

CALIFORNIA
Waterfront Age

Winter 1989

Vol 5 No 1



Guidelines for Contributors

California Waterfront Age is glad to consider contributions of articles and shorter items related to the California coast, and especially to its waterfronts. We aim to provide a forum for the description and discussion of public programs and private initiatives relating to waterfront restoration and development, coastal resource management, and economic development.

We will consider articles of up to 3,000 words on the following subjects:

1. Economic development, project finance, waterfront restoration, the impact of changing uses.
2. Land-use conflict resolution.
3. Water quality, resource restoration, enhancement.
4. Maritime industries.
5. Tourism, waterfront parks, public access.
6. Environmental education and occupations.
7. Cultural and historical issues.

We will also consider the following shorter features:

Conferences: We publish announcements and summaries of waterfront-related conferences.

Book reviews: We seek relevant reviews, about 500 words long, of current books and other publications of interest to our readers.

Essays: Reflections on themes related to waterfronts are welcome. They can be verbal, photographic, graphic, or in cartoon form.

Interested contributors should call or write the editor. Send self-addressed stamped envelopes with submissions.

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California Waterfront Age
State Coastal Conservancy
1330 Broadway, Suite 1100
Oakland, CA 94612

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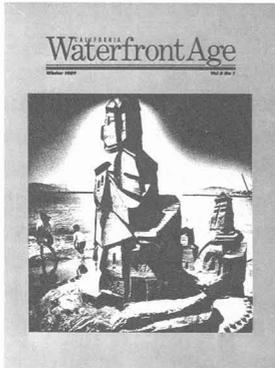
CALIFORNIA WATERFRONT AGE

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CALIFORNIA Waterfront Age

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VOL. 5 NO. 1



Storek & Storek,
San Francisco architects,
found enough sand at
Aquatic Park to
construct this fabulous
castle, winner of Best in
Show at the 1986 LEAP
Sand Castle contest.
Photo by Brant Ward,
San Francisco Chronicle



**The Sand Deficit:
Causes and Management.
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From the Executive Office *Peter Grenell*

THE FINAL REPORT of the National Wetlands Policy Forum, "Protecting America's Wetlands: An Action Agenda," released last November, is the result of an intensive year-long effort by a diverse group of individuals "to address major policy concerns about how the nation should protect and manage its valuable wetlands resources."

The forum was the brainchild of the U.S. Environmental Protection Agency (EPA), which in 1987 asked the Conservation Foundation to convene the body. It was chaired by Gov. Thomas H. Kean of New Jersey, and co-chaired by governors Carroll Campbell of South Carolina and Booth Gardner of Washington. The 20-member group also included a state senator, heads of state agencies, a town supervisor, chief executive officers of environmental groups and businesses, farmers and ranchers, and academic experts. Senior officials from the five principal federal agencies concerned with wetland protection and management also participated as ex officio members. Members were assisted by their own representatives, a group of technical advisors, and foundation staff.

The goal was to formulate broadly supported recommendations on how federal, state, and local wetlands policy could be improved, and its implementation made more effective. To obtain a wider range of perspectives on the issues, the forum also sponsored public workshops last May in Louisiana, New Jersey, and Washington. The report's recommendations, which number over 100, reflect a broad diversity of views and information obtained and deliberated upon over many months. They represent a consensus of forum members.

This consensus is quite remarkable, although the extremes of the environmental spectrum already have criticized the forum's report as not going far enough—in their respective directions—or for various sins of

omission. The forum established a two-part goal: in the short term, "To achieve no overall net loss of the nation's remaining wetlands base;" in the long term, "To increase the quantity and quality of the Nation's wetlands resource base." Various recommendations for legislative, administrative, and other actions follow. These would aim to promote private stewardship and public education; improve the effectiveness of regulatory programs; establish government leadership by (a) reducing wetland destruction resulting from governmental actions and inducements, and (b) acquiring and managing wetlands; provide better information on wetlands functions and how to conserve, restore, and create wetlands; and provide for financing wetlands protection and management.

The forum concluded early on that consensus could be the only useful outcome of its deliberations—two firmly contending positions or a majority finding with a vocal dissenting view would neither be very effective nor command the attention of policy-makers and implementors. (Members retained the right, however, to voice such dissent at the end.) With such a formidable agenda, the achievement of consensus makes the report a significant document.

Especially noteworthy is the fact that representatives of such diverse organizations as the Environmental Defense Fund and National Wildlife Federation on the one hand, and the National Homebuilders Association and ARCO on the other, could agree, albeit reluctantly on several points and on the language of their expression, with the forum's recommendations. In such an undertaking, one must agree at the outset to listen—really listen—to other viewpoints, and to commit to the achievement of a mutually acceptable outcome. Basic issues were at stake, such as the balance between private property rights

and public needs, the definition of wetlands and their true values to society, and the roles and responsibilities of government and the private sector toward these resources.

That the State Coastal Conservancy staff participated in the forum's activities should come as no surprise, given its ten years of experience in mediating and resolving land-use disputes, including those involving major wetlands, on the California coast.

Several topics received intensive consideration. Uppermost on the list, of course, were questions of whether there should be a national wetlands goal and, if so, what it should be. Much effort was directed to the language with which the goal should be expressed, and the degree of generality. Discussion on these points was followed immediately by the inevitable issue of definition, especially in view of the 50 or so definitions currently in use by different entities for various regulatory and other purposes. Another priority concern, not surprisingly, was regulation—its weaknesses, inconsistencies, inefficiencies, and inequities. Forum members wisely chose not to turn their deliberations into a referendum on the Clean Water Act's Section 404 permit program, which is administered by the U.S. Army Corps of Engineers, and which actually covers only a comparatively small part of the entire wetlands universe. Instead, the group considered a wide range of regulatory problems and mechanisms.

Yet another major area of concern was the confrontation of agriculture and wetlands, and the role of government support programs in inducing wetland alterations.

Besides these principal issues, the forum also gave attention to strengthening the states' role in advance planning and regulation of wetland conservation, expanding private sector and general public awareness of the importance of wetland protection, and iden-

tifying increased scope for non-regulatory approaches to wetland protection and restoration.

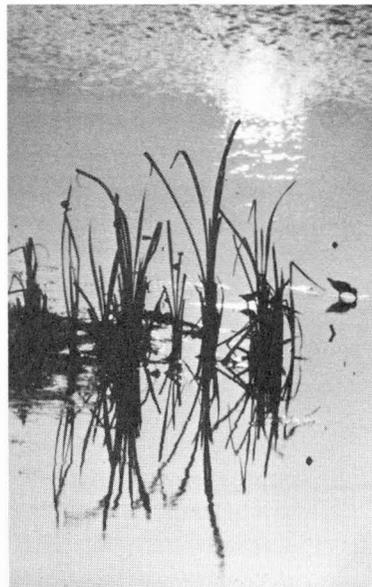
The report calls for several specific and immediate actions. These include administrative actions and movement toward a series of legislative ones on both the national and the state level. Its recommendations include:

- Create a system of National Wetlands Preservation Trusts, an Agricultural Wetlands Reserve Program, and several other initiatives to provide better incentives to private wetland owners to protect these resources permanently for the public benefit.

- Fund the restoration of 2.5 million acres of former agricultural wetlands over the next ten years, in addition to protecting existing wetlands, by implementing the recommended Agricultural Wetlands Reserve Program.

- Reduce wetland losses resulting from government programs that either affect wetlands directly or encourage private landowners to alter them.

- Institute more effective and evenhanded regulatory programs to ensure that no types of wetlands conversions—including those resulting from drainage, excavation, the destruction of vegetation, and other such



U.S. FISH AND WILDLIFE

Continued on Page 45

Ebb and Flow

The State Coastal Conservancy's recent actions have included significant authorizations for urban waterfront restoration, wetlands enhancement, and the initiation of a major land acquisition program at Point Cabrillo in Mendocino County.

Progress at Point Cabrillo

Years of patient planning and negotiation reached a climax with the November authorization of first-phase acquisition at Point Cabrillo, about 3 miles north of the town of Mendocino. Over \$2.1 million will be spent to acquire fee title to 76 acres and options to purchase an additional 190 acres to implement the approved Restoration Plan at Point Cabrillo.

The 300-acre area identified in the Point Cabrillo Restoration Plan includes about two miles of ocean shoreline with several points of informal public access to small pocket coves. The open grassland slopes gently toward the ocean, with several stands of mature trees along the bordering Point Cabrillo Drive, a small pond, and considerable seasonal marsh land. On the bluff in the central portion of the open headland is the 35-acre Point Cabrillo Light Station, a U.S. Coast Guard facility, which has been characterized as the most complete example of an old-time lighthouse operation remaining in California. This area includes the lighthouse, built in 1908, associated outbuildings, and three two-story clapboard houses.

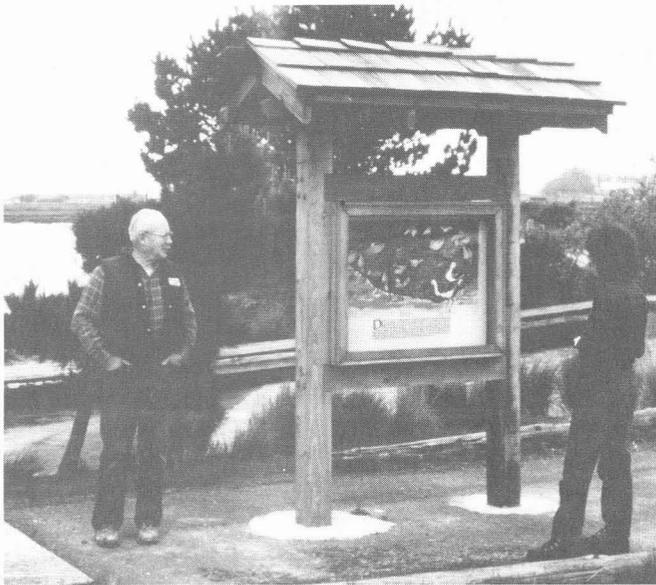
The Conservancy recommended acquisition of the entire Point Cabrillo headland to avoid the degrading impacts of residential development and to preserve the public use of these lands as part of a public recreation area incorporating the Point Cabrillo Light Station. This acquisition of scenic north coast property is one of the Conservancy's most

significant current projects. Further acquisitions for the project are anticipated next year.

Waterfront Restoration Begins

Waterfront restoration is underway in **Suisun City** and **Carpinteria**, thanks to recent Conservancy actions. At its meeting in December, the Conservancy approved the Carpinteria Urban Waterfront Revitalization Plan, concurred with the city's Final Environmental Impact Report, and authorized up to \$935,000 (\$555,000 of which is repayable from Santa Barbara County) to implement the plan's first phase. The plan, jointly funded by the Conservancy and the city, recommends immediate implementation of several projects designed to promote the economic vitality of the waterfront area, protect and restore significant coastal wetlands, improve public parking and beach access, and encourage visitor-serving development. Conservancy funds will be used to acquire six parcels adjoining Carpinteria Salt Marsh, to prepare a resource enhancement plan for these parcels, and to assist the city in implementing the remaining projects identified in the waterfront revitalization plan. Projects that will be funded by the city of Carpinteria include the creation of additional waterfront parking, the installation of landscaping and street furniture, the construction of a new bicycle overcrossing and boat ramp, and various public access improvements.

In September, the Conservancy authorized a grant of up to \$600,250 to Suisun City for shoreline stabilization, land acquisition, public accessway construction, and street-end improvements on Suisun Channel. Thus, the city will begin to implement recommendations of the Suisun City Urban Waterfront Restoration Plan, funded by the Conservancy and completed in late 1987.



Visitors to Arcata Marsh study one of Erica Fielder's vividly colored interpretive panels, produced for the Conservancy's Resource Signing Program. Six new panels will be developed for the central and northern parts of the state.

More Restoration

Three other Conservancy authorizations launched urban waterfront restoration plans in the **Noyo Harbor District** in Mendocino County, for the city of **Antioch** in Contra Costa County, and for the unincorporated community of **Summerland** in Santa Barbara County.

The Noyo Harbor plan will focus on commercial fishing support facilities, but will also include circulation and land-use plans, a public access plan, environmental analysis, and cost estimates for public access, recreation, and visitor-serving commercial improvements. Antioch will prepare a comprehensive and unified design for public access, recreation, and visitor-serving commercial facilities along the downtown waterfront. Authorizations for each community were \$50,000 in November.

In September, up to \$25,000 went to Santa Barbara County to prepare a plan for Summerland. The county and the Summerland Citizens Association requested Conservancy assistance in preparing the plan. The town is physically separated from its shoreline by Highway 101 and the Southern Pacific rail-

road tracks. The plan will provide for expanding and improving public access to the beach, increasing recreational and open space opportunities (including additional beach parking), improving view corridors and the scenic quality of the shoreline area, promoting visitor-serving development, delineating the urban/rural boundary, protecting coastal agriculture, and consolidating antiquated subdivisions. Conservancy funds will be targeted for beach access, recreational opportunities, and visitor-serving development. Implementation of the waterfront plan will rely heavily on local resources.

Elkhorn Slough Approved

The State Coastal Conservancy approved the Elkhorn Slough Wetland Management Plan in December. The Conservancy authorized a grant of up to \$51,500 to the Nature Conservancy for the acquisition of the 44.7-acre Silversword property within the wetlands of Elkhorn Slough, in northern Monterey County.

Elkhorn Slough is the major coastal wetland of Monterey County and one of the largest wetlands remaining in Coastal Cali-

fornia. It contains tidal marsh, salt ponds, diked marsh, and an extensive open water area. One of the largest concentrations of migratory waterfowl and shore birds of California's coastal wetlands can be seen here.

This is the first Coastal Conservancy project

in Elkhorn Slough and will initiate acquisition and enhancement of the Blohm-Porter Marsh. The Silver-sword property will be the first of four proposed acquisitions in this marsh needed before it can be enhanced.

The Nature Conservancy, which held an option on the Silver-sword land until the end of 1988, had raised \$75,000 toward its purchase, but needed \$51,500 more for its acquisition.

Once the wetlands are purchased, the plan calls for returning this area to the brackish/freshwater marsh, as it existed 50 years ago.

San Francisco Estuary Project

In 1988, the Environmental Protection Agency (EPA) designated the San Francisco Bay and Delta as a National Estuary and established a five-year cooperative federal, state, and local pro-

gram, the San Francisco Estuary Project, to promote effective management and restoration. In December, the Conservancy accepted a \$375,000 EPA Action Plan Demonstration grant, which will be used to fund up to 25 percent of the implementation costs of selected Conservancy wetland enhancement projects in the San Francisco Bay and Delta. These projects will demonstrate effective means of restoring and maintaining water quality and natural resources in the estuary, in accordance with the National Estuary Program.

Sensitive Resource Area Signs

A grant of up to \$42,600 to the California Institute of Man in Nature was authorized in December for the development of six new interpretive panels for the Conservancy's Sensitive Resource Areas Signing Program. This authorization will provide for inclusion of more areas in the central and northern parts of the state. The new panels would interpret environmental themes that are common to several sites throughout the region, possibly including but not limited to: seasonal wetlands, human impact on fragile riparian environments, whale migration, salmon and steelhead life cycles, upstream water quality, Monarch butterfly migration, the impact of pets on wetland habitats, and coastal wildflowers. The new panels will be displayed at several public access points within or near wetlands in central and north coast counties. Fifteen copies of each panel will be printed so that displays can be erected at other locations where similar resources exist, or replace worn or faded panels.

To order panels, or for more information, contact Karen Rust at the State Coastal Conservancy, 1330 Broadway, Suite 1100, Oakland, CA 94612. (415) 464-4174. □

Let's Eat Stars

Believe me, children!

*By the name of God
Sky is made for airplanes.
Coral reef for tourists.
Farm for agrichemicals.
River for dams.
Forest for golf courses.
Mountain for skiing grounds.
Wild animal for zoos.
Car for traffic tragedies.
Nuclear power plant for ghost dance.
Man for dancing robot.*

*Don't worry, children!
The well's never dried up.*

*Look at the evening glow!
Sunflowers in the garden.
Red dragonflies in the air.
Somebody starts singing—*

• "Let's eat stars."

Nanao Sakaki

*September 1988
Mount Daisetsu, Japan*

Conference Log

Greenhouse Effect in California

A "Workshop on the Implications of Climate Change for California" was held in San Francisco on November 21, sponsored by the Pacific Institute for Studies in Development, Environment and Security. The focus was on two questions: What do we know about greenhouse warming? and What does it mean to us in California?

The answer to the first question is that the concentration of greenhouse gases, mainly carbon dioxide and methane, in the atmosphere has increased significantly over the last few decades. This increase is primarily the result of human activities such as fossil fuel combustion, biomass burning, and the destruction of tropical forests. More of the sun's heat will be trapped by the atmosphere, increasing the average global temperature.

The answer to the second question is that in the long term we could be in serious trouble. The potential problems are: rising sea level, changes in rainfall patterns, less snow pack in the mountains, and changes in crops grown in California. One of the most significant issues for California was raised by Peter Gleick, director of the Pacific Institute's environment program, who suggested that increased global temperature could cause the snow line to rise, meaning a smaller snow pack. For the same amount of precipitation there would be more runoff in the winter months and less during the spring and summer. Since the snow pack stores much more water than our network of dams, there are implications for agriculture, hydroelectric generation, water storage needs, and the ecology of bays and estuaries.

For more information on the conference, contact the Pacific Institute, 1681 Shattuck Ave., Suite H, Berkeley, CA 94709.

Ron Kukulka

Environmental Jobs Conference

In 1984, the Office of Technology Assessment projected a sixfold increase in the demand for environmental engineers and hydrogeologists. The prediction has held so far, and there will soon be a shortage of qualified hydrogeologists, according to Stuart Pike, an employment manager from Kleinfelder, a Walnut Creek groundwater consulting firm. The American Geological Institute recently projected a 24 percent increase in the demand for geoscientific consulting firms, he said.

Pike was one of many panelists from a wide variety of environmental fields who spoke at the "Environmental Careers—Challenges and Directions for the Future" conference held at Golden Gate University in San Francisco on November 5. About 300 people attended the conference sponsored by the EIP Fund.

Participants included local, state, and federal regulatory enforcement agencies, private consulting firms, the National Park Service, Chevron Corporation, and Dow Chemical Company. They covered areas from surface and groundwater management to international environmental management.

Hazardous waste management and clean-up was described as a growing field with plenty of employment opportunities for qualified professionals. "The types of jobs likely to come out of the next decade of concern for the environment will be in the areas of toxicology; soil, plant, water, and air monitoring; risk assessment; policy analysis; environmental research; and regulatory enforcement agencies," said Joe Shimm of the Environmental Sciences Division at Lawrence Livermore National Laboratory.

A new and growing activity is called waste

Continued on Page 45

To the List of Vanishing Resources, Add Sandy Beaches

It surprises some people to hear this, but most Southern California beaches are not natural. Some are entirely man-made, others are artificially maintained. Without imported sand, many would disappear. So much has man interfered with natural coastal processes that rivers and streams no longer replenish sand the waves take away. As Gregory Woodell, supervising planner for the Los Angeles County Department of Beaches and Harbors, puts it, "Most of our beaches have reached the point of extinction and can only survive in captivity."

Managing beaches takes money and effort, however, and these resources are increasingly scarce. Will this region—its very name synonymous with sandy beaches—have to accept more rocky shores?

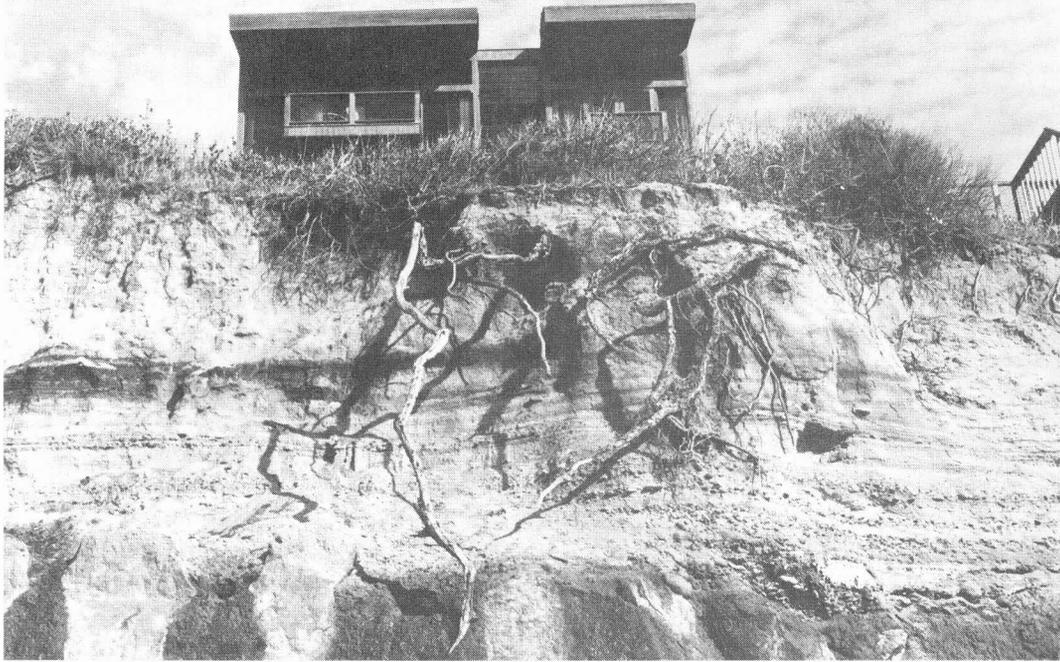
Beaches in their natural state shift and move. Big winter waves pull sand off the shore, gentle summer waves coax much of it back. Some sand is irretrievably lost to the deep, but more comes down rivers and streams, settles in deltas, and is distributed by waves to beaches. In Southern California, floods used to bring huge volumes of sand to river mouths. After major floods, beaches widened and then shrank until the next big storm replenished the delta supply.

Since the 1920s, this dynamic equilibrium has been interrupted by dams [see Page 12], harbors, various shoreline structures, and urban development. The cumulative effect on beaches has only recently come to wide public attention. Now it's hard to miss. Between Santa Barbara and San Diego, many beaches have been reduced to mere stretches of cobble, and some have vanished altogether.

The loss of beach sand is not uniform, nor is it limited to the southern



JIM MILTON



Adjacent to destroyed public access stairway, Encinitas, 1988.

part of the state. Some southern beaches have gained width at the expense of others. Some northern shoreline areas are affected, particularly Monterey Bay, Santa Cruz, and Stinson Beach. But overall, the deficit is most severe south of Santa Barbara harbor.

“Sand starvation” of beaches is a topic of urgent debate among coastal scientists and engineers. Most agree that the phenomenon they are witnessing is largely man-made and not simply a natural cyclical fluctuation on a restless coastline. They differ on the extent to which they attribute the perceived sand deficit to dams, jetties, urban development, and other factors, and on what, if anything, should be done. Doing nothing is not considered to be a serious option: the commitment to beach management was made long ago.

Some decades ago, beaches were reshaped and created as spinoffs from other development. During a channel-deepening project in San Diego Bay in the mid-1940s, 28.3 million cubic yards of sand were placed south of Coronado, widening a narrow beach and creating new land on which the condominium towers of the Hotel Del Coronado now stand. In the 1920s, sand dredged from Los Angeles harbor was used to create Cabrillo Beach in San Pedro, now highly popular with advanced wind surfers. After building this beach, the U.S. Army Corps of Engineers also put in a groin to protect it and, after sand washed away—as artificially placed

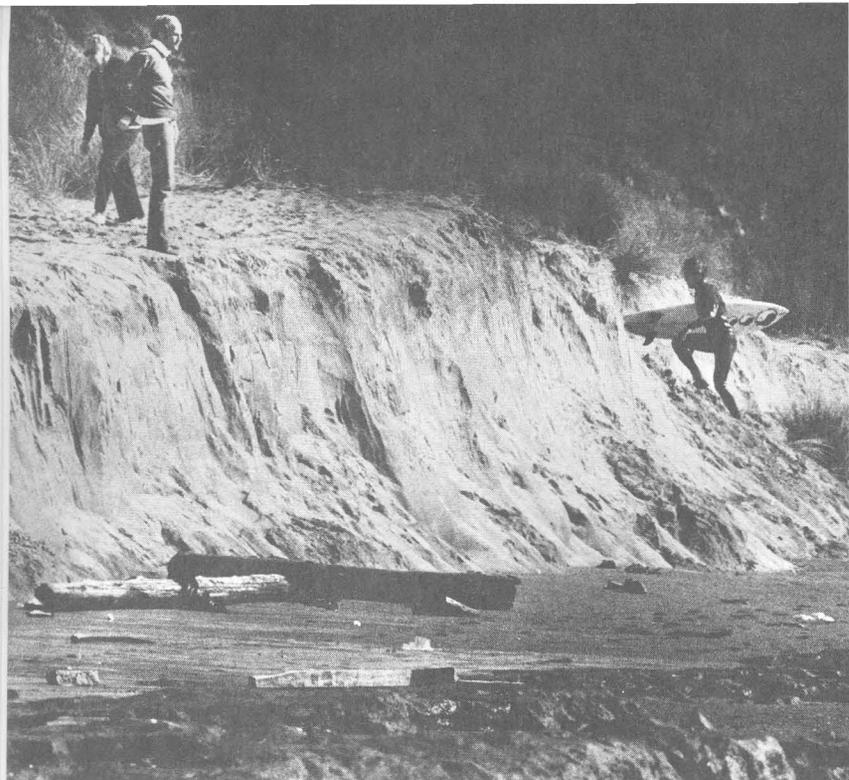
sand has had a way of doing—replenished it twice with further dredging.

Many Los Angeles County beaches, including those in Santa Monica and Venice, were widened in 1948, when 14.5 million cubic yards of sand were moved by slurry to the shoreline from the Hyperion Dunes, south of Marina del Rey, during construction of the Hyperion sewage treatment plant.

Meanwhile, other projects brought unwelcome surprises, for bold attempts to discipline the coast were not informed by understanding of shore processes. Nowhere is this more evident than in Oceanside, a city founded in 1883 as a resort featuring a wide, gently sloping beach. In 1942, after Camp Pendleton Marine Corps Base was established to the north, a harbor was built between two river mouths north of the city. It soon became a sand trap. A jetty held back sand that was drifting downshore, causing the harbor to silt up and Oceanside’s beautiful beach to shrink. To stop the silting, the Corps extended the jetty, aggravating beach erosion and apparently diverting some of the drifting sand offshore, to depths beyond the waves’ retrieval. Oceanside beach disappeared. Tourism took a nose dive. Without a protective sand cushion, shoreline property was exposed to heavy storm damage.



Stinson Beach, January 1978.



SAN FRANCISCO CHRONICLE

**Stinson Beach,
January 1983.**

The city threatened to sue. The Army Corps tried to make amends by pouring sand dredged from the harbor onto city beaches. Between 1965 and 1981, it moved 5 million cubic yards of sand, enough to have covered 7.5 miles of shoreline with a sand dune 45 feet high and 156 feet wide. The sand soon drifted away.

The Corps offered to capture a beach for the city by building a submerged breakwater connected to the beach on each end by a rock wall. But Oceansiders refused a "sandbox."

At a cost of \$3 million, the Corps brought a million more cubic yards by truck from the San Luis Rey River. (A double-belly truck can carry 15 cubic yards. That much sand would be 66,667 maximum-capacity truckloads.) Now the city again has a fine beach, but nobody knows how long it will stay. Long-term hopes rest with an experimental system, the \$4.5 million jet-pump bypass system now being installed at the harbor, which is to pump sand continually from above the harbor and pipe it to the beach.

Partly in response to the Oceanside problem, Congress directed the Corps to conduct a mammoth study of the state's coast, be-

ginning with the San Diego region, and authorized \$22.9 million. The first, \$7.2 million phase of the California Storm and Tidal Waves Study is almost complete. Among the conclusions: Camp Pendleton Harbor blocks sand flow and deflects it offshore.

Coastal science has boomed since the 1940s, when wartime needs fueled academic research. Failure to understand waves and currents had led to the loss of many lives during amphibious landings, according to Reinhard E. Flick, oceanographer, State Department of Boating and Waterways.

As knowledge grew, however, resources for applying it dwindled. Massive sand transfers still occur, but far less often. This year, the Seal Beach shoreline will be nourished with 80,000 cubic yards of sand dredged from the entrance to the Navy's Seal Beach Weapons Station. Last year, as part of the expansion of the Hyperion sewage treatment plant, nearly a million cubic yards of sand were moved to El Segundo Beach, re-creating that Los Angeles county beach. Though some sand will wash away, it will drift downcoast to nourish other starved beaches.

Further dredging for the Hyperion plant will make more sand available. Cabrillo Beach, mostly cobble now, could benefit. But current Army Corps policy prohibits projects deemed to be primarily recreational, and the county lacks funds.

How then shall beaches be maintained? More than the Southern California mystique is at risk with their loss. They are vital to many communities' livelihoods and are the shoreline's most effective protection against waves. Half or more of the estimated \$100 million damage from 1982-83 storms was to public property, Flick points out.

The two basic approaches to beach management are known as the hard and the soft. The first relies on defensive structures, the second on sand replenishment. Arming the shore against the waves destroys the natural appearance of a beach, causes more erosion



Newport Beach, September 1967.

in adjacent areas, and requires a continuing defense buildup. A dramatic case in point can be seen along the Sunset Cliffs shoreline in San Diego. In 1982, the city of San Diego spent about \$3.5 million to fortify cliffs here with riprap, backfill, vertical retaining walls, concrete walkways, and landscaping. The project is now seen as an example of unenlightened shoreline management. According to a 1985 report by attorney Robert Burns and marine geologist Wendell Gayman, it accelerated erosion in unprotected areas and destroyed sandy beaches and tidepools.

Groins, jetties, and seawalls protect some properties at the expense of others, Craig H. Everts, of Moffat & Nichol, Engineers, has observed. Conflicts over the use of such protective devices often arise when a public beach with a retreating shoreline is backed by a private property. Without a protective structure, the private property will eventually be destroyed. With it, the public beach will narrow and eventually disappear because its landward boundary is fixed, Everts found.

Because of such liabilities, many coastal managers favor the soft approach, artificial sand transfer. However, suitable sand is scarce and increasingly expensive, going as high as \$10 a cubic yard. Nourishment must be repeated periodically. Nevertheless, the benefits a natural-looking sandy beach provides have encouraged the pursuit of this option.

Other proposals for saving beach sand have included the construction of underwater devices to keep sand from going down canyons, and installation of artificial seaweed as wave brakes. A project that would bypass dams has been proposed by Scott A. Jenkins and Douglas L. Inman at Scripps Institution of Oceanography, who seek funds for an experiment that would transfer to beaches sand that builds up at the heads of reservoirs.

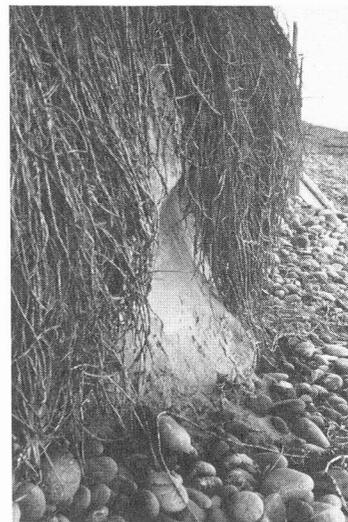
The most promising new trend, according to Jim McGrath at the California Coastal

Commission and others, is the beginning of regional cooperation among beach communities. In Ventura and Santa Barbara counties, seven public jurisdictions have established BEACON (Beach Erosion Authority for Control Operations and Nourishment) as a joint powers agreement to work toward the protection and improvement of the coastline and beaches. In San Diego, BEACH (Beach Erosion Action Committee) has a similar intent. Regional cooperation leads to better planning, better use of resources, and to stronger political influence toward a shared goal. But local jurisdictions will require state and federal aid.

If California is to continue to enjoy sandy beaches, especially in developed areas, taxpayers will have to pay for them, just as they do for streets and water systems. This need has long been accepted in New York City, says Reinhard Flick:

"When I was in high school, on weekends I'd walk to my girlfriend's house and we'd take the subway to the beach. The beach in Brooklyn is considered part of the city. ... Once you have large-scale development in a coastal area, you have to maintain the beaches as you do everything else." □

LARS FAHLBERG



SAN FRANCISCO CHRONICLE



The Impact of Dam Building on the California Coastal Zone

BY SCOTT A. JENKINS, DOUGLAS L. INMAN AND DAVID W. SKELLY

THE MOUNTAINOUS COASTLINE of California was formed as the oceanic and continental plates collided millions of years ago. These collisions created a relatively steep coastal topography, with narrow shelves backed by mountain ranges. Because of this steepness, and the state's semi-arid climate, great volumes of silt, sand, and gravel flow down rivers and streams toward the ocean. Before dams were built, this sediment reached the shore, was deposited in deltas, and over time was spread along the shoreline by waves. Since the 1920s, however, most of the sediment in rivers flowing toward the coast of Southern California has been trapped behind dams. In the past few decades, only a fraction of the normal volume of sediment has reached the river mouths. One result has been sand starvation on the beaches.

Sand follows a complex one-way path. It is carried along the shore by the littoral (longshore) current, washing on and off beaches with waves and tides. Eventually it arrives at one of the submarine canyons that

punctuate the continental shelf. These canyons are ancient drowned river mouths from thousands of years ago, when the shoreline was farther out to sea. The sand accumulates at the canyon heads and periodically avalanches down the walls. Thus, over time, beach sand originally derived from rivers is lost. Each submarine canyon is a sink for the sediments of a number of rivers and streams.

Sediment moves from the coastal range to the submarine canyon within littoral cells, geographic units that include the sediment sources, pathways, and sinks. There are several of these cells, in varying sizes, along the California coast. Each is self-contained—sand does not flow alongshore from one to another—and each is leaky; that is, it continually loses sand to submarine canyons.

Therefore, a shoreline on a collision coast can only remain stable if a steady state exists between sand lost down submarine canyons and sand resupplied by rivers and streams. The dams have upset this balance. Jim McGrath of the California Coastal Commis-

sion staff has calculated that the Los Angeles and San Gabriel rivers now carry only a third as much sediment as they did before being dammed; the San Diego River carries only one-ninth of what was normal before 1935, when its first dam was built.

The entrapment of sediment behind dams has also caused other problems: a loss of flood control capacity behind dams, stream bed erosion below dams, beach erosion along the coast, and sea cliff erosion behind the former beaches. The 56-mile-long Oceanside littoral cell provides examples of all four of these consequences.

Man's Intervention

Dam building within the Oceanside littoral cell began in 1922 and was completed in 1977. Most of this cell's rivers and streams flow into the ocean near the city of Oceanside, a community founded in 1883 as a resort, featuring wide sandy beaches. Here the seasonal beach foreshore (the part of the shore lying between the upper limit of wave wash at high tide and the ordinary low-water mark) was once nearly 1,000 feet wide, according to photographic evidence taken in 1916, after a great flood. Such floods used to create a delta that lasted several years and was a source of sand for beaches to the south.

Today the Oceanside beaches are a few hundred feet wide on the foreshore, while the beaches south of the San Luis Rey River are entirely denuded of sand during winter months. In the past few decades, even after very wet winters and El Niño events, no big deltas formed, and no major new sand supply came to downshore beaches. This rather dramatic example of beach erosion is the result of the failure to replace the approximately 250,000 cubic yards of sand that drifts downshore with the littoral current during each average year. Every year for the past 65 years since the major dams were built in this littoral cell there has been a deficit of sand yield to the beaches: what came down from

the rivers was less than what disappeared into submarine canyons. According to our studies, this deficit is nearly equal to the amount of sand falling into the La Jolla submarine canyon during the same period.

Also contributing to the net loss of sand in this littoral cell, though only to a minor degree, is Oceanside Harbor, which was built in 1942 between the mouths of the San Luis Rey and the Santa Margarita rivers. Sand trapped within the harbor is dredged and placed back on the beach. But harbor structures also divert some sand offshore, to depths beyond 30 feet, from which waves cannot return it to the shore. According to recent estimates, as much as 140,000 cubic yards a year have been diverted offshore, forming a bar that does

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not return to the beach. We estimate that the cumulative sand deficit in the Oceanside littoral cell is 14 million cubic yards, representing many years of losses.

The sand deficit has caused cliff erosion. Gently sloping sandy beaches are nature's most effective wave energy dissipator. When beaches retreat landward, waves can act directly on the base of the sea cliffs, causing

Delta of San Luis Rey River in Oceanside after 1916 flood.

erosion. Large blocks of cliffs collapse. By crumbling, the cliffs replenish the sand-starved beaches. However, this is not generally seen as desirable when there are roads, homes, and other structures on top of the cliffs. Beach communities just south of Oceanside have suffered millions of dollars of property damage because of cliff failures during the last decade. The storms were not extreme hundred-year events in those years.

The loss was a direct result of denuding the beaches of their protective beds of sand. Many of the structures lost had stood since the early 1900s.

In addition to damaging beaches and cliffs, dams have also caused stream beds to erode below the dams. For thousands of years, the streams had adjusted to seasonal flows of sediment-laden runoff. After the

dams were built, these streams were forced to readjust to the flow of clear water released through sluice gates in an almost steady discharge. With no new sediment from upstream, the erosional force of the water was increased. During the heavy rainfall of January 1978, February 1980, and January 1983, bridge trestles and utility poles along state Highway 76 were damaged by the rush of water released from Lake Henshaw Dam into the San Luis Rey River. The situation was aggravated by the mining of sand from this river below the dam.

Thus, stream beds, beaches, and cliffs have

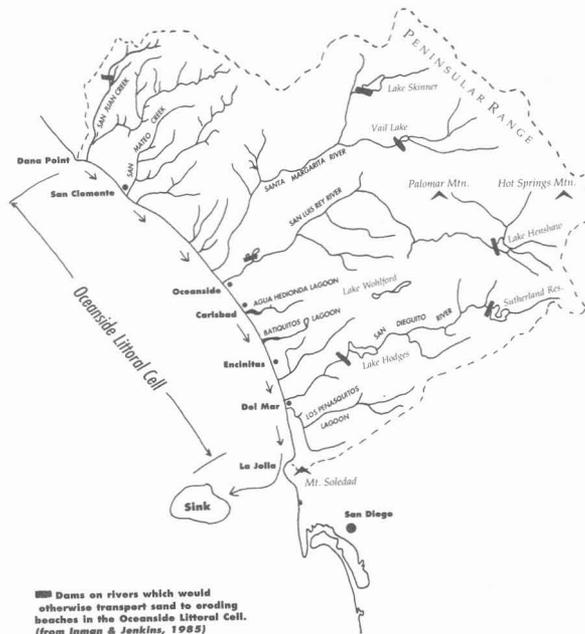
been damaged by the interruption of flow down rivers due to the obstructions caused by dams. At the same time, sediment was building up behind dams and the reservoir capacity has steadily diminished in the Oceanside littoral cell. Lake Henshaw has been reduced to about a third of its original storage capacity by the static loading of sedimentary deposits over the Elsinore Fault at the far reaches of the reservoir. Parts of the

Warner Valley have subsided as much as half a foot, producing large cracks in the earth core of the Henshaw Dam.

This problem is common to dams and, indeed, was foreseen by early dam designers. They estimated that Lake Mead would accumulate as much as three cubic miles of sediment every 100 years. At that rate, Hoover Dam

will be reduced to a useless waterfall within 500 years. Designers for the Hoover, the Glen Canyon, and the Grand Coulee dams built sediment traps in low lying areas along the riverbeds behind the dams. But it was subsequently learned that new sedimentary deposits were forming above the traps, in the upper reaches of the reservoir. Aside from diminishing reservoir capacity, such deposits can place a tremendous weight on the soils above the original riverbed, producing subsidence.

The problems precipitated by dam building in the Oceanside littoral cell are typical



along the West Coast of the United States and along most mountainous coasts of the world. The severe coastal erosion along the Nile delta in Egypt is due to the Aswan Dam, and that of the Ebro River delta in Spain results from the numerous dams on the Ebro.

Remedial Measures

Can anything be done to restore the dynamic natural balance of Southern California's beaches? Remedial measures taken thus far on the coastline treat only the symptoms of the problems caused by dam construction. Structural shore protection such as seawalls and jetties, for instance, have not stopped shoreline erosion, but have merely deferred it to other beaches downcoast—just as stream bed reinforcement around bridges and overpasses merely results in increased current scour immediately downstream. Once structural shore protection is begun at any point along a coastline, a downcoast chain reaction begins, and construction must be continued throughout the entire littoral cell. The result is an armored coast, which few people find aesthetically pleasing. Moreover, the value of such structures is temporary. They do not create any new sediments. They only rearrange the limited supplies remaining on beaches. Each year there is less and less to rearrange.

Another, potentially more promising, approach to the problem of sand loss on beaches is beach "nourishment," the practice of finding new sand sources to repair erosion damage. This treats the problem closer to its roots, but has been difficult to carry out. In the case of both beaches and streams, the main difficulty is finding enough suitable "borrow pits," sources of suitable sediment.

The most commonly used borrow pits have been stream beds near eroding beach areas. Unfortunately, many of these stream beds have already been mined out by sand and gravel companies, and continued use of their graded beds as borrow pits further

exacerbates stream bed erosion.

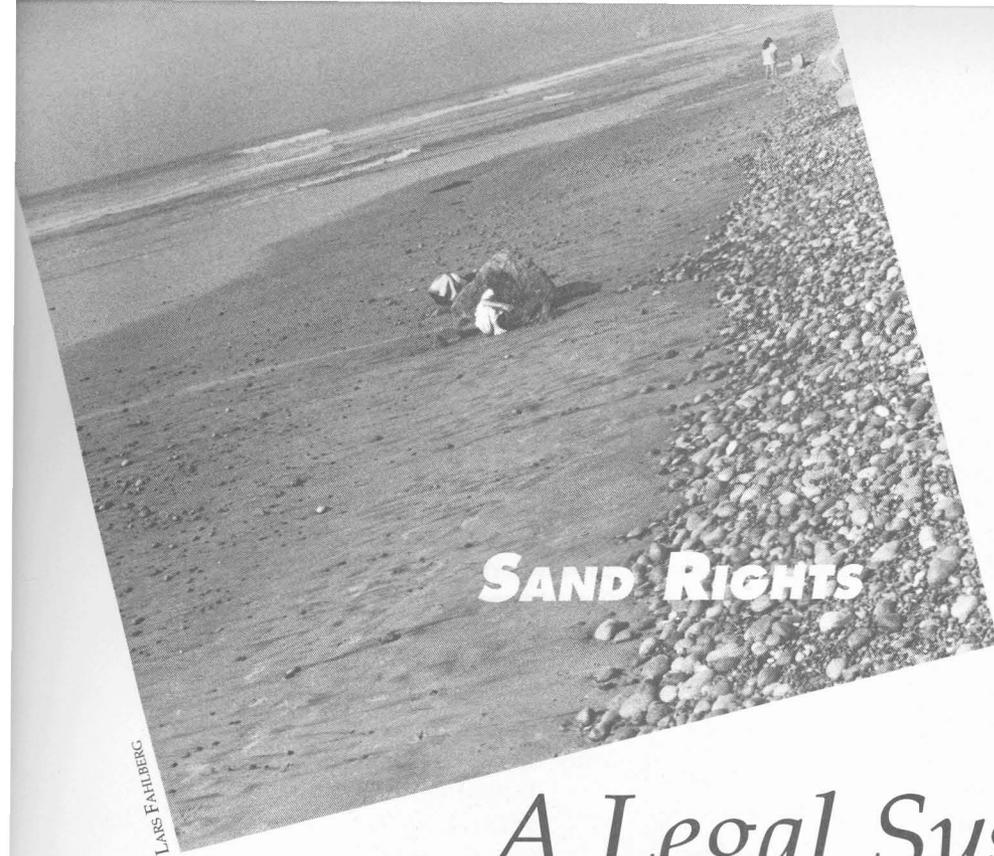
An alternative is to dredge offshore sediment deposits. The trouble there has been finding enough coarse sand offshore and then trying to recover it without damaging the beach. An offshore borrow pit steepens the slope and frequently becomes an offshore sink for beach sand. When suitably coarse offshore sediments are found, they are usually older deposits buried beneath finer sands and silts laid down in more recent times. Therefore, nourishment from offshore sources requires a major dredging project, which can only take place during calm seas.

Conclusion

The key to beach stability is restoration of the sand supply. The deltas that have been forming behind each dam are potential borrow pits. At the heads of reservoirs behind dams and above catch basins on local streams and rivers lies the sand supply missing from the beaches. In the Oceanside littoral cell, it is the largest available sand supply.

There are many impediments to getting at this supply. The right combination of existing earth-moving techniques must be determined. Cities and counties within the watershed must examine the overall problem together. Existing regulations, which make it difficult to nourish beaches from any source, must be reexamined. However, by moving the sediment from above the dams, where it is useless at best and hazardous at worst, to the beaches where it naturally belongs and is so badly needed, we can progress toward correcting the problems caused by early water management efforts. □

Scott A. Jenkins is assistant research oceanographer, Douglas L. Inman is professor of oceanography, and David W. Skelly is staff research associate at the Center for Coastal Studies, Scripps Institution of Oceanography, University of California, La Jolla.



LARS FAHLBERG

SAND RIGHTS

A Legal System to Protect the Shores of the Sea

BY KATHERINE E. STONE AND BENJAMIN KAUFMAN

*By the law of nature these things are common
to mankind : the air, running water, the sea
and consequently the shores of the sea.*

Institutes of Justinian 2.1.1

THE LEGAL SYSTEM OF WATER RIGHTS is highly developed in California. So far, however, it has failed to recognize in any comprehensive fashion the importance of sand transported to beaches by streams and littoral currents. Beach sand is a valuable resource, both for recreation and as a buffer to prevent storms from causing severe property damage. A system of "sand rights" should be integrated into the existing legal framework.

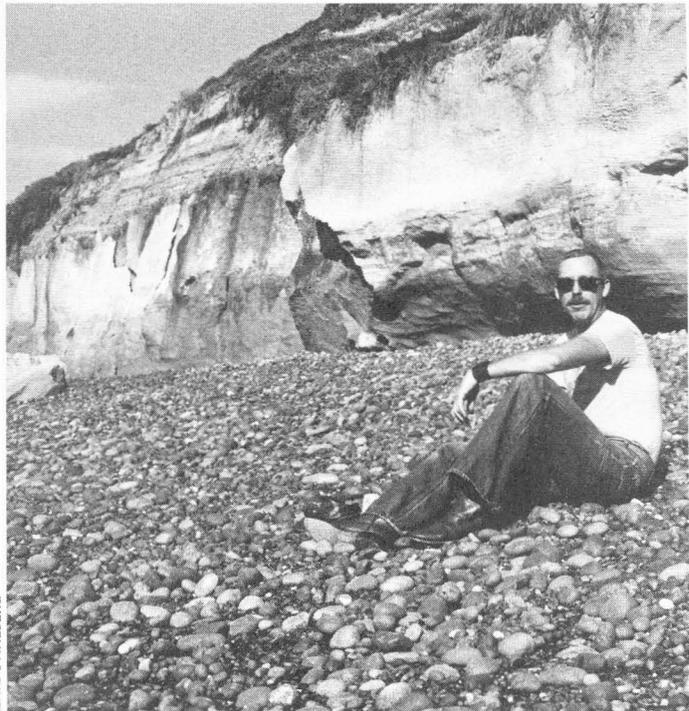
Sand rights, like water rights and property rights, are state law questions which vary from state to state. A 1988 Supreme Court decision (*Phillips Petroleum Co. v. Mississippi*) suggests that California and other coastal states could extend the public trust doctrine to cover sand rights. A theory of sand rights would require that the evaluation of new development projects include interference with the sand transport system as part of environmental impact. It would also provide a legal basis for funding sand replenishment through fees, taxes, and assessments. All decision makers within a littoral coastal cell would be required to consider a project's effect on the supply of sand to the beach.

Toward a Theory of Sand Rights

California courts traditionally have been hostile to any concept of sand rights. For example, in 1943, the California Supreme Court, in *Miramar Co. v. City of Santa Barbara* (a split decision), held that a beachfront hotel owner had no right to the continued accretion of sand carried by the littoral current onto his property. The plaintiff, owner of the Miramar Beach Hotel, complained that a breakwater built by the city of Santa Barbara three miles west of his property blocked the natural flow of sand to his property. Seven years after the breakwater's completion, the beach in front of the hotel was completely denuded of sand. The Court found that the state or a city has an absolute right to build

coastal structures that aid commerce, navigation, or fishing, even though the structure leads to the erosion of the plaintiff's property.

This case and others like it rest in part on the public trust doctrine, the principle that the state holds the tidelands and navigable waters of the state in trust for all the people. Plans for public improvements made to further the public trust (traditionally for com-



LARS FAHLBERG

merce, navigation, or fishing) have commonly been approved by courts in the face of claims by beachfront property owners that the state's action would diminish their property's value. While California has developed the public trust doctrine to a far greater extent than almost any other state, other states with a significant body of public trust law include New Jersey, Florida, Massachusetts, Wisconsin, Maryland, and Mississippi.

In 1967, in *Joslin v. Marin Municipal Water District*, the California Supreme Court ruled

Cobbles don't invite sunbathing.

CITY OF OCEANSIDE

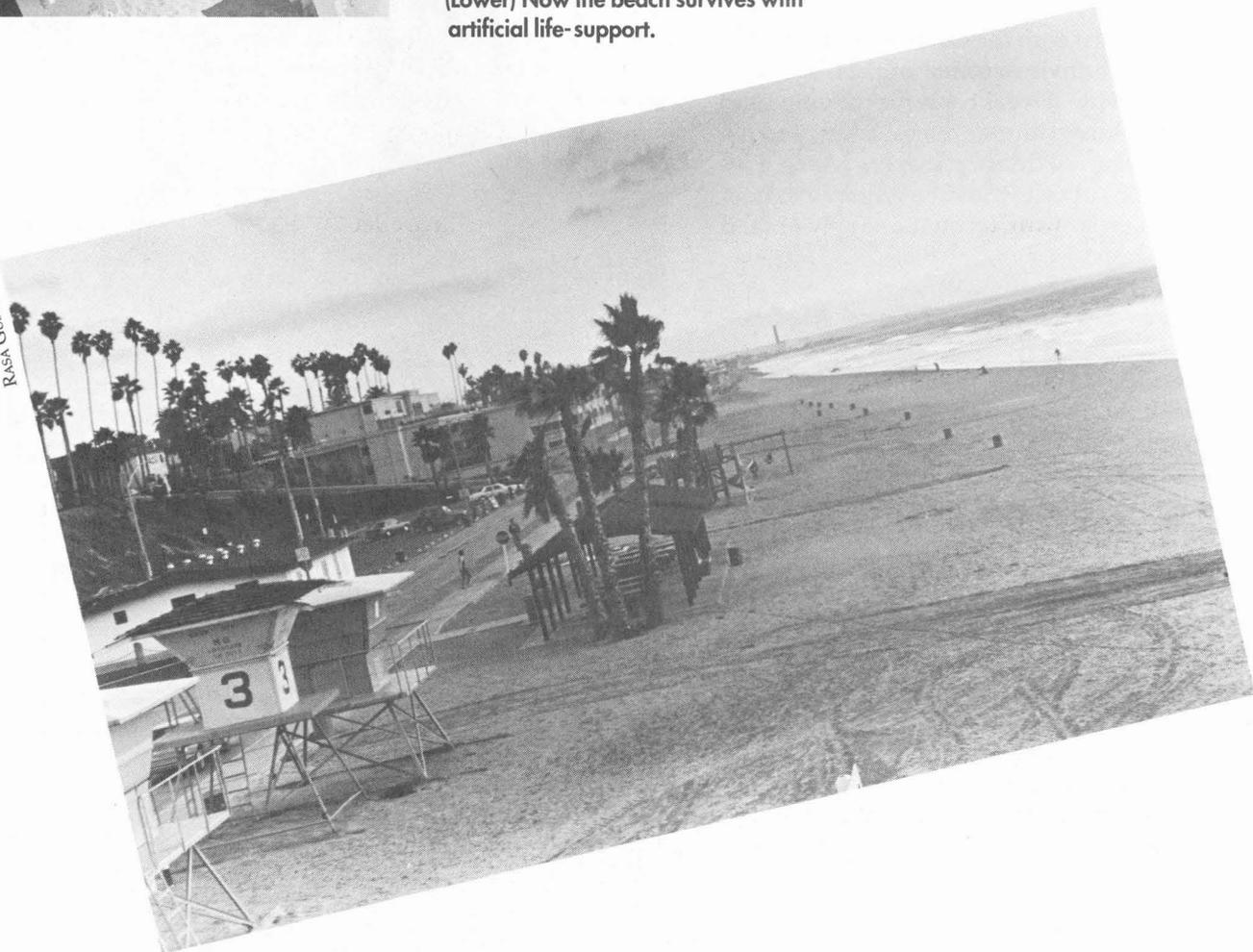


CITY OF OCEANSIDE



(Left) Oceanside Beach in 1941, before construction of Camp Pendleton Harbor.
(Above) Oceanside Beach, 1976.
(Lower) Now the beach survives with artificial life-support.

RASA GUSTAITIS



that a downstream landowner has no right, as against a city, to the continued flow of sand and gravel in suspension in the waters of the stream. The plaintiffs' rock and gravel business depended upon sand and rock being carried downstream by the Nicasio Creek and deposited upon their property. The city built a dam in 1962, reducing the flow of water and thus impeding the replenishment of gravel and sand. The Court rejected plaintiffs' claim based on California's longstanding riparian rights doctrine (set forth in the California Constitution at Article XIV, Section 3), which declares that:

- The right to the use of flowing water is limited to the amount of water which is reasonably required for the beneficial use to be served.
- This right does not extend to the waste of water.
- This right does not extend to the unreasonable use or an unreasonable method of use, or an unreasonable method of diversion of the water.
- These riparian rights apply only to as much of the flow as is required or used consistently with the particular beneficial use.

In *Joslin*, the Court held, as a matter of law, that the use of the creek for the transport of sand, gravel, and rock on plaintiffs' property was an unreasonable use.

In this and other cases, California courts refused to conclude that there was any right to continued sand build-up on a particular piece of property. However, all these cases involved private parties complaining that the actions of a public agency diminished the accretion of sand to their property. The courts decided in favor of the public agency—the asserted public benefit of the traditional public trust projects far outweighed the private benefit incidentally lost by constructing a project. More recent cases, however, indicate that the courts may now be more favorably disposed toward demands for the protection of beaches.

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In 1985, in *Whaler's Village Club v. California Coastal Comm.*, the Court of Appeal, affirming the public trust doctrine, held that a permit to construct a revetment to protect private homes fronting the beach could be granted on condition that the homeowners dedicated some of their land to public access. The court reasoned that there was sufficient evidence that seawalls and revetments tend to cause sand loss from nearby beach areas, even if they protect immediate structures, and that the cumulative effect of revetments along the California coast impeded public access to and along state tide and submerged lands. It concluded that the state could reasonably demand that property owners compensate the public by providing additional access.

Now we need to pick up where *Whaler's Village Club* left off. California's coastal beaches are mostly public, used for public benefit. Beach erosion threatens the fiscal well-being of entire communities by, for example, causing the loss of tourist revenues. While in *Miramar* or *Joslin* only individual interests were affected, depriving coastline beaches of sand needed to replenish them will result in an injury to the interests of the public at large. In the larger picture, the continued supply of sand to the beaches confers a significant public benefit, which is difficult, if not impossible, to quantify.

Some pocket beaches, such as La Jolla Cove, stay sandy while other beaches starve.

Federal Law

One question that had historically caused great confusion was whether lawsuits concerning riparian or littoral rights presented issues of exclusively state law, or whether federal law was determinative. This issue was eventually resolved by the U.S. Supreme Court in 1977 in a case involving sand rights, *State Land Board v. Corvallis Sand and Gravel*, and reaffirmed this year in *Phillips Petroleum*. The *Corvallis* lawsuit began when the state of Oregon sued the Corvallis Sand and Gravel

The Court examined the venerable case of *Pollard's Lessee v. Hagen*, which established the principle that:

[T]he shores of navigable waters, and the soils under them, were not granted by the Constitution of the United States, but were reserved to the states respectively.

In *Corvallis*, the Court held that because of the doctrine in *Pollard's Lessee*, states are free to choose their own legal principles to resolve property disputes relating to land under riverbeds. The U.S. Supreme Court sent the case back to the Oregon Supreme Court. The State Supreme Court held that the state of Oregon had title to the beds of all navigable rivers within the state, which title could not be transferred to any private party. Therefore, Corvallis Sand could not continue to dredge the Willamette River and would be required to pay damages for the sand that it had removed.

In *Phillips Petroleum Co. v. Mississippi*, the Supreme Court extended the ruling in *Corvallis*, by holding that under the public trust doctrine, the states hold title to all lands under waters influenced by the tides. Thus, states have absolute title to the beds of all waters influenced by the tides as well as all navigable fresh waters within their boundaries, which title cannot be defeated even by an act of Congress.

In *Phillips Petroleum*, the Supreme Court strongly reaffirmed the public trust doctrine, holding it applied to a non-navigable bayou and small drainage streams several miles north of the coastline. The Court reasoned that there is no difference in kind between these waters, since both types of waters are connected to the sea and share those geographical, chemical, and environmental qualities that make lands beneath tidal waters unique. The fact that record title had been privately held since before statehood (by Spanish land grants) and that the title holder had paid taxes on the land, did not divest the state of its sovereign ownership because under state law the state's ownership could

LARS FAHLBERG



**At low tide,
you can still
walk on
sand along
Leucadia
Beach.**

Co. in an attempt to stop the company from dredging sand from certain lands beneath the Willamette River. The company had been digging in the disputed part of the riverbed for 40 to 50 years under a federal patent, but without a lease from the state. This case, like many other cases involving the continued appropriation of sand by a private party, was filed by the state, which, in a more environmentally enlightened period, repented of its previous generosity in allowing the company to remove this sand from the overall littoral cell.

not be lost by adverse possession, delay, or any other equitable doctrine.

Public Trust Doctrine

The public trust doctrine traces its lineage to ancient Roman law. The Institutes of Justinian established that certain types of property were common to all the people and could not be privately owned. These included running waters in the sea and the land beneath them. "[T]he shores are not understood to be property of any man, but are compared to the sea itself, and to the sand or ground which is under the sea."

Historically, California and other states have recognized the public trust doctrine. In one early, seminal case, *People v. California Fish Company*, the Supreme Court of California held in 1913 that unless a statute authorizing the conveyance of tidelands for private use explicitly does so clear of the public interest, the grantees do not acquire absolute title. The state retains the right to interfere for public trust purposes, without paying compensation.

In a 1971 public trust case, *Marks v. Whitney*, the California Supreme Court, perhaps in response to the growing environmental movement, discussed the flexibility of the public trust doctrine in a case that actually concerned a boundary dispute between two private property owners on a bay in Marin County. The Court held that the public trust extends beyond the traditional purposes of navigation, commerce, and fisheries to the protection of environmental and recreation values.

The doctrine's application has been ex-

Sand Rights and Beaches

Sand rights are at issue in the controversy over the Monterey Sand Company's activities in Monterey Bay. The firm has been extracting sand from the surf zone for 40 years, selling it for industrial uses that range from sandblasting to water filtration to foundry casting to water-well packing. Its 20-year lease from the State Lands Commission expired at the end of 1988, but it provides for two 10-year renewals subject to reasonable terms and conditions.

*Under terms of the lease, the firm can take up to 150,000 cubic yards a year from two sites in Sand City and Marina. That the company has a "vested right" to continue mining under terms of the lease, without a permit from the California Coastal Commission, has been affirmed by the California Court of Appeal for the Third District in *Monterey Sand Company v. California Coastal Commission* (1987). Opponents to lease renewal have pointed to studies showing that the mining has led to beach erosion in Monterey Bay. Further environmental review appears certain.*

Monterey Sand has been the last sand miner in the California surf zone. Other operations continue in the San Luis Rey River and in dunes in Guadalupe, Marina, and San Juan Capistrano. Inland sites are near Los Angeles—in Corona and the Simi Valley.

tended in California and elsewhere beyond waters influenced by the tides to all navigable lakes and streams.

Protecting Water-Based Resources

California's complex system of water law evolved from the state's colorful history, from a time when water became more important than gold. In 1983, the California Supreme Court overlaid water law with the public trust doctrine in *National Audubon Society v. Superior Court*. This case arose out of a long-standing dispute over the appropriation of water by the Los Angeles Department of Water and Power from streams feeding Mono Lake.

After tracing the history of water rights and the evolution of the public trust doctrine, the Court held that the diversion of water from Mono Lake to "thirsty" Los Angeles could be evaluated on the basis of the public trust doctrine, independent of

Continued on Page 36

Circling San

FROM RIDGE TOPS AND WATER'S EDGE, TWO CONCENTRIC TRAILS WILL OFFER

Imagine being able to walk or bike along the water all around San Francisco Bay, or being able to hike around it, ridge to ridge. It may be possible before too long. Impressive progress is being made toward the creation of two linked concentric trails—

a regional network that may eventually stretch 1,000 miles, connecting ridge tops, waterfronts, and natural areas.

The two separate but related trail projects bring together the efforts of many people and communities to increase enjoyable public access to their waterfronts and ridge tops.

They will stitch together patches of the fragmented landscape, allowing inhabitants of the region to experience it as a whole.

The Association of Bay Area Governments (ABAG) is coordinating work by local jurisdictions and nonprofit organizations to create the Bay Trail, a 350-mile path as close to the edge of the Bay as possible. It will be "a string of pearls" connecting gems scattered along waterfronts—parks, natural and historic areas, view sites, and visitor-serving business areas, according to ABAG's John Steere.

Meanwhile, the Greenbelt Alliance (formerly People for Open Space), a San Francisco nonprofit organization, is managing a mostly volunteer effort to build the 450-mile Ridge Trail. Though started after the Bay Trail, this project has progressed rapidly, mostly because more than 60 percent of the proposed right-of-way is publicly owned.

The two trails will be connected to each other and also to the Coast Trail. "They will not only link publicly owned open space, they will tie Bay area communities together," says Barbara Rice, director of the Ridge Trail project at the Greenbelt Alliance.

"The Bay defines the region, so we're providing the best form of access," said Susan Phillips, coordinator of the trail project at ABAG. "From the shore you can hear the water, you can see the Bay and see how close various cities are. From Mountain View Shoreline Park [in the South Bay] you can see Coyote Hills [in the East Bay]. You have a sense of community." From the ridge tops, the area's geography will be even more clearly visible.

The Trail Begins

The creative spark for the Bay Trail came from State Senator Bill Lockyer of Hayward. In late 1986, during the autumn legislative break, he was having lunch with a local editor, Dave Halvorsen, in a waterfront restaurant. The end-of-session frenzy had ended, and he was in a reflective mood, ready to think about issues for the following year. The

JIM MILTON



Francisco Bay

MYRIAD VIEWS OF THE BAY'S NATURAL AREAS

BY RICHARD RETECKI

conversation turned toward Bay access, he recalls.

He turned to his companion: "Let me try this idea out on you. What would you think if we tried to develop a pedestrian and bicycle path around the Bay with access to the shoreline?" Halvorsen applauded the idea and urged the senator to pursue it.

"So I got my staff working on it. The outcome was SB 100," Lockyer said. The bill defined the parameters of the planning process, designated ABAG as the lead agency, provided \$300,000 for planning, and set the date of July 1, 1989, for submittal of the plan to the Legislature. It also set guidelines on how to proceed.

To strengthen his approach and provide a cohesive political front in Sacramento, Sen. Lockyer solicited and achieved co-authorship from all Bay area legislators. Most signed up right away. A few checked first with environmental or farmer/rancher constituents. "During that process, there were numerous concerns that refined the bill, with the principal one being that we'd write the very best protection measures that we could for wetlands. When that was worked out, everyone came aboard," Lockyer said. The bill that passed the Legislature stated specifically that there should be no adverse impacts on wetlands.

Building the Bay Trail is a matter of gathering existing elements, making creative use of varied resources, and supplementing local efforts with appropriately directed state aid. Existing trails are being fitted into the

system through the efforts of various state and local agencies. New sections are being built. Many groups and entities will have to cooperate to bring the project to completion.

As one of the primary agencies involved, the Coastal Conservancy is playing a major role. Through a close working relationship with ABAG, it has been implementing vital links of the network (the San Leandro Channel Bridge and the Pinole Shoreline Trail, for example) even while the plan was being prepared for the Legislature.

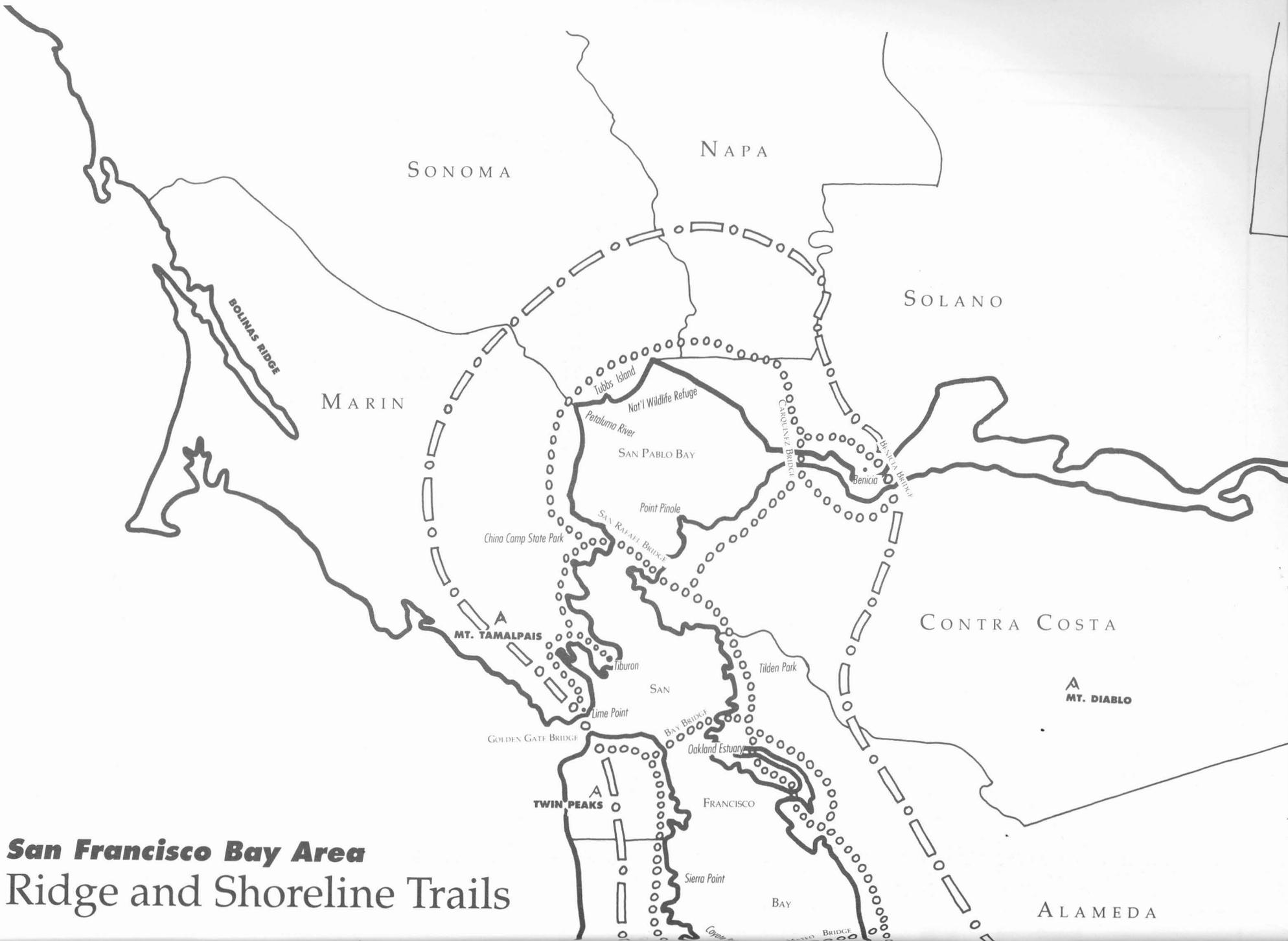


JIM MILTON

Linking the Ridge Tops

The Ridge Trail project, meanwhile, has been taking shape without any legislative mandate, growing almost spontaneously from a confluence of citizen and public agency interest.

It was sparked by a meeting called by the Greenbelt Alliance in May 1987, in an effort to persuade the San Francisco Water Department to open some of its lands to public access, as the Marin and East Bay Municipal Utilities districts had done. Of special con-

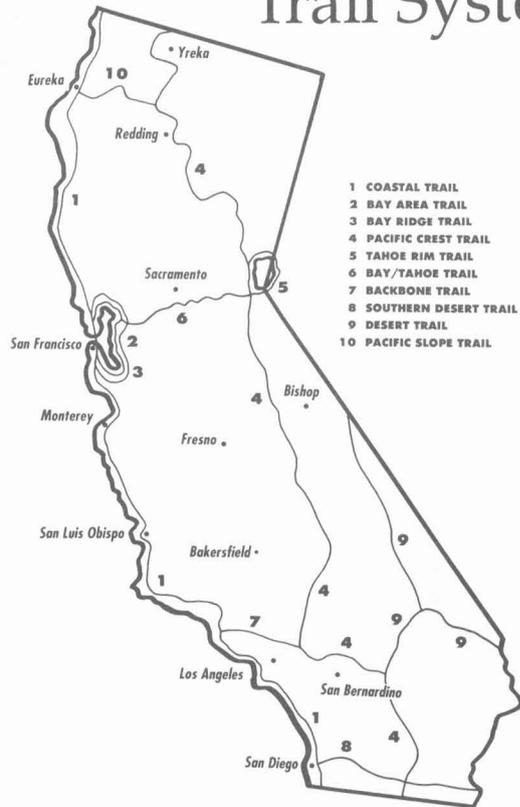


San Francisco Bay Area
Ridge and Shoreline Trails

0000000 **SHORELINE TRAIL**

□ □ □ □ **RIDGE TRAIL**

California Trail System



- 1 COASTAL TRAIL
- 2 BAY AREA TRAIL
- 3 BAY RIDGE TRAIL
- 4 PACIFIC CREST TRAIL
- 5 TAHOE RIM TRAIL
- 6 BAY/TAHOE TRAIL
- 7 BACKBONE TRAIL
- 8 SOUTHERN DESERT TRAIL
- 9 DESERT TRAIL
- 10 PACIFIC SLOPE TRAIL



cern was land at the base of the new Pleasanton Ridge Regional Park, which the San Francisco Public Utilities District was negotiating to lease to a private developer; the Little

Lime Point

A visit to Lime Point, at the foot of the Marin County pillar of the Golden Gate Bridge, is an experience of contrasts. The bridge, which looks like a toy from my front porch in Berkeley, looms above and, when seen from this angle, seems far too immense to have been made by man. It rises in the middle of the span, but seems to curve horizontally too: is this an optical illusion? The rumble and crash of cars crossing so far above adds to the unearthly effect. At this spot, where the (well-

marked) Coastal Trail meets the (unmarked) Bay Trail, tiny Lime Point Light blinks; out of the fog that lies on the Bay, even on this warm December day, plows an oil tanker. Like the bridge it's fast approaching, the tanker seems far beyond human scale, dwarfing the sailboats that get in its way. As this monster passes Alcatraz, its name glides into view: Exxon Baytown. I can't believe so huge a craft can fit under the bridge, so we race along the water's-edge path to see. But it beats us there, and of course

slides through, out to the blue Pacific. We wave goodbye and turn back to face the sailboats, the sea gulls, and a Sunday on the shores of our Bay.



“Others heard about the meeting and wanted to participate. So our guest list grew to about 40,” including representatives of agencies from five counties and several counties’ supervisors. “Then Brian O’Neill [general superintendent of the Golden Gate National Recreation Area] stood up and said: ‘We got together, let’s keep meeting.’”

O’Neill pointed out that the President’s Council on Americans Outdoors had just issued its report, urging that greenbelts around cities be more connective and wider. He mentioned that William Penn Mott Jr., director of the National Park Service, envisioned a trail connecting public lands when he was general manager of East Bay Regional Parks in the 1960s.

In November 1987, the 50-member Ridge Trail Council was formed, with half its representatives drawn from agencies and half from citizens groups. The David and Lucile Packard Foundation provided a \$40,000 startup planning grant that was followed, in fiscal 1989, with \$120,000 from the National Park Service Rivers and Trails Conservation Assistance Program. Planning groups formed in each Bay county. In August 1988, after hundreds of volunteers walked sections of proposed trail route and mapped the alignment of public lands, the Ridge Trail Council endorsed the corridor plan. Implementation will be up

Yosemite area adjacent to the Sunol Regional Wilderness; and land between Sunol and Ridgeland parks, both part of the East Bay Regional Park District, said Mark Evanoff, of the Alliance. The hope was to see the water department’s land opened to the public, connecting Sunol and Pleasanton Ridge parks.

to the council members. “Each jurisdiction has ways of funding trails,” said Rice. She believes that the Ridge Trail can become a national model, in keeping with the President’s Council recommendation. It can bring public attention to greenbelt areas, encourage their beneficial use, and thereby also lead to better stewardship.

The Era of Trails

The 1980s are emerging as the decade of trails, not only in California, but also around the nation. Three decades after the massive federal freeway construction program, states are engaged in a very different type of development. They are carving long-distance footpaths and bicycle trails, and even some equestrian trails, that will give people access to the landscape that lies between and beyond the high-speed roads. Ohio is building the 1,000-mile Buckeye Trail, a loop that will take hikers around the state. Iowa has completed the conversion of roughly 300 miles of unused and abandoned railroad rights-of-way to pedestrian trails. Florida is working on 25- to 40-mile segments of the Florida Scenic Trail that will become part of the National Scenic Trails Program.

In Michigan, the North Country Trail, which is still mostly in the planning stage, will enter the southern peninsula near the Ohio/Indiana border and progress north and west across the state's upper peninsula, through Wisconsin, Minnesota, and then west across North Dakota, ending near Garrison Dam and Lake Sakakawea Reservoir in the west-central part of the state. In the Southwest, the Desert/Dominquez Trail will pass through some of the most spectacular terrain in this nation, linking Utah, Colorado, New Mexico, and Arizona. There is a plan for a trail on both sides of the Columbia River basin in Oregon. And there are more.

In California, the Bay trail projects will be part of a growing statewide trail network. The Pacific Crest Trail, which travels from Oregon to Mexico along the highest mountain ridges, is 98 percent complete. The proposed Desert Trail, which includes other states, runs through Death Valley and then splits into two branches, one heading southeast through the Providence Mountains to enter Arizona near Needles, while the other heads southwest, merging with the Pacific Crest Trail at Joshua Tree National Monu-

ment. A trail around Mount Shasta is in the works, with the U.S. Forest Service taking the lead. And then there is the Coastal Trail, which is to traverse 15 coastal counties.

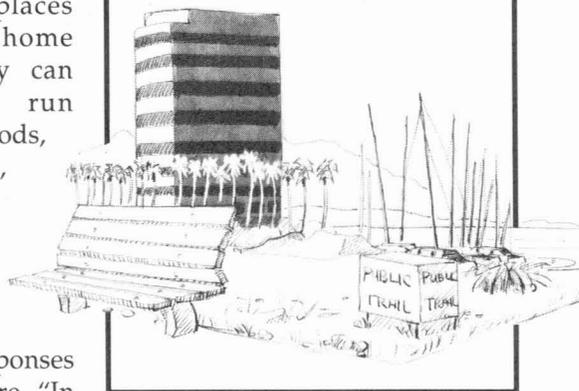
In the Lake Tahoe basin, work is underway on a Tahoe Rim Trail that will enable hikers to circumambulate the basin and continue, if they wish, on the Pacific Crest Trail. There is a proposal to explore a possible link between the Bay area and the Tahoe trails along the American and Sacramento rivers, and parallel to Highway 50. In the northern counties of Humboldt and Trinity, consideration is being given to a proposed trail through the Trinity Alps and Siskiyou to connect with the Pacific Crest Trail.

Some of these trails probably will follow the routes of Native Americans and early European explorers, for their routes often ran along the natural contours of the land.

Why all these projects—and why now? Stuart Macdonald, trails coordinator for the Colorado State Division of Parks and Outdoor Recreation, says many people now seek to restore to their daily lives an experience of active recreation in a natural setting. Instead of driving long distances to mountains or beaches, many look for places close to home where they can walk or run through woods, hear birds, see trees. Trails and riverside greenways are two responses to that desire. "In

Sierra Point

The Sierra Point exit off southbound Bayshore Freeway leads into the Brisbane Marina and about a mile of waterfront trail.

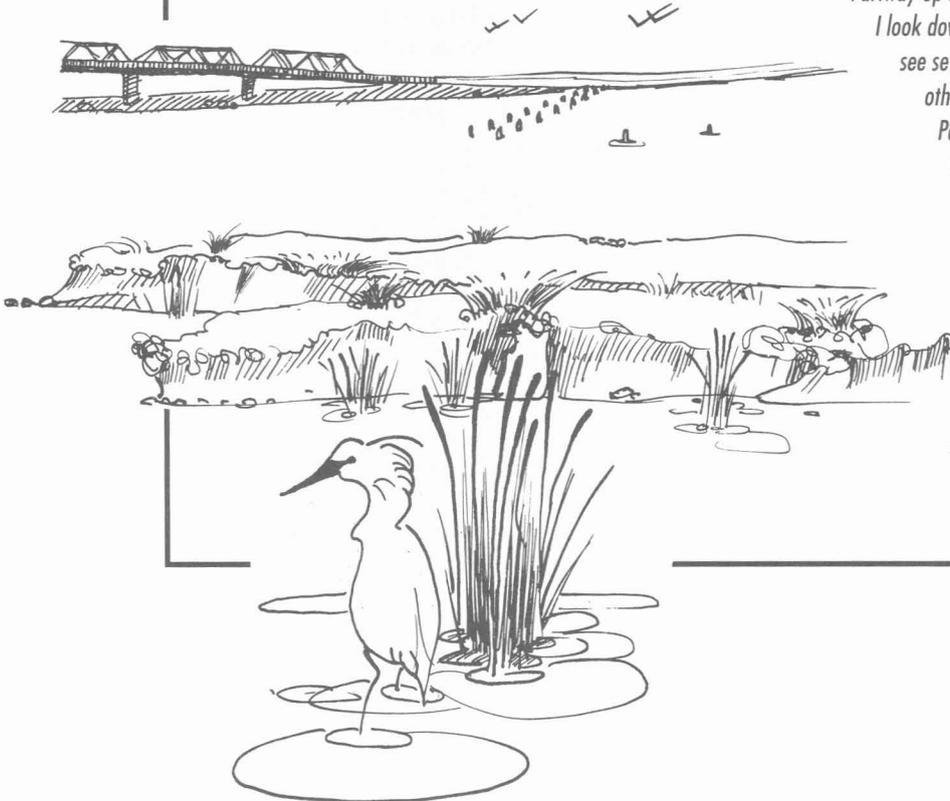


Dumbarton Bridge

In front of the San Francisco Bay Wildlife Refuge Visitor Center, I pick up the bike trail heading for the bridge. The round trip to Palo Alto's shoreline will take only 40 minutes, but part of that ride, over the bridge, will be harrowing. At first the path runs along a road parallel to Highway 84, separated from it by a chain-link fence. To the south I see people on the wooden walkways of the Tidelands Trail, part of the Refuge Center's self-guided tour through the salt marshes. It's late autumn and the marshes are populated by Snowy egrets, Northern harriers, kildeer, and sandpipers, as well as the familiar ducks and gulls. I can faintly hear their calls over the roar of bridge traffic. The smell of roadside wild anise mingles with marsh smells and heavy car exhaust, an assault on my nose. At the foot of the bridge, the bike path cuts through the fence. Suddenly I am terrifyingly close to automobile traffic rushing by at 60 miles per hour, separated from it by only a narrow concrete barrier, about four feet high and one foot wide on top. My bike wobbles violently each time a car whizzes by. One of them honks, nearly startling me off my bike. My nose and eyes fill with grit and exhaust despite the breeze off the water.

Partway up the incline of the bridge, I look down at a public pier and see several people fishing, others walking. From the Palo Alto shore, a matching pier juts out. It looks much friendlier down there.

On the way back to the car, I stop at the Wildlife Refuge Center and find a bench. The setting sun reflects off marsh waters.



Colorado I can count 40 communities that have some sort of greenway project that's giving the river back to the people," he said. Many greenways also include trails.

As to why now, "People realize they have to start now or it will be too late," said Evanoff. "If we wait, development will occur across trail areas." In San Diego, for instance, it probably would now be impossible to connect canyons with a trail, he said, because of extensive development.

"Trails are easy to use," said Susan Phillips. "You don't have to be physically fit. You can cycle, walk, jog, rollerskate. It's great for all ages, and it's not intimidating to go on a trail.

"It's also a nice way to get from one place to another without driving—and you don't have to provide parking. There is a surprising number of avid bicyclists who make round trips daily that would be daunting for someone else. We are also trying to connect the Bay Trail with bike routes."

Might there not be conflict between bicycles and strollers? "Sure. There already is. We've done surveys to see how different communities resolve that," said Phillips. Palo Alto has avoided the problem along its Baylands Trail by providing a separate, paved eight-foot bike path on the street and a foot-path off the street. That's one option. "There is a certain process to beware of: first you make a path, then you widen the path, then you paint a stripe down the middle and you have a freeway for bicycles," said Phillips.

With good planning, that issue should be resolvable. So should the issue of dogs. In some cases, they will be barred from trails to prevent them from going to fetch in the middle of a marsh, according to Phillips. The Bay Trail will increase access to many different natural and cultural environments and will open new perspectives on the region. It will allow hikers or bikers to enjoy views that are now either unavailable to the public or can only be glimpsed from a car window—to look across the water, across marshes, and

up into the hills—and to get a fresh understanding of local geography.

This trail will wind through places that are now little known but have interesting histories and character—Alviso near San Jose, for instance, which once was a fishing port, but silted in and is now recognized as a historic area. It may provide incentives for waterfront improvement projects and for wetland restoration, for which "the possibilities are particularly evident along some dikes or levees on which the trail would pass," according to ABAG's Steere.

The Ridge Trail, meanwhile, will take people up above it all, to look down upon scenes of their comings and goings and, perhaps, develop a loftier view of life. Hikers will be able to enjoy views from Twin Peaks, the East Bay hills, Mission Peak in Fremont, Mount Tamalpais and Bolinas Ridge, and the Sonoma Mountains.

Progress on both projects is necessarily piecemeal, coming when opportunity presents itself. When the Coastal Conservancy allocated \$1.5 million for 18 access projects in the Bay area in 1988, these included land with trail access that fit into the proposed trail right-of-way. Since then, the agency has approved three other projects and has begun to develop six more.

A one-mile section in the city of Richmond and three miles at East Fort Baker were recently added with the Conservancy's help. The Richmond portion, at Point Isabel, will also include park and recreational fishing improvements. It offers spectacular views of Marin County and Mount Tamalpais. The East Fort Baker section, a cooperative funding effort with the Golden Gate National Park Association and Marin Community



Foundation, will link Bay and coastal trails at the Golden Gate. The city of Alameda recently completed 1.3 miles of its Bayfarm Island Trail along an old landfill. The city of San Mateo has built trail and access improvements at Coyote Point.

Meanwhile, Sen. Lockyer has been staying on the case, nudging the process along. "You just have to constantly keep applying new energy to it," he said. "One thing I do is to follow through in a specific way to solve problems or break through inertia. We will focus on areas where there are gaps in the trail."

The most problematic gap is the East Bay crossing. As of now there is no way to cross the Carquinez Straits between Benicia and Martinez. Ferry service or a van shuttle for bicycles are being considered. The Dumbarton Bridge includes a bike lane, though it may be scary for many bikers. Regional Measure 1, passed last November, will raise bridge tolls and provide some funds for bicycle and pedestrian access to Bay bridges.

Sen. Lockyer knows that access to the bridges is essential for the trail to work. He plans to introduce a bill directing the California Department of Transportation to provide the missing ingredient. "I'm beginning to get the support of the most relevant people to co-author it with me," the senator said. "The bridge toll measure includes a lot of places that the money could go, but we specifically wrote into it the bicycle access," he said. "There are still issues of matching funds for construction, and there are operation and maintenance concerns, insurance and liability. Hopefully the [Bay Trail] plan will focus on those."

Other problem areas include Moffett Field, where a recently relocated ammunition storage dump precludes a path on a levee, and the trail will probably have to turn inland; and areas in the North and the East Bay, where trail routes are being considered around existing railway routes. There is no precedent in this area for trails next to active

rail lines, though some do exist in Europe, usually separated by a fence. Such fenced lanes, if wide enough, might also be useful for rail service vehicles.

Three decades ago, when the nation hurried to build many-laned freeways for big automobiles, few people would have imagined that trail-building would so catch the national fancy. But more and more citizens are becoming involved.

Trail building is a cooperative effort. Ambitious trail projects, which necessarily cut across several jurisdictions, require a functioning democratic process at various levels of government and public interest. The trail process, then, becomes a path of personal experience that can affirm values that have been undermined by many recent trends and events.

By their nature, trails are democratic. Anyone can travel on them, usually at no cost. And when people pass each other, they acknowledge each other's presence and right to be there. The two concentric trails around the Bay will come to represent different experiences for everyone who travels along them. The entire system, and each separate trail, will offer its own harmonies and rhythms, an opportunity to step beyond oneself and one's daily life, and to rediscover a kind of prosperity in common that we thought we, as a people, had lost. □

Richard Retecki is a project manager for the Conservancy's Access and Nonprofit programs. Cursed with a 27-inch inseam, Retecki says he limits his hikes to three miles at a time—"Just do not invite me on a long hike unless a trouble-free vehicle is at my disposal." He vows to put all his energies instead into realizing the Bay trails.

Kristi Farnham contributed descriptions of Sierra Point, the Dumbarton Bridge, and Alviso, and Avril Angevine visited Lime Point.

Alviso

At the southernmost end of San Francisco Bay, I pull into the Alviso Marina parking lot and warm up for my run. The Bay stretches north in front of me—quickly lost in the haze. Nothing of the Dumbarton Bridge or the cities on the peninsula is visible. A few boats are stuck in thick, sticky mud. The marina has been closed for over a year.

Salsa sounds from a car across the mostly empty lot mingle with the screech of sea gulls overhead and the quacking of ducks to the east—from marsh land that is part of the San Francisco Bay National Wildlife Refuge. Very faintly from the east comes the hum of traffic on Highway 880.

The Alviso Slough trail begins just to the east of the marina and runs for about two miles on a levee parallel to railroad tracks along the Bay. Then it turns west into the salt marsh, finally looping back toward Alviso. The marsh waters are glassy, and the prevailing sound is that of birds calling. Numerous bike tread marks and footprints are dried into the hard-packed mud.

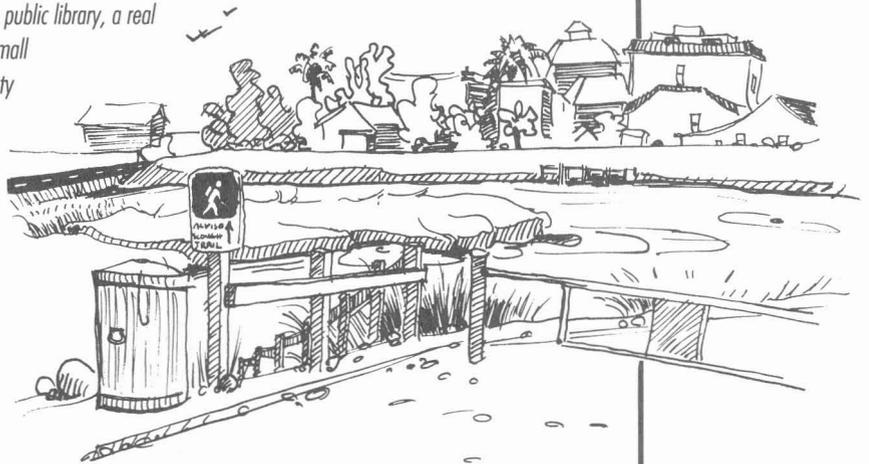
I meet a woman walking with a German shepherd, then an older English gentleman biking with his two grandchildren.

"We've just come from the lost village," he tells me. "That's what we like to call it. Actually, it's named 'Drawbridge.' In the '40s, there was a group of wooden cottages. The freight train would bring people there and drop them off for the weekend to duck hunt. It's not much more than a bunch of timbers now." The only legitimate way to visit Drawbridge is as part of a tour, offered by the Wildlife Refuge Center between March and October.

From just before where the trail veers west, I see the cluster of deserted buildings, some sinking sideways into the marsh. It is late afternoon now. The haze has begun to burn off. One jogger and two bikers pass me as I follow the trail back toward Alviso, a piece of early Bay area history. It was founded in 1883 and was one of the area's key ports before the turn of the century, when drainage silted up the port channel. The San Francisco-San Jose railroad bypassed the town, and its fortunes began to sink. Then, in the 1940s, even the town itself began to sink: due to continual ground water pumping to irrigate the area's orchards, the soil subsided, and Alviso dropped to four feet below sea level.

Though San Jose incorporated the community of some 2,000 souls 20 years ago, it continues to maintain a proud separate identity.

Today downtown Alviso is little more than a public library, a real estate office, a diner, a bait and tackle shop, a small market with post office attached, and a few empty old brick buildings. On the waterfront, a houseboat sits on dry land with flowerpots ringing the hull.

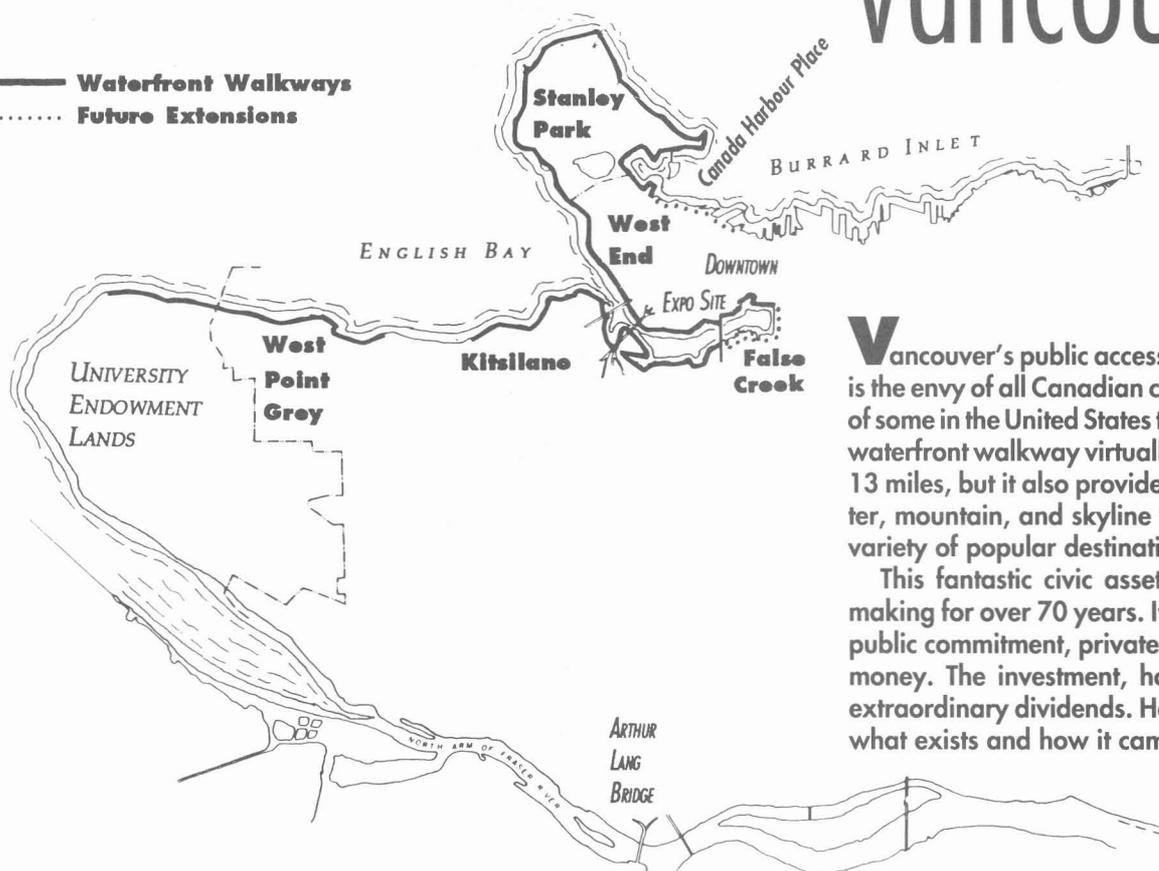


DRAWINGS BY KEN DOWNING

Waterfront Access

A Shoreline Path Grows in Vancouver

— Waterfront Walkways
..... Future Extensions



Vancouver's public access to the waterfront is the envy of all Canadian cities, and perhaps of some in the United States too. Not only is the waterfront walkway virtually continuous over 13 miles, but it also provides spectacular water, mountain, and skyline views and links a variety of popular destinations.

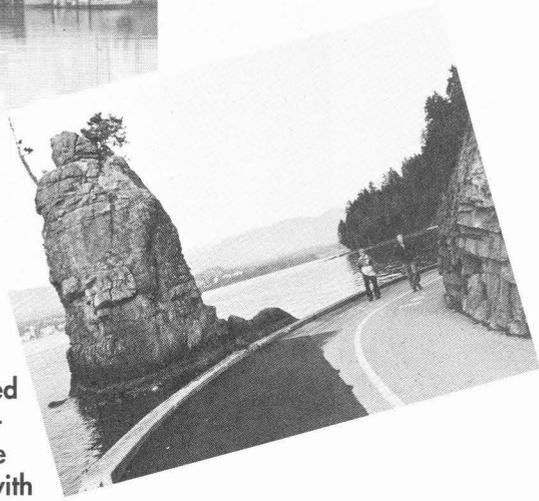
This fantastic civic asset has been in the making for over 70 years. It has taken vision, public commitment, private cooperation, and money. The investment, however, has paid extraordinary dividends. Here is a glimpse of what exists and how it came into being.

BY JEANNETTE HLAVACH



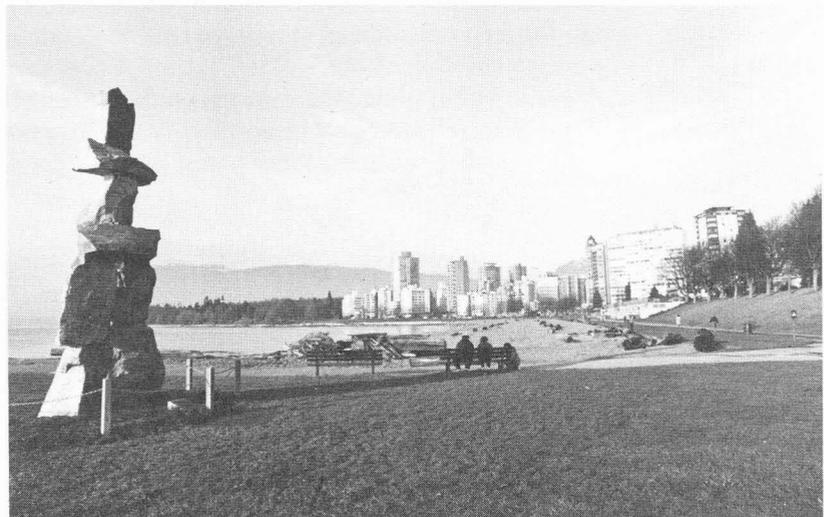
Stanley Park

In 1918, Stanley Park Superintendent W.S. Rawlings envisioned a "combined park and marine walk." The 5.5-mile seawall walkway and waterfront drive are now the best-known features of the 1,000-acre park. The seawall is built almost entirely of granite, with stone sets from street-car lines in the wall face. The walkway, completed in 1980, is mostly asphalt, with a white line to separate pedestrians and cyclists. Conflicts between walking and wheeling users increase on sunny summer Sundays.



West End

The high-rise apartment area here is edged by a strip of public beaches along English Bay. The walkway, a continuation of the Stanley Park sea walk, sometimes comes to the water's edge and sometimes runs behind a sandy beach. It draws mostly West End residents and tourists. Many city dwellers join the crowds during the annual Sea Festival, bathtub races, Polar Bear Swim, and other popular events.



PHOTOS COURTESY CITY OF VANCOUVER PLANNING DEPARTMENT

False Creek

For almost a century, False Creek was the center of Vancouver's industrial activity. In the 1960s, the city acquired 86 acres on the south shore and built a 1.5-mile walkway as part of a planned pedestrian-oriented residential community with maximum public access to the waterfront. The walkway varies in width between 6 and 40 feet and is surfaced in varied materials, including wooden boardwalk, quartzite tiles, and interlocking pavers of various colors. The area has restricted vehicular access, limited visitor parking, is hidden from the arterial access road, and offers only recreational activities.

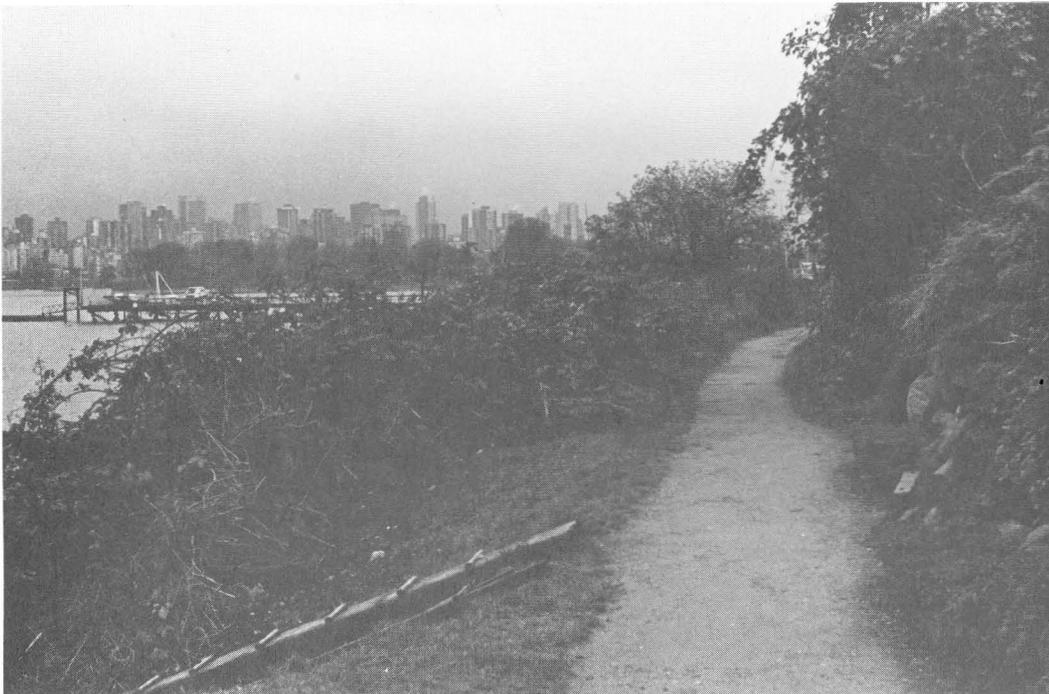
False Creek's north shore was the site of the World's Fair: Expo '86. Earlier, it had been railway land. Recently, the provincial government sold the 200-acre fair site to a private developer. Based on the commitment to provide a waterfront walkway on city-owned land on the south shore, the Vancouver City Council agreed to establish a matching policy for the north shore.

To be developed for residences and offices, the property must be rezoned. In Vancouver, as elsewhere, a landowner requesting rezoning may be asked to cooperate in achieving a public objective. In this case, the new owner put in a temporary walkway before completing the official development plan. He did so in exchange for

keeping some of the land created on bayfill for Expo. When the adjoining development is completed, this 1.2-mile walkway will vie for popularity with Stanley Park's.

Eventually, the walkway will surround False Creek. Few obstacles to its completion are foreseen—the city owns virtually all the land.





Kitsilano

Within view of downtown high-rises is the trendy Kitsilano neighborhood. Popular "Kits Beach" has benefited from the recent construction of an outdoor swimming pool at the water's edge. The waterfront walkway runs past the pool, on the water side. It also passes along an old rail right-of-way, where wild vegetation provides a sharp contrast with the urban skyline.

To the annoyance of many publicly minded people, a mile of waterfront walkway is missing in Kitsilano along "the Golden Mile," a stretch of rare privately owned waterfront land that is lined with expensive homes. Access is available at poorly marked road allowances. Steep stairways lead down to the water. Persistent souls will find a sheltered natural beach here.

West Point Grey

Like the West End, this area is also edged with public beaches, with a walkway behind them. With ample easy parking, West Point Grey is popular with families. A swamp shelters a wide variety of waterfowl (and one beaver!). A fishing pier juts into English Bay and is a popular crabbing spot. Although the city limits end at the University Lands, public access for the able-bodied continues. Walkers soon arrive at Wreck Beach, Vancouver's nude beach. Here, free enterprise flourishes, with roving vendors selling food and a wide variety of refreshments.

And We're Not Finished Yet

Another major piece is about to fall into place. Plans for the 70-acre Coal Harbour site downtown include—of course—a continuous waterfront promenade. All north-south streets are to be extended to meet it. Last fall, Mayor Gordon Campbell, in his successful campaign for reelection, pledged to continue to add to the system, "with public waterfront walks around the entire perimeter from Canada Harbour Place to the Arthur Laing Bridge by the year 2000."

What we have now will only get better. □

Jeannette Hlavach is a planner with the city of Vancouver Planning Department.

A Legal System to Protect the Shores of the Sea

Continued from Page 21

riparian rights or other water rights theories.

The Court noted that the most important facet of the public trust doctrine is the state's power and duty as the sovereign to exercise continuous supervision and control over the tidelands and navigable waters of the state and the lands underlying those waters. The state's responsibility for supervision continues despite previous contracts or transfer of property rights concerning the uses of the water in question or the land underlying the water. The state cannot abrogate the trust by merely authorizing a use that is inconsistent with the trust.

This critical holding of the Supreme Court of California means that no one can ever gain a vested right in continued unreasonable use of waters or lands underlying the waters of the state. While a property owner may have a vested right in the use of property subject to the public trust, no vested right can be asserted, despite the passage of long periods of time, to bar the recognition of the trust or of state action to carry out trust purposes. The U.S. Supreme Court's recent decision in *Phillips Petroleum* points out that a landowner cannot have a reasonable expectation of owning such lands.

Protecting Sand Replenishment

The *National Audubon Society v. Superior Court* decision indicates that the Court would not look unfavorably upon an argument that its analysis should be applied to the diversion of sand from coastal beaches. For example, the Court recognized that the public trust extends to non-navigable tributaries where extraction of waters harms public interest in navigable waters. It could similarly be argued that diversion of sand by action on a shoreline or a non-navigable stream is protected under the public trust doctrine because it damages the public interest in the tidelands.

The California Court also recognized that traditionally the public trust doctrine has been applied to only three uses—navigation, commerce, and fishing. In language crucial not only to any legal argument for sand rights, but also to any policy argument on the necessity of creating a system of sand rights, the Court stated:

The public uses to which tidelands are subject are sufficiently flexible to encompass changing public needs. In administering the trust the State is not burdened with an outmoded classification favoring one mode of utilization over another. There is a growing public recognition that one of the most important public uses of the tidelands—a use encompassed within the tidelands trust—is the preservation of those lands in their natural state, so that they may serve as ecological units for scientific study, as open space, and as environments which provide food and habitat for bird and marine life, and which favorably affect the scenery and climate of the area.

In the *Audubon* case, the plaintiffs were seeking to protect values other than those traditionally associated with the public trust. Specifically, they sought to protect the attributes of the resource itself—the lake's recreational and ecological values, the scenic views of the lake and its shores, the purity of the air, and the use of the lake for nesting and feeding by birds. The Court held that it was clear that the protection of environmental and recreational values were among the purposes of the public trust. Protection of beaches that serve not only recreational purposes, but also aid commerce, navigation, and fishing, clearly falls within traditional as well as recently expanded public trust purposes. Protection of the shoreline would also seem to be a proper trust purpose.

It logically follows that should sand rights be recognized as subject to the public trust, the courts would be free to reexamine any or all uses of state waters to assure that sand rights, as well as water rights, be protected.



J. Herb and Anne-Marie Garvie own and operate the Ocean Manor Apartment Hotel on Sunset Cliffs Boulevard in San Diego. In the early 1950s, the hotel's builder added to a low seawall that had been placed at the cliff base in the '30s; Mrs. Garvie's father soon raised the wall, filled behind it, and added sand, creating the perched beach seen here. It washed away every winter, so eventually the Garvies paved it. "We used to say there are sand areas here, but now we just say we're on the cliffs and the beaches are north of here," said Mr. Garvie. To both sides of the seawall there is severe erosion.

Sand mining along the coast and in the rivers leading to the coast, for example, might be considered an unreasonable use and be terminated.

Integrating Sand Rights

There are at least three potential legal avenues for integrating into the decision making process a recognition of a project's effect on beach erosion. First, the courts could recognize sand rights as an interest to be protected under the California Constitution by the public trust doctrine. Second, the state Legislature and Congress could mandate consideration of the effect of a project on sand supply. Third, public agencies could administratively recognize and deal with the problem.

Legislation can further sand rights. For example, consideration of a project's impact on the sand supply to the coast could be incorporated into the existing Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) processes, under NEPA

and CEQA (the United States and California environmental protection laws).

State guidelines could also be amended administratively to specify that where a project may affect the deposition of sand on the coastline, that project will normally be considered significant and therefore require the preparation of an EIR. The CEQA process would require measures to mitigate the project's effect on beach erosion unless there were substantial evidence of some overriding consideration.

Public agencies could, through regulation, impose the consideration of a project's effect on beach nourishment upon themselves. Cities, counties, and special districts (to a limited extent) have the ability to do this legislatively through their reserved police power, and many state and federal agencies may do so under their broad grant of statutory authority. For example, the Army Corps of Engineers has wide discretion to take measures to mitigate erosion damage caused by new or existing navigational structures and to investigate and reverse beach erosion.

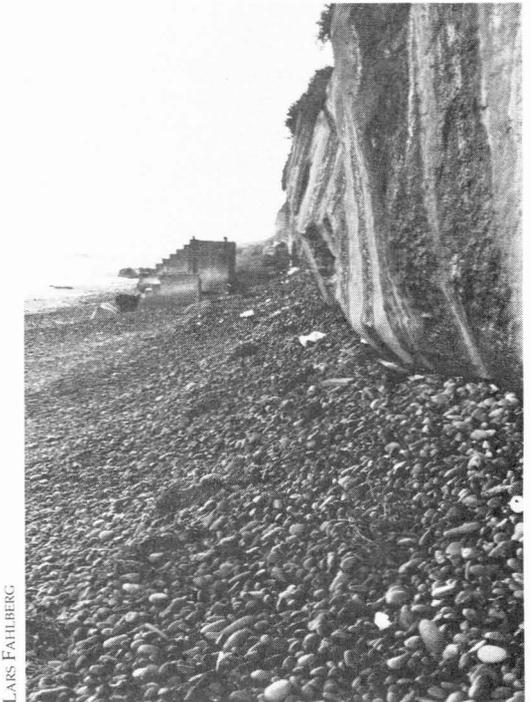
An example of an administrative approach to dealing with beach erosion is found in a 1984 decision of the Massachusetts Department of Environmental Quality Engineering (DEQE) approving the construction and maintenance of a revetment for ten years provided that the applicants agree to undertake a comprehensive beach renourishment program to ensure sufficient quality of downdrift sediment. The approval was also conditioned on the applicants, through a consultant, providing DEQE with annual reports summarizing the effects of the revetment and the beach renourishment program on adjacent or downdrift coastal banks or coastal beaches during the preceding year, and outlining the renourishment program for the following year. At the end of the ten-year period, the DEQE may extend the term for five years, order the revetment removed, modify any conditions respecting renourishment or reporting requirements, or make final the applicants' right to maintain the revetment subject to reasonable conditions.

Under existing statutory authority, the California Coastal Commission has conditioned its approval of the San Juan Creek project by requiring sand to be transported to a beach. However, the California Coastal Act only applies to decisions made within the coastal zone. Many large projects such as dams, which have major effects upon the delivery of sand to beaches, are constructed outside of the coastal zone and are thus beyond the jurisdiction of the Coastal Act.

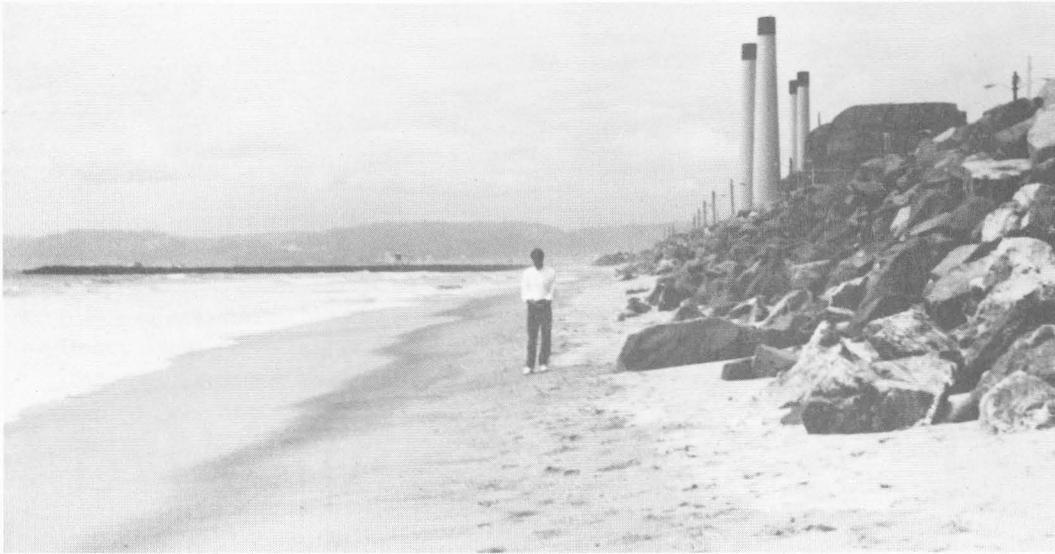
Public agencies could use their existing powers to fund erosion control projects. One way to obtain funding for beach stabilization projects—such as groins, breakwaters, artificial fill, artificial sea grass, and even transportation of sand trapped behind dams would be to form special assessment districts. A special assessment district could be formed that could possibly encompass the entire greater littoral cell. The greater littoral cell includes the entire watershed that feeds the beaches. Each person residing in a greater

littoral cell (and there are millions of residents within some cells) would only have to pay a few dollars per year in assessments to support the issuance of bonds providing for millions of dollars that could be spent on beach protection projects. Funding could also be obtained by imposing a "sand fee" on new development within the greater littoral cell that affects the supply of sand to the coast.

Thus, there are several approaches to institutionalizing a doctrine of sand rights. Obviously, there are distinct advantages to incorporating the concept of sand rights within the public trust doctrine. For example, because the public trust doctrine imposes a continuing duty of supervision upon the state, it would allow for a reappraisal of a permit to mine sand on beaches, which in hindsight appears to be mistaken. In addition, while the public trust doctrine cannot be invoked for private purposes, any party may raise the public trust in a lawsuit. Because, at least in California, the doctrine is derived from the Constitution, it would have to be considered



LARS FAHLBERG



GREG WOODSELL

(Upper) El Segundo Beach before replenishment, and (lower) during sand nourishment.

by all state and local agencies even when performing their mandated duties under state statutes. This would require the California Coastal Commission, for example, to consider the effect of its actions on sand supply even when it is performing its statutory mandate to protect existing structures from storm and wave damage. Above all, because there is an affirmative duty to continue to supervise any appropriation of water, the state retains the power to reconsider decisions, even when these decisions have been made after due consideration of the public trust. Finally, no individual can claim a vested right against the public trust; therefore claims of inverse condemnation would fail.

Less radical legislative and administrative actions are also readily available to help protect beaches from sand starvation.

Conclusion

It is not our intent that a doctrine of sand rights be used to halt development or improvements to the state's navigable waters. However, we firmly believe that careful consideration must be given to those proposed or existing projects that interfere with the delivery of large amounts of sand to our coastal beaches and, when new projects are approved, that measures should be taken to mitigate the damage to one of our nation's most important resources. □

Katherine E. Stone is the managing partner and Benjamin Kaufman is an associate in the Los Angeles office of Freilich, Stone, Leitner & Carlisle, a national law firm specializing in land-use and environmental law.

Exploring the Tijuana River Estuary

Life in the Front Yard

BY RASA GUSTAITIS

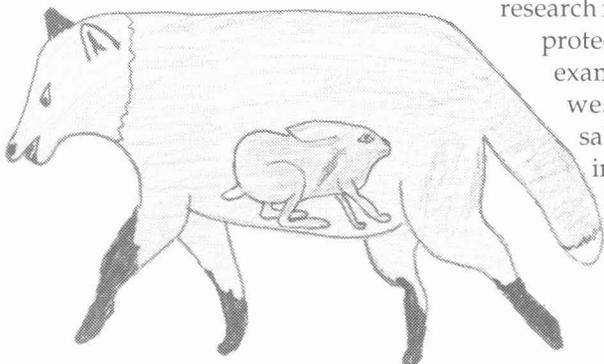
Resource agencies and nonprofit organizations offer a variety of programs, ranging from one-day workshops to in-depth seminars and field research opportunities, to help teachers use nearby natural landscapes as outdoor classrooms. Some have also prepared printed and audio-visual materials about specific places and different natural areas, often in both English and Spanish. At the Tijuana River National Estuarine Research Reserve, education coordinator Pat Flanagan helps teachers to introduce children to a unique national treasure.

part an unused resource" as far as schools were concerned, according to Dr. Lars Helgeson, science coordinator, San Diego County Office of Education. "Maybe an occasional teacher would go in, but kids were not getting any knowledge or sensitivity to this wetland area and the tremendous value it has," he said.

In 1986, the California State Department of Parks and Recreation, which manages the reserve, moved to amend that situation by hiring naturalist Pat Flanagan with a grant from the National Oceanographic and Atmospheric Administration (NOAA). Since then, teachers and children have been discovering a rich landscape where they had earlier seen only a scraggly stretch of undeveloped land. More than a hundred teachers took a one-day workshop with Flanagan last year to prepare to lead their classes into the Tijuana River Valley. Groups in schools and the community have seen a videotape on the estuary's ecology prepared by Flanagan with a grant from the Environmental License Plate

ERIC LEGGITT

The Tijuana River Estuary is a national research reserve, officially protected as the best example of a southwestern intertidal salt marsh remaining in the United States. But until recently, it was "for the most



The red fox ate a rabbit who ate a carrot. Sometimes, alas, the fox eats least terns, clapper rails, and their eggs.



Fund. The reserve's education program not only has promoted better use of a precious resource, it also has helped to build a constituency for its protection.

Flanagan has a long stride, a quick smile, wide blue eyes, and a voice that can speak firmly enough to be heard. She grew up in the San Gabriel Mountains and now spends a lot of time in wide open spaces, either here on the estuary or in the Anza Borrego Desert.

This morning she stands with field glasses around her neck at Fifth and Iris streets in Imperial Beach, waiting for a bus bringing 60 fourth- to sixth-graders from the Encanto Elementary School in San Diego. She knows they will be well prepared and full of questions.

The street corner where Flanagan waits is at the very edge of the reserve, where it stops at the fence around the Navy's Outlying Field, a training ground for helicopter pilots. Choppers clatter constantly overhead. To the west, the uplands stretch toward the ocean; to the south, the Tijuana bullring is visible on a rise. Off the sidewalk where Fifth and Iris join, a dirt path leads along the Navy fence toward the river.

Flanagan bases her work on the conviction that "people don't care about the environment until they love what's in their front yard." She therefore lives right off the reserve. From her tiny apartment three blocks away, she needs only to cross Imperial Beach Boulevard to be inside the reserve's northern border. She has walked in this sanctuary at almost any daylight hour, studying its life forms, scanning the horizon for some of the 340 species of birds that have been sighted here. She does not, however, walk there at night: "The night life is basically undocumented Mexicans."

The bus arrives and children pour out, shepherded by teachers and parents. For a moment they look up at the loud helicopters, then their eyes are drawn to the ground. They have been told this is not just a field trip, it is a field investigation. Teacher Janet

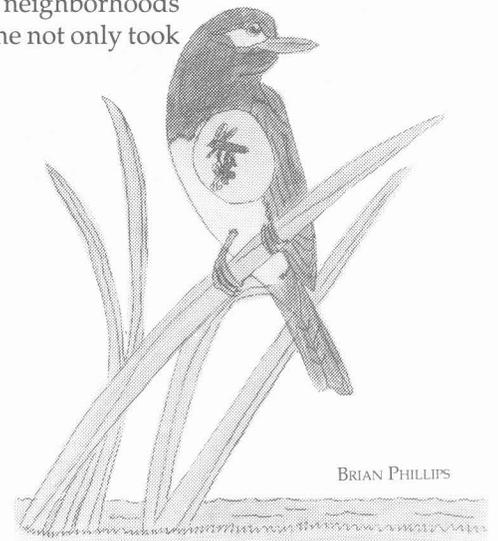
Posen, who shares Flanagan's dedication to learning what's underfoot and within range, has worked with them for days toward this trip. They will not need to ask, as one child on another field trip asked Flanagan: "How do you keep all these birds here? Do you clip their wings?"

Posen is a mentor teacher in charge of the special math-science-computer lab at Encanto, which is a "magnet" school: It offers an especially attractive curriculum designed to bring children from other neighborhoods into a low-income district. She not only took Flanagan's workshop, she also came out four times before bringing the first group of children. The last time, with Flanagan's help, she drew up a list for today's scavenger hunt, making sure that everything on that list could be found.

All the children carry copies of this list, plus a crib sheet on which they have jotted or drawn additional information about things they want to look for. They also carry laminated cards with pictures and descriptions of plants, animal tracks, birds, and insects. Now they scatter, hot on the quest.

"Why are there so many dead crabs here?" a boy wants to know, picking up a small exoskeleton. "Did they wander too far out of the water?" Children cluster around Flanagan

Northern portion of Tijuana River Estuary. Foreground: Seacoast Drive.

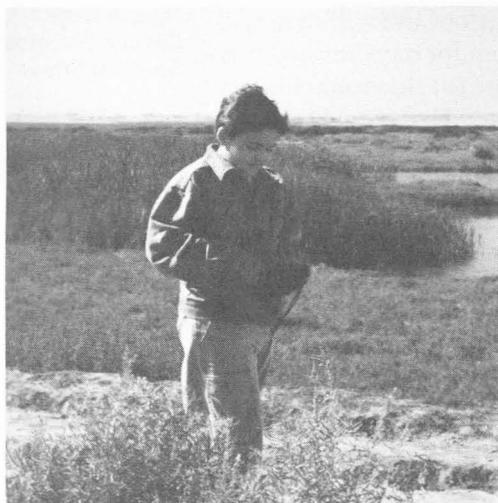


BRIAN PHILLIPS

The black phoebe ate a dragonfly.



RASA GUSTAITIS



(Upper) Encanto School children arrive at the reserve. (Lower) Some children prefer to explore alone.

to hear the answer.

"Are these crabs dead?" she asks.

"Yes," calls a child.

"Wrong! Look." She opens a shell and shows it to be empty. "Crabs shed their shells the way snakes shed their skins."

"Even their claws?" asks a boy, holding up a claw he found.

"Even the linings of their intestines. It's truly bizarre, but that's the way it is among arthropods." She drops the crab shell. The children know that nothing should be removed from here because everything has a place in the food chain.

To reserve manager Paul Jorgensen, a major benefit of the educational program is the protection it brings for the reserve. "We are the most urban of all the 18 national estuaries," he says. "About 2.5 million people live within 20 miles of us." Tijuana is the second largest city on the West Coast. San Diego County is one of California's fastest growing counties.

There is no barrier or transition zone between the wildlife sanctuary and the urban street scene. The domain of shore birds and

sea grasses begins at sidewalk's edge. On Seacoast Drive, which is built on dunes in the surf zone, houses stand on one side of the street, while on the other, blue herons and egrets walk in the slough.

But to fence and guard the reserve would be counterproductive, Jorgensen says: "A fence would be too disruptive." He prefers to place his bet on education, because he has seen that work. In the case of the Kendal-Frost Marsh on Mission Bay, residents of adjacent condominiums call the police if they see a canoe, for instance, where they know no canoe should go. He likes that. "We are developing a group of people who are very vigilant, and that's worth more than all the officers you can hire," he says. "One of the functions of education is to get a constituency in an area."

Official protection can be nothing more than a formality if neighbors of the reserve do not value the land in its natural state, if they allow their cats and dogs to hunt there, and if children ride their bikes there. Children who have studied the sanctuary, and parents who come along to help the teachers, are likely to be respectful. "You have to appreciate the outdoors and have a reverence for life first," said Jorgensen. "Then all the facts start to make sense."

For two and a half hours the children proceed south. Every discovery prompts a lesson. Scat. Who dropped it? Hair and bones in it. "It's either a dog that ate a rabbit or it's a coyote. You can write down coyote," says Flanagan. "Dog scat is made out of dog food—boring." Tracks. Whose? Dog? Too many toes. Raccoon? Too small. Not always do the laminated cards provide enough clues for the answer. Then Flanagan or Posen say they will have to look further in books that are back in the school lab. That is one of the best things about such an investigation—teacher does not always know, and students learn how to find out.

There are other kinds of tracks here too—tire marks and clothes—socks, shoes, trou-

sers, other items dropped by people coming across the river from Mexico. A state ranger recently remarked that while "to us this is a wildlife reserve, to the border patrol it's almost the DMZ." Flanagan once found a hand-drawn map, with bus routes carefully noted. She found several wallets containing laminated pictures of the Virgin Mary, a few snapshots, and some kind of ID. Like the animal tracks, these items told a story. To her, they meant that the wallets' owners had probably been robbed, that they were "scared to death, they trust in the Virgin Mary, and they're on their way." The children note the items they find on their lists, without picking them up.

"What's that?" Flanagan calls, pointing at a large brown bird. "A marsh hawk," comes the reply. She is as thrilled as the child to hear the correct identification. The bird is checked off. The children are used to lists—but not to this, not to observing living creatures in the wild. When a girl correctly identifies a California laurel bush and Flanagan tells her she did, a light spreads across her face. From that moment on she stays at Flanagan's side, watching and listening with keen interest. "Usually, when we do a survey, we find that field trips are especially meaningful, if they are carefully run and selected," said Helgeson. Children tend to remember what they learn on field trips better than what they learned inside the school. But because of the

costs, he said, "field trips are not a high priority" now.

Ten years ago, when teacher Peter Fink began teaching at Encanto, classes went on 12 field trips a year. There was federal money for education then. This year Encanto children and their parents had to raise \$800 for bus transportation to the estuary. They baked 1,700 cupcakes and sold them for 25 cents each, in addition to paying \$1.35 each. But the effort has been worth it, says Posen. "This has been one of the most valuable field studies we've ever conducted with children."

When the children are finally back on Fifth Street, 10-year-old Natasha Yarborough remarks that "When I first looked at it [the estuary] it was boring, but when I went in it was fun." David Alvarado is still amazed at having spotted a tarantula hawk, the wasp that seeks out tarantulas to sting and drag to its nest as food for larvae. "I didn't think I would find one," he says with awe in his voice.

Posen is the kind of teacher students remember and, if they grow up to be scientists, many credit with sparking their interest. She

"Outdoor ethics, like any kind of ethics, is simply the final, inevitable stage of a learning process. It cannot be imparted. It comes from within, or not at all."

**Ted Williams
Audubon, Sept. 1988**

Meanwhile, at the Elkhorn Slough Reserve . . .

The education department at Elkhorn Slough National Estuarine Research Reserve, managed by the California Department of Fish and Game, has goals similar to those at the Tijuana River reserve, but is older and more extensive. Here teachers may spend one day learning about the estuary, or three days studying only plankton. They may work with scientists, "taking part in everything from field sampling to computer data analysis," says education coordinator Melanie Mayer. About 400 teachers have participated since the program began in 1985. During the 1987-88 school year, more than 7,000 students came for field study. Summer programs bring youth from as far as Trinity County. Though the focus is on natural science and research, some groups came to sketch or paint. A 109-page "Teacher's Packet" is available to help teachers use the slough and research reserve as a "field lab" for studying wetlands, especially estuaries. Public programs include diverse guided nature walks, symposia, and book parties with nature writers.

For more information, contact the Elkhorn Slough National Estuarine Research Reserve Visitor Center at 1700 Elkhorn Rd., Watsonville, CA 95076. (408) 728-2822.

R.G.

The great blue heron ate a frog who ate a fly. Encanto students drew as they studied the food chain before their trip.

demonstrates again and again that learning and work are actually the same as fun and play. She is demanding, informed, calm, intense, and thorough. Though she is often at the school from 7 a.m. to 5 p.m. and spends many evenings and weekends at meetings and conferences, she appears too intensely involved to have time to complain.

Her hope is that when these children grow up to become decision-making citizens, they will realize that what looks to most people like "a bunch of weeds" may actually be

"Rather than nurturing the natural 'sense of wonder' in our children, we lecture them about trash, a subject that bores even the lecturers. On the rare occasions we allow the kids out into the natural world we have them collect trash, ignoring all things bright and beautiful for the few things dirty and disgusting...the fact that the trash is there year after year proves that environmental education isn't happening."

**Ted Williams
Audubon, Sept. 1988**

dying. This is living. All this is OK now, it is not disappearing. And we didn't pick up trash, though we observed and took note. But the kid who saw two plants with salt glands—he could see it was something special."

The success of this kind of a program, however, depends on people who dedicate themselves to helping other teachers get the maximum value from it, Posen and Flanagan both emphasized. "I work two to eight hours a day on one class" in her lab, she said. "Classroom teachers may love science, but know how much energy it takes to set up something like this. They might spend half an hour reading a chapter and quickly check-

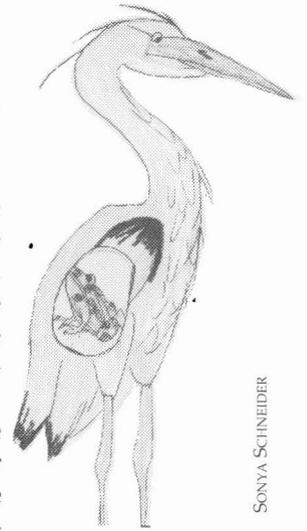
ing their kit before class time and hope the stuff is in there. My job is to make their job feasible within their constraints."

When the nature center now under construction at the reserve is completed, teachers without access to labs such as Posen's will gain a facility for experiments and research. The education program at the reserve may be expanded, diversified, and even taken across the border into Mexico. "The slough is part of the international boundary," said Susan Ferrell Pettit, who while with the South Bay Union School District in San Diego, teamed up with Flanagan to create a marsh study curriculum. "You can't protect it from one side only."

Right now, however, the task is to acquaint those who live on this side of the border with the value—and the rewards—of protecting the wetland. Interest has definitely been piqued among the neighbors. On the morning of the Encanto School children's visit, a woman with an apron over her dress stepped out of the last house on the west side of Fifth Street to talk with Flanagan. As she watched school groups come and go, she said, she had started to wonder whether she might not offer her help in some way. She had been doing volunteer work elsewhere, but perhaps she could do something more useful right here, in her own front yard.

And so, perhaps, this wetland will continue to represent a cheering story, thanks to the work of Pat Flanagan, teachers, the parks and recreation department, supportive school officials, NOAA, and, most especially, thanks to an interested and informed citizenry, both adult and growing. □

For more information: Pat Flanagan, Frontier District Office, State Parks and Recreation Department, 3990 Old Town Ave., Suite 300C, San Diego, CA 92110. (609) 237-6766.



Executive Office

Continued from Page 3

causes—are allowed to escape unreviewed because of peculiarities in the wetlands protection laws and regulations.

- Implement stronger mitigation requirements so that, taken as a whole, permitted conversions are fully offset by wetlands restoration or creation.

- Establish a cooperative public-private National Wetlands Restoration Initiative to search out opportunities for restoration, focusing on government-owned lands and areas that have been altered by the construction of facilities undertaken or sponsored by government.

- Establish the recommended goals as national policy.

- Require the president to report to Congress every five years on the nation's success in achieving the national wetland protection goal.

- Work toward adopting a single regulatory definition of wetlands.

- Encourage delegation of federal wetlands regulatory responsibilities to qualified states.

The forum has organized a subcommittee to continue its involvement in support of its recommendations. For copies of the forum's report, "Protecting America's Wetlands: An Action Agenda," contact the Conservation Foundation, 1250 24th St., N.W., Washington, D.C. 20037. \$17.50 plus \$2 for shipping and handling. □

Conference Log

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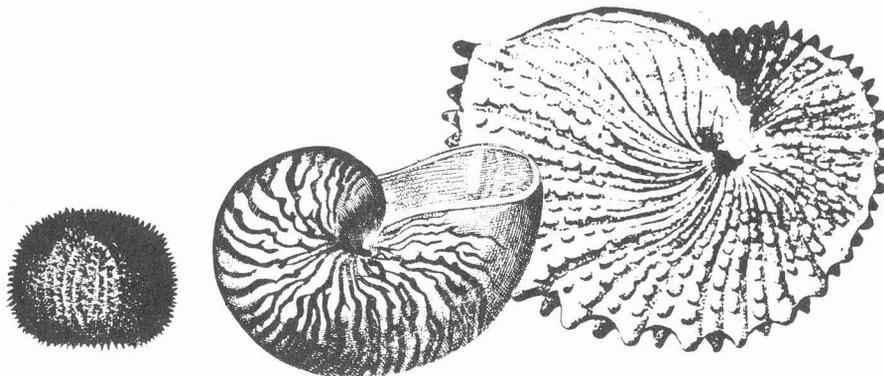
minimalization. The Resource Conservation and Recovery Act of 1976 and the Hazardous and Solid Waste amendments of 1984 have "dramatically changed how industries deal with wastes," said Huey Dickey of Chevron. "Corporations are beginning to focus on waste treatment and reduction instead of disposal."

Several panelists emphasized that good writing skills are a key element in job interviews. "Writing is our bread and butter," said Pike. "It is extremely important to be clear on a one-page memo, and our final product is a written report. There is always going to be a market for people who can express themselves clearly, distinctly, and forcefully."

The \$60 attendance fee seemed high for a conference aimed at college students, recent graduates, career changers, and job-seekers. Part of the cost could have been avoided by omitting the buffet luncheon at the Commonwealth Club, or at least allowing a less costly option of brown bagging a lunch.

A conference report will be available for \$14.95 (including postage and handling) in February. Write to: The CEIP Fund, Conference Summary Orders, 68 Harrison Ave., 5th Floor, Boston, MA 02111.

Kristi Farnham



Book Reviews

Our Environmental Roots

The Quiet Crisis and the Next Generation, by Stewart L. Udall. Peregrine Smith Books, Salt Lake City: 1988. \$18.95, 320 pp

The birth of the modern environmental movement is usually linked either to the publication of Rachel Carson's *Silent Spring* (1962) or to the national exercise in public information called Earth Day (1970). But many events helped to thrust environmental issues into the foreground of public awareness during that period: among them were disasters like the oil spill off the California coast; the tireless efforts of Sen. Gaylord Nelson (D-Wis.) who conceived the Earth Day idea; and the publication (in 1963) of *The Quiet Crisis* by then Secretary of Interior Stewart Udall.

The Quiet Crisis was both a history of American environmentalism and a history making development in itself. Its publication signified that a top official of the federal government was himself an environmentalist. And its content placed environmentalism deep in American history: Indians, Jefferson, Thoreau, George Perkins Marsh, John Muir, Teddy Roosevelt. Udall (and his book) helped enormously to deflate the idea that environmentalism was just a passing campus enthusiasm, irrelevant to the serious business of government.

The present book contains the original plus a new section ("The Next Generation") on developments since the early '60s. It is more about American environmentalism than about the American environment, and its main shortcoming is an inability to find anything at all to criticize on the environmental side: the growth of NIMBY (short for Not In My Back Yard) thinking is seen by Udall only as healthy citizen activism, with no word of concern for its failure to address

what happens in other people's back yards. So if you are searching for a piercing critique of the American environmental movement, look elsewhere; if you are looking for a history of the movement by somebody who has lived it and studied it and cared deeply about it, look here.

Walter Truett Anderson

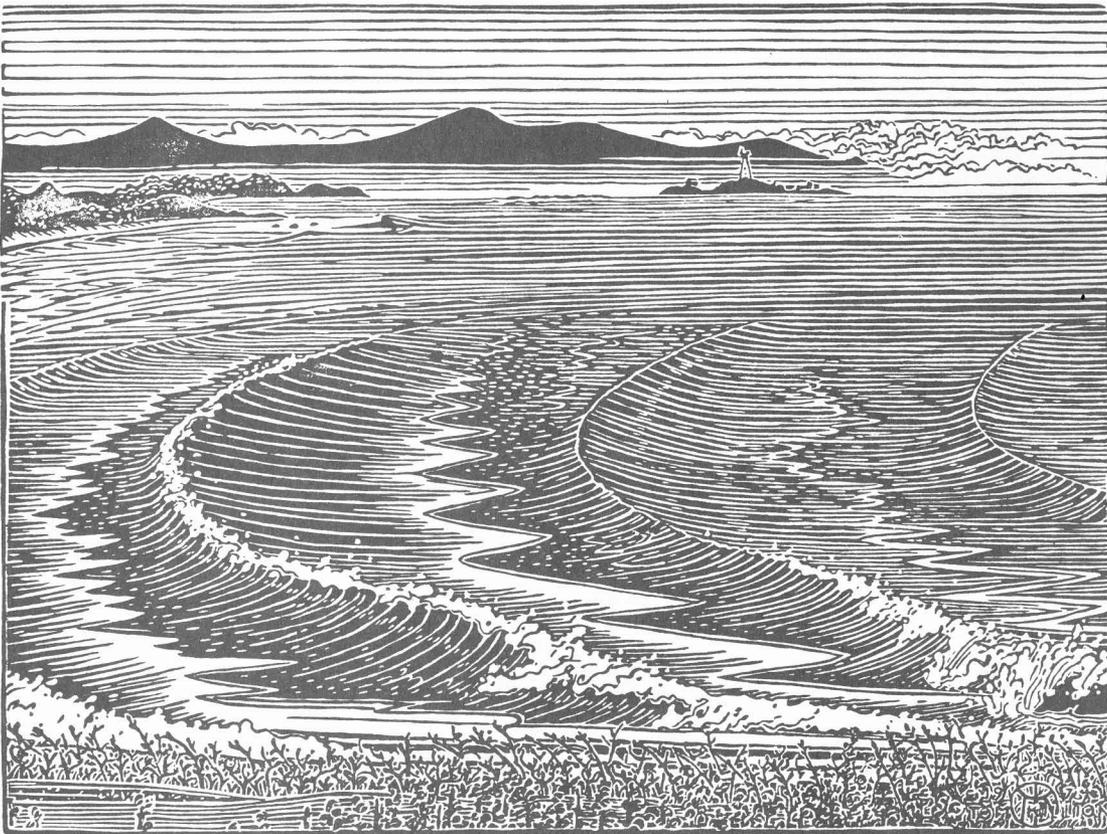
Fine Coastal Views

The Coast of California, by Tom Killion. David R. Godine, Boston: 1988. \$40, 78 pp

If a culture is lucky, about once in every generation an artist appears whose skill and genius match his vision of his world. California has had her share. Albert Bierstadt, William Keith, Maynard Dixon, and Charles Nahl to name but four. More recently, photographers have captured the beauty of this long coastal state. The distinguished example in everyone's mind is Ansel Adams.

In 1975, by the time he was 22 years old, woodblock artist Tom Killion had demonstrated that his gifts ranked with the best graphic interpreters. It was then that his first book, *28 Views of Mount Tamalpais*, appeared. Hand cut from wood and linoleum blocks and hand printed on his own press, it is a treasure to the few fortunate owners of the limited edition. *The Coast of California* first appeared this way in 1979, the output of Killion's own Quail Press, produced "in an old garage, down a dirt road, a few eucalyptus windbreaks from the sea in Santa Cruz," as he writes in the introduction to this new edition. That first edition focused on the central coast, between Point Reyes and Big Sur. The new book includes scenes to the north and south.

The premonition I voiced in the introduction to the first edition that "soon the taxes of the dead



Año Nuevo Island from Pigeon Point.

world will be levied against this coast" has been tragically fulfilled in recent years, particularly along the central coast [he writes] . . . the south provides a terrifying example of the ecological destruction we may expect as energy production and urbanization increase along the coast north of Morro Bay. . . . This book is above all an attempt to understand our place in the living world of the California coast, how we came to be here and how we may stay here without destroying the very beauty and power which attract us.

If this sounds too polemic, the sheer beauty of the prints, many of them in four colors, make the book a joy to leaf through.

The long poem that accompanies some woodcuts and the vignettes that describe others are almost a journal of the San Francisco-born artist's love affair with the place of his birth.

If the sea, in all its many manifestations, holds a fascination for you, as it does for most of us, this book belongs on your coffee table. Pick it up and the smell of salt spray, the great calming presence of water, and the far horizons of the coast will refresh you as quickly as a walk by the shores Killion depicts.

Margot Patterson Doss

More Responses: "Books That Changed Our Lives"

In our Fall 1988 issue we printed a list of books named in response to the question: "Have you ever read a book that forever changed your perception of the natural world and your place in it?" Three more responses have surfaced:

Jacques-Yves Cousteau, president, The Cousteau Society, has said his idol has been Bertrand Russell: "He has written pages I will never forget. His work for me is the fantastic combination of a scientist, a good writer, a humane character who loved women, life, who had the courage to go to prison for his ideas."

Jane Goodall, ethnologist and naturalist: *Animal Machines*, by Ruth Harrison.

And we have learned by the grapevine that **Joel Hedgpeth**, marine biologist, still has the copy of Jules Verne's *Twenty Thousand Leagues Under the Sea*, that he read and cherished as a child. □

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Some back issues are still available. Write to the State Coastal Conservancy, 1330 Broadway, Suite 1100, Oakland, CA 94612.



Mystery Photo

What is it? Where is it? The correct (or possibly, the best) response wins a free subscription to *Waterfront Age*.

Answer to last issue's mystery:

Not surprisingly, no one managed to identify Juan Cabrillo -- actually, it was someone who looked very much like him -- at the 1936 Cabrillo Festival at Cabrillo Beach. Wayne Till, of Petaluma, named every Spanish explorer he could think of (and a few we'd forgotten) and even threw in Sir Francis Drake, without success. Mark Homrighausen of Berkeley guessed Sir Francis Drake (and his crew) at the Golden Gate International Exhibition of 1939-40.

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