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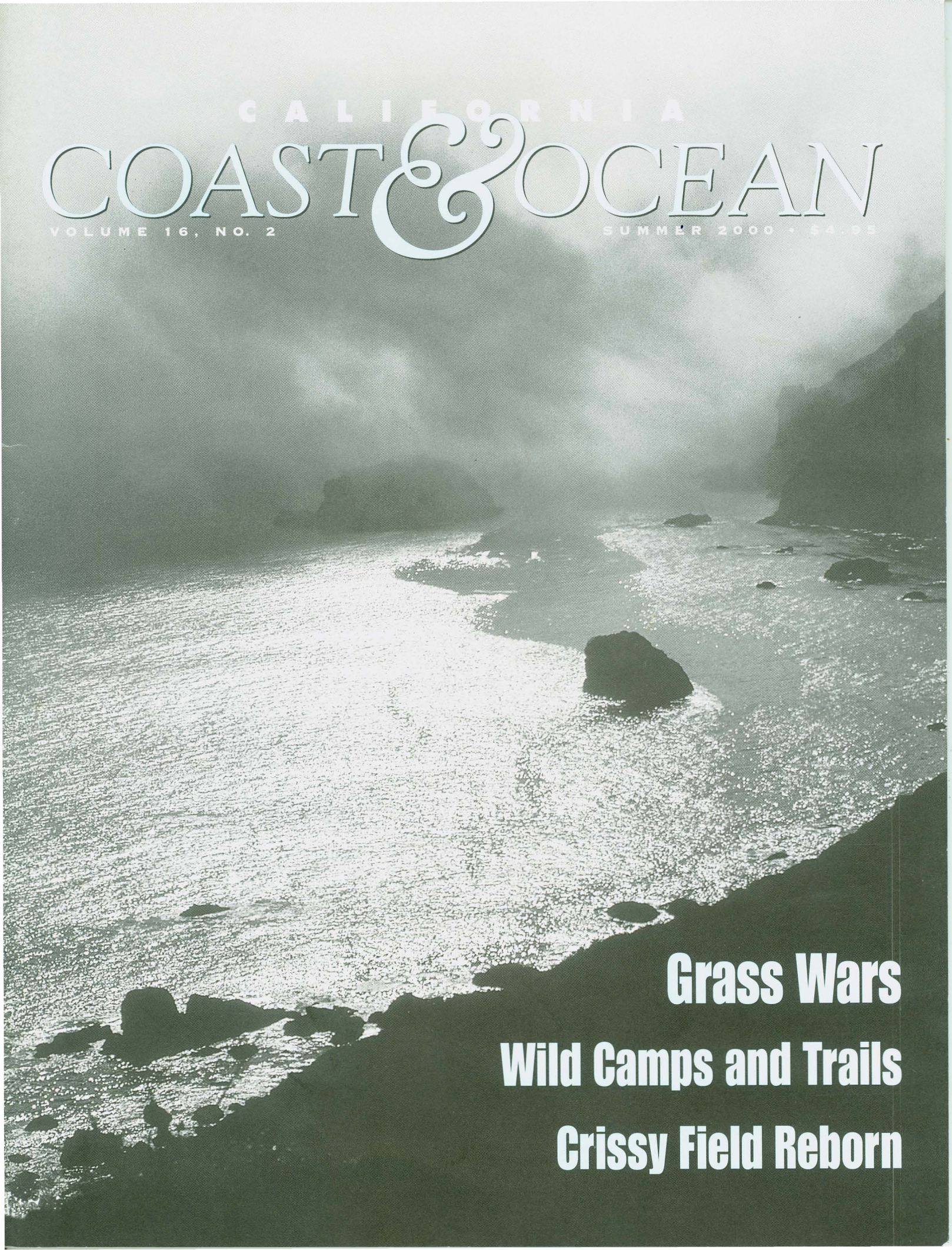

Grass Wars

Wild Camps and Trails

Crissy Field Reborn

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Cover photo: In her work, Michelle Vignes seeks to catch the mood and spirit of people and landscapes. Her photography has been widely exhibited and published internationally. She lives in San Francisco.

Back cover: Avocets by Ken Gardiner

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VOLUME 16, NUMBER 2 SUMMER 2000

KEVIN THATCHER

Crissy Field Reborn

3 Tides That Bind
Kevin Thatcher
Nature meets the public by the Golden Gate

6 The Transformation of Crissy Field
Arlene Gemmill
From military airfield to great urban park

Grass Wars

14 Good Intentions Gone Awry
Phyllis Faber
Why would anyone bring an alien cordgrass into San Francisco Bay?

18 Girding for Battle against Spartina
Bill O'Brien
Invasive alien threatens restoration

25 The Middle Way in Camping
Dewey Schwartzenburg
Peace and quiet off the beaten path

28 Hiking the Backbone Trail
Richard Nichols

31 What's Killing So Many Gray Whales?
Ryder Miller

32 Fish Friendly Farming
Laurel Marcus

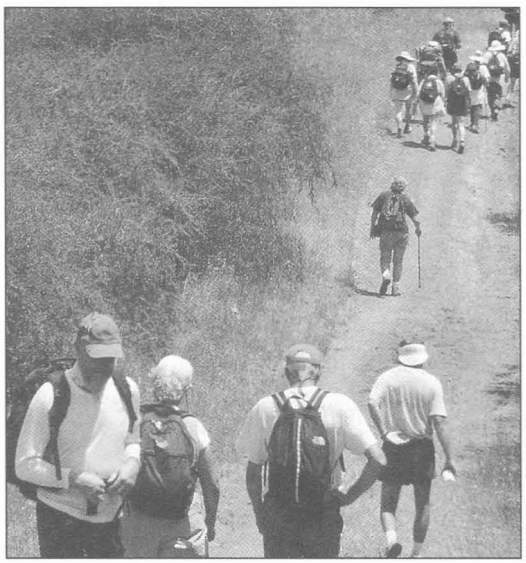
40 Don't Cry Yoshino River
Poem by Nanao Sakaki

DEPARTMENTS

2 EDITOR'S NOTE
Plant Wars and Botanical Rage

34 EBB AND FLOW
- *Coastal Conservancy News*
- *San Francisco Bay Conservancy Projects*
- *Other Coastal News*

38 BOOKS



RICHARD NICHOLS

Plant Wars and Botanical Rage

Many people will fight to defend animals they care for, be they wild or domestic. They'll violate regulations, even go beyond the law, in defense of cats and dogs especially, but also in behalf of wolves, whales, dolphins, the irresistible sea otter, and a few others, usually large species recognized as being highly intelligent or charming.

Botanical activists tend to be quieter. Except for the brave souls willing to risk their lives for ancient redwoods, people working to save some part of the plant kingdom have not been known for guerrilla activism. Most who love wildflowers, forests, and gardens love them discreetly. Most who engage in native landscape restoration do so patiently, gathering and planting seeds, sitting on committees.

Occasionally someone will go off the path, of course. Reputable sources have it that a certain native plant advocate, who has given endless hours to reviving urban wastelands, has girdled some eucalyptus trees with wire in hope of strangling them after efforts to remove them legally failed. But such incidents of botanical rage have been rare.

Lately, however, plants seem to be inspiring more ferocious responses and there seem to be more of them. In Rancho Palos Verdes, above Santa Monica Bay, a voter-approved ordinance allows authorities to "restore" homeowners' views by cutting trees on neighbors' property. Tree advocates are challenging the ordinance in court.

In a quiet Marin County village, meanwhile, violence was recently committed on a controversial hedge. On the night after the Fourth of July, a person—or persons—attacked and almost felled a row of 180 young cypress recently planted in Bolinas, along the road to Olema, on land purchased about ten years ago by Susie Tompkins Buell, cofounder of Esprit de Corp. The saplings were cut close to the ground, about three-fourths of the way through each trunk.

Community reaction has ranged from anger to approval: "It's her land. She can do anything she wants," said one homeowner. "If only she had planted flowering cherries, everyone would have been delighted," said another. Said a third : "Unfortunately, some of the trees may make it."

In this community, people differ fiercely in their views of what trees and plants are appropriate. Local resident Judith Larner Lowry, who runs a business propagating native plants, has a "restoration garden" of local wild species. "By seeing your particular piece of land as part of a larger plant-animal community and seeking to enhance old and established relationships through your style of gardening, you join that community," she writes in *Gardening with a Wild Heart: Restoring California's Native Landscapes at Home* (University of California Press 1999). She describes what she learned by careful observation of the coyote bush, sage, and other local wild plants, and also talks of the harm done by certain introduced species. A botanist who is a neighbor of Lowry's, on the other hand, treasures his collection of tropical plants and does not seem to care that the fast-growing Chiapas oak he introduced has spread into Lowry's yard, among the coast live oak saplings she is nurturing.

At the time the 180 cypress were planted, "committee and subcommittee meetings had been going on about what to do with the eucalyptus," on public lands, says Joanne Kyger, Wednesday editor of the thrice-weekly *Bolinas Hearsay News.* "The town had galvanized into pro-eucalypus and pro–scrub oak. The pro-eucalyptus people were saying, 'These trees are habitat for the monarch butterflies.' The others talked of cedar waxwings with their beaks gummed up. There were pictures of little birds with their feet up. People are passionate about plants. I was amazed. After nine months of testimony, awareness of native planting was very high."

Also very high was the fear that wealthy people who had been buying property in town would change the community's character, erecting walls between themselves and others. The trees were meant to delineate the property, Mark Buell, husband of Susie Tompkins Buell, explained in the *Hearsay News.* Shutting out sunlight was not the intent. Another resident noted that if cypress were not carefully maintained they would grow into a high wall, "a dark corridor into town." Meanwhile, on the non-botanical front, the *San Francisco Chronicle* told of a rumor that Martha Stewart was looking at property in Bolinas, threatening its cherished obscurity. Soon after, someone attacked the cypress hedge.

There are skeins in this story that have not yet been unraveled. The enormous jump in coastal real estate prices has set neighbor against neighbor. A growing appreciation of native landscapes has led some people to despise eucalyptus and other trees they disapprove of. (Of course, it may be that neither of these facts is relevant to what happened in Bolinas.)

As humans occupy more and more of other species' habitat, and native plants and animals succumb to the pressures, battles to save what remains become more intense. Eradication campaigns have been launched on several fronts against alien plants that threaten habitats along rivers, in wetlands, and along the nearshore (pp. 14 to 24). Even as San Francisco gains a new saltmarsh (see pp. 3 to 13), invasive alien cordgrass threatens all that has been achieved in other wetlands.

One woman who has devoted decades of her life to wetland recovery has watched these grasses gaining ground. Can anyone blame her for thinking—just a thought, now, not an intention—that time is running out and maybe she should buy some herbicide spray and, never mind the permits, just do what needs to be done?

—Rasa Gustaitis

COURTESY PARKS ASSOCIATION

Tides That Bind

Nature Meets the Public by the Golden Gate

KEVIN THATCHER

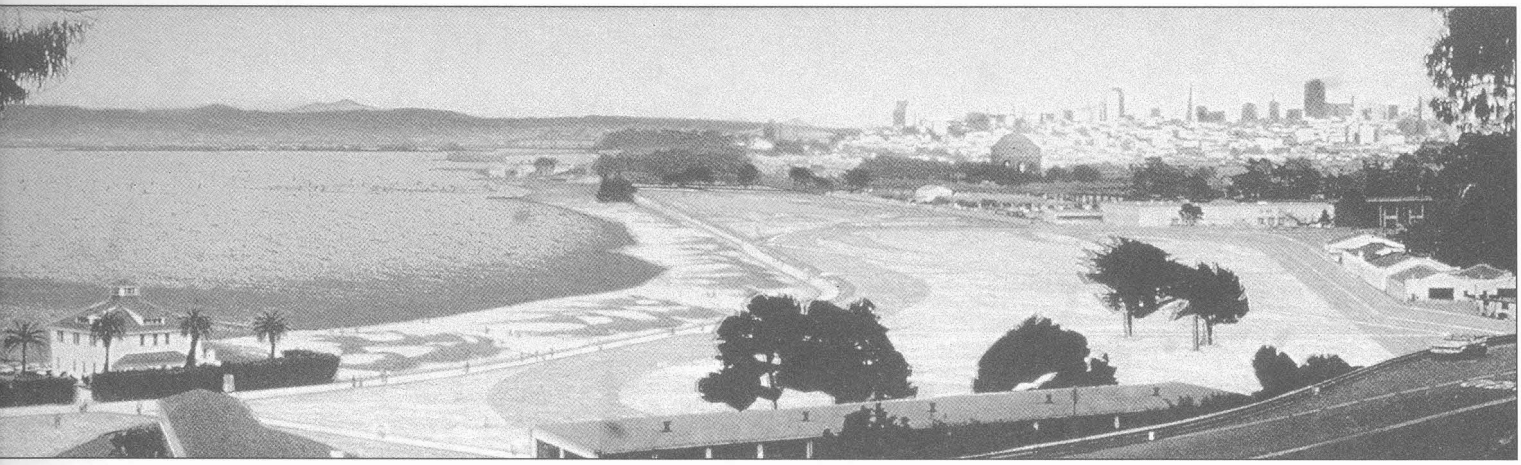
I was born in this town. Although I spent my Wonder Bread years growing up in San Jose, on clear nights we could see the shimmering lights of San Francisco's skyscrapers and the towers of the Bay Bridge from perches in the Los Gatos–Almaden foothills. As soon as somebody could drive, we were hauling up to Winterland for rock shows and to prowl Broadway and the first punk clubs "south of the slot" (that's Herb Caen for "south of Market"). Eventually, since we were in the city every night, it made sense to sleep and work there also. Before I was twenty-two, the City by the Bay's Oz-like stature had lured me back.

When we were kids, our rare forays close to the actual shores of San Francisco Bay were either on the Bayshore (101) or Eastshore freeways, bumming around the Alviso and Milpitas wetlands or riding dirtbikes over the landfills now known as Sunnyvale and Redwood City. We were always told the Bay was polluted, and the smell of rot and tidal swill confirmed it. The creeks that we foraged ran black in summer with pesticides

and petroleum products that were washed downstream with each flushing winter rain. In a family that included five rugrats, our juvenile jousting often included verbal threats to throw one another in "the smelly Bay." We just thought that's the way it was and would be. To the people's credit, our Bay water quality, and even the air above it, is much improved since the filthy '60s and '70s. Just don't eat the fish every day and, as always, breathe at your own risk.

Now, wherever I am in San Francisco, my gaze is constantly drawn to the waters of the Bay and the Golden Gate. If not for a quick check of the anchored tankers waiting for Oakland port (bow pointing out, tide coming in!), then as a reminder of exactly where I'm at on the map. Over the past twenty years, during regular bicycle touring from my Potrero Hill digs, I always seem to choose a route that follows closest to the shoreline.

I've enjoyed the windswept pleasures of Candlestick Point Recreation Area when it wasn't covered with 49er parking. The PG&E outflow at Hunters Point makes me wonder what Islais and Mission Creeks, farther north, looked like when



RENDERING BY HARGREAVES ASSOCIATES

Looking eastward across the grassy airfield and marsh toward Russian and Nob Hills

they flowed naturally into the Bay. I've gladly welcomed the sea lions to blubber around Pier 39, and always salute the old guard rowing clubbers swimming laps inside the breakwater at Aquatic Park, its sliver of sand at lower tides one of the few approachable "beaches" inside the Gate.

San Francisco has great oceanfront beaches, but most of those on the Bay were filled and paved long ago. You won't find any sand, or a place to put a blanket, in North Beach or trendy South Beach. The recently improved northeastern waterfront and Embarcadero Drive brought us better Bayside access and a beautiful "old-timey" brand-new ballpark, but no new beachfront.

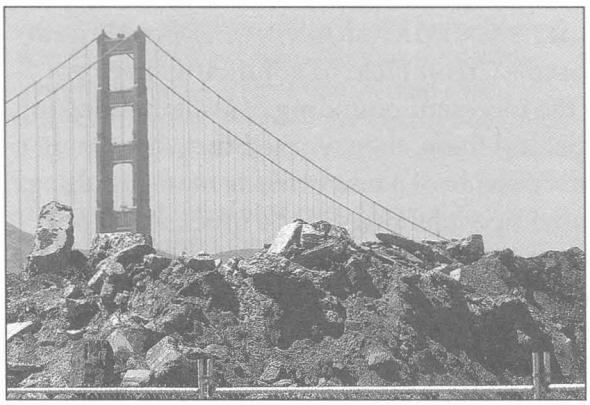
During my bike rides I'd continue to the Marina Green, check the fishermen's buckets along the wall there, and take a side trip to the Wave Organ on the jetty. Then I would tuck into the moist headwinds sweeping fog across the barren Crissy Field, bearing for Fort Point and the Golden Gate Bridge. Because of the cold wind and the presence of the 6th Army (and later, the mess left behind), I would usually pedal right past the sandy shoreline of the Presidio. Why couldn't this city have great urban beaches to rival those in Sydney, Rio, Waikiki, and cities on the Mediterranean?

Well, at long last, there is a new "jewel" to add to the crown that is San Francisco, and it has nothing to do with Barry Bonds's pierced earring. The new cool spot that has defied all government red tape and bumbling local politics is the lagoon and beachfront at Crissy Field. This is the best thing to happen to San Francisco since the Embarcadero Freeway was taken down (the '89 earthquake left it cracked and unstable), and it rivals Golden Gate Park in its value to the human spirit. PacBell ballpark is for baseball fans; what's being done at Crissy Field is for everybody, providing San Francisco residents and visitors with a natural respite from urban dilemmas just blocks away. Even a

KEVIN THATCHER

view of the city has been restored, so to speak. Looking eastward from the new beachfront (yes, beach, I tell you!) and path system presents you with a historical panorama, with the Palace of Fine Arts and the grounds of Fort Mason anchoring the foreground and the white-painted buildings crowding the slopes of Russian and Nob Hills. It's a romantic view of the city, and one that hasn't changed a lot since the 1920s.

Oh yeah, the wind and fog are still out there, but dunes behind the beach have been restored and planted with native grasses and flora by volunteers' hands. New parking areas are well disguised by designer landscaping, and large cypress trees holding sway over many newly planted saps will deflect the chronically healthy northwesterly breezes. New nooks, swales, and picnic areas are being established, even a protected set of concrete sunning steps toward the Fort Point end, so bring a blanket and the "pic-a-nic" basket, Yogi. Besides, the wind fuels the sailboards that have long been a feature on the waters of this part of the Bay.



COURTESY PARKS ASSOCIATION

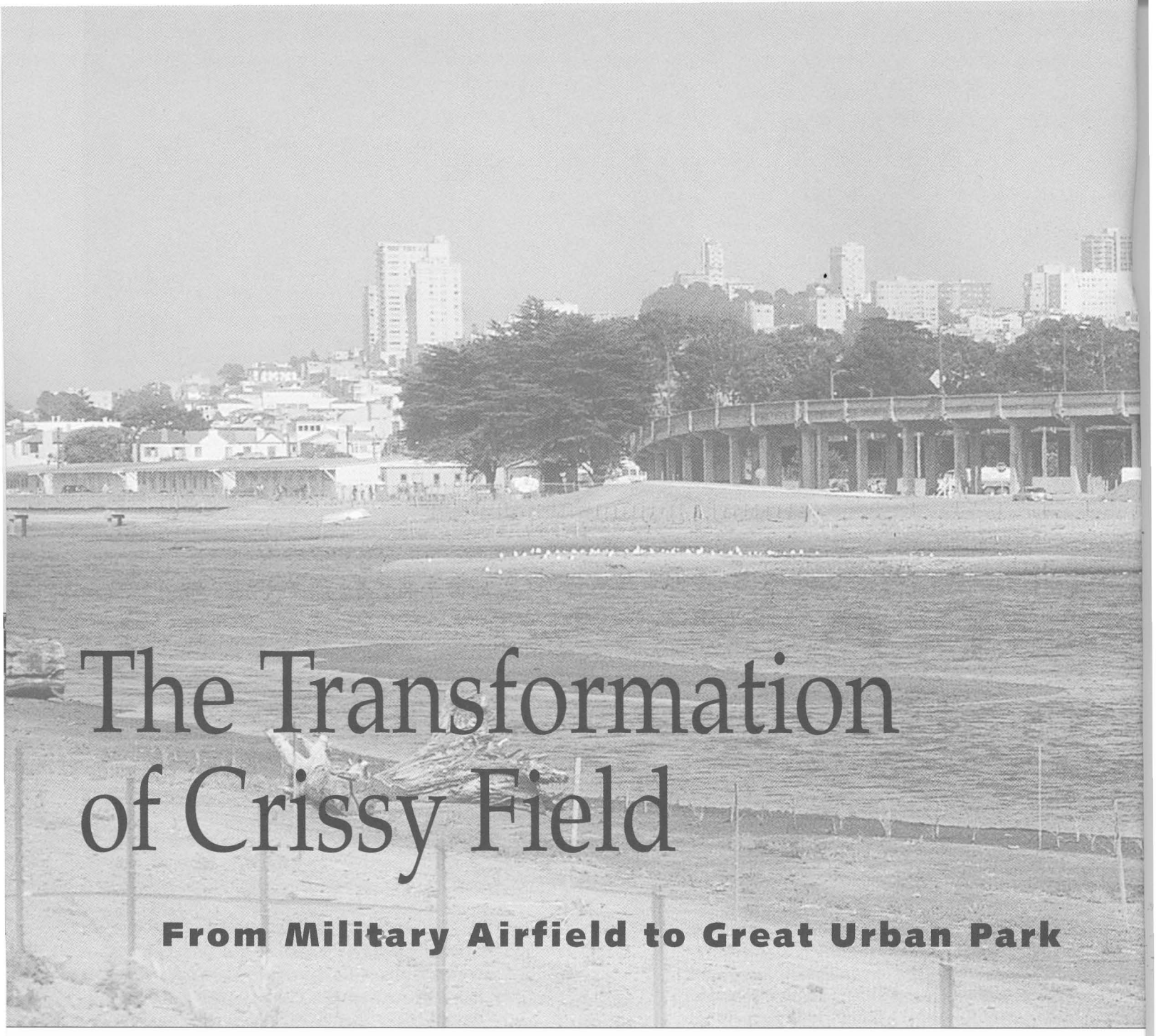
Wave at the mouth of the new tidal channel

CRISSY FIELD

I can see a parking problem developing as too many board-laden SUVs insist on nosing right up to the sand to jockey with rental cars for too few spaces. Already, the area's attraction as a haven for extreme sports enthusiasts, dogs running wild, joggers and walkers and bikers and skaters and gawkers is causing the kinds of conflicts that tend to stop projects like this from ever getting started because of all the "what ifs?" and special interests. My own personal use of the site, besides gliding through in my wannabe Lance Armstrong road jersey, is saltwater fly fishing for surf perch and occasional striped bass, and skimboarding the mouth of the channel to the new marsh, where a small one- to two-foot breaking wave peels across the sandbar when the tide is right. So far I have taken no fish on the fly rod, and last time we went skimming I was sore for three days so, as always, "nature" has a way of leveling the playing field.

Problems and conflicts will arise, but they will be "good" problems to have. The project at Crissy Field is a model for the future, and possibly the key to humans' continued coexistence on a fine line between Mother Ocean and Mother Earth. For me, it's a joy just seeing that little peeling wave where none existed before, or imagining a steelhead trout someday instinctively poking around the channel to the new lagoon, as if maybe rediscovering the route to a long-lost ancient spawning ground. Obviously I'm crazy, as were the individuals who came up with a plan like this, which is now laid before us for all to see and enjoy. Thank you. ■

San Francisco local Kevin Thatcher (age 42 going on 17) is publisher of Thrasher *skateboard magazine,* Schwing! *golf magazine, and* Juxtapoz *art magazine.*

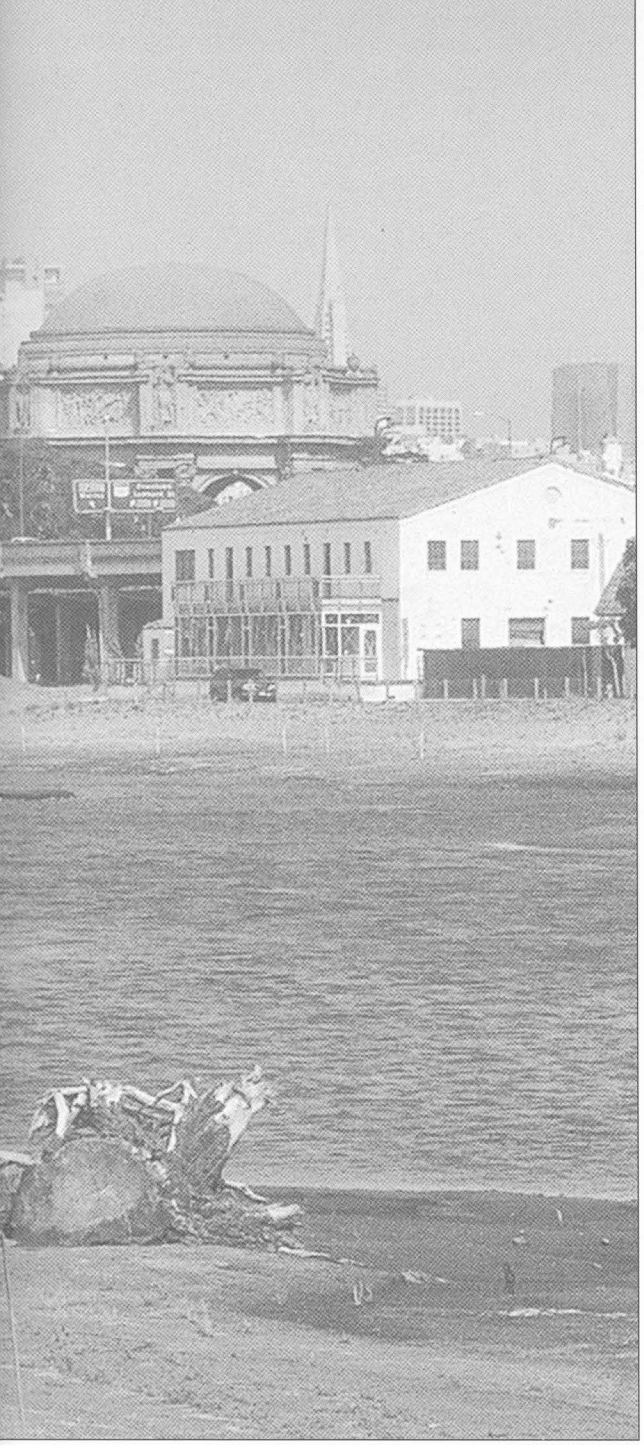


The Transformation of Crissy Field

From Military Airfield to Great Urban Park

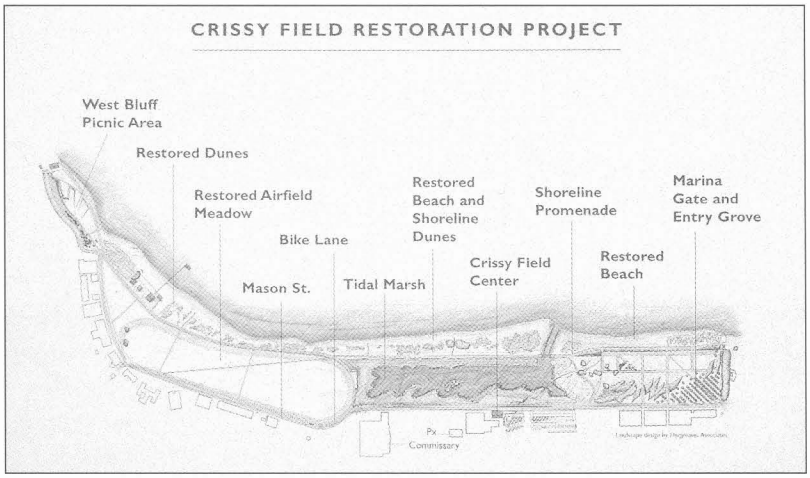
ARLENE GEMMILL

ON A RECENT BALMY SATURDAY MORNING, 15 people gathered at San Francisco's Crissy Field to voluntarily perform manual labor. To the incessant pounding of Walkmanned joggers on the path behind them, they worked their way, bent double, along the waterline of a newly made marsh, pulling weeds among tender new plantings in the muck. After a while they took a quick break, then shifted to the other side of the promenade where, on their knees in warm sand dunes, within sound of lapping waves, they yanked enough weeds to fill a pickup truck.



KEVIN THATCHER

COURTESY PARKS ASSOCIATION



RENDERING BY CHRIS GRUBBS

Above left: Birds are drawn to the new tidal marsh. Fences protect young native plants.

Above right: Crissy Field stayed open to the public as the work went on.

The volunteers worked against a stunning background: the Golden Gate Bridge glowing tangerine against a sapphire sky; a flotilla of sailboats skittering over the water, seen through a white confetti of Forster's terns that swirled over nearshore waters. People were tossing balls into the surf for dogs to fetch, walking along the shore, lounging in the sand, playing with children. Why would anyone choose to spend such a glorious day with hands in the mud?

When asked, volunteers offered varied reasons, including: "a chance to actually see ecological restoration"; "beautiful weather"; "I saw the signs on lamp posts"; "I live close by"; "inspiring, seeing what's happening here"; "I just moved back. I didn't know all this was happening"; and "the donuts, they're not something I ever buy myself."

In truth, however, they had all come to participate in a visionary endeavor: the reshaping of an abandoned military airfield in the San Francisco Presidio into a great urban national park that includes a restored tidal marsh. The $32 million Crissy Field project has been steered by the nonprofit Golden Gate National Parks Association (Parks Association), in cooperation with the National Park Service (NPS), funded largely by private donations, and carried out with the help of thousands of volunteers.

"This is the largest waterfront project the National Park Service has ever undertaken," said Brian O'Neill, general superintendent of the Golden Gate National Recreation Area (GGNRA).

With its mile-long beach offering panoramic vistas of the bridge, the Marin Headlands, Sausalito, Angel Island, and Alcatraz, Crissy Field is nothing short of spectacular. It is a landfill, created when a 150-acre tidal marsh was filled for the 1915 Panama Pacific International Exposition, which used it

PHOTOS THIS PAGE: KEVIN THATCHER

as an automobile race track. Afterward, the Army built an airfield on the site (see p. 11). In 1994, Crissy Field became part of the GGNRA. Until two years ago, however, 70 percent of it was still covered by concrete and asphalt. Empty barracks, storage sheds, and other abandoned buildings stood behind cyclone fencing and huge informal parking lots.

Even in that condition, Crissy Field was enormously popular. It was always a great place to come for a Sunday walk, bring out-of-town visitors, or simply quiet the mind and breathe deeply of salt wind and tranquillity. The offshore breezes also made for excellent windsurfing conditions. Now, however, after several years of planning and two and a half years of construction, a park site is evolving that is worthy of the setting.

Crissy Field embodies a visionary concept: a highly accessible place, inviting to people with diverse tastes and interests, which is also a model for ecological restoration within an urban environment. The process of creating this park has brought in hundreds of volunteers, not only those who already had an interest in environmental restoration but many others from this multicultural community who had seldom, if ever, been to Crissy Field or other park sites within the GGNRA. The volunteers accomplished most of the labor-intensive and otherwise prohibitively expensive work of restoring native vegetation.

The money required for the project poured forth from a long list of supporters. A leading gift of $16 million—from the Evelyn and Walter Haas Jr. Fund ($12 million) and the Colleen and Robert Haas Fund ($4 million)—took the project halfway toward its budget goal. Together with early support from the Coastal Conservancy ($1.5 million for planning, habitat conservation, and an environmental education center), these funds enabled the vision to grow. "Without the Haas Fund and Coastal Conservancy coming in early on to support project planning, we could not have come this far," said Parks Association executive director Greg Moore. The breadth of community support was evidenced, however, by the rest of the numbers: of 2,400 gifts received, 2,200 were $100 or under.

Recreation takes many forms here. Crissy Field is accessible by public transportation, as well as by skateboard, bicycle, and car.

BEFORE WORK ON THE PARK SITE could begin, the Army had to clean up contaminants left behind by 224 years of military use (see p. 10). That process took much longer than expected

THEY DID IT WITH VOLUNTEERS

COMMUNITY OUTREACH and stewardship have been two key elements in Crissy Field's transformation. A concerted effort was made to engage large numbers of people from San Francisco's many diverse communities in hands-on activities, particularly habitat restoration work.

An active stewardship program already existed within the GGNRA. The Presidio Park Stewards, for instance, maintain 13 sites within the Presidio. But never before had there been such an enormous and successful effort to bring in large numbers of people from population groups that were not already park advocates and users.

During the two and a half years of construction, 120 schools had workdays at Crissy Field. A couple of high schools used the field as an outdoor science laboratory. Several corporations donated employee time, finding that restoration work is a good team-building exercise. Scout troops, churches, clubs, families, and groups of friends turned out.

To handle the many new volunteers, the National Park Service, Parks Association, and San Francisco Conservation Corps launched a Presidio AmeriCorps in 1997. This three-year program allows 20 people a year to receive training in restoration under the guidance of National Park Service mentors, who also help manage the volunteers.

Restoration work is labor-intensive. Seeds of native plants are gathered in the wild and germinated in nurseries (the GGNRA has five, one in the Presidio); the seedlings are then transplanted to pots and nurtured in greenhouses. When they are almost ready to be planted, they must be moved to shade houses for "hardening." The site has to be prepared by removing invasive or exotic species. It's a lot of work, all unpaid.

PHOTOS THIS PAGE: COURTESY PARKS ASSOCIATION

Above: AmeriCorps members helped to guide volunteers.
Below: Young volunteers working to restore native plants

Between November 1998 and February 1999, volunteers planted 15,000 natives, mostly in sand dunes above the beach, working during the rainiest months. Attendance at Saturday morning work parties averaged 15. The following year, with 50,000 plants to be put into the ground, the Parks Association needed more people, so it undertook a "Help Grow Crissy Field" campaign. Posters appeared on light posts and shopping bags, in public transit stations, trains, and buses. AmeriCorps members manned tables at special events, handing out pamphlets.

With the help of this campaign, word-of-mouth, and considerable media attention, attendance at the Saturday morning work parties quadrupled in the second planting season, with 60 to 80 people taking part between November 1999 and February 2000. A total of 193 adults and 48 youth volunteers devoted 3,000 hours of time on these mornings. "Volunteers were so enthusiastic, they came in such large numbers, we had to start rationing the plants," said Carol Prince, deputy director of external affairs for the Parks Association.

Because many people brought their children, a K–8 program was developed. City high schools had been using Crissy Field as part of their science curriculum for three years.

Most of the planting is now finished. A few years of maintenance weeding will be required to prevent aggressive nonnatives from regaining a foothold. There will be a continuing need for maintenance, care, and attention until the plants are well established.

The GGNRA intends to build on the successful volunteer program at Crissy. "We're beefing up the Presidio Stewardship and building the infrastructure for volunteers to get involved," says Brian O'Neill, general superintendent of the GGNRA.

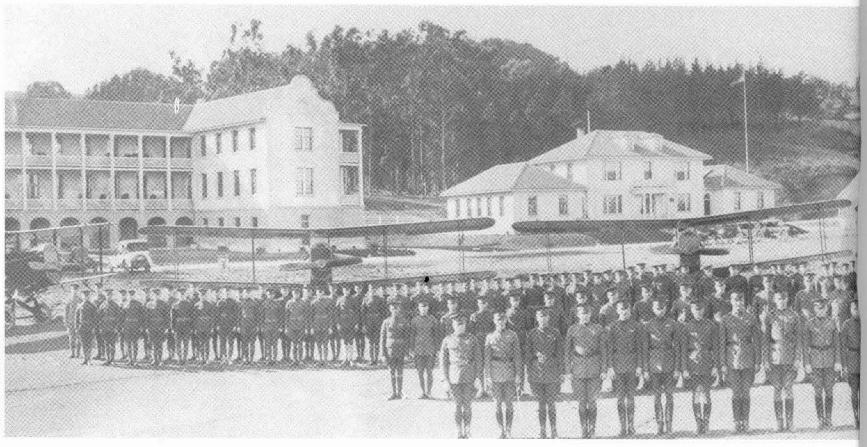
A newly formed partnership between the Park Service, the Parks Association, and the Presidio Trust will provide funds to hire and train interns to supervise volunteers. It will also pay for improving the greenhouses used for plant propagation. The Presidio plans to restore native vegetation to several areas of the historic military base, on a scale several times larger than the pioneering project at Crissy Field.

—*AG*

because of unanticipated problems, such as the discovery of unexploded ordnance, including a Civil War cannonball. Work stopped until munitions experts arrived and detonated the devices. Eventually, in a performance exquisitely choreographed by Glen Angell, the Parks Association's project manager, and Brian Ullensvang, NPS environmental engineer, the Army moved out with its backhoes and, simultaneously, Parks Association contractors moved their backhoes in.

First, NPS contractors removed 50 buildings, including "temporary" World War II barracks, which were dismantled by hand to save and recycle the old-growth redwood used in their construction. Asphalt covering 40 acres was excavated, ground up, and reused in landscaping Crissy Field with hillocks and dunes. Along the shoreline, 15,000 tons of concrete and rock debris were removed to expand the beach. Storm drains and utility cables were dug up and relocated. Mason Street, which marks the southern boundary of the park, was realigned to accommodate the historic contours of the airfield. As that street was repaved, a bicycle lane and pedestrian path were added.

Before that, of course, there had been years of discussion, public meetings, and negotiation over the proposed design by landscape architects Hargreaves Associates of San Francisco. Among Crissy Field users who had to be accommodated and brought together—without causing controversy that might sink the project—were dog walkers, windsurfers, native plant advocates, historic preservationists, and neighbors wary of wetlands.



GGNRA/PARC

Army aviators in the 1920s, with DeHavilland biplanes

In the end, a plan emerged that was a masterpiece of diplomacy. It gave everyone something important without offending or depriving anyone else. Native plant advocates are pleased that all vegetation will be California endemics, and that fragile plants in the dunes will be protected by low fences.

Preservationists are pleased because the historic airfield is becoming a 28-acre meadow, with one native grass planted so as to outline the historic

TOXIC CLEANUP

ROY EISENHARDT: COURTESY PARKS ASSOCIATION

POLYCYCLIC aromatic hydrocarbons (PAHs) are not fragrant. They can be carcinogenic, and the former Skeet Firing Range at Crissy Field was littered with skeet discs made of a tar substance contaminated with PAHs. These and several other potentially toxic substances had to be removed before work on the new park site could begin.

The Defense Department is responsible for cleaning up any hazardous materials left behind when a base closes. At Crissy Field the Army began that process in the early 1990s. First it sampled oil and water over the course of several years to identify contaminants and contaminated areas. With that information in hand, it hammered out cleanup plans in consultation with state and local agencies and community representatives—neighborhood associations and public interest groups, as well as concerned individuals.

Deciding what constitutes an "acceptable" level for each potentially hazardous substance was a slow, laborious process. Many elements that occur naturally in the environment—including lead, chromium, copper, zinc, selenium, cadmium, and nickel—can be detrimental to health at high concentrations. But the point at which they might cause harm to humans and wildlife is not easily established. Decision-making was further complicated by the location of Crissy Field at the water's edge, and by the extensive excavations being planned.

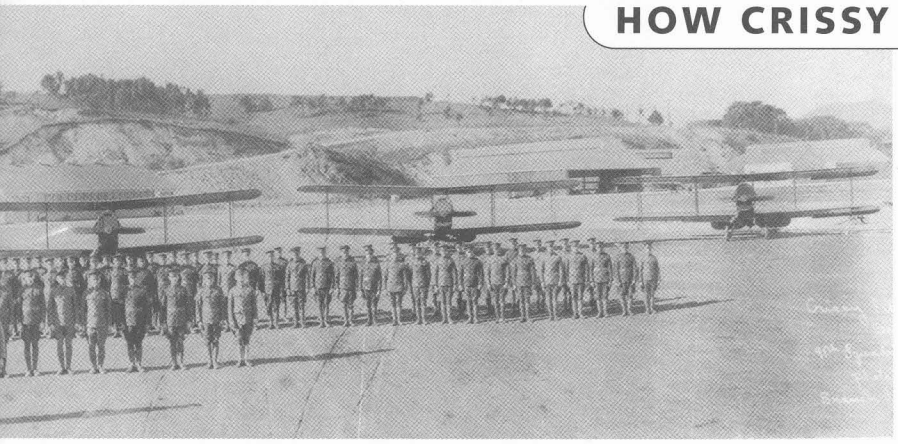
Finally, in April 1998, an agreement was signed between the Army and the California Department of Toxic Substance Control. Cleanup began almost immediately thereafter.

The Army excavated 87,000 tons of soil and hauled it to approved dump sites; the hazardous waste was taken to Kettleman Hills, near Bakersfield. Soil contaminated by petroleum—a legacy of transportation and industrial activities conducted at Crissy Field over 85 years—was also removed and taken to landfills.

More difficult than the challenge of polluted soils were the petroleum plumes in the aquifer 12 feet underground. Bioremediation is being tried at one site in an attempt to attenuate, if not eliminate, the plumes. An "oxygen-release compound" has been injected into the soil to provide a steady stream of oxygen, allowing native bacteria to flourish and devour the plume.

—*AG*

HOW CRISSY FIELD GOT ITS NAME



IN **1919** the U.S. Army sent 61 airplanes racing in short hops across the country to demonstrate aircraft reliability and endurance. Major Dana H. Crissy led the West-to-East contingent, which left from the as yet unnamed flying field in the Presidio. He died in a crash on the first day out. In 1921, Major Hap Arnold, pioneer military aviator, later a five star general, saw to it that the air base was named after Crissy. It was a first-line air base until 1936, then an auxiliary airfield until 1974, when it was closed to fixed-wing aircraft. It was used for helicopters carrying high-ranking officers or emergency medical response teams until 1996.

racetrack, the other to outline the airfield. New dunes surround it, and they're not fenced.

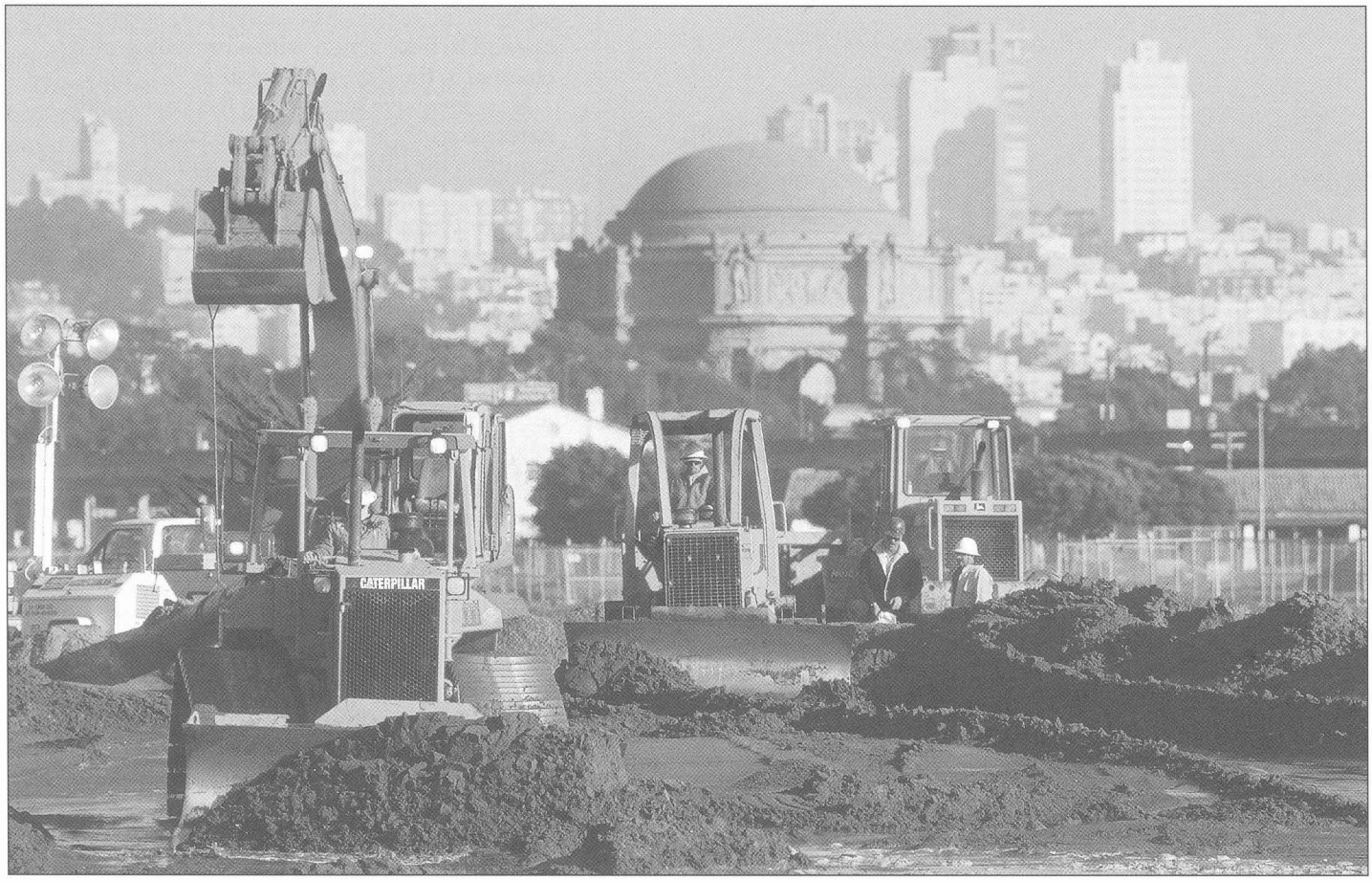
Dog owners, a highly vocal and sometimes litigious group in San Francisco, were satisfied by a plan that establishes three kinds of zones: some where dogs will be allowed off leash under voice control, others where leashes will be required, and a third where no dogs will be permitted.

To accommodate windsurfers, the parking lot has been designed to provide a soft surface for setting up equipment and contoured with sand dunes to block the wind in a launching area.

The toughest conflict-resolution challenge, however, was posed by the tidal marsh. The very thought of such a wetland upset some people living nearby. They worried about mosquitoes, smells, and stagnant water. To assuage these concerns, some Marin County residents who live near restored marshes—in neighborhoods as affluent as the San Francisco Marina district—appeared at a public meeting to speak of the joys and benefits: opportunities to watch birds, the pleasure of seeing nature coming back. None complained about smells or mosquitoes.

Getting neighborhood support was only one of

The only Expo building still standing is the domed Palace of Fine Arts, which houses a theater and the San Francisco Exploratorium. Its lagoon (not visible in photo) is the last remnant of the original marsh.



ROY EISENHARDT: COURTESY PARKS ASSOCIATION

the challenges the marsh presented. The first wetland restoration in an urban landfill on the Bay, it was designed to be 20 acres in size and to fit between the historic airfield site and the East Beach recreation and open space improvements. (Hydrologists had recommended 30 acres as an adequate size; the Park Service's plans call for eventual expansion.) At other restorations, dikes were breached and the tides were able to do the rest of the work, helping plants and other marsh life to become established in areas that were not so rigidly defined. Here a template had to be shaped, some 230,000 cubic yards of soil and rubble removed, and a 40-foot-wide channel dug to allow Bay water to flow in and out within strict parameters. The material removed was deposited on the site of the former airfield.

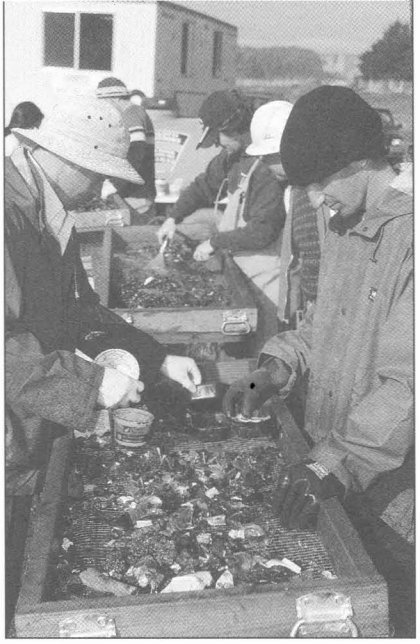
Inevitably, not everything went as planned, here as in other aspects of this enormous project. Soon after digging began at the marsh site, remnants of an aboriginal shell mound surfaced. Work stopped for three months while Park Service archaeologists, monitored by native Ohlone consultants, probed and defined the outlines of the crescent-shaped midden, which contains shells and charred bones of fish, land mammals, and birds. After it had been mapped, carbon-dated to A.D. 1400–1500, and its artifacts examined, the site was reburied to protect it from wind and water erosion. The marsh had to be recontoured into its present peanut shape to flow around the midden.

PHOTOS THIS PAGE COURTESY PARKS ASSOCIATION

Soon after, a second, newer, midden was unearthed—debris from the Army Quartermaster's Depot, dumped into the marsh in the late 1800s. What had been trash then was now historical treasure. Archaeologists excavated some 90,000 military artifacts, remarkably well preserved in the sand. Metal implements, military equipment, glass bottles, and pottery now provide a remarkable picture of late-19th-century life and the region's military history. Perishable items such as leather harnesses from mules are being stored in curatorial refrigerators.

Right: Sorting archaeological finds

Below: Ohlone dance celebrating the marsh opening



Finally the marsh template was in place. Because this wetland is very sandy and, unlike others restored on the Bay, lacks the silt strata that allow marsh vegetation to return with the tides, pickleweed stays low and a greater range of plants can take hold. A "plant palette" of some 60 species was selected, including some plants that had been extirpated from the region. The marsh was ceremonially opened to tidal action with a breaching of its channel to the Bay on November 9, 1999.

Now intensive monitoring has begun. Will nature comply with human intentions? The mouth of the tidal channel has shifted, eroding the beach where windsurfers launch—to their extreme dismay—while building up a beach to the west. Shoreline processes often prove unpredictable, at least in the short term. The Park Service plans to replenish the eroded beach, then wait for an equilibrium to be reached before deciding whether anything else should be done.

During the two and half years of earth moving, the public could watch the progress, for Crissy Field was never closed. Cyclone fences and work plans were constantly being changed, sometimes day by day, to accommodate visitors and work parties safely. Display panels along trails showed what the park would become. Changes will continue, both natural and man-made.

TODAY CRISSY FIELD HAS AN EXPANDED beach with native plants in restored dunes. The new 500-spot parking lot resembles grassy dunes, with saltgrass growing in durable composition material. Facilities for windsurfers have been improved with an outdoor shower, picnic tables, and toilets. A bridge across the new marsh links two foot and bicycle paths, moving people easily

KEVIN THATCHER

between street and shore. The circulation pattern also channels foot traffic away from vegetation in sensitive areas.

The Golden Gate Promenade, part of the 400-mile Bay Trail, has been widened and resurfaced and is fully handicapped-accessible. It smoothly links Fort Point to Fort Mason, joins the national park to Marina Green, and accommodates an endless stream of people. Dog walkers, joggers, and bicyclists move harmoniously at their own pace, watching sailboats, windsurfers, and birds against sky and water, with the Golden Gate Bridge in the background. A lawn of native grasses will soon stretch over the old airfield, limning the former runways; sculpted hillocks and coves will provide grassy picnic areas and shelter from the wind. A picnic area and small amphitheater are sheltered in the West Bluffs, snug under the Golden Gate Bridge.

The work continues. A historic building overlooking the marsh is being gutted and converted into the Crissy Field Center, which will provide diverse multicultural programs, strengthening the partnership between the park and the urban communities it serves. Hands-on workshops, laboratories, and exhibits will focus on wetland ecology and other urban environmental issues. The Center will feature exhibits that tell the stories of Crissy Field.

What can other communities learn from this success story as they work to create parks on abandoned urban military or industrial sites? As Moore points out, there is only one Crissy Field, and it's here. "When you bring people here, it takes their breath away." But he adds: "When you invite the public into the vision, people help you to fulfill it—in a volunteer capacity, a financial capacity, and an advocacy capacity."

"At first, when I'd tell people that a new tidal marsh would be built, few believed me," said the Coastal Conservancy's Crissy Field project manager, Marc Beyeler. "Now this early success is encouraging other waterfront communities." The grand opening of Crissy Field and its Center is projected for spring 2001. The Park Service and the Parks Association are planning a weeklong celebration as a "thank you" to the community for its generous support. ■

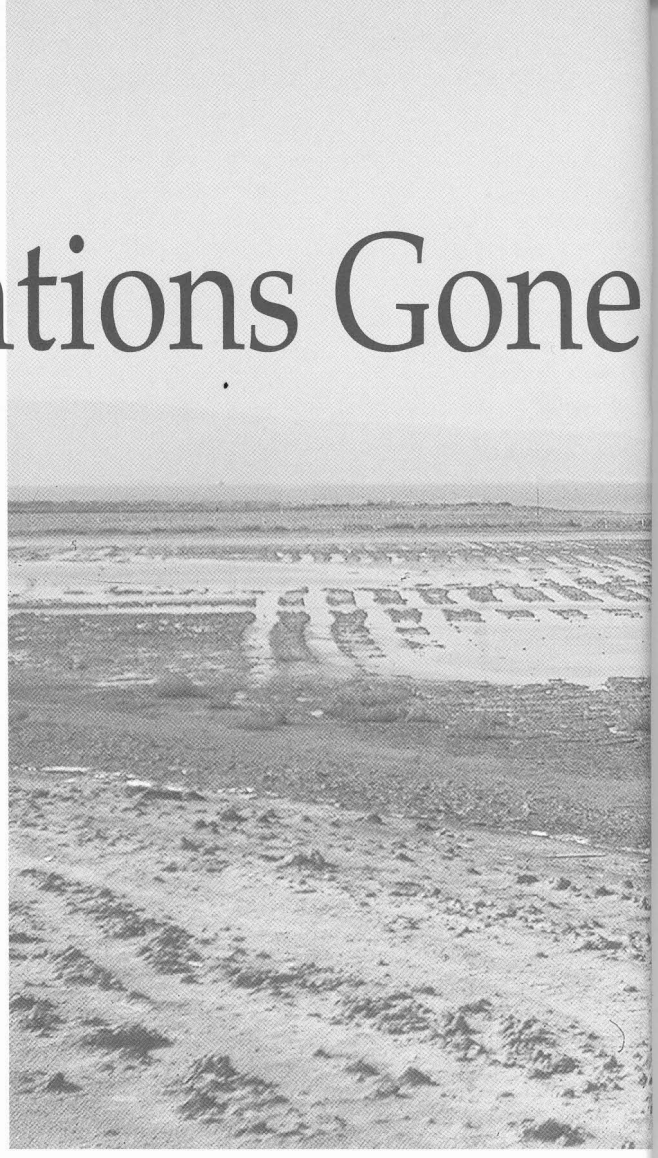
YOU CAN VOLUNTEER AT CRISSY FIELD by calling (415) 561-3034, ext. 3445. Work parties are held each Saturday, 9 a.m. to noon. To volunteer in GGNRA as a whole, call (415) 561-4755. See www.crissyfield.org for more information.

Arlene Gemmill, an environmental economist, has been active in behalf of Crissy Field for five years. She has published two studies on the award-winning Toronto Waterfront Regeneration project.

Good Intentions Gone

Why Would Anyone Bring an Alien Cordgrass into S.F. Bay?

PHYLLIS M. FABER



Right: Pond 3, the U.S. Army Corps of Engineers experimental site, in October 1976 after smooth cordgrass seed had been planted.

THE CALIFORNIA COASTAL Conservancy is sponsoring a program that could cost millions of dollars to rid the San Francisco Bay of two species of cordgrass that were intentionally introduced less than thirty years ago. It is difficult now to see how this could happen, but a little sleuthing reveals a tale of good intentions gone awry.

Atlantic cordgrass (*Spartina alterniflora*), also known as smooth cordgrass, was introduced by an employee of the U.S. Army Corps of Engineers who had limited understanding of biology and no knowledge of the hazards he was creating; the other offender, dense-flowered cordgrass (*S. densiflora*), was introduced by a geneticist working with a landscape designer who didn't understand that there was a difference between the native San Francisco Bay cordgrass (*S. foliosa*) and one he had found growing in Humboldt Bay. Once introduced, both cordgrasses have naturalized, spread, and now further degrade the San Francisco Bay ecosystem, particularly its shorebird habitat and its native marsh flora.

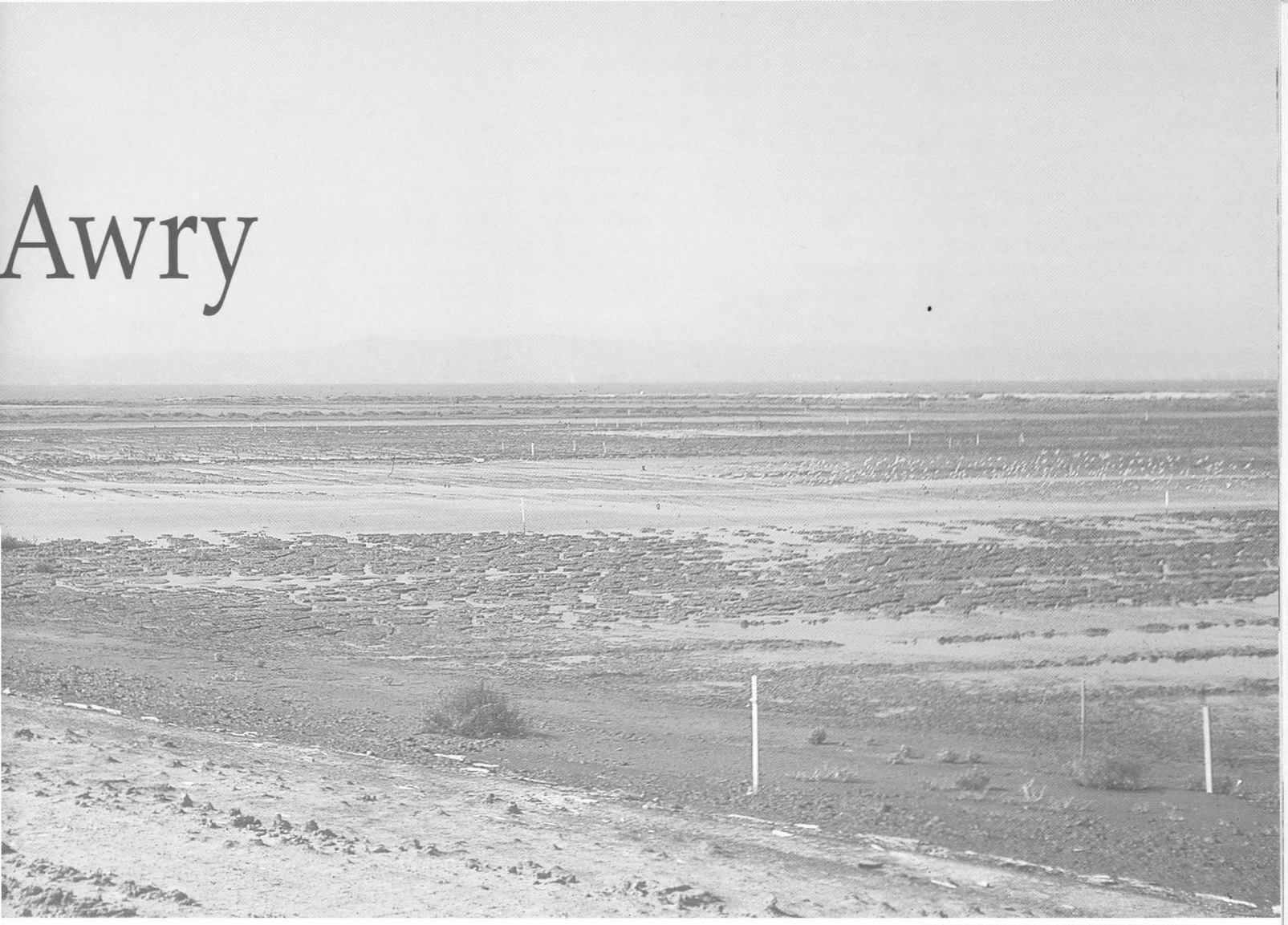
DEBRA SMITH

Left: Elsie Roemer Bird Sanctuary, Alameda. Non-native *Spartina alterniflora* colonizing mudflats in 1998

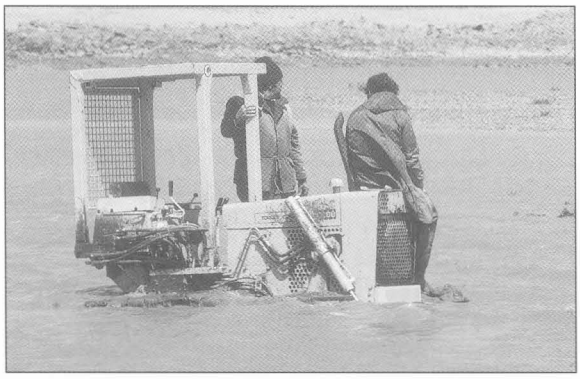
In the late 1960s, Tom Harvey, a biology professor at San Jose State University, conducted an experiment to see whether marsh vegetation would grow on land that was once a tidal wetland, then diked and left to dry out, and subsequently reopened to tidal activity. Until this time the general belief was that once gone, wetlands were gone forever. Before dikes were breached at the Faber Tract (no relationship to the author) in Palo Alto, Harvey transplanted a few sprigs of the native San Francisco Bay cordgrass into an area that had been made tidal. To his delight, the plants became established and grew. This success pointed the way toward restoring a number of diked former tidal marshlands in San Francisco Bay. The era of marsh restoration had arrived. The question then became how to do restoration work.

A few years later, in the early 1970s, several young men at the San Francisco Division of the

Awry



PHOTOS THIS PAGE: COURTESY TOM WAKEMAN



Left: Equipment used by the Army Corps to prepare Pond 3 for planting and for dispersing seed became bogged down in mud in April 1976, after dikes were breached.

U.S. Army Corps of Engineers took a field course in wetland ecology given by Ida Geary, a private biology instructor from Mill Valley. One of her students, Paul Knudsen, a returning Vietnam marine, soon became involved with a potential restoration project on a 75-acre site at Pond 3 adjacent to Alameda Creek in the south Bay. Knudsen met and talked with Professors Emeritus Herbert Mason from the University of California and Curtis Newcombe from San Francisco State University, who were experimenting with methods for restoring cordgrass along Alameda Creek. Should one sow seed, plant sprigs, or transplant clumps of cordgrass? They agreed that, for large-scale restoration, sowing seed was the least labor-intensive method and least likely to disrupt donor marshes.

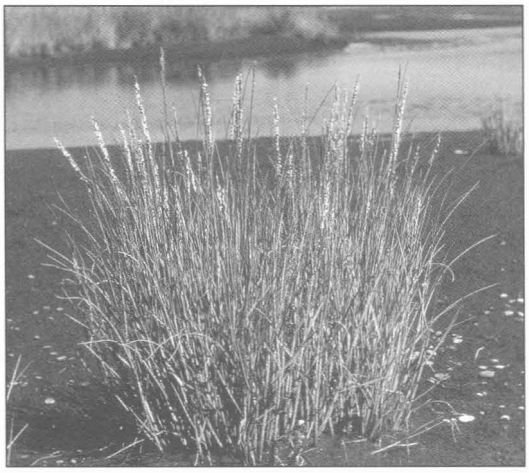
The seed set for *Spartina foliosa* harvested in San Franciso Bay is frequently poor, so Knudsen turned to Ed Garbish, director of Environmental Concern, a private consulting firm and nursery in St. Michael's, Maryland, on the east shore of Chesapeake Bay. Garbish had worked extensively on methods for handling the seed of Atlantic cordgrass, an eastern native. He had found that overwintering seeds at a constant temperature in refrigerated fresh water resulted in the highest rates of germination, and that seed sowed directly over exposed mudflats gave good establishment success. This was particularly important along the eastern seaboard, where erosion threatens the shoreline. It was hoped that through proper seed management, large stands of Atlantic cordgrass—a perennial that grows to six to eight feet in height, twice as tall as our native cordgrass—would stabilize large areas.

Paul Knudsen wanted to experiment on the

Corps' Pond 3 site to demonstrate large-scale establishment of cordgrass. He arranged to buy some of the Environmental Concern seed of Atlantic cordgrass collected in Maryland that had been properly overwintered. The imported seeds were spread across the mudflats in Pond 3, and many germinated and became established. Dikes at Pond 3 were breached soon after the planting; Atlantic cordgrass quickly naturalized, and it is now aggressively spreading around the Bay. Paul Knudsen transferred to the Corps facility in Mississippi soon after this planting and several years later left the Corps to work in his wife's antique store in New Jersey.

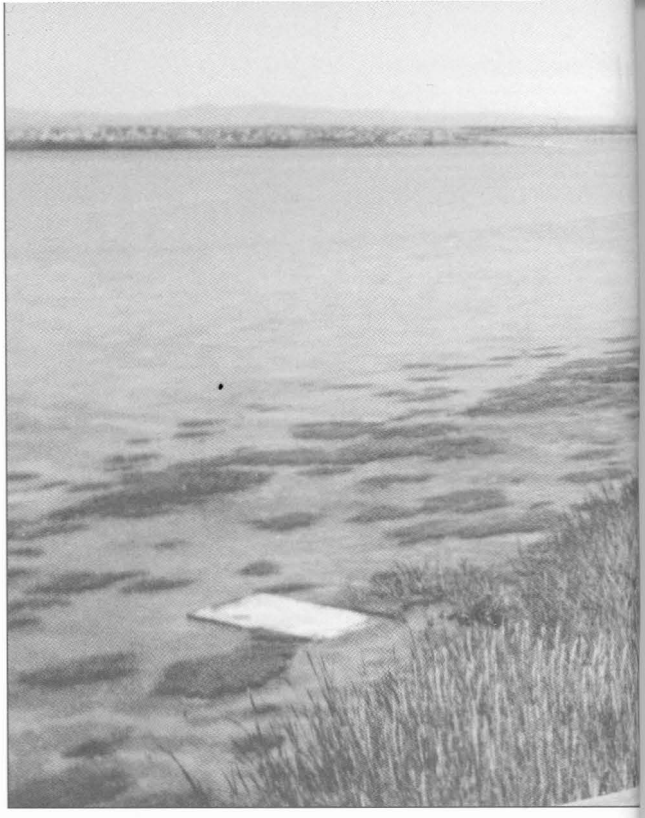
According to Don Strong at the Bodega Marine Lab, Atlantic cordgrass spreads by dispersal of seeds on the tides. Because it is apparently hybridizing with native cordgrass (*S. foliosa*), largely through its windblown pollen, it is a particularly aggressive and disturbing invader. Atlantic cordgrass grows at somewhat lower elevations than the native plant, reducing the area of intertidal mudflat—shorebird feeding grounds—at low tides. Its dense growth also clogs flood control and navigation channels.

By 1988 Atlantic cordgrass had spread 15 miles north to the bayfront at Alameda, where Brit Larson, a graduate student of wetland biologist Michael Josselyn of San Francisco State University's Tiburon Centers, studied its habitat and growth patterns. By 1990 it had also spread 15 miles south into Alviso and Mud Creeks, where it now densely lines creek edges. Debra Ayres, a postdoctoral student in Strong's lab and lead author of a study published in 1999, reported that Atlantic cordgrass is competitively superior to native cordgrass and that all categories of hybrids exist in marshes colonized by water-dispersed seed. The study predicts that proliferation of cordgrass hybrids could grossly alter the character of San Francisco Bay.



Right: At Warm Springs Marsh in Fremont, native cordgrass first colonized newly created mudflats but was rapidly swamped by smooth cordgrass. This photograph, taken in 1994, shows a large continuous stand of smooth cordgrass that borders an extensive mudflat. Today there is little cordgrass. Bulrushes and cattails have replaced it.

Below: *Spartina densiflora* at Puerto Saavedra, Chile



THE CIRCUMSTANCES SURROUNDING the introduction of dense-flowered cordgrass (*Spartina densiflora*) into San Francisco Bay are quite different, but provide another example of good intentions gone awry. In this case, the problem involved mistaken identity: the Humboldt form of Spartina was thought to be a growth form of the native cordgrass species, *S. foliosa*. For aesthetic reasons it was selected for a landscaping plan, and as it turned out, another exotic was thus introduced into San Francisco Bay.

This tale begins in 1972. Property between Marin Catholic School and Corte Madera Creek in Marin County was slated for development. Barbara Boxer, now a U.S. senator from California, was then running for county supervisor and made protecting this land part of her political campaign. She won, and the County subsequently acquired the site, now called Creekside Park. The County contracted with landscape architects Royston, Hanamoto & Abbey to create a park. They in turn subcontracted with Curtis Newcombe, of the San Francisco Marine Resources Center in Richmond, to develop and carry out a vegetation plan. Newcombe, formerly a professor of biology at San Francisco State University, had recently hired a former colleague and genetics professor, Kenneth Floyd; Floyd would create the vegetation plan.

In preparation, Floyd visited tidal salt marshes along the northern California coast. He was attracted to the gray, clumped appearance of the cordgrass growing in Humboldt Bay and incorporated it into his plan. He thought it was a growth form of the San Francisco native, *S. foliosa*. Not being a botanist, he did not question the species identification. During this period, Tom Harvey had mentioned to various people that the plant he saw on Humboldt Bay looked different from the San Francisco native, but no significant attempt was made to further identify it until after it had been introduced into Creekside Park. Landscaping for Creekside Park was carried out in 1976–77.

In 1983, I collected cordgrass specimens from Humboldt Bay and, using specimens in the Cali-

PHOTOS THIS SPREAD: PHYLLIS FABER

fornia Academy of Sciences collections, tentatively identified the Humboldt plant as *Spartina densiflora*. Biology professor Beacher Crampton, a grass specialist at the University of California, Davis, later confirmed this identification. I then carried out transplant experiments to determine if the Humboldt form of cordgrass would revert to a more typical form when grown in San Francisco Bay. It did not. I also collected the cordgrass *S. densiflora* from three locations along the coast in Chile and from a fourth on Chiloe Island, also in Chile. In 1985 Josselyn and Douglas Spicher published a description of the Humboldt *S. densiflora* as part of Spicher's master's thesis—along with his hypothesis that the plant had arrived in California aboard a lumber ship from Chile that emptied its ballast water into Humboldt Bay.

In the meantime, dense-flowered cordgrass—now known to be an introduced species—was growing well in Creekside Park in Greenbrae. Too well. Dense-flowered cordgrass is distinguished from the native cordgrass by more than its color, narrower leaf blades, and earlier bloom. It grows at a higher elevation than the native cordgrass and outcompetes other plants; it thus threatens mid-elevation species such as alkali heath (*Frankenia salina*), marsh rosemary (*Limonium californicum*), and *Jaumea carnosa*. After almost 30 years, this plant has spread along Corte Madera Creek to the San Francisco bayfront.

SO IN SAN FRANCISCO BAY, where 90 percent of tidal marsh habitat has been lost over the past 120 years, we now have two new introduced nonnative species of cordgrass disrupting a vitally important ecosystem. Smooth cordgrass is reducing the feeding grounds for migrating shorebirds, while dense-flowered cordgrass is reducing the tidal marsh flora. The public will foot the bill either for the removal of these invasive grasses or for the damage their spreading will cause. Certainly there was no criminal intent in either introduction; however, it is also clear that each was preventable. No professional botanists were involved in these two introductions. Had they been, their plan review might have discouraged either or both.

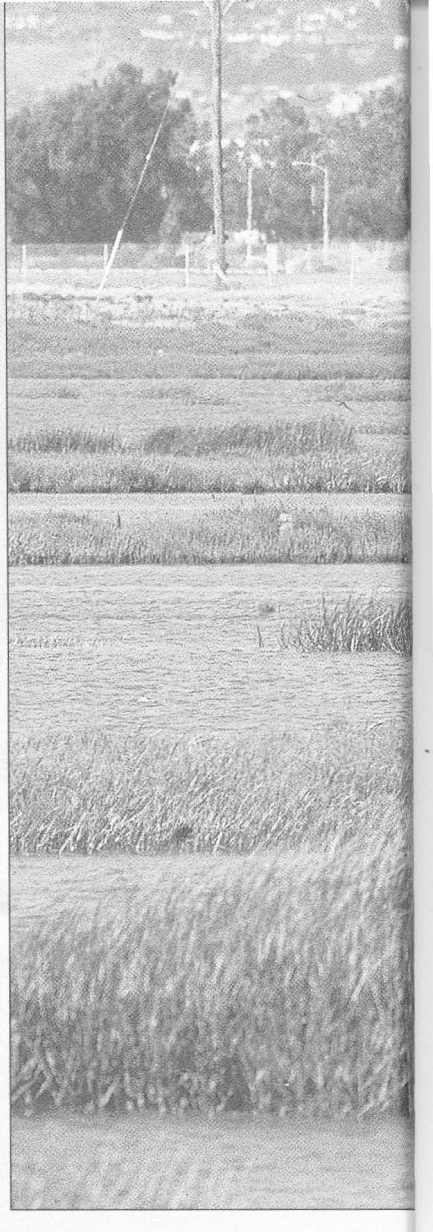
Accidental introductions such as occurred in Humboldt Bay over a hundred years ago may become more preventable if there are requirements to empty ballast water at sea. Accidental introductions by well-meaning landscapers are no longer acceptable: people need to be aware of the risk of moving plants from one place to another. As stewards of our land we must work hard to discourage the inadvertent moving of plants that naturalize easily, and if mistakes do occur, we must act promptly and aggressively to control introduced populations. Each of us is guilty of watching weedy plants spread—and conversely, each of us could help in their control or elimination. Sadly, through human carelessness or ignorance, the biodiversity of this once rich ecosystem is being reduced by the introduction of exotic species. We need no more good deeds gone awry. ■

Phyllis M. Faber is a founding member of the League of Coastal Protection, a former chairman of the North Central Coastal Commission, and the general coeditor of the Natural History Series for the University of California Press.

Girding for Battle against Spartina

Invasive Alien Threatens Restoration

BILL O'BRIEN



Above: Atlantic cordgrass inflorescence, ready to cast its seeds

Top right: Tall clumps of Atlantic cordgrass at high tide. Native cordgrass would be under water.

Bottom right: Atlantic cordgrass taking over a mudflat

Background: Atlantic cordgrass has taken over Willapa Bay in Washington.

IF YOU STAND at the water's edge in Alameda's Elsie Roemer Bird Sanctuary and look out across the dense marshgrass meadow at San Francisco Bay, you may well think: This is what the Bay must have looked like hundreds of years ago.

But you'd be wrong. That expanse of tall cordgrass reaching out into the mudflats is an alien invader, a nightmare for those working to protect and expand tidal marshlands. "It's all nonnative, everything you see," says Debra Smith, coordinator of the Invasive Spartina Project, which was launched last year to rid the Bay of this pest, or at least to control it.

Ironically, *Spartina alterniflora*, commonly known as smooth or Atlantic cordgrass, was introduced to the Bay in the 1970s as part of an effort to restore degraded wetlands (see p. 14). It has been spreading inexorably ever since. In many places, including the bird sanctuary, it has all but wiped out the native Pacific cordgrass (*Spartina foliosa*). It menaces salt marshes in much of San Francisco Bay and in estuaries up and down the West Coast. Restored marshes are especially vulnerable. Even as millions of dollars are being committed to restoration, it threatens to undermine virtually all efforts to bring back some of the lost marsh habitat. Several other nonnative invasive species of Spartina—*S. densiflora*, *S. anglica*, and *S. patens*—are also making headway. "There's definitely a sense of urgency here," says Smith.

The eradication effort is funded by CALFED, a federal-state water policy partnership; the National Fish and Wildlife Foundation; and the Coastal Conservancy. An immediate goal is to prevent the spread of nonnative

cordgrass in the north and south Bay and to keep it out of Suisun Bay.

I follow Smith to the upper edge of the marsh, where we can get a close look at some Spartina. For me, an amateur, it's difficult to distinguish the native species from the nonnative. Both grow in the intertidal zone and look nearly identical. Both have tough, narrow leaves that taper to a point. (Both look like lemon grass to me.) Smith says Atlantic cordgrass tends to grow taller and thicker than its Pacific counterpart, and if you peel away the outer leaves of the nonnative plant you may find a purplish pink coloring that is absent in the native. She picks a couple of plants at random. Both show the trace of purple. Then she pulls a foot-tall plant from the mud, revealing a thick, almost mandrake-like root structure.

BUT WHY DO THEIR DIFFERENCES matter? Local and state agencies may commit millions of dollars and untold hours of work to get rid of nonnative Spartina. Why? Smith has often been asked that question, especially by folks from the East Coast who are using Atlantic cordgrass in efforts to rebuild their own wetlands. "They're floored that we think it's a problem," she says.

Well, east is east and west is west, and what's good in the smooth cordgrass's natural habitat—which stretches from New England to the Gulf Coast—can be deadly to the estuaries on this side of the continent. Here the alien species of Spartina "actually re-form the terrain," says Peter Baye, a botanist with the U.S. Fish and Wildlife Service Endangered Species Program, who has studied cordgrass on both coasts.

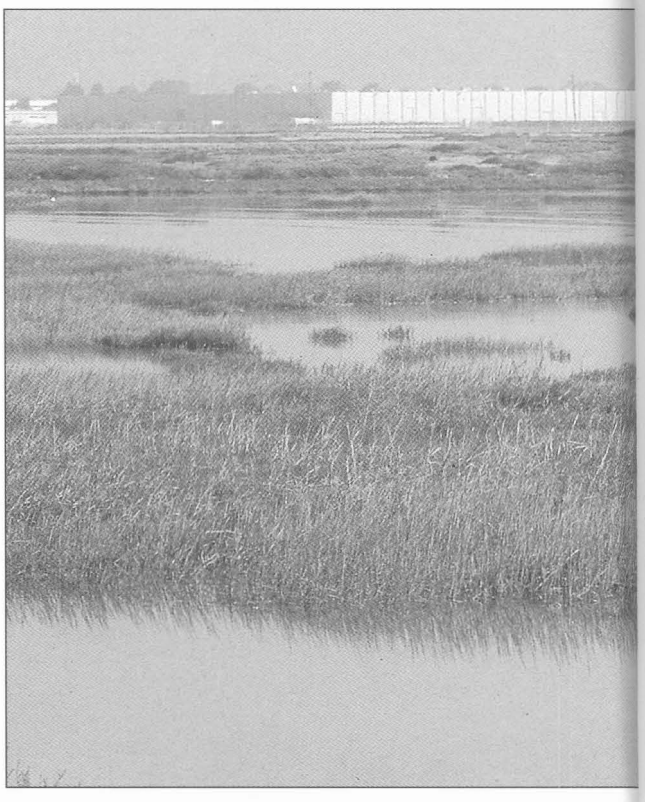
BACKGROUND: DEBRA SMITH; OTHER PHOTOS THIS SPREAD: COURTESY MARK TAYLOR/EAST BAY REGIONAL PARK DISTRICT

PHOTOS THIS PAGE: MARK TAYLOR/EBRPD

Pacific cordgrass tends to grow in small clumps, allowing wetlands to drain through numerous channels. When Atlantic cordgrass arrives, usually in the form of seeds that wash in, it sends out numerous rhizomes, forming massive clones that can coalesce into vast meadows. The thick roots and stems accrete sediment, and in subsequent seasons new Spartina grows on top of the old, building a mass of plant material several yards deep. Atlantic cordgrass also hybridizes with the *S. foliosa*, so that within a few years almost all the pure native cordgrass is gone. Meanwhile, the clones merge and build up, sometimes raising the level of the marsh by several feet and effectively "paving over" the channels that allowed the marsh to drain. Tidal flows diminish. Marsh creatures lose channel habitat and foraging areas. The endangered clapper rail, for one, forages on the open mud in the channels. Without these pathways, the birds are forced into more open spaces, where they are more vulnerable to predators.

Above: A salt marsh on the Hayward Shoreline in September 1988, with shorebirds on a tidal mudflat

Right: In another part of the same marsh, a thick meadow has formed. There are no more shorebird feeding grounds here.



Endangered clapper rail

No studies have as yet documented the impact of invasive Spartina species on wildlife. Some researchers have seen signs that marine invertebrate populations may actually increase as Atlantic cordgrass covers open mudflats; and clapper rails have been observed nesting in it. "Nonnative species provide wonderful cover for rails, even at the highest of tides," says Carl Wilcox, habitat conservation manager for the central region of the Department of Fish and Game. Smith notes, however, that the birds appear to build their nests at the edges of the larger and denser alien stands; how they use large meadows of *S. alterniflora* is still not known.

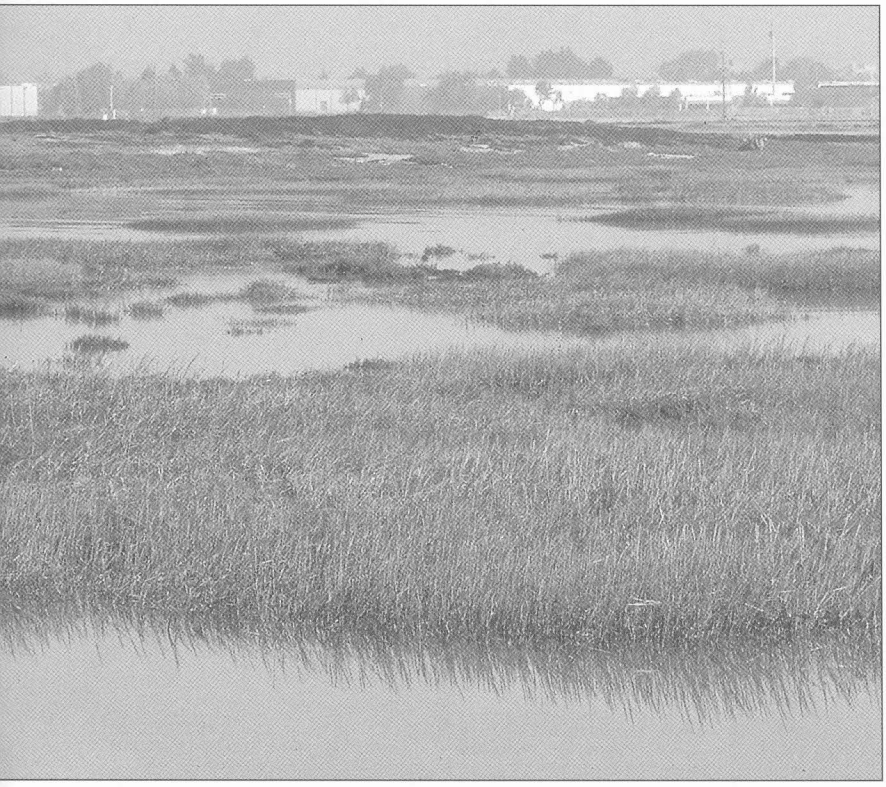
Atlantic cordgrass also extends farther into the tidal zone than the native grass does, invading the pickleweed habitat of the endangered salt marsh harvest mouse, and it spreads far into the mudflats. Smith says she's seen the Alameda

DEBRA SMITH

Left: Katy Zaremba, a graduate student, in a meadow of *S. alterniflora* in San Bruno

Below: Endangered salt marsh harvest mouse

MARK TAYLOR/EBRPD



mudflats shrink dramatically as *S. alterniflora* has taken over. If it's not controlled, she says, Atlantic cordgrass could eventually fill in the mudflats between Alameda and Bay Farm Isle, about a quarter of a mile away, leaving open just the narrow deep-water channel between them.

Mudflats along the California coast are crucial stopover points for shorebirds migrating along the Pacific Flyway. Long-billed birds that hunt for small critters in wet sand would not likely be able to forage in a dense stand of alien Spartina. Gary W. Page, director of coastal and estuarine research at the Point Reyes Bird Observatory, says that birds that overwinter in the Bay could be especially affected, such as dunlins, which arrive from nesting grounds in the Arctic, and marbled godwits, which nest in the Great Plains.

On San Francisco Bay there are 1,000 acres or so of *S. alterniflora* south of the Bay Bridge, and new outlying populations in Marin County and Emeryville. On Humboldt Bay a small stand was discovered in the mid-1980s; it was eradicated before it could spread. But *S. densiflora,* a Chilean native, now covers 80 percent of Humboldt Bay's 1,000 acres of salt marshes. Because it arrived way back in the 19th century, people had long assumed it was a native. "By the time anyone noticed [that it wasn't], it was everywhere," says Andrea Picard, a Fish and Wildlife Service ecologist at the Humbolt Bay National Wildlife Reserve.

In Washington State, *S. alterniflora* has spread over 5,000 acres of saltmarsh in 10 counties, and continues to outpace control efforts.

"Every estuary on the Pacific Coast could be vulnerable," says biology professor Donald Strong of the University of California, Davis, Bodega Marine Laboratory. The nonnatives favor shorelines with shallow water and little wave action—common on the West Coast. Strong and his colleagues have identified 31 estuaries in California, Oregon, and Washington that could potentially be impacted, including several that could be dramatically changed by an influx of nonnative Spartina. They estimated that almost two-thirds of Bodega Harbor could be covered by *S. alterniflora* if the plant were introduced there. "It could go up the [San Joaquin–Sacramento] Delta," Strong says. "It probably will." Baye worries that as the areas covered with nonnative cordgrass expand within San Francisco Bay, seeds are more likely to be flushed through the Golden Gate, ending up on the mudflats of Point Reyes and Tomales Bay. Coastal areas to the south are likewise at risk, including Morro Bay, San Diego Bay, and the Tijuana River Estuary. "We need to do something now or learn to live with it," says Wilcox. "If we don't, it will be beyond control. It may be already."

NEWLY RESTORED WETLANDS seem to be especially vulnerable. In Cogswell Marsh at the Hayward Regional Shoreline, levees around a series of former salt ponds were breached in 1980. This marsh is now the site of one of the largest, densest *S. alterniflora* stands in the Bay, says Shoreline park supervisor Mark Taylor. At nearby Oro Loma Marsh, reopened in November 1997, the

ANOTHER BIG MISTAKE: GIANT REED WAS SUPPOSED TO BE USEFUL

THE RUSSIAN RIVER watershed, once home to the largest steelhead population in the world, is increasingly being invaded by a nonnative weed that threatens the viability of numerous fish and wildlife species. The highly destructive giant reed (*Arundo donax*) is degrading native riparian habitat, which includes such species as alder, willow, and cottonwood.

Giant reed is a bamboo-like grass, native to Asia, which has been wide-spread in some Mediterranean countries for centuries. It was brought to California by early settlers from Spain, who used it to build animal shelters and other enclosures. It was also planted in the 1940s and '50s by people who believed that it was effective in controlling erosion. Landowners have since learned that willows are far more effective, for the reed has a shallow root system.

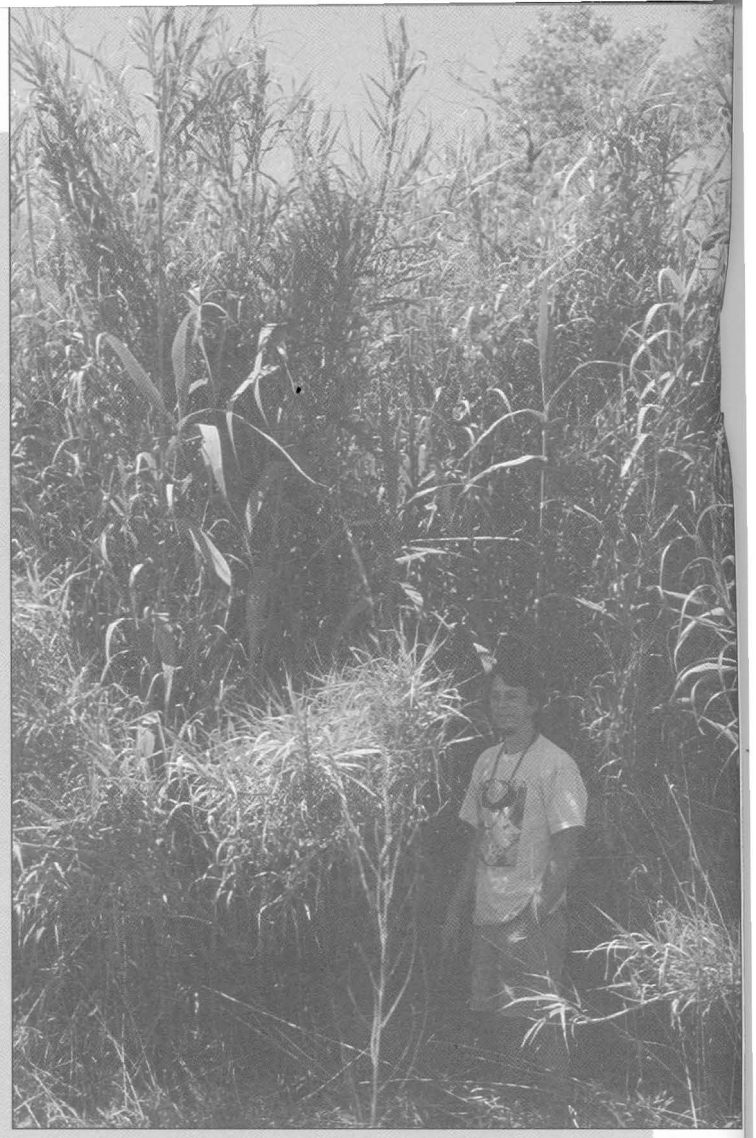
This very invasive reed grows up to thirty-five feet high, is highly flammable, uses large amounts of water, and rapidly takes over streamside vegetation. In some California stream systems, solid stands of giant reed have replaced diverse riparian forests within ten years, creating a monoculture that supports very few wildlife species. *Arundo donax* is an enormous problem in many coastal watersheds, particularly in southern California. It has created a monoculture on some reaches of the Santa Ana and Santa Margarita Rivers, is widespread on the Ventura River, and has begun to infest other rivers to the north, including the Gualala and the Sacramento.

Riparian habitat is critical to the long-term health of the salmonid fishery, providing shade over stream channels, as well as a long-term source of food and "large woody debris" to the aquatic environment. Considering that the Russian River is home to three federally listed salmonid species—steelhead trout, and Coho and Chinook salmon—the replacement of native riparian vegetation by the giant reed is a serious natural resource management issue.

Circuit Rider Productions, Inc., a nonprofit agency specializing in ecological restoration and watershed planning, began a giant reed removal program on the Russian River in 1999 with start-up funding from the Sonoma County Water Agency, the Sonoma County Community Foundation, and numerous landowners and community groups. In May 2000, the Coastal Conservancy enabled the program to expand considerably by approving $121,000 for the Giant Reed Extraction and Enhancement Program.

The reeds will be cut down by hand, with loppers and machetes. Landowners will follow up by tarping, removing new growth by hand, or careful application of low-impact herbicides approved for such use. The choice of method will be the landowner's. The Circuit Rider program will restore native riparian habitat, educate the public about giant reed, and involve volunteers in the fill removal and restoration program. —*Karen Gaffney*

For more information about giant reed in the Russian River watershed, contact Circuit Rider Productions, Inc. at (707) 838-6641 or crp@sonic.net. For information about giant reed, see the Team Arundo del Norte website: ceres.ca.gov/tadn/.



Giant reed in the Alexander Valley, Russian River. Giant reed does not provide streamside habitat for fish and wildlife.

COURTESY CIRCUIT RIDER PRODUCTIONS, INC.

"KILLER ALGA" REACHES CALIFORNIA

THE LATEST, AND PERHAPS MOST dangerous, invasive alien to appear in California waters is a clone of *Caulerpa taxifolia,* a tough, fast-growing alga that has devastated large parts of the Mediterranean seafloor since it was accidentally released there in 1984. In June, scientists found patches of this plant in Agua Hedionda Lagoon, near Carlsbad in San Diego County. Eradication efforts began immediately. In the Mediterranean the plant has proved unstoppable (see page 24).

alien cordgrass came in right away, he says. "In some ways, future restorations in the Bay are being held hostage to these species."

Controlling the invaders is not easy. Eradication efforts must be tailored to each individual site. If only a few plants have appeared, they can be removed by hand. Scattered individual clones can be destroyed by covering them with heavy black plastic fabric. But where the invasion is more widespread, the task is much more difficult.

The first attempt to eradicate clones at Cogswell Marsh by tearing out the plants was a failure. A group of Boy Scouts worked fiercely and filled a large truck with cordgrass pulled up by the roots, but the next spring the plants came right back. "It was a complete waste of time," Taylor says. Laying on black plastic proved ineffective. "All it takes is just a couple of shoots coming out one side," Taylor explains, and the trouble is back. He tried burning a stand with a propane torch, but "that failed miserably," he says. "If anything, it came back stronger." Much more successful was an experimental application of the herbicide Rodeo. It showed good results in Cogswell Marsh and the East Bay Regional Park District is now working to refine the spraying techniques and concentrations required.

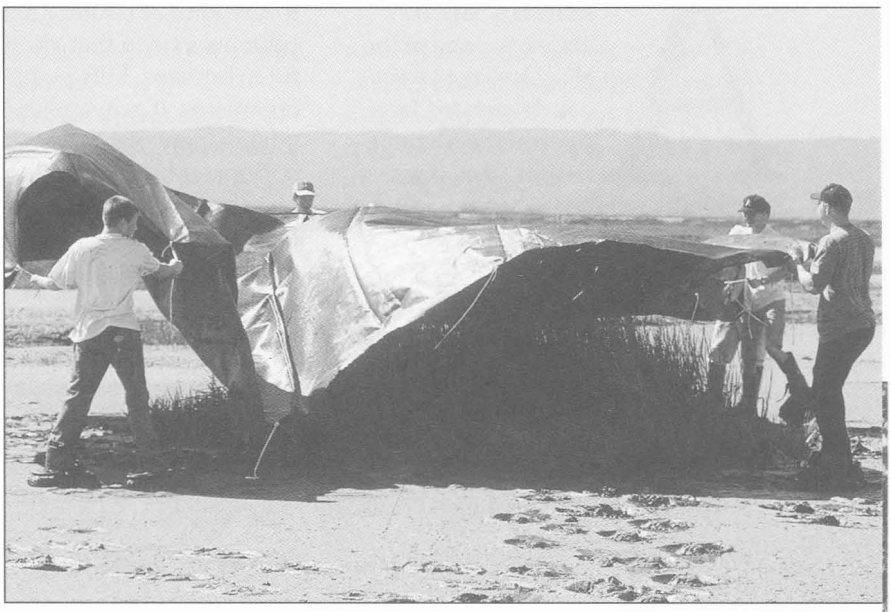
Because San Francisco Bay is home to the endangered clapper rail, eradication efforts must take place after the rail's nesting season ends on September 1 and before it resumes on February 1. Any attack must be quick and thorough, for the plants begin broadcasting seeds in autumn, and then the rainy season arrives.

Those wrestling with the problem are acutely aware that the public knows little about cordgrass, be it native or alien. Smith and her colleagues have begun to spread the word among public agencies and community groups. They hope that once people learn that these grasses could cancel out all the money and time already invested in restoration, they will support the efforts of the Invasive Spartina Team. ■

Bill O'Brien can frequently be found along the shores of the Bay, happily confusing godwits with avocets and curlews. He lives in Oakland.

For more information, contact Debra Smith, coordinator of the Invasive Spartina Project, at (510) 526-4628 or dbrsmt@aol.com.

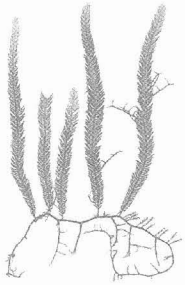
PHOTOS THIS PAGE: MARK TAYLOR/EBRPD



Top: Mark Taylor tried to burn cordgrass with a blowtorch. "That failed miserably," he says. "If anything, it came back stronger."

Center and Bottom: Boy Scouts tried to kill Atlantic cordgrass by smothering it with black plastic. That didn't work.

Aquarium Escapee Hits California



Killer Alga

A STURDY, HIGHLY invasive clone of the alga *Caulerpa taxifolia* has devastated large parts of the Mediterranean since it was accidentally released when the aquarium of the Oceanographic Museum of Monaco flushed its tanks in 1984. Patches of this fast-growing, extremely destructive plant were discovered in June in Agua Hedionda Lagoon, near Carlsbad in San Diego County.

Scientists monitoring eelgrass transplanted to the lagoon as part of a restoration effort found a patch of *C. taxifolia* measuring about 30 by 60 feet, and nine smaller patches. Eradication efforts began immediately. A coalition of 10 federal, state, and county agencies and two private companies are attacking the alga with chlorine, which kills the plant in laboratory conditions. The first treatment seemed to be successful on the small patches.

This clone of *C. taxifolia*, a tropical Pacific species, was developed in the 1970s at the aquarium of the zoo at Stuttgart, Germany, as an attractive, fast-growing warm-water aquarium plant. It was distributed freely to other European aquaria, including the Monaco Aquarium. It has now covered over 10,000 acres of the Mediterranean seafloor, wiping out native seagrasses and other plants, invertebrates, and many fishes, creating monotypic meadows that rapidly eliminate habitat and diversity.

The clone grows much faster and many times larger than the original species. It tolerates cold water, adapts to any kind of seafloor habitat, and contains a toxin that, though not harmful to humans, kills many marine organisms. It propagates by fragmentation—new plants can start from one-millimeter bits of frond, and a single plant can have as many as 200 nine-foot-long fronds—so it is easily spread by boat anchors and fishnets. Many methods of eradication had been tried, with little success; often the plant returns even more vigorous and tenacious than before. Mediterranean regions have already felt significant economic impacts on tourism, recreational diving, and commercial fisheries. Though little known in the U.S., there is extensive documentation of European studies, conferences, and eradication efforts.

Recognizing the perils the *C. taxifolia* clone would pose if introduced to American waters, in 1998 100 scientists petitioned the federal government to ban importation, sale, and possession of the plant. In 1999 the federal government imposed the ban, designating *C.taxifolia* a prohibited species under the Federal Noxious Weed Act. It is still sold and distributed by the aquarium business in some countries, however. (A web search found aquarium enthusiasts eagerly requesting stalks of *Caulerpa* from others whose tanks were overgrown. It was not possible, however, to determine whether the invasive clone was among those discussed.) There is hope that the California invasion may have been caught early enough to eradicate this "killer alga" before it spreads, but scientists also fear that its eventual introduction and spread may be inevitable and unstoppable. Game wardens are posted around the clock at Agua Hedionda Lagoon to prevent anyone from carrying away pieces of the killer alga. ■

—*HMH*

For more information see Caulerpa taxifolia *links at: www.sfei.org/invasions.html (San Francisco Estuary Institute).*

ALEXANDRE MEINESZ, UNIVERSITY OF NICE–SOPHIA ANTIPOLIS

For those who find car camping too tame and backpacking too tough

The Middle Way in Camping

DEWEY SCHWARTZENBURG

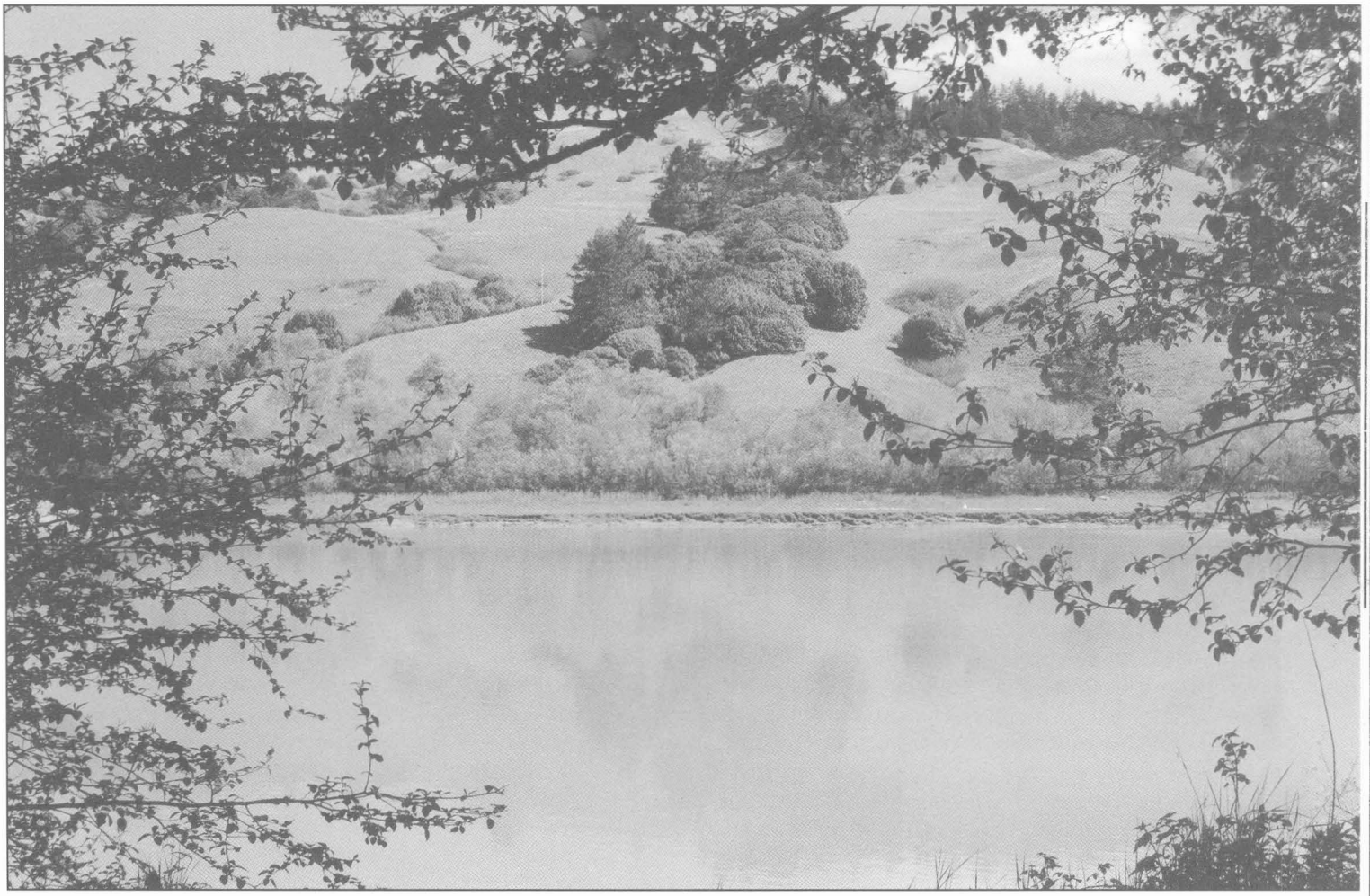
IT WAS SO QUIET at my campsite that I could hear the wind rustling through the redwood trees around me and the water trickling over the rocks in the creek down below. From time to time a bird cried, sometimes right overhead, sometimes in the distance. I felt a sense of presence in the canyon, a consciousness of the wilderness around me that included me as part of it, not as an outside observer.

This sense of solitude and silence, of total immersion in the natural world, is one of the things that draws me and so many others to backpacking. Most California campgrounds are crowded and noisy except off-season or in inclement weather. Cars and station wagons, SUVs, and even mini-buses continually roar by, expelling noxious fumes. The sounds of neighbors camped only 20 feet away intrude on your quiet. The crowds of noisy people, as well as barking dogs, are guaranteed to keep what wildlife there may be at a safe distance.

So is backpacking, with all its sacri-

The Russian River as seen from one of the environmental campsites.

DEWEY SCHWARTZENBURG



DEWEY SCHWARTZENBURG

Environmental campsites at Pomo Canyon, Sonoma Coast State Park

fices and demands, the only alternative to car-camping? Not in California, where the State Parks system has developed, here and there, a "middle way" between the rigors of backpacking and the comfort and ease of car camping: "Environmental Camps." The wooded place I enjoyed, in Pomo Canyon, Sonoma Coast State Beach, was one of these. Environmental camps differ from most other campgrounds in that they "are primitive sites accessible only by foot," according to State Parks. But "primitive" does not mean that you have to hack your way through the brush or carry a shovel. You have to hike a mile or so to get to some of these camps, but others are no more than a few hundred feet from parking places, or close enough, anyway, for a cooler to be carried in. This allows for a considerable comfort factor.

Water usually must be brought in, and toilet facilities are of the outhouse or porta-potty variety. Each site has a picnic table, however, and a fire ring or barbecue stove. Pets are not allowed, on the grounds that their presence would disturb the wildlife.

Campsites are spaced much farther apart than they are in regular car-accessible campgrounds, allowing more quiet and a much greater degree of privacy. The settings for each site have been selected for scenic and natural qualities, and offer the chance to experience camping as it used to be: a means of getting away from it all and back in touch with the natural world.

The environmental camp idea originated in the early 1980s, the brainchild of then–State Parks director Pete Dangermond. There are nearly 200 such campsites in 25 California State Parks now, spread from Lake Earl and Lake Talawa near Crescent City (eight sites) to Crystal Cove State Park on the south coast (21 sites). There are even nine environmental campsites on Angel Island in San Francisco Bay. Usually a park has no more than 10 such sites, but Pomo Canyon has 21, and Julia Pfeiffer Burns State Park in Big Sur has only two.

About two hours after I began, I found that the campsite I wanted—one of the most popular in the system—was already completely booked for the entire month of August except for a few scattered midweek days.

Many environmental camps operate on a first come, first served basis (such as Pomo Canyon and the 11 sites at Willow Creek, also at Sonoma Coast State Beach). But those that can be reserved can be devilishly difficult to get. The State Parks system now allows reservations to be made as much as six months in advance, twice as far ahead as the previous 90-day

limit and more than three times earlier than the original eight-week limit. Furthermore, reservations for a particular campground (regular or environmental) do not simply become available six months in advance to the day. Rather, an entire month is opened up on the first of the month six months prior. Thus, reservations for the entire month of August became available on February 1; all of September on March 1.

You can reserve over the Internet (see address below), but that may be a trying experience. The opening of a whole month on a single day can lead to incredible demand on the web site and frustrating slowdowns. On the morning of February 1 of this year, for example, I got up early to try to make a reservation for an August weekend. There were plenty of open dates, I saw, but to secure one I had to download several web pages, each of which required up to 15 minutes—there were so many people trying to access the system at the same time. About two hours after I began, I found that the campsite I wanted—one of the most popular in the system—was already completely booked for the entire month of August except for a few scattered midweek days. In other words, every weekend was booked during the first few hours of availability over six months in advance!

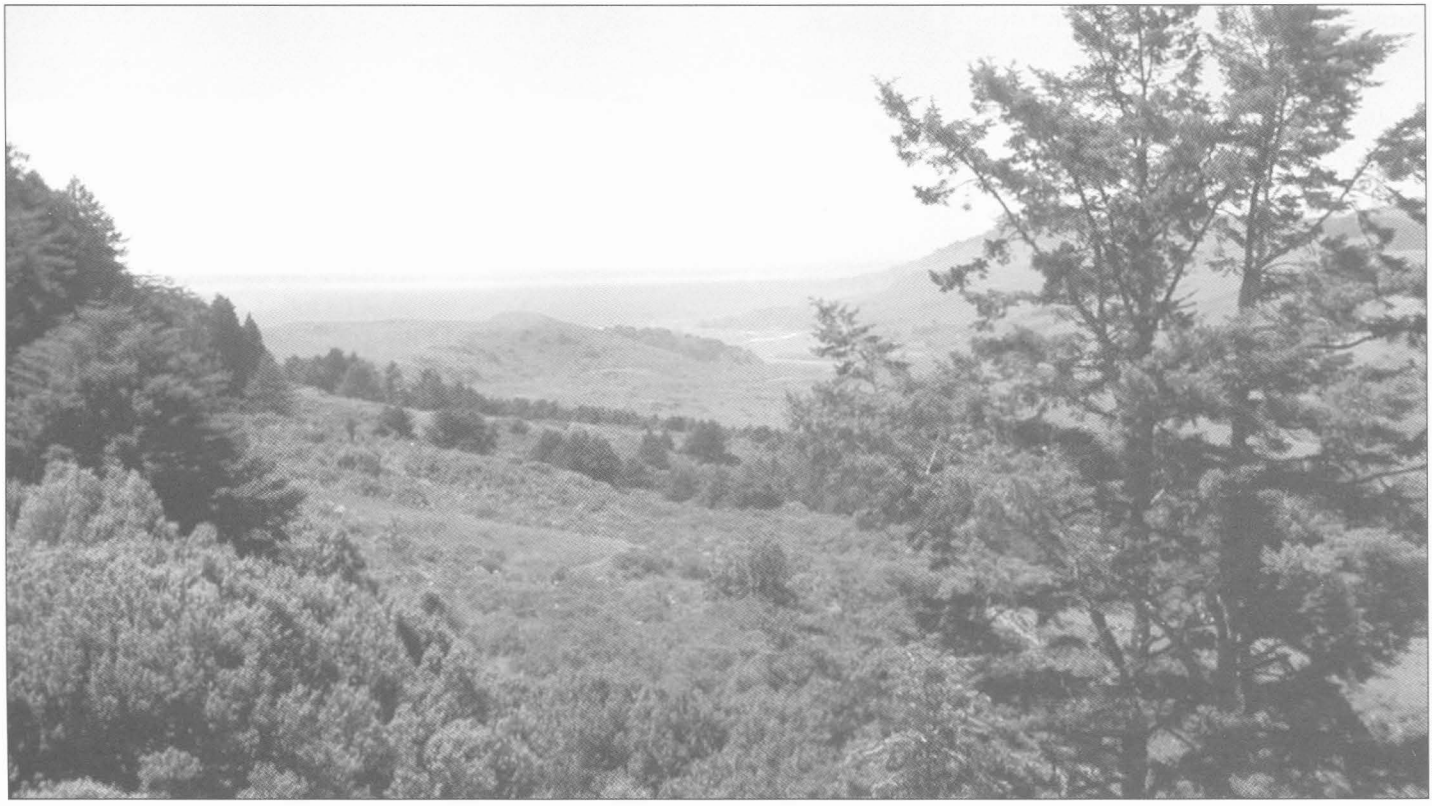
FOR MORE INFORMATION SEE: www.cal-parks.ca.gov; for reservations see: maps1.ReserveAmerica.com/static/ca4.html.

The cost of the environmental campsites has increased substantially in recent years—even more than the cost of traditional campsites. (The Governor has recently ordered a rollback in rates, but this has not yet occurred.) The more desirable sites, which once cost only $5 per day, are now $15. But many—including those in Sonoma Coast State Beach—are $10. The justification for charging less for environmental campsites than for regular ones has traditionally been that they provide fewer amenities and are less expensive to maintain, but the current price setting seems to be simply market-based: some sites are highly desirable, people are willing to pay more for them, so State Parks charges more. Certainly the park system has no difficulty renting out the two sites at Julia Pfeiffer Burns State Park every night throughout the season, even at $15 per night. The solution would seem to be to increase the number of environmental campsites.

California's Environmental Camp program is an innovative recreational concept that offers campers the opportunity to experience nature in an intimate way with only a small expenditure of effort. Neither vehicles nor other park visitors intrude on these special sites, and campers can feel that they are the only people for miles around. Certainly I felt that way at Pomo Canyon as I looked up at the stars above the towering redwoods and listened to the wind. ■

Dewey Schwartzenburg, managing editor of Coast & Ocean, *was reluctant to write about environmental camping—a little-known program. He was afraid that his story would make it even more difficult to reserve his favorite sites. It was bighearted of him to share his secret.*

The mouth of the Russian River seen from a trail above the Pomo Canyon Environmental Camps

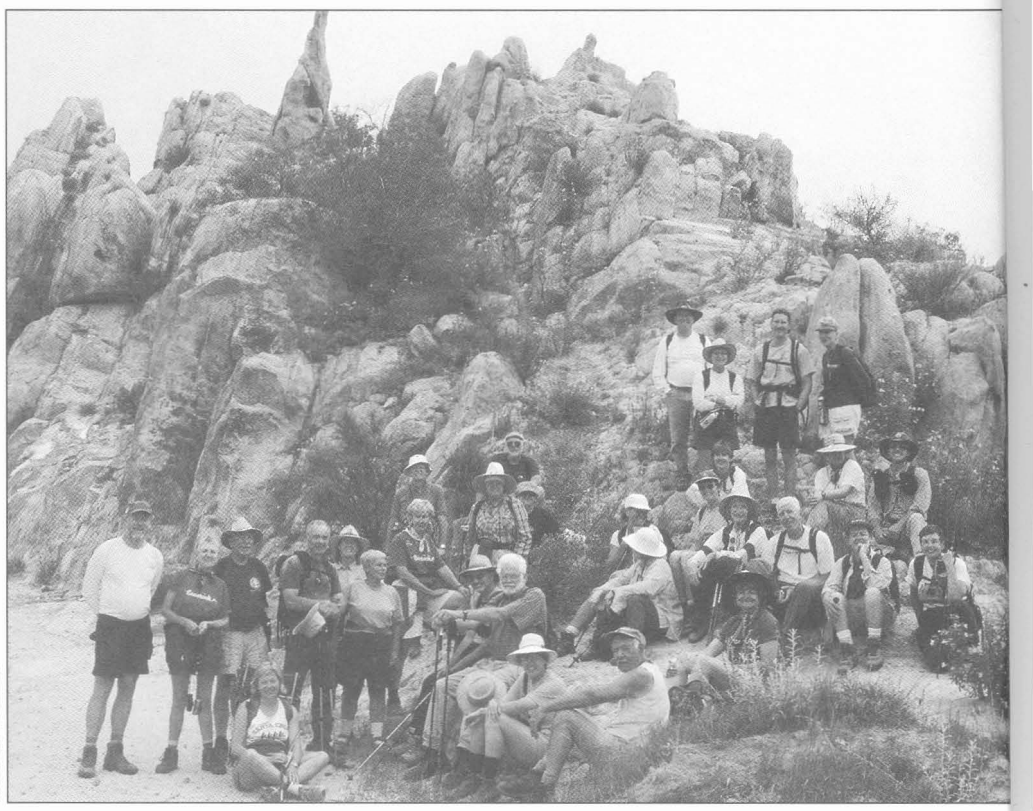


DEWEY SCHWARTZENBURG

Northern Hikers Discover the Southern Wild

Hiking the Backbone Trail

RICHARD NICHOLS



RICHARD NICHOLS

The hikers at Castro Crest, Day Four

MILLIONS OF people see it daily, hundreds of thousands drive through it every year, and about 80,000 live in it and directly around it. Yet the Santa Monica Mountains National Recreation Area and its great scenic hiking trails remain largely undiscovered by the vast majority of California's residents.

I lived in Montebello as a child. We used to drive through the Los Angeles Basin en route to Ventura to see my grandparents. We never went to these mountains. Later, as a northern California resident, I have walked and driven along the coast many times, but never, until just recently, was I aware of the existence of 160,000 acres of mountain parkland in the midst of this vast metropolitan area.

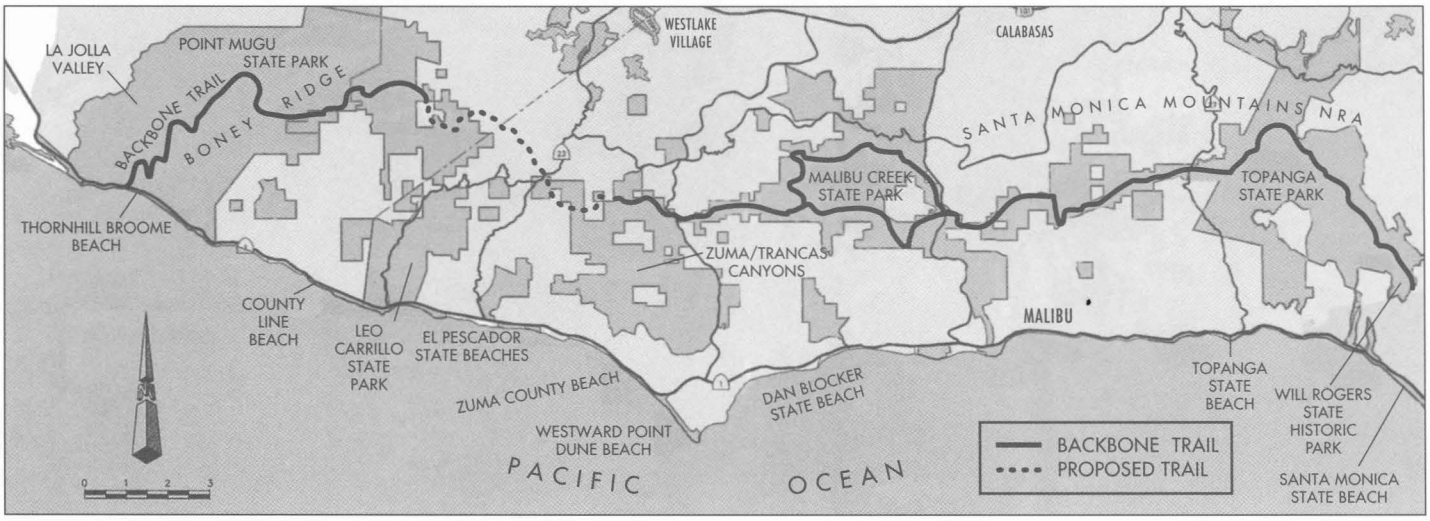
This mostly wild expanse extends on an east-west axis for 46 miles from the Oxnard plain of Ventura County to the heart of Los Angeles, from the Malibu coast to the Conejo and San Fernando Valleys. It includes high peaks and year-round creeks, old movie sets and Chumash Indian sites. The National Park Service is the overall land manager, and California State Parks is the largest landholder. These agencies, together with dozens of other government agencies (sewer and water districts, for example) and private property owners, constitute the ownership of the Recreation Area. It's a place of startling beauty, contrasts, and wildness, abundant wildlife ranging from sea anemones to mountain lions, and some 1,020 plant species. The 70-mile Backbone Trail winds the length of the mountain range.

IN EARLY MAY, a group of 35 veteran hikers, almost all from northern California, walked this trail for seven days and were amazed at what they discovered.

The hike was organized by Coastwalk and the Santa Monica Trails Council. Coastwalk, the group dedicated to advocating for the completion of the California Coastal Trail, wanted to see if the Backbone Trail could be an inland alternate to the shoreline route of the Coastal Trail from Mugu Rock to Santa Monica. The shore route at the base of the mountains, though scenic and fun, is tide-dependent, in part because of a narrow beach.

On May 7 we gathered in the group camp at La Jolla Canyon, at the Ray Miller Trailhead, just across the highway from Thornhill Broome Beach. We had been warned that during the next week we would ascend 11,000 feet and then descend to sea level, and that we might meet rattlesnakes, poison oak, ticks, scorpions, and possibly very hot or quite cold weather. Beyond that, we had no idea of what lay ahead.

Our hike leader for the week was Milt McAuley, foremost expert on the trails and wildflowers in the Santa Monica Mountains, who has campaigned for 25 years for the completion of the Backbone Trail. He pioneered



SMMNRA

much of the route, pushing, crawling, and hacking through thick underbrush; and he helped to build and maintain trails. Milt turned out to be an awe-inspiring leader. At age 81, he was always ahead of the group, always set a good pace, and kept up a running commentary on trails and plants.

As we set out, the chaparral-covered hills were bright with spring. Mountain sunflowers lined the trail, and black sage bloomed on slopes along with ceanothus, lupine, poppy, and monkey flower. As the trail ploughed through lush chaparral and ocean views expanded, the sight of oak-studded La Jolla Canyon surprised us. This high, wide valley where Chumash villages once stood was once slated to become a golf resort. Water lines had already been laid in 1966 when the State bought it from the William R. Broome family to create the 15,000-acre Point Mugu State Park.

We climbed 900 feet that first day, to the first of many ridges. That night, camping among oak and sycamore trees near the old Danielson Ranch house, we celebrated the Danielson family, which had also sold land to expand the park. The sumptuous dinner was the first of several served us by volunteers from the Santa Monica Mountains Trails Council and from Coastwalk.

On the second day we climbed 3,000 feet, following a well-built trail up the west flank of Boney Ridge, a spectacular ridge of weathered rock topped by 3,111-foot Sandstone Peak, the highest point in the range. As we reached the summit, the fog lifted, opening up

Emerging from days in the green mountains, we were amazed that such wildness could exist in southern California, in the heart of the megalopolis. We were from the north. We had been unaware.

views of the Channel Islands, the Oxnard Plain, Conejo Valley, and the city of Thousand Oaks. The Santa Monica range stretched out eastward before us, drawing us onward.

On the third morning we awoke to a clear day at Circle X Ranch, a former Boy Scout camp now run by the National Park Service. We traveled to our starting point by van, bypassing a five-mile gap in the trail. We stopped at clear-flowing Zuma and Trancas Creeks, bordered by sycamores, oaks, and thickets of poison oak and berries. Carpets of wildflowers, among them Mariposa lilies and Indian paintbrush, continued to hold us in awe. That evening we enjoyed showers and beds, or pitched our tents on green lawns, and ate a hearty meal at Calamigos Ranch, a conference center founded by Grant Gerson, whose wife, Ruth Gerson, is president of the Santa Monica Mountains Trails Council.

Day Four took us to the rocky spine of Castro Crest—with great views and a rare flower, the Santa Susana tarweed—then down 2,000 feet into Malibu Creek State Park. We learned that Malibu Creek has a small

Above: Only a six-mile gap remains.

Below: California Conservation Corps members were clearing the trail.

but active steelhead run, one of only two remaining in southern California. We walked through some of the prettiest country in the mountains that day, with oak woodlands and the narrow creek gorge through Goat Buttes, then past the site for the movie and TV series MASH, and ending at a fine campground under oaks, where again our volunteers provided good food and company. We had now covered about

LINDA LOCKLIN

half the length of the Backbone Trail.

On the fifth day we started at 8:30 a.m. to make the 2,500-foot climb up Saddle Peak. The finely designed trail had been laid out by Ron Webster and friends and built by a crew of volunteers led by Webster, builder of many miles of the Backbone. We reached the 2,800-foot peak after lunch. The wind

RICHARD NICHOLS

Malibu Creek State Park, Day Four

had blown off the hazy marine layer and the inland smog, and we gazed south at Catalina Island 30 miles offshore, beyond the shoreline of Santa Monica Bay curving gently toward the bluffs of the Palos Verdes Peninsula. Below lay the Los Angeles basin, with the tall buildings of downtown Los Angeles and the Wilshire District rising out of the sprawling metropolis. The San Gabriel Mountains formed a backdrop 30 miles to the east. Emerging from days in the green mountains, we were amazed that such wildness could exist in southern California, in the heart of the megalopolis. We were from the north. We had been unaware.

On Day Six we stood at the corner of Stunt Road and Saddle Peak Road, peering 1,200 feet down Hondo Canyon into Topanga Canyon. McAuley said that after the fire of 1993, bush poppy exploded in Hondo Canyon in an astounding display of yellow flowers. There was little of it now, as the chaparral had crowded out the poppy.

Descending, we heard chainsaws, and before long came upon a California Conservation Corps crew clearing fallen trees and thick brush off the trail. Our group of fiftyish-plus hikers heaped praise on the young workers, for without them the trail would have been difficult to travel. That night we camped at the old Musch Ranch homestead in Topanga State Park. Park ranger Greg Nelson invited us to have our dinner in the yard behind the old residence.

Finally came Day Seven, our last day. We hastened along the last 10 miles, looking forward to the farewell lunch. Up a ridge to Eagle Rock we walked, to see streets in the San Fernando Valley stretching north toward the San Gabriel Mountains. Later, from another ridge, we again saw Los Angeles and Hollywood, then descended into Will Rogers State Historic Park. After crossing what Milt called the million-dollar bridge (because of the large sum spent to get the trail past a narrow and dangerous spine of ridgetop), we left the chaparral behind, walked past the historic eucalyptus-shaded Rogers stables, and arrived at a sumptuous lunch prepared by our loyal volunteers. Quite proud of our achievement, we ate, posed for the last photo, thanked Milt, trip coordinator Burt Elliot, Mel Savage, our gear wagon driver, cook coordinator Annie Salerno, and other volunteers who had supported us, and said our farewells.

The Santa Monica Mountains National Recreation Area is a national treasure. While the Backbone Trail is almost complete, there is much work to be done in the Recreation Area. Of the 150,000 acres within its designated borders, only 60,000 are public parkland. Development continues along the edges and within the park. When more California citizens discover this gem of a park, hard on the border of Los Angeles, perhaps the federal legislature will give it the attention it deserves. ■

Richard Nichols is the executive director of Coastwalk, and co-author, with Bob Lorentzen, of the two-volume Hiking the California Coastal Trail.

FOR MORE INFORMATION on the Santa Monica Mountains National Recreation Area contact the National Park Service Visitor Center: (805) 370-2301, or California State Parks: (818) 880-0350. See p. 39 for guidebook information.

What's Killing So Many Whales?

Starvation may be a cause.

RYDER MILLER

DEAD WHALES have been washing up recently in unprecedented numbers on the West Coast, and researchers are puzzled. Last year, 273 were found between Alaska and Mexico, five times more than the 54 reported in 1998, according to an expert panel's report to the National Marine Fisheries Service (NMFS) released in June.

Gray Whale Strandings in 1999 and a Review of Stranding Records in 1995–1998, prepared by the Working Group on Marine Mammal Unusual Mortality Events, noted that "emaciated condition of many stranded whales suggests that starvation may have been the primary cause of the high mortalities observed in 1999." El Niño ocean conditions may have diminished the food supply. In addition, "more intense" survey efforts in Alaska and Mexico last year could help account for the reported increase. *Gray Whale Strandings* states: "Although five to 13 times higher than annual counts since 1995, the number of stranded whales was within expected natural mortality for a population estimated to number in excess of 26,600 whales." The eastern Pacific gray whale population has returned to pre-exploitation levels.

According to cetacean specialist John Calambokidis, research director at Cascadia Research in Olympia, Washington, "the primary theory is that this [dramatic increase in mortality] is related to prey availability in their feeding ground in the Alaska seas."

On the California coast and San Francisco Bay, 48 dead whales were found in the first half of this year, a steep increase from 47 in the whole year 1999 and 28 more than in all 1998, according to wildlife biologist Joe Cordaro of the NMFS. In San Francisco Bay, 17 were found through June 2000, nine more than in all of 1999.

Frances Gulland, director of veterinary sciences at the nonprofit Marine Mammal Center, said these whales could have died from varied causes, including starvation, toxins, diseases, and boat strikes. "We haven't found anything conclusive," she said. Cordaro, who coordinates response to whale strandings for NMFS, agreed. "We don't know what their health status was before they entered the Bay. We don't know how long they were in the Bay before they died. We are unable to determine cause of death because of the state of decomposition of the carcasses."

Some scientists have suspected that an accumulation of chemical compounds, such as polychlorinated biphenyls (PCBs), may be suppressing the immune systems of sea mammals, so that they become abnormally susceptible to disease. "We still can't determine if any animals died due to contaminant load," said Cordaro. DDT is still in the marine food chain, and "it is always present at higher concentrations [in whales] than [in] land animals," he noted."We are still investigating. And we are gearing up for the next migration season. Hopefully we can get better samples than we got last season."

Gray Whale Strandings states: "Overall, contaminant levels in the whales that stranded in 1998–1999 were not significantly higher than expected, suggesting that pollution was probably not the primary cause of death."

Elsewhere in the world's oceans, underwater noise has been a suspect. Four different species of whales (including Cuvier's beaked whale and Blainville's dense-beaked whale) stranded in the Bahamas in mid-March were found to have had ear hemorrhages. The U.S. Navy had been testing antisubmarine sonar in nearby waters.

"The coincidence of the timing and the pattern of the stranding with the presence of Navy sonar . . . raises a red flag and I think there's reason for concern," Darlene Ketten, a marine biologist at Harvard Medical School and the Woods Hole Oceanographic Institution, told the Associated Press. The Navy has stated that it has set up an expert panel to look into the matter.

In California, however, "Sound testing is at the bottom of the ladder [as a suspect] now," said Cordaro.

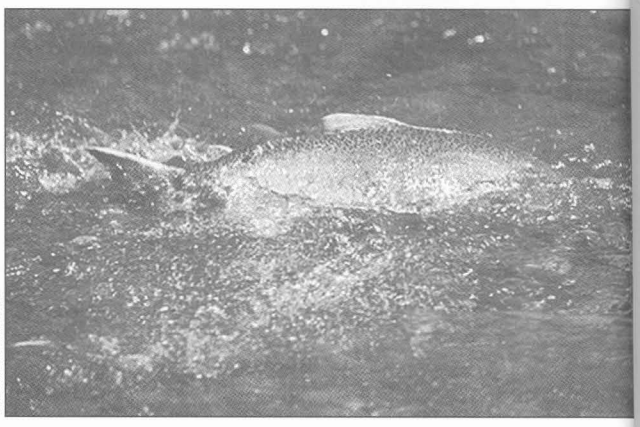
What happens to sick or dead whales after they wash ashore? The property owner is required by law to report the stranding to the Marine Mammal Stranding Network, represented by various agencies and organizations. [If you don't know whom to contact, call Joe Cordaro at (562) 980-4017.] After authorities take measurements and biological samples, the property owner can bury the whale or tow it out to sea. In June, two tagged gray whales that had previously been towed out washed up in an advanced state of decay on San Francisco's Ocean Beach. They were buried, separately, under the sand. ■

Ryder Miller is a freelance writer in San Francisco.

Read the Label, Save the Salmon

Fish Friendly Farming

LAUREL MARCUS



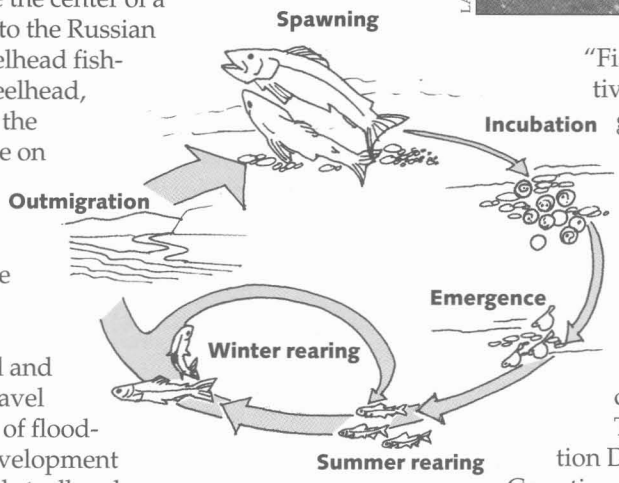
LAUREL MARCUS

ON THE WALL OF PAT'S Restaurant in Guerneville is an old map of the best fishing spots on the lower Russian River—deep cold pools in the wide river where silver salmon and steelhead trout take refuge. The map seems quaint, an emblem of a bygone era when steelhead were the center of a tourist trade and anglers traveled to the Russian for the most renowned trophy steelhead fishery in North America. Now the steelhead, silver salmon, and king salmon in the Russian and most coastal rivers are on the threatened and endangered species list.

A long list of human activities explains how this happened. Large and small dams were built; water was diverted; streams and rivers were channelized for flood control and urbanization; logging, deep-pit gravel mining in rivers, agricultural uses of floodplains and hillsides, and urban development all took a heavy toll on salmon and steelhead habitat. We will lose these amazing fish forever unless people change their ways—logger, farmer, engineer, urbanite: all of us.

Individual in-stream projects and classroom salmon-rearing efforts can be beneficial, but a few isolated programs are not enough to save the salmon over the long term. The Endangered Species Act, the Clean Water Act, and other environmental regulations protect them in theory, but cannot address all the actions that degrade habitat and water quality.

Recognizing these sobering facts, many organizations are now focusing on decentralized, community-oriented programs to restore streams and other watershed features essential to sustaining salmon populations. Voluntary incentives are being created to assist industries and property owners in changing their operations to benefit salmon instead of causing harm.



Coho salmon and steelhead trout life cycle

"Fish Friendly Farming" is an incentive-based program developed for grape growers and wineries in the Russian River Watershed. It enables the consumer to participate with the farmer in restoring salmon habitat and spawning grounds. Participating farmers undergo a rigorous certification process. Within a few years, wine made from certified vineyards will carry a "green" or eco-label.

The Sotoyome Resource Conservation District in Sonoma and Mendocino Counties developed Fish Friendly Farming with the help of growers and property owners, the Farm Bureau, winery organizations, Friends of the Russian River and other environmental groups, and agencies including the California Department of Fish and Game, National Marine Fisheries Service, and Regional Water Quality Control Board. The Coastal Conservancy provided $400,000 in March to implement the program, including farm planning workshops and projects such as stream restoration and road repair.

A group of grape growers, environmentalists, agencies, and others spent two years reviewing all grape grower activities, from vineyard development and installation to soil conservation, restoration, management of creek corridors, and water supply and use. For all these activities beneficial management practices (BMPs) were developed, based upon the best science and information available. The application of these

BMPs on each farm benefits both the farmer and the fish, and provides the basis for certification.

An example is soil conservation. When fine sediment erodes from a vineyard or other land, it's a loss to the grower and a problem for the fish, as it clogs spawning gravels and lowers water quality. Using the program BMPs, certified farmers are required to winterize their vineyards by using an array of measures, including cover crops around vine rows and along roads, filter strips between vineyards and streams to catch sediment, careful design and management of road and vineyard drainage, and the use of both emergency and permanent erosion-control measures during wet winters.

Stream restoration gets special attention in the Fish Friendly Farming program. The farmer sets aside and restores a native riparian corridor of sufficient width to sustain fish habitat. To determine what the width should be, hydrologic and geomorphic data are evaluated in detail for the Russian River watershed and the location of the specific farm in that watershed. Native riparian plants are planted along stream channels in the same manner as would occur naturally. Once a creek corridor is restored to a naturally healthy state, the farmer does little to "manage" it except to remove invasive species or use biotechnical methods for bank revegetation after floods.

Farmers prepare a farm conservation plan for use in the certification process. They provide photos of all areas of the farm, plus monitoring information on a yearly basis. In return, they gain recognition for their products, potential regulatory approvals, funding help, and an overall improved agricultural operation. The public benefits from long-term changes in agricultural operations that help sustain salmon and improve water quality.

This innovative farming program hopes to provide cost-shared funding to farmers for expensive improvements such as major creek restoration, road repair, erosion site repair, and relocation of water supply facilities. The farmer is expected to be responsible for management measures for soil and water conservation, reduced pesticide use, removal of invasive plants, and other activities.

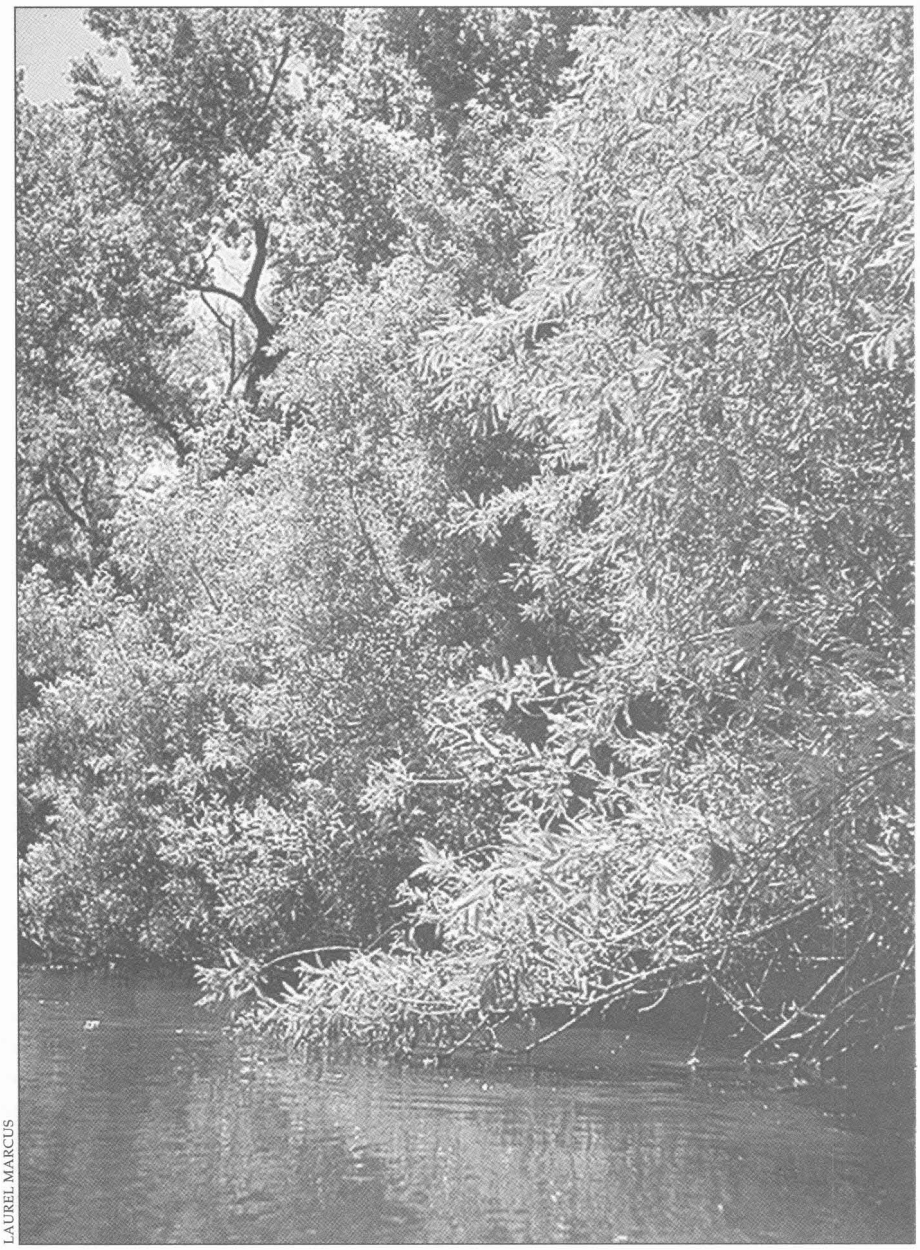
"Fish Friendly Farming allows a farmer to learn about the best practices for obtaining improved environmental conditions on the farm while retaining economic efficiency for small family farmers," says program participant Bev Wasson, a third-generation grape grower in the Alexander Valley and member of the North Coast Regional Water Quality Control Board. "It is a blueprint to assist us and give us encouragement to modify our practices and gain some positive recognition for our efforts."

Joan Vilms, president of the Friends of the Russian River, says, "Fish Friendly Farming allows for the good farmers to be recognized for their efforts and for the regulators to focus on the real problems."

The first Fish Friendly Farming class, 10 farmers representing 17 ranches, graduated in May. Two more sets of workshops have been scheduled. Inquiries have come from as far away as Europe. The program is being extended to pear growers in Sonoma County and grape growers in Napa County, and potentially could include other types of crops.

So, support salmon and their rivers: Drink certified wine (but never to excess). ■

For more information on Fish Friendly Farming contact program director Laurel Marcus: (707) 869-2760; e-mail: laurelm@ix.netcom.com.



LAUREL MARCUS

COASTAL CONSERVANCY NEWS

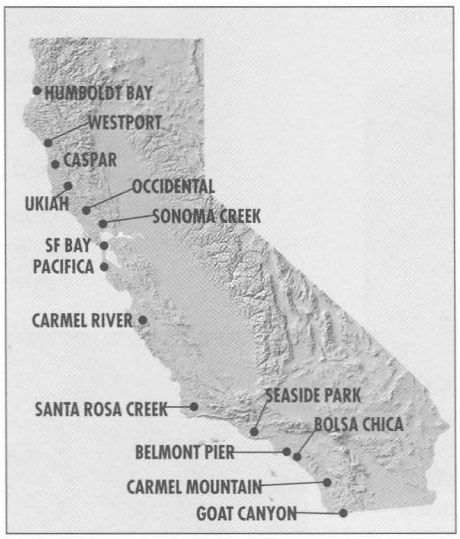
AN ARRAY OF DIVERSE COASTAL projects moved forward in every coastal county between May and August 2000 as the Coastal Conservancy worked with many partners to resolve land use conflicts, improve public access, preserve open space and farmland, protect shorelines from eroding, safeguard habitat for plants and animals, and improve urban waterfronts for the public's use and enjoyment. Here are a few of the many active projects:

SAN DIEGO COUNTY

THE CITY OF SAN DIEGO is working to acquire 10 acres of undisturbed coastal mesa on Carmel Mountain with the help of $4.5 million authorized by the Conservancy in June. The City has already invested $10 million toward land acquisitions meant to secure a wildlife corridor between Los Peñasquitos Canyon and Torrey Pines State Reserve/Los Peñasquitos Lagoon. The San Diego coast horned lizard and other sensitive species survive in this habitat. Also contributing toward the land acquisitions are the Department of Fish and Game, the U.S. Fish and Wildlife Service, and the Crestridge Mitigation Bank.

ORANGE COUNTY

THE DRAFT ENVIRONMENTAL Impact Report/Environmental Impact Report for the Bolsa Chica Lowlands Restoration Project was released in late July for a 45-day period of public comment. This document is the result of more than three years of consultations with stakeholders, engineering and design of seven alternative restoration plans, plus six months of additional environmental review. For information on how to see a copy, call Dwight Sanders at the State Lands Commission: (916) 574-1880, or see the Commission's web site: www.slc.ca.gov.



LOS ANGELES COUNTY

THE CITY OF LONG BEACH is restoring the deteriorating Belmont Pier and improving the neighboring plaza with the help of $525,000 approved by the Conservancy in June. The $7.8 million project includes the installation of a wheelchair-accessible ramp from the parking lot to the pier and other improvements. Contributions from other agencies and funding sources are expected. The 1,620-foot-long concrete pier is at the eastern end of the ocean bluff that extends over two miles east from the mouth of the Los Angeles River.

VENTURA COUNTY

THE CITY OF BUENAVENTURA will place cobble material on Surfer's Point at Seaside Park, at the Ventura River mouth, to increase the size of the beach and protect the shoreline bike path and adjacent parking lot. The Conservancy approved $250,000 in August for the project, which will be monitored for 18 months to gauge its usefulness in stabilizing the shoreline. In the 1980s and 1990s, storms severely damaged the beach and the shoreline between the river mouth and the Ventura County Fairgrounds. The bike path leads to the Ventura Pier, which reopened in April after a $2.2 million renovation that will help it withstand powerful ocean waves that have repeatedly damaged it. A 1995 storm destroyed 400 feet of the pier and carried pilings out to sea.

SANTA BARBARA COUNTY

THE SANTA BARBARA FLOOD Control District will undertake erosion-control work that will also restore and protect 28 acres of wildlife habitat along Santa Rosa Creek, a tributary of the Santa Ynez River, using $500,000 in Conservancy funds plus an expected $500,000 in other state grants. Over the past two decades, severe streambank erosion has destroyed nearly all the riparian habitat along a mile-long reach of the creek between Highway 246 and Santos Road. Several erosion-control structures and drains will be built and a habitat restoration program will be undertaken.

MONTEREY COUNTY

THE INSTITUTE FOR FISHERIES Resources will evaluate alternatives for modifying the San Clemente Dam on the Carmel River, including the feasibility of removing all or part of it to improve fish passage and wildlife habitat. In August the Coastal Conservancy approved $50,000 to the Institute for the study, which is expected to be completed within four months. The Carmel River drains a 255-square-mile watershed in the Santa Lucia Mountains and is the principal water supply for the Monterey Peninsula. The San Clemente Dam, built in 1921 about 15 miles

above the river mouth, has lost more than 90 percent of its storage capacity to sediment buildup. Because of the weight of sediment now behind it, the state Division of Safety of Dams has declared this dam unsafe. To get past the dam, the river's endangered run of steelhead must first ascend the longest fish ladder in the country, then pass through the very shallow sediment field behind it. Passage is becoming increasingly difficult because of the lack of a clearly defined channel. Fish that make it as far as the Los Padres Dam, ten miles farther upstream, are captured in a holding tank and transported to upstream spawning areas.

SAN MATEO COUNTY

A 4,000-FOOT STRETCH OF wheelchair-accessible Coastal Trail will be built between Rockaway Beach and Pacifica State Beach in the City of Pacifica. The Conservancy approved $300,000 for the $680,000 project, which will also use federal and city funds. The new trail will replace a network of informal paths that cross bluffs and dunes.

SONOMA COUNTY

NEAR OCCIDENTAL, the nonprofit LandPaths got a $500,000 assist from the Conservancy in its effort to buy an ancient 28-acre redwood grove for $2 million. The grove is atop a 1,200-foot-high ridge on Fitzpatrick Lane, west of Occidental. The owners have an approved timber harvest plan and intend to start logging if the sale does not occur. LandPaths has raised over $100,000 in private donations, Save the Redwoods League has agreed to provide $150,000, and the Sonoma County Agricultural Preservation and Open Space District has provided $1.25 million to complete the funding package. The acquisition is expected to be completed in September.

The Southern Sonoma County Resource Conservation District will undertake studies related to flood control and environmental restoration of Sonoma Creek in the Schellville area with $160,000 in Conservancy funds approved in May.

MENDOCINO COUNTY

THE CITY OF UKIAH will improve Gobbi Street Riverside Park on the Russian River with $120,000 approved by the Coastal Conservancy in May. Ten acres of the 42-acre park will be restored as wildlife habitat and will serve as a buffer between the park and vineyards. Native vegetation will be planted along the river and concrete debris that has been dumped on the site will be removed.

Two Mendocino County headlands are to be acquired by local land trusts to protect them for everyone's use and enjoyment. In May, the Conservancy approved $1.5 million to the Mendocino Land Trust toward the purchase and management of 71 acres in Caspar, including the Caspar Headlands and land north of Caspar Creek. In August, the Conservancy approved another $500,000 to match a Conservation LandsShare TEA grant of $1.5 million. An option to purchase the property for $3.5 million was obtained by the Trust for Public Land in November 1999 and expires in October. The acquisition is expected to be completed by the end of the year.

The Conservancy also approved $727,000 to the Westport Village Society to acquire and manage about nine acres of oceanfront property known as the Westport Headlands, about 15 miles north of Fort Bragg.

HUMBOLDT COUNTY

THE HUMBOLDT BAY HARBOR, Recreation and Conservation District will prepare a comprehensive natural resource management plan for Humboldt Bay with the help of $100,000 approved by the Conservancy in May. Over $400,000 has already been contributed by federal, state, and local agencies toward this effort to consider upcoming issues and opportunities on the Bay, the largest estuary and port between Coos Bay, Oregon, and San Francisco Bay.

DEL NORTE COUNTY

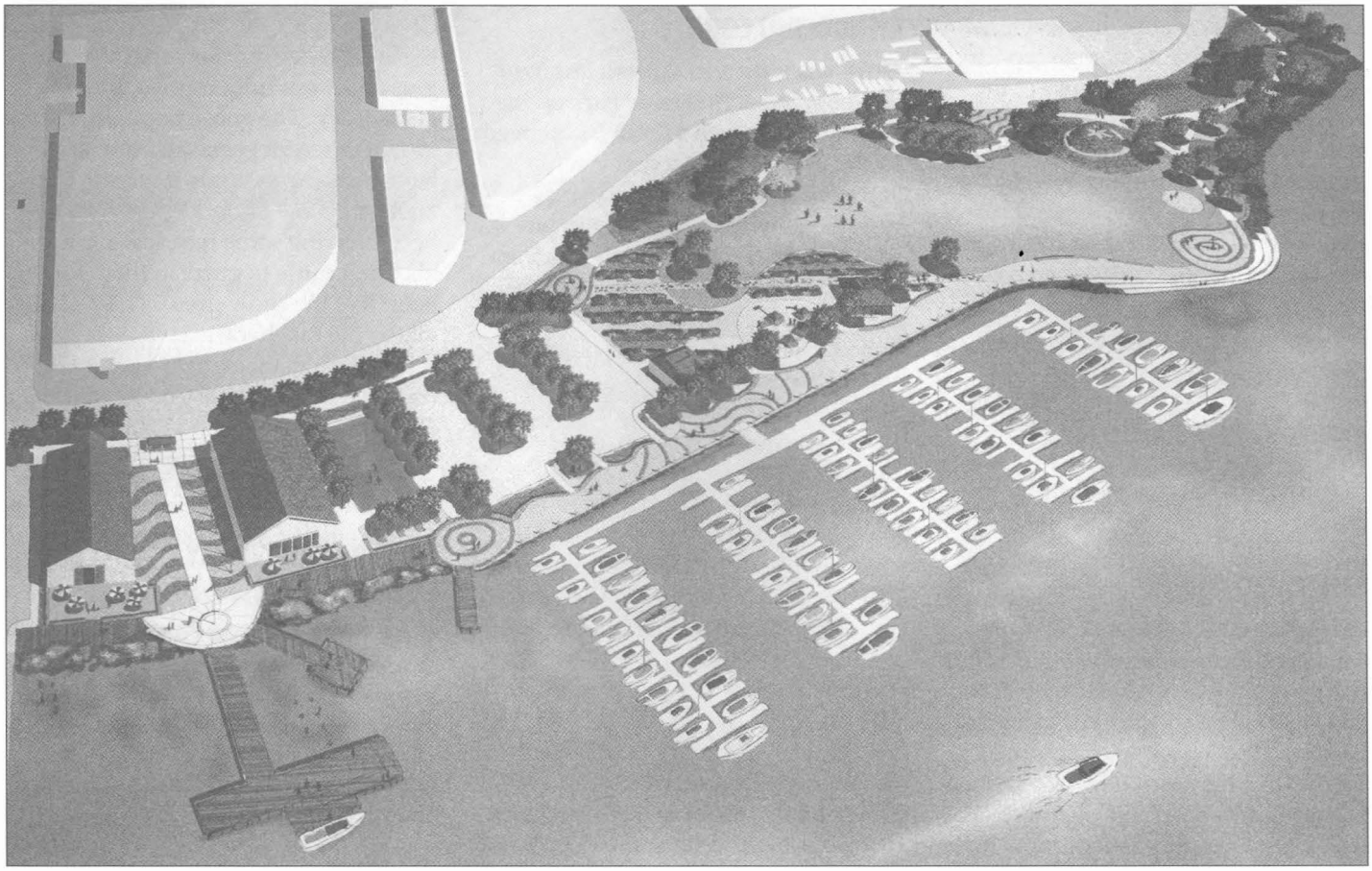
THE SNOW GEESE THAT COME to Lake Earl each spring prefer the lush young grasses on lands grazed by cattle to the more natural public lands in the area. Dairy ranchers find that the grass does not fully recover after the geese leave. The goose population has grown in recent years, and the farmers have been increasingly distressed. So lately the State Parks Department has been mowing some meadows and allowing cattle to graze in them for the benefit of the snow geese. This has alleviated the ranchers' problem for now. A longterm management plan is being crafted by the Coastal Conservancy, the Department of Fish and Game, State Parks, and other agencies in partnerships with ranchers and the county.

SAN FRANCISCO BAY CONSERVANCY NEWS

THE PORT OF SAN FRANCISCO will use $100,000 from the Conservancy, approved in August, to design Brannan Street Wharf, a 1.8-acre public plaza on the waterfront between the Bay Bridge and Pacific Bell Park. Piers 34 and 36 are to be removed to make way for the plaza, which will extend from Pier 32 to Pier 38. Piers 30 and 32, now used for parking, will be used for the Port's new cruise terminal.

IN OAKLAND, ALAMEDA COUNTY, Union Point Park is being created on the Oakland Estuary, on the border of Oakland's Fruitvale and San Antonio neighborhoods, which have the greatest population density in the city and the lowest proportion of park space per resident. In May the Conservancy approved $415,000 to the Port of Oakland to acquire two-thirds of an acre on the waterfront, plus $330,000 to the nonprofit Spanish Speaking Unity Council to complete construction drawings for the park.

More than 1,000 local residents and 50 community organizations participated in the design, which will feature a waterfront promenade that will add to the Bay Trail, a large open field for informal play and public events, picnic areas, a public dock and pier, a restaurant with outdoor seating, a new youth center, and an interpretive area for public education about the estuary. A site for water taxi service is also included.



COURTESY UNITY COUNCIL

The proposed Union Point Park in Oakland will provide opportunities for recreation, education, and wildlife watching on the Oakland Estuary. The buildings on the left are a restaurant and youth center.

The Unity Council will manage planning and construction of the new nine-acre park. The City will maintain the park after it has been built.

IN RICHMOND, CONTRA COSTA County, the Urban Creeks Council is restoring 800 feet of Baxter Creek in Booker T. Anderson Jr. Park with the help of $45,000 approved in June by the Conservancy. The creek's channel is being reshaped to restore pools, riffles, and meanders. Boulders and riprap will be removed and the banks rebuilt with native plants. Native trees and shrubs will be planted to prevent bank erosion and provide shade, habitat, and forage for wildlife. The vegetation will also filter pollution that would otherwise enter the creek and run into San Francisco Bay. The park offers play areas, several athletic fields, and a community center.

LAND ALONG THE LOWER REACH of the Napa River will be acquired for improved wildlife habitat and flood management, with the Conservancy contributing up to $1.7 million, approved in June. The Napa County Flood Control and Water Conservation District will contribute over $5 million of the funds needed to acquire up to 417 acres at a total cost of $6.75 million. The Napa River/Napa Creek Flood Protection Project, developed through several years of community efforts, has become a model for planners, engineers, and communities elsewhere. Its total cost is estimated at $180 million.

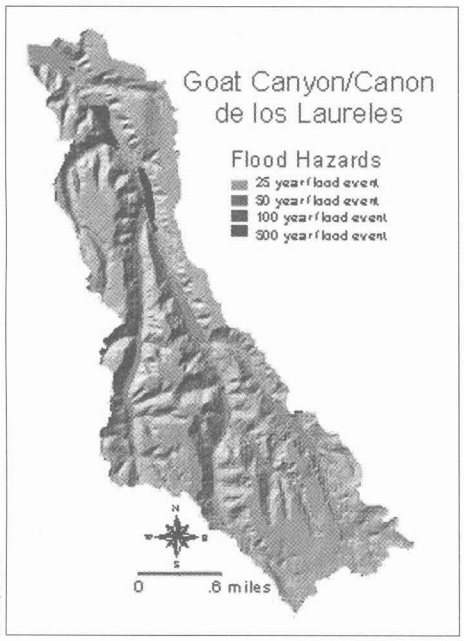
OTHER COASTAL NEWS

NEW FUNDS FOR MIGRATORY BIRD HABITAT

WITH PRESIDENT CLINTON'S signing of the Neotropical Migratory Bird Conservation Act on July 27, up to $5 million a year will become available to conserve habitats in the United States, Latin America, and the Caribbean. Senator Spencer Abraham of Michigan is the author of the new law, which provides that 75 percent of the funds be spent south of the U.S. border. About 500 species of neotropical migrants breed in the U.S. or Canada and winter in the tropics, including hummingbirds, orioles, plovers, warblers, and many ducks.

CROSS-BORDER GIS

VICE PRESIDENT AL GORE'S National Partnership for Reinventing Government includes the National Spatial Data Infrastructure (NSDI) Initiative, which focuses on using GIS (Geographic Information System) spatial data layers to attempt to understand and solve community problems. The Tijuana River Watershed is one of six community demonstration projects that were celebrated at a ceremony in Imperial Beach June 27. The focus for this particular project is flood risk



USGS/NSDI

assessment and modeling, with special emphasis on the Goat Canyon/Cañon de los Laureles section of the binational watershed. Acute flooding in the canyon threatens life and property in Mexican communities and natural resources in the Tijuana Estuary in the United States. Among major project partners are San Diego State University, Colegio de la Frontera Norte of Tijuana, the Tijuana Estuary Reserve, and the National Oceanic and Atmospheric Administration. This problematic canyon subwatershed must be managed for the Tijuana Estuary Restoration Program to move forward. The Coastal Conservancy and its grantee, the Southwest Wetlands Interpretive Association, are leading the effort to bring new technological information from the NSDI to the current Goat Canyon Enhancement Project and other aspects of the Restoration Program.

COASTAL CLEANUP DAY

WHO LET LOOSE A LIVE BOA constrictor in Orange County last September? How did a grave marker tag from San Antonio, Texas, end up on San Francisco's shore? What was the state of mind of the person who apparently threw a laptop off the Monterey pier? Every year odd things turn up during Coastal Cleanup Day. This year, for the 16th time, it will happen again, in California and worldwide.

The California Coastal Commission asks you to mark your calendar for Saturday, September 16, 2000, 9 a.m. to noon, and to join the volunteers who will again comb coastal and inland shorelines. With a trash bag in one hand and a glove on the other, 45,000 people picked up 655,200 pounds of trash and 58,122 pounds of recycleable materials during last year's event.

California's Coastal Cleanup Day is the state's contribution to the International Coastal Cleanup, organized by the Center for Marine Conservation (CMC). Each year, on the same day, cleanups take place in 50 states, four U.S. territories, and over 80 countries worldwide. For more information, call (800) COAST-4U or visit www.ceres.ca.gov/coastalcomm.

—Marsha Venegas
California Coastal Commission

WHALE TAIL GRANTS

GUIDELINES AND APPLICATION forms for the Whale Tail License Plate Grant Program will be available in September from the Coastal Commission. The grants are funded from sales of the Whale Tail License Plate and go to nonprofit organizations and government agencies for marine and coastal education projects. Call (800) COAST-4U, or e-mail coast4U@coastal.ca.gov to be put on the mailing list.

TINY PLASTIC BEACH MESS

A RECENT STUDY by the Southern California Water Research Project shows that there may be 50 times more debris on California beaches than is being collected on California Coastal Cleanup Day. Their report, *Composition and Distribution of Beach Debris in Orange County, California,* notes that Cleanup Day tends to focus on "large, visible debris at a subset of high-use beaches that are periodically cleaned by mechanical cleaners." They found that most debris items occurred more densely on the remote rocky shoreline than on such beaches, and that waterborne sources (runoff and overboard disposal) were more important than direct littering or wind. The researchers sampled 43 random stratified sites on the Orange County coast between August 2 and September 18, 1998. The most abundant item they found on the beaches was preproduction plastic pellets, typically less than 5 mm in diameter, which were probably lost during transport from raw materials producers to the processors who mold the pellets into plastic products.

CALIFORNIA COASTAL COMMISSION

Last year's Coastal Cleanup Day volunteers thanked all who joined in protecting the Californias' ocean and its creatures. This year's Coastal Cleanup is on September 16.

Survival Skills of Native California, by Paul D. Campbell. Gibbs Smith, Salt Lake City, 1999. 448 pp., $39.95 (paper).

CALIFORNIA IS ONE of the most populous and culturally diverse states in the Union, yet many people are unaware that there are, or ever were, California Indians. The first of our National Parks, Yosemite, and other places of wild and scenic beauty are the ancestral homelands of unique indigenous peoples with lifeways unlike any others on the continent. Yet

Cahuilla sandal collected in 1875 (Bean 1978)

a casual survey of visitors to such places reveals many popular misconceptions. Even for some long-time residents, California history often starts with the Spanish conquest and the mission system.

I have seen visitors to the Miwok village in the heart of Yosemite Valley staring in wonder at the authentic local native demonstrations of acorn soup making, traditional games, and basketry. What is this marvelous shell beadwork and feather basketry, this intricate netted bagwork, this rich diverse cuisine? Those visitors, of course, expected tipis and buffalo. Indeed, the gift store at nearby Mineral King, in Sequoia National Park, is full of souvenirs evoking images of the Southwest—sand paintings, miniature kachinas and, for children, rubber tomahawks and Plains Indian war bonnets of brightly dyed chicken feathers. Totem poles of the Pacific Northwest are common in gift shops, but very rarely does one find an object or image that captures the distinct spirit of native California. In a state where urban Navajos are the largest Native American group, we need to become more aware of the true indigenous population.

Paul D. Campbell's *Survival Skills of Native California,* a voluminous and highly readable encyclopedia of traditional technologies, goes a long way towards dispelling popular misconceptions. It is a monumental research effort, pulling together a great deal of information from the publications and field notes of anthropologists of the early and mid-1900s. The notes of J. P. Harrington, which, housed at the National Archives of the Smithsonian Institution, remain largely unpublished, are included here. Classic studies from the University of California Press's Publications in American Archaeology and Ethnology and Anthropological Records are also summarized. Many of the detailed line illustrations are taken from these sources.

Campbell mainly presents basic life skills and technologies that relate to day-to-day survival. He has not delved into the elaboration of these basic skills into intricate artistic pursuits such as basketry and adornment. Indeed, given its immense complexity, it is understandable that California basketry, often called the best in the world, is not treated in detail. However, detail is lacking on most of northern California as well, and a clearer distinction should be made between the various areas within what we today call California. The title implies that these skills were practiced similarly throughout the state. In fact, the book is heavily weighted toward southern Alta California and Baja California, with other examples drawn from the western Great Basin and the Southwest.

Campbell's own research with the southern Diegueño people of northern Baja California is by far the most illuminating aspect of this work. These people still have first-hand knowledge of many skills that once were widely practiced. Detailed step-by-step photographs show the processing of raw materials; the making of cordage, basic baskets, pottery, acorn soup; arrow fletching; and much more. Many of these crafts, including one-of-a-kind basketry, have never before been documented, and certainly never in such wonderful detail.

Campbell points out, quite rightly, that a hands-on approach is necessary to a full appreciation of these skills. The actual practice of a skill, or the viewing of a true master at work, brings understanding that no amount of library research can provide. "Books record skills buried by the spreading refuse of the modern throwaway world, and we would be much less without them. Yet books seem a weak substitute for the living tradition," he writes. "Watching Manuela Aguiar roll cordage from the short rough fibers of the thick-leaved desert agave *(Agave deserti),* I felt the sadness that comes in reducing to a few abstract lines the richness of reality."

Margaret Mathewson teaches traditional survival skills and basketry from her field school, Ancient Arts and Technologies, in Alsea, Oregon, and part time at the University of Oregon.

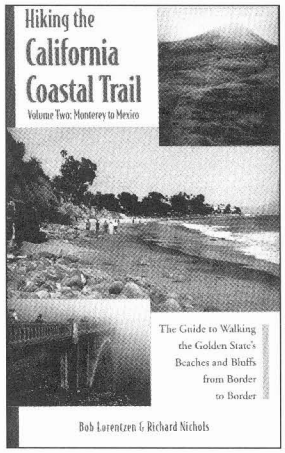
Wukchumni method of twining small mats (Gayton, 1948)

DRAWINGS FROM *SURVIVAL SKILLS OF NATIVE CALIFORNIA*

TRAIL BOOKS

Hiking the California Coastal Trail, Volume Two: Monterey to Mexico, *by Bob Lorentzen and Richard Nichols. Bored Feet Press, Mendocino, and Coastwalk, Sebastopol, 2000. 368 pp., $19 (paper).*

THE CALIFORNIA COASTAL Trail winds over bluffs, dunes, beaches, through grasslands, mountains, and villages, and along urban waterfronts. Veteran hikers Nichols and Lorentzen offer glimpses of the amazing diversity of the coast as they traverse the state's designated Millennium Legacy Trail from the fishing harbor of Moss Landing to Borderfield State Park and the Tijuana Slough National Wildlife Refuge. As in Volume One: Oregon to Monterey [see *Coast & Ocean,* Autumn 1998], their meticulous trail descriptions, practically step-by-step, give would-be hikers all the information they'll need to plan and enjoy walks ranging from casual strolls to challenging backpacking expeditions.



SANTA MONICA MOUNTAINS

Hiking Trails of the Santa Monica Mountains, sixth edition, *by Milt McAuley, Canyon Publishing Company, 8561 Eatough Ave., Canoga Park, CA 91304, 1999. 368 pp., $11.95 (paper).*

THE STANDARD HIKERS' guide to the region has added new trails, and now includes 89 hikes. McAuley's other books include *Guide to the Backbone Trail* (144 pp., $7.95), and *Wildflower Walks of the Santa Monica Mountains* (128 pp., $5.95).

Mountains to Ocean: A Guide to the Santa Monica Mountains Recreation Area, *by Randolph Jorgen. Southwest Parks and Monuments Association, Tucson, 1995. Available from the SMMNRA Visitor Center, 401 West Hillcrest Dr., Thousand Oaks, CA 91360.*

FOUR YEARS OLD, but useful as general description of the many features of the Santa Monica Mountains Recreation Area.

ALSO NEW

Bicycling America's National Parks: California, The Best Road and Trail Rides from Joshua Tree to Redwood National Park, *by David Story. The Countryman Press, Woodstock, VT, 2000. 335 pp., $17.95 (paper).*

Fifty Trail Runs in Southern California, *by Stan Swartz, Jim Wolff, and Samir Shahin. The Mountaineers, Seattle, 2000. 236 pp., $16.95 (paper).*

COOL WEB SITES

A NEW WEB SITE, www.eNature.com, offers free regional guides to wildlife throughout the United States. By entering a zip code, you can look at birds, mammals, reptiles, and amphibians of that region, as pictured in the National Audubon Society Field Guides. The site also has national field guides to butterflies, insects, spiders, fishes, seashells, seashore creatures, trees, and wildflowers, as well as habitat guides. This is by far the most comprehensive and user-friendly site we've found for wildlife identification. The photographs are outstanding and easily enlarged, and complemented by thorough, informative text. The site was launched in February by a partnership that includes Chanticleer Books, publisher of the Field Guides. The free services are supported in part by advertising and an on-line store. Additional services are available through membership.

If you haven't checked out Tim Anderson's site, www.birdingbyboat.org, as recommended in our Winter 1999–2000 issue, give it a try when you need to put a smile on your face. He's added a series of delightful videos made in the "wilds" of the Los Angeles–Orange County border.

—HMH

Saving the Gray Whale: People, Politics, and Conservation in Baja California, *by Serge Dedina. University of Arizona Press, Tucson, 2000. 186 pp., $17.95 (paper).*

ALTHOUGH MOST OF US know something about the popular movement that brought the gray whale back from the brink of extinction, few of us are aware of Mexico's role in the story.

"While many of the wealthy nations of the world were turning a blind eye to the fate of the world's whales, Mexico, a country beset by rampant poverty but with a wealth of natural resources, helped protect a species it considers 'Mexican by birth,'" writes geographer Serge Dedina in a book that provides a fresh and valuable perspective. In 1971, President Luis Echeverría set aside Scammon's Lagoon as a whale reserve. In the next 17 years, laws were adopted to protect the whale population of Baja California Sur, Dedina reports. The motives for these actions were not all the same as the motives of save-the-whale activists in other countries.

Whale tourism has grown into a multimillion-dollar industry, raising new issues. How many boats should be permitted in the lagoons where whales give birth and nurse their young? Who should have permits to guide whale tours? There is fierce competition for permits between local fishermen and tourist outfitters.

"The success of gray whale conservation depends on the people who live around the gray whale lagoons in Baja California Sur," Dedina concludes, having spent two years living on these lagoons in the course of research for his dissertation on gray whale conservation. In this volume he offers a view of the relationship of the region's human inhabitants and gray whales, which will enrich the understanding of anyone interested in the gray whale's future.

—RG

Don't Cry Yoshino River

Somewhere on the Water Planet
Somewhere in Yaponesia
Somewhere in a rice-rich country
Along the Median Tectonic Line

There is holy water.
People call it a river:
People call it Yoshino River.

Earth's muscle—the mountains high.
Earth's bloodlines—the gorges deep.

The Yoshino River
Gathers snow, rain and beach tree sap.
Cascades numberless falls, and
For a short while
Hanging in the terracing rice paddies
Reflects beautifully thousands of moons
Through late Spring nights.

In the olden days
When the Yoshino River was dreaming
The twenty-first century
A golden wonder-horse was crossing
In a desert of concrete blocks and plastic trees.

A mysterious figure.
With an attaché case and a portable phone,
Was sitting uptightly on that golden saddle.

Today, the Yoshino River
Is a flow of spirits
Offering generously
Its beauty, its strength and its richness
To all beings.
At the end of epic journey
The water is returning
To the Mother Ocean
Now and always.

Look there!
At the estuary
A golden monolithic dam

Rises up!

Under the foot of the magic dam
All disappears . . .
From the tidal flat the fiddler crab
From the beach the whimbrel
From the binoculars the osprey
From the future the birdwatcher.

Living in his concrete cave
Third Stone Age man,
Just like a fiddler crab,
His one-sided tremendous claw.
What destiny await him tomorrow?

Don't cry Yoshino River!

You are holy water!
People call you a river!
People call you Yoshino River!

Don't cry Yoshino River!

—Nanao Sakaki
November 1996

The Yoshino River flows 120 miles from the mountains of Shikoku, smallest of Japan's four main islands, to a lush tidal wetland where it meets the ocean. A large dam scheduled for construction eight miles from the river mouth has met with fierce opposition from residents of the coastal city of Tokushima. The national government says the dam is needed to control floods. Its opponents say a 250-year-old stone weir has done the job and has become part of the river's ecosystem. In an unprecedented initiative, 53 percent of local citizens petitioned for a referendum and, in January 2000, more than 90 percent of those voting rejected the dam. This referendum, however, is not legally binding, and the national government expects to proceed with construction. Hope remains, as opposition to the dam continues to grow.

KEN GARDINER

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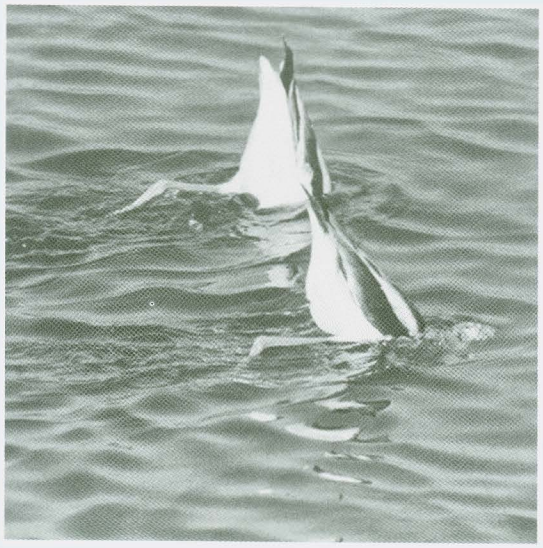
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