks Foundation, \$60,000 to restore wetlands along San Francisco's Yosemite Slough and plant native plants throughout Candlestick Point State Recreation Area;

- To Literacy for Environmental Justice, \$90,000 to restore wetlands at Heron's Head Park in San Francisco;
- To the San Mateo County Department of Parks, \$38,122 to rehabilitate two seriously neglected trails on San Bruno Mountain; and
- To the California Department of Parks and Recreation, \$50,000 to remove invasives and plant native plants, as well as clean up the river and beach, at Half Moon Bay State Beach and Pigeon Point Light Station.

SANTA CRUZ HARBOR TRAIL REPAIRS

A popular but sometimes steep and poorly paved trail in the Santa Cruz Small Craft Harbor will be broadened, regraded, and repaved to accommodate wheelchair riders, with the help of \$250,000 approved by the Conservancy in November 2007. The Santa Cruz Port District will use the funds, along with \$675,000 in private donations and \$21,000 of its own money, to replace the existing West Jetty Pathway and add landscaping, harbor overlooks, benches, interpretive signs, and other amenities.

The Pathway runs along the harbor's navigation channel from a restaurant at the foot of Atlantic Avenue to Walton Lighthouse at the jetty's south end. Visited by 150,000 people each year, it is a spur of the two-mile Harbor Trail, which in turn is a segment of the Monterey Bay Sanctuary Scenic Trail. When completed, the Scenic Trail will travel along the edge of Monterey Bay from Santa Cruz to Pt. Pinos Lighthouse in Pacific Grove, and will serve as the California Coastal Trail through this area.

HUNTINGTON BEACH WETLANDS GAIN

Orange County's Huntington Beach Wetlands are a remnant of the coastal wetland system created by the meandering of the Santa Ana River, which extended over 2,950 acres before most of it was drained and filled for agricultural and urban development. Much of the approximately 300 acres that remain were cut off from tidal action by construction of the Pacific Coast



Santa Cruz Harbor

of the fastest-growing in California. When and if it is completed, the parkway will be one of the longest urban recreation and river parkways in the nation. It will connect 17 cities, traveling from the coast up through urban areas of Orange County and the Inland Empire to National Forest wilderness areas. The trail is designed to be used by bicyclists and horseback riders as well as hikers, and will connect inland communities to the California Coastal Trail. Within communities, it will link playgrounds, schools, commercial centers, residential neighborhoods, and natural areas.

Progress on the parkway proceeded in fits and starts from the 1950s until 1990, when the three counties, along with 11 cities and various agencies, came together to adopt a regional approach to planning the trail. In 2005 the parties adopted a Parkway Partnership Action Plan to help coordinate planning and secure funding for trail projects. The Partnership's work plan lays out a strategy for completing the backbone of the trail by 2012.

Orange County has already completed 24 miles of trail and has to build only 4.5 more miles to finish its stretch of the parkway, but the projects needed to complete them—including one road undercrossing and two bridges across the Santa Ana River—are complicated and potentially costly. The County will use the Conservancy funds to refine trail alignments, develop conceptual plans, identify areas where right-of-way agreements will be needed, and prepare an engineer's report for the projects required to finish three of the 4.5 miles. Riverside County has completed 12 miles of the parkway and will use the Conservancy funds to plan alignments, analyze environmental impacts, and complete detailed engineering and permit applications for its remaining 22 miles. San Bernardino County will use the Conservancy funds to design approximately four miles of trail in its remaining 14-mile gap. These four miles will connect to the county's existing seven miles of paved parkway. Eighteen miles of dirt National Forest trail also lie within the county's boundaries.

Highway, channelization of the river, and construction of flood control channels. Over the past 20 years, the Huntington Beach Wetlands Conservancy has acquired approximately 120 acres of degraded tidal marsh, restored 27 acres of one of the marshes in the complex, and constructed a wetlands education and wildlife care center. It continues to restore and enhance the wetlands, as well as acquire new acres as they become available.

With the help of \$865,000 approved by the Conservancy in November 2007, 16.6 acres of tidal marsh will be restored and added to the complex, which will total 191 acres when the project is complete. The Huntington Beach Wetlands Conservancy will use the grant to buy the 16.6 acres, which are currently owned by the University of California, Riverside. This acquisition will allow the property to be included in the restoration work scheduled to begin

in 2008. Eventually trails will connect the wetlands to the regional trail network and to nearby parks and schools.

RIVER PARKWAY PROGRESS

For 50 years, citizens groups and community leaders in San Bernardino, Riverside, and Orange counties have dreamed of completing the Santa Ana River Trail and Parkway, running 100 miles from the crest of the San Bernardino Mountains to the coast near Huntington Beach. About half of the parkway has been completed or is under construction, and now, with the help of a \$2,750,000 grant approved by the Conservancy in December 2007, planning and design can go forward on 29 more miles in the three counties. When these projects are completed, only 11.5 more miles will be needed to finish the parkway.

More than 7 million people live in the region through which the trail passes, one



On November 10, 2007, hikers and bicyclists celebrated the opening of a new section of trail that closes the "Hole in the Hammond" Trail in McKinleyville, north of Humboldt Bay. The new trail segment—a pedestrian path along White Widow Creek and a paved trail for bicycles that bypasses the creek—connects two existing trails, allowing continuous travel for over five miles between the Mad River and Clam Beach County Park. Local agencies, organizations, and citizens have worked for more than 25 years to develop the Hammond Trail—an effort the Conservancy has contributed to since 1978, most recently with a grant of \$700,000 to help complete this new section.

BOOKS



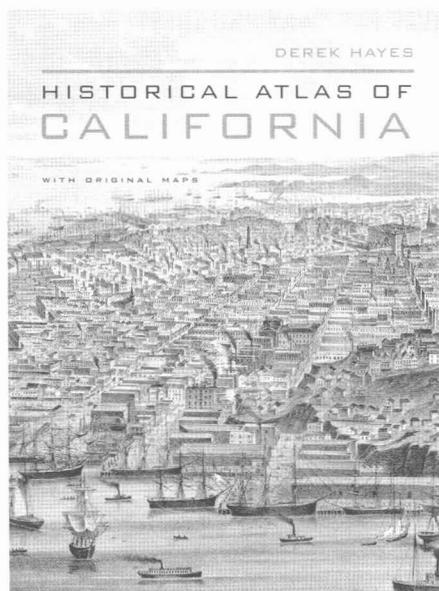
MAPS OF A CHANGING STATE

Historical Atlas of California with Original Maps, by Derek Hayes. University of California Press, Berkeley, 2007. 256 pp., 550 color illustrations, \$39.95 (hard cover).

Any book on the cartography of California that opens with a full-page joyous and vividly colored cartoon map of the state by the great Jo Mora is bound to be a winner. Derek Hayes is a map collector and scholar who lives in Vancouver, British Columbia, and he has become a prolific author of historical atlases. His latest project received lavish design and production support from the University of California Press, as well as the attention of very good book printers in China, and the result is a volume that sparkles on every page.

The atlas is organized into about 35 short thematic chapters that proceed roughly chronologically, in terms of how California was encountered by European and then American cartographers, which is

to say the book opens by evoking California Indians, but it includes only maps of their historic homelands made by white mapmakers. As the maps are ordered by their makers' perspective, the first several centuries are dominated by a California seen from a ship's deck, as the shoreline and that shoreline's relation to a vast continent become clearer.



As the mappers' gaze moved inland from the shore, the native land was repeatedly reconfigured as a new Europe with cactus and lush bunchgrass, named New Albion, New England, New Spain, New Some Old Place. Eventually the lovely name California stuck, derived from the Amazon Queen Calafia, heroine of a very bad Spanish fantasy novel. As the Europeans debouched from their ships to claim land, the maps moved inland, and lines of mountains appeared behind mountains, separated by seemingly endless desert playas. Hayes's chapters on Mexican land grant maps are a particular revelation, as most *diseños*, as they were called, have never been seen by map lovers, or have been seen only in very poor-quality reproductions.

That Mexican era recedes like Calafia's island shrouded in mist, as gold and the gringos show up at about the same time. The major part of the atlas then becomes a cascade of mining territory maps, boosterish bird's-eye views of nascent cities, railroad and street car plans, and endless real estate plats. In the last third of the book, the maps round the bend into the 20th century, just in time for the spectacular cartography

of the San Francisco earthquake and fire of 1906. Aqueducts and invented wildernesses compete, then airplanes and automobiles arrive and transform everything, while World War II, surprisingly, hardly intrudes cartographically—although map 447, the color-coded scheme for forced Japanese evacuation along the entire West Coast to the infamous camps, is a revelation which all Californians and everybody else should ponder deeply.

Seismic California gets its due, satellite data and 3D digital images appear, a little bit of bathymetric mapping of the ocean returns—about which more anon—then the book ends with a flourish like a circus act, with the state upside down, and a final Jo Mora map.

Unfortunately for *Coast & Ocean* readers, once gold and real estate have been discovered, the California coast and the vast Pacific Ocean recede from the cartographic story. There are a few contemporary bathymetric charts and crops from 3D digital models of Monterey Canyon, but for the most part that great nexus and collision between land and water that makes California what it is all but vanishes. Hopefully Mr. Hayes can rectify that in a forthcoming *Historical Atlas of the California Coast*.

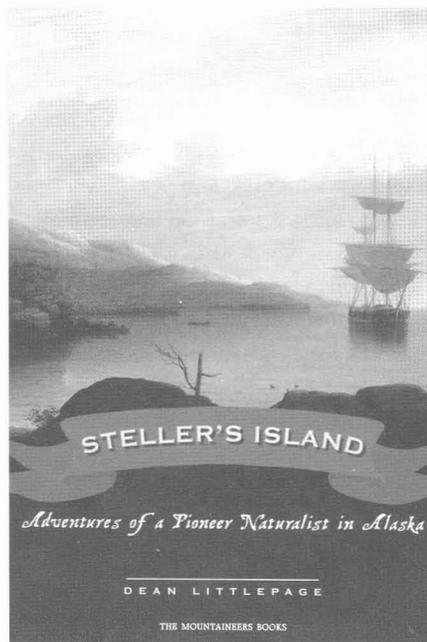
—John Cloud

A VOYAGE OF DISCOVERY

Steller's Island: Adventures of a Pioneer Naturalist in Alaska, by Dean Littlepage. Mountaineers Books, Seattle, 2006. 256 pp., \$17.95 (paper).

German biologist Georg Steller was the first European scientist to set foot on the West Coast of America, and the first to describe many of its flora and fauna. Though he visited only one Alaskan island for less than a day, on July 20, 1741, his observations included the first scientific descriptions of many species, several of which now bear his name, such as Steller's jay, Steller's eider, and the Steller sea lion. His notes still have relevance today, and are especially helpful in ongoing efforts to understand the dynamics of marine mammal populations in the North Pacific.

Steller was astounded by the abundance of marine mammals: "If I had to say how many [fur seals] I saw on Bering Island I



would truthfully say that I could not guess. They were countless." This would not be true for long. His descriptions of sea otters, fur seals, and the Steller sea cow quickly led to a long chain of human depredations. The Steller sea cow was hunted to extinction by 1768, and waves of hunters thereafter brought one species after another near to the same fate. What had been a marine mammal paradise became a killing ground. Although Steller's sea lion and other species are now protected, they are victims of food-web disruption from both top and bottom, and menaced by the ever more dire effects of human-induced climate change.

In 1737, the young Georg Steller found employment with the recently formed Russian Academy of Science, and the next year was sent to join Vitus Bering, a Dane, on his Second Kamchatka Expedition, which was already four years under way.

The voyage from Kamchatka to America and back lasted from April 1741 to August 1742, but most of that time was spent either wandering at sea or being driven about by storms, and half the party spent seven months marooned on what's now known as Bering Island, about 150 miles from Kamchatka. Only a few men set foot on American soil on what is now Kayak Island, and for less than a day. The rigors and perils of the journey were numerous and relentless, and many died, most of scurvy. Of 78 men initially on board Bering's ship, the *St. Peter*, only 46 survived. Steller eventually became the expedition's medical officer by default, and his efforts, once accepted, kept the death toll from being even higher.

For this book, author Dean Littlepage set out with a friend to retrace Steller's path on Kayak Island. He has combined his description of that experience with the story of Steller's travels and scientific observations, liberal quotes from Steller's writings, and well-informed commentary on the impacts and ramifications of that historic journey.

The 1964 Alaska earthquake altered the terrain of Kayak Island somewhat, but little has changed in the area Steller explored. Littlepage and his partner were able to confirm many of the details of Steller's description, including spruce trees that had been partly stripped of bark by the native Chugach people, who were regular visitors to the island. The southern shore, however, is piled high with plastic flotsam, as it is the first landfall for major ocean currents from thousands of miles to the south. The Chugach left traces of their presence, but their methods of gathering food and other resources did not damage the world they lived in. Littlepage saw clearly that people of European origin have consistently exploited those resources far past the point of sustainability, with devastating consequences.

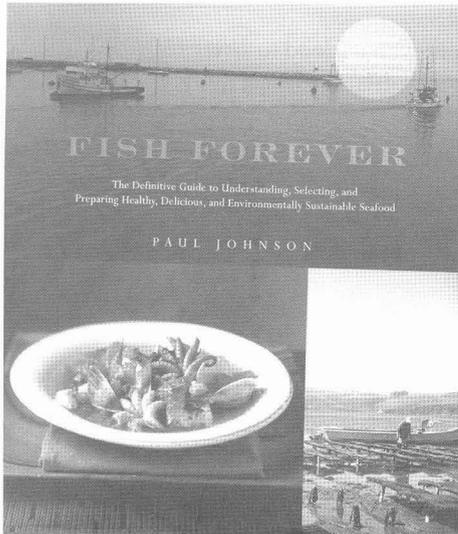
This book is a wonderful combination of high adventure, nature study, scientific observation, revelation of the breadth and depth of human potential, and history of fascinating regions and cultures. Georg Steller emerges as a remarkable figure, capable of extraordinary feats in the face of overwhelming conditions. In a letter written after the expedition, used as an epigram for this book, he reflected, "I would not exchange the experience of nature I had on this miserable voyage for any amount of money."

—HMH

GUILT-FREE SEAFOOD

Fish Forever: The Definitive Guide to Understanding, Selecting, and Preparing Healthy, Delicious, and Environmentally Sustainable Seafood, by Paul Johnson, photography by Karl Petezke. John Wiley & Sons, Inc., Hoboken, 2007. 438 pp., \$34.95 (hard cover).

So often, doing the right thing means self-denial. You look at a seafood counter or menu, check against the little red (no), yellow (caution), and green (okay) guide you keep



in your wallet to see what you must forego if you care for your health and the ocean, then choose something less appealing than what you'd really like. Not much fun.

Now here is a book that invites you to delight in choosing seafood that's healthy and sustainable and introduces you to surprising gourmet recipes that can expand and diversify your seafood pleasures. You'll also learn about the fish and the fisheries. The "good for you" approach is secondary to enjoyment in Paul Johnson's book. By the time I had finished reading the chapter on fresh sardines I was ready to rush to the fish market to try making "crispy bread crumb-coated fresh sardine salad with herbed mustard dressing," or maybe sardine pasta with fennel, tomato, and bread crumbs.

The European sardine, which is similar to the Pacific sardine, is flown in fresh from the Azores to be enjoyed on the East Coast and other parts of the country, Johnson writes. "Sardines fresh from the sea" are "one of the healthiest choices in the sea; living in clean offshore waters where they filter plankton for food, they are very rich in heart-healthy omega-3s, and are an excellent source of B vitamins, phosphorus, potassium, and iron." The fishery is well-managed, so this little fish is not only tasty and nutritious, it can also be eaten guilt-free.

You won't find recipes for unsustainably fished or farmed species such as orange roughy, Chilean sea bass, shark, or farmed salmon in this book. But you will for sea bass, both wild and farmed, and for wild

salmon, specifically for chum (keta), coho (silver), chinook (king), pink, sockeye (red), and steelhead. Johnson also provides recipes for healthy and tasty seafood that is unfamiliar to many North Americans, including squid as well as fresh sardines, and for parts of the fish not typically used in this country. Fish bones, for example, are not only edible, they can be prepared as a delicacy.

Paul Johnson owns and operates the wholesale Monterey Fish Market off Pier 33 in San Francisco, with a retail outlet in Berkeley. He supplies many highly regarded chefs, including Alice Waters, Paul Bertolli, Tracy DesJardins, and Alain Ducasse. He promotes sustainably caught fresh fish and encourages ocean conservation. A disclaimer: I might not have heard of this book had I not been invited to a publication party at San Francisco's Hayes Street Grill. What drew me there was the thought of the hors d'oeuvres. But I ended up buying a copy, and now both my daughters want it.

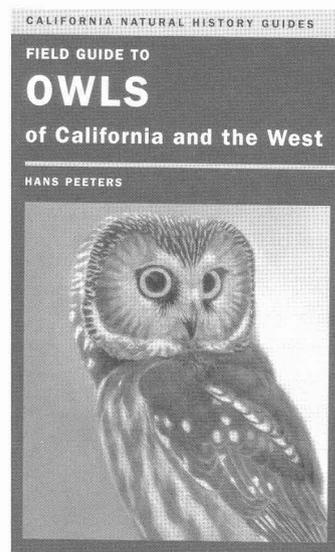
—RG

OWLS!

Field Guide to Owls of California and the West, by Hans Peeters. University of California Press, Berkeley, 2007. 376 pp., \$50 (hard cover), \$19.95 (paper).

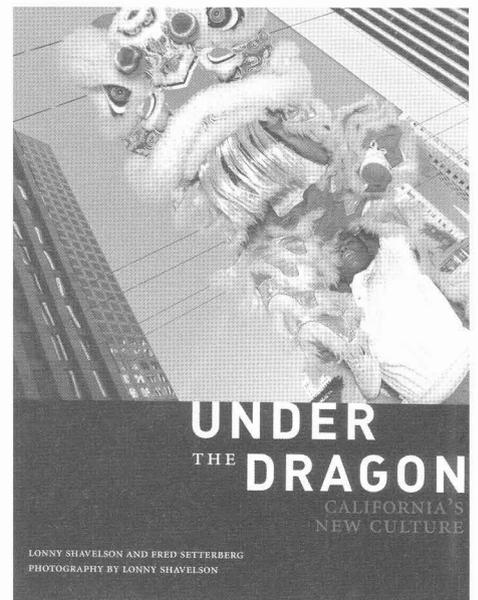
This guide has all the usual virtues of this excellent series, but focusing on one kind of bird—19 species in two families—allows it to go into much greater detail than more general guides can. Owls are among the most recognizable and uniquely adapted birds, and this book is filled with facts and anecdotes that can expand our understanding of them. There are generous sections on their unusual anatomy and behavior, along with tips for finding and watching them, as well as commentary on their relationships with humans.

—HMH



RICHES OF DIVERSITY

Under the Dragon: California's New Culture, by Lonny Shavelson and Fred Setterberg, photos by Lonny Shavelson. Oakland Museum of California and Heyday Books, Berkeley, 2007. 164 pp., \$24.95 (paper).



This colorful book gives us vivid views of and insights into the remarkable ethnic diversity of the San Francisco Bay Area (the subtitle is a bit misleading, as the book addresses the rest of the state only by implication). It's an excellent introduction to both the distinctive qualities of the many cultures that call the region home, and to how they have merged and blended over time. The title comes from the discovery that dragon dancers in San Francisco's Chinese New Year parade

included Latinos, Russians, and Samoans, as well as Chinese youth. This sort of mix appears again and again in both the vibrant photos and the text. Judge Peggy Hora's quote sums it up: "Cultural awareness around here is not just some politically correct horsepucky. It's real." *Under the Dragon* holds delights and surprises even for those who know the Bay Area well.

—HMH

BEGINNERS

But we have only begun
To love the earth.
We have only begun
To imagine the fullness of life.
How could we tire of hope?
—so much is in bud.
How can desire fail?
—we have only begun
to imagine justice and mercy,
only begun to envision
how it might be
to live as siblings with beast and flower,
not as oppressors.

—Denise Levertov
from *Candles in Babylon*,
copyright 1982 by Denise Levertov.
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Western meadowlark (*Sturnella neglecta*) by George W. Hartwell



Coastal
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