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AUTUMN 1994

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State Coastal Conservancy
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About the cover:

Imagine the dredge as an instrument of environmental restoration, put to work on a project to recreate a wetland that was diked and drained decades ago. Imagine a lush tidal marsh, with its sinuous natural channels reclaiming a dry hayfield for creatures now endangered by loss of habitat. Imagination was essential to launch the Sonoma Baylands Tidal Marsh Resotration Project, featured in this issue.

Dredge photo courtesy Port of Oakland, marsh by Laurel Marcus, pickleweed drawing by Mimi Osborne, who also drew the crab on page 10 and plants on pages 23 and 26.

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Rasa Gustaitis, Editor
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Direct all correspondence, including editorial submissions, to:

CALIFORNIA COAST & OCEAN
1330 Broadway, Suite 1100
Oakland, CA 94612
(510) 286-0934

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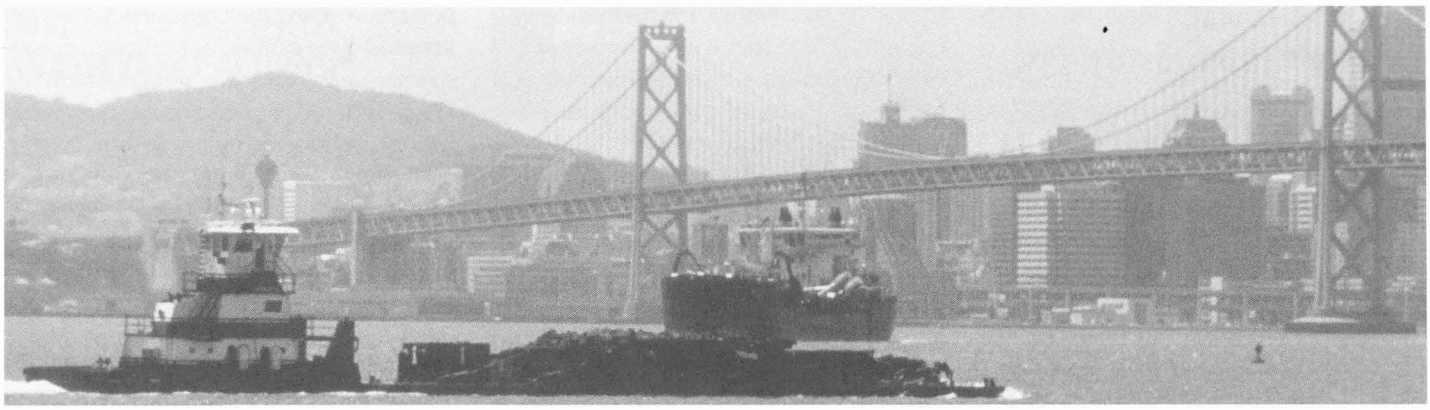

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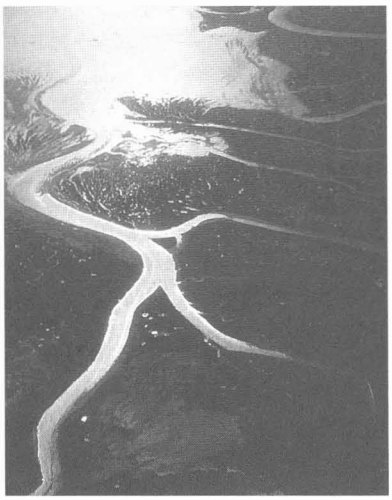
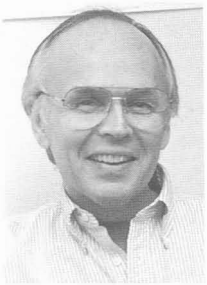


Morro Bay estuary at low tide

WORKING TOWARD ENVIRONMENTAL JUSTICE



ZIP CODE 90058 encompasses the most polluted square mile in California. Each year, industries in this zip code have been spewing into the environment 16,500 tons of toxic waste, including 380 tons of trichloroethane, 28.7 tons of lead , and 167 tons of ammonia. By way of comparison, the annual polluting discharges for the entire nine-county San Francisco Bay Area have been reported as 17,500 tons—for 6,923 square miles, not just one.

What appears to be the dirtiest zip code in the state was discovered in 1991 by the *San Francisco Examiner's* scrutiny of toxic discharge statistics that large manufacturers are required to provide under the federal Community Right-to-Know Act.

Where, you might ask, is Zip Code 90058? You may not be too surprised to learn that it is in south central Los Angeles, and that most residents here are low-income Hispanic or African American. Are we seeing here evidence of systematic environmental racism?

"Environmental racism" is a jarring, provocative term. "What's that?" was the most common response to a course on the topic I taught last year at Harvard University's John F. Kennedy School of Government. You may be thinking: most of the Zip Code 90058 residents are people of low income; nobody who could afford to live in a cleaner neighborhood would live in such an area. What you're seeing is poverty, not racism.

But to Robert D. Bullard, professor of sociology at the University of California, Riverside, poverty does not suffice as an explanation. He has found that public and private agencies tend to locate polluting industry, hazardous waste dumps, and similar noxious facilities in communities of color—and not only in communities of low income. The implications of this tendency are examined in *Unequal Protection: Environmental Justice and Communities of Color*, edited by Bullard (See review, p. 46).

This is a problem we can no longer afford to ignore. California's population represents almost every nation and culture on the planet. In another six years, it is expected that no more than 15 percent of new entrants into the job market will be white males. European Americans still make up the voting majority, but soon will be in the minority. They are still the most powerfully represented demographic segment in government and in environmental groups, and they continue to enjoy a disproportionate degree of access to the state's natural resources—especially on the coast.

California's population represents almost every nation and culture on the planet.

It is essential that people of color participate in environmental activities and organizations. To achieve that, the concerns most important to minority communities must be woven into the fabric of work that concerns the environment. To do otherwise is to ignore the demographic and political future, as well as social equity.

In another six years . . . no more than 15 percent of new entrants into the job market will be white males.

Environmental justice usually requires that economic as well as environmental concerns be taken into account. The Coastal Conservancy has been working to breach the walls that have kept these interests separate. A prime example is the Sonoma Baylands Tidal Marsh Restoration Project (featured in this issue of *Coast & Ocean*), but projects are under way along the entire coast, and on San Francisco Bay, even reaching into south central Los Angeles. The recent report on recreational opportunities along the Los Angeles River identifies possibilities for parks and open spaces that would serve predominantly Hispanic and African American communities, which have incredibly few parks for a potentially huge demand. Because Conservancy projects are always undertaken in partnership with local communities, projects in communities with many people of color assure participation by people of color.

Among the Conservancy's other high priority projects is the San Francisco Bay Trail. Senate president pro tem Bill Lockyer, who launched the Bay Trail Plan, knows its significance as a means to strengthen the social fabric of the Bay Area: "The Bay Trail is an important positive contributor to an increased quality of life in Oakland, Hayward, Richmond—and it will lead, in time, to reinvestment in those cities," he has observed. The Conservancy has been the largest single funding source for the Bay Trail, and has played an important role in its development.

Meanwhile, on Elkhorn Slough in Monterey County, we are experimenting with new techniques of strawberry farming to minimize the use of fertilizers and pesticides—both to reduce polluting runoff to the estuary and to reduce the health risk to farm workers. In San Luis Obispo County, we are working with the mayor and city council of Guadalupe, a largely Hispanic community adjacent to the Nipomo and Guadalupe Dunes, to locate an interpretive center in the business district, instead of opting for a remote site in the dunes.

Statewide, we have funded the construction, repair, or restoration of more than a dozen urban piers—facilities that are heavily used by Asian, African, and Hispanic Americans for subsistence and recreational fishing. On the Russian River, we have retained the services of Ya-Ka-Ama, a Native American nonprofit associ-

ation of basket weavers, to make sure that the integrity of traditional reedbeds is protected as we complete a restoration plan for the river.

Regulatory agencies charged with controlling pollution have the most direct responsibility in righting past wrongs—in cleaning up the Zip Code 90058 environment, for instance. But those of us who work on restoring degraded environments, providing public access to the shorelines and waterways, and developing urban waterfronts must also make certain that our programs address the needs of our diverse communities.

The work of the Coastal Conservancy is just a beginning; we look forward to close partnerships with community leaders, local, state, and federal agencies, and nonprofit organizations in an aggressive pursuit of environmental justice. Please help us find more opportunities to engage in this work! ■

—Michael L. Fischer

HIGHLIGHTS OF CONSERVANCY ACTIONS

THE COASTAL CONSERVANCY'S pioneering Sonoma Baylands Tidal Marsh Restoration Project cleared all remaining roadblocks and moved forward with strong support from a diverse coalition that includes the ports, environmental organizations, the Bay Area Congressional delegation, and the White House. Construction is well under way (see pp. 6 to 21). Other Conservancy actions undertaken in 1994 include the following:

Erosion Control on Morro Bay

The State Coastal Conservancy enabled the Coastal San Luis Resource Conservation District (RCD) to start the third and final phase of an enhancement program for the watershed of Morro Bay, which includes one of the most important wetlands of the state's central coast.

In the October action, the Conservancy approved a conceptual plan for the Martines property, 144 acres of privately owned marginal farm land in the Los Osos Creek drainage, and authorized $268,000 to the RCD to acquire a conservation easement on this land, as well as $20,000 for preparing a management plan. About 111 acres of the property under easement are to be restored to floodplain and riparian habitat, while the remaining 33 acres will continue to be used by the owner for irrigated crops. Some dikes on the property have previously broken through during heavy storms. Others will be considered for removal. This restoration will allow sediment to settle here instead of flowing into Morro Bay.

ROLAND & KAREN MUSCHENETZ

The California Legislature has designated Morro Bay as the first official State Estuary. This designation supports local efforts to prepare a management plan for the bay and watershed. While not intended to be regulatory in nature, this plan will identify policies and measures that could best protect wetlands and other habitat areas while supporting appropriate recreational and commercial uses of this outstanding Central Coast estuary.

The bay has been filling rapidly with sediment, causing damage to aquatic life, birds, and other wildlife, and causing economic losses to fishermen and the local tourist and recreation industries. About a fourth of the bay's volume has been lost during the past 25 years as sediment has continued to pour down creeks. The Conservancy has taken several major initiatives and provided major funding to reduce erosion in the watershed, to slow sedimentation to acceptable rates, and to restore several hundred acres of riparian habitat. A project similar to this one was begun two years ago at Chorro Flats, in the second of the watershed's two major drainages. Together, the two projects are expected to stop about half the sediment that has been flowing into the bay.

The Legislature recently designated Morro Bay as the first State Estuary.

Matching funds for the acquisition of the conservation easement on the 144-acre Martines property will be provided by the U.S. Department of Agriculture's Wetland Reserve Program, a federal program to expand wetlands on agricultural land. From a biological perspective the Wetland Reserve Program gave the Martines Property its highest priority rating. Final enhancement and management recommendations will be developed in conjunction with the Soil Conservation Service, U.S. Fish and Wildlife Service, Department of Fish and Game, and Regional Water Quality Control Board staffs.

Santa Ynez River Watershed Plan

In September, the Coastal Conservancy awarded $204,800 to the Land Trust for Santa Barbara County to prepare a comprehensive plan for the long-term management and enhancement of the Santa Ynez River watershed.

The plan will examine the entire river, from its headwaters to its mouth. It will consider numerous elements: flood hazards, water resources, biological

resources, agricultural resources, aggregate resources, archaeology, land ownership, and public access and recreation needs. It will build on work already being done by the Lake Cachuma Water Authority, the Santa Barbara County Flood Control District, the City of Lompoc, the Department of Fish and Game, and others. Representatives from these and other entities will make up the committee that steers the plan's development.

The plan is expected to take two years to complete, and to cost about $545,000 in cash and in-kind contributions from participating agencies. The U.S. Environmental Protection Agency has contributed $104,800, and the Coastal Conservancy, the City of Lompoc, the County Flood Control District, and the Land Trust for Santa Barbara County are seeking further funds. The Coastal Conservancy is managing similar watershed plans on the Santa Clara, the Santa Margarita, and the Russian rivers.

Ventura River Estuary Plan

The Coastal Conservancy approved the Ventura River Estuary Enhancement and Management Plan in June and authorized $400,000 to the City of San Buenaventura to begin the first phase of the plan's recommendations.

The estuary supports a diverse wildlife community, including 18 species of concern and four federally and state listed endangered species. Located seaward of Main Street in the City of San Buenaventura, between the Ventura County Fairgrounds and Emma Wood State Beach, the estuary has been reduced to an island of valuable wetland, riparian, dune, and beach habitats surrounded by buildings.

Recognizing an urgent need to enhance the estuary's resources, the City of San Buenaventura, the California Department of Parks and Recreation, and the Coastal Conservancy jointly funded and developed a plan to be implemented over a three-to-five-year period. Phase I calls for removing debris, eradicating invasive, non-native plants, creating a new trail with educational signs, closing informal trails near sensitive habitats, and monitoring the use of these improvements and changes in the estuary's water quality.

Additional funding for the implementation of Phase I will come from the Ventura Audubon Society ($8,500), the City of San Buenaventura ($193,900), and the State Department of Parks and Recreation ($150,000). Phase II of the plan recommends additional native plant revegetation efforts and more formal public access facilities. Phase III calls for restoration of wetland habitat at the river's second mouth after Southern Pacific Railroad replaces the existing bridge with a longer twin-span bridge. Phases II and III will be guided by the results of Phase I monitoring and by the availability of funds.

Navarro River Enhancement Plan

Also in June, the Coastal Conservancy authorized $98,000 to the Anderson Valley Land Trust to prepare a resource enhancement plan for the 330-square-mile Navarro River watershed.

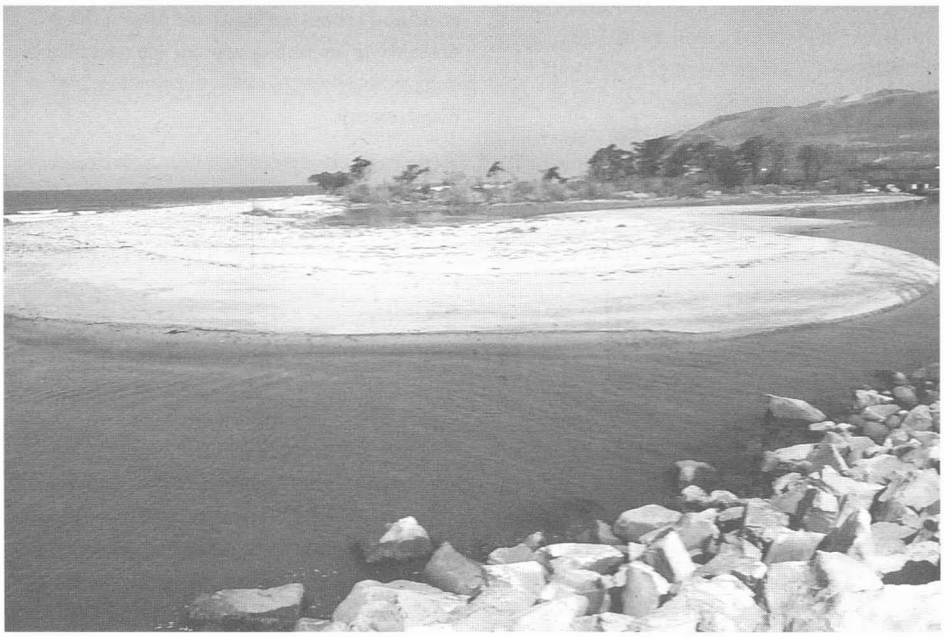
The river's natural and scenic values have been disturbed and degraded by historic land uses, and extensive erosion and sedimentation have resulted in a loss of habitat for many species. The Navarro River's coho salmon habitat was the best in Mendocino County ten years ago; now the population is severely reduced. The coho salmon is likely to be added to the federal list of endangered species this year.

The project will be a significant contribution to the economic well-being of the watershed; the Navarro and its tributaries are the lifeblood of the region's grazing and agriculture industries, as well as the growing wine production and tourist industries.

Large Napa Marsh Acquisition

The Conservancy authorized up to $1 million to the Wildlife Conservation Board in March for the acquisition of the 9,850-acre Napa Marsh. This is the single largest public conservation acquisition of existing or restorable wetlands ever to have occurred on the California coast or in San Francisco Bay.

The Napa Marsh consists of diked salt ponds, remnant sloughs, and saltmarsh. It lies at the eastern edge of the 48,000-acre complex of tidelands and diked historic baylands known as the Napa-Sonoma Marshes. While several of the salt ponds within the Napa Marsh provide habitat for high numbers of migratory waterfowl and shorebirds, most ponds are too saline for most marine organisms, birds, and insects. These historic baylands supported tidal marshes before they were diked and converted. As they have not yet been built upon, they provide an excellent opportunity for restoration.



MARC CAPELLI

Ventura River estuary

The Wildlife Conservation Board and the Shell Oil Spill Litigation Trustee Committee have negotiated the purchase of the Napa Marsh from the owner, Cargill Salt. The balance of the $10 million purchase cost will be provided by the Shell Oil Spill Litigation Trustee Committee, the Wildlife Conservation Board, and the State Lands Commission. The property will be managed as a wildlife reserve by the Department of Fish and Game.

Alcatraz Island Access

The Coastal Conservancy authorized up to $150,000 to the Golden Gate National Park Association (GGNPA) in June to construct new public access on Alcatraz Island and improve existing access and interpretive areas on the old Parade Grounds at the top of the recently completed upper Agave Trail.

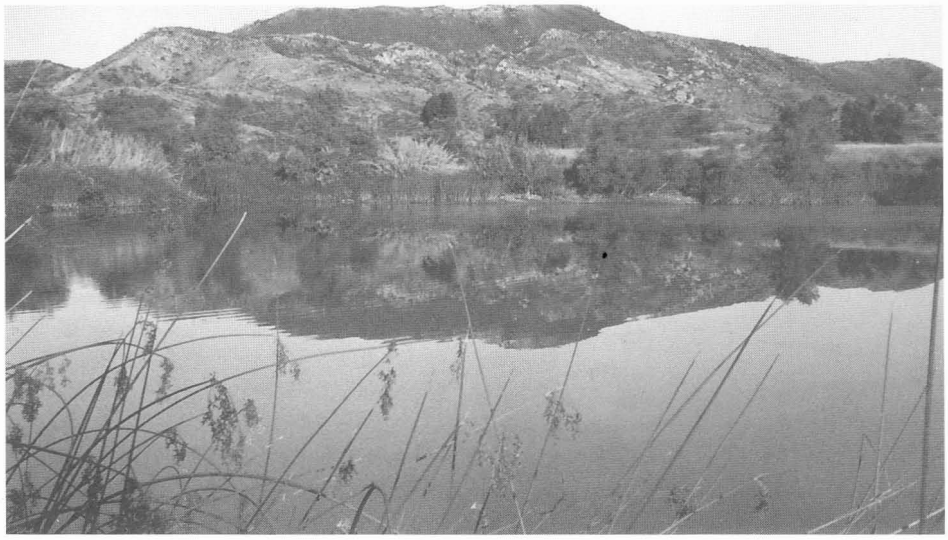
Conservancy funding, matching an equal amount contributed by the GGNPA, will build on previous work on the Agave Trail and will provide a key link to the seasonal opening of an additional 25 percent of the island to unguided public access. The improvements include a 1,000-foot-long clifftop promenade along the edge of the Parade Ground and interpretive exhibits.

Carpinteria Marsh Enhancement

The Carpinteria Salt Marsh, in Santa Barbara County, is one of California's most significant estuaries for both its natural resources and its socio-economic value. It supports threatened and endangered species, including the Belding's savannah sparrow and the light-footed clapper rail, and is a nursery for halibut, flounder, sea bass, and other fish. It also provides flood control for the city.

The Coastal Conservancy approved $218,865 to the City of Carpinteria in January, to enable the City to provide the match necessary for a federal grant of $500,000 under the Intermodal Surface Transportation Efficiency Act of 1992 (ISTEA).

The Conservancy-ISTEA funds have enabled the city to excavate fill and tidal channels, revegetate some wetland areas, install new fencing and hydraulic structures, and construct a public access overlook. In addition, ISTEA funds will be used to prepare a drainage and pollution control plan for the entire 230-acre marsh. An overall marsh management plan was funded in September 1993 by the Conservancy, the University of California Natural Reserve System, and the Land Trust of Santa Barbara County.



DEBRA CONKEY

Laguna Lake No. 3

Land Acquisition on Bolinas Lagoon

The Conservancy approved $38,750 to the Marin County Open Space District, to be matched equally by District funds, to acquire eight parcels, totaling 1.1 acres, on the Bolinas Lagoon in Stinson Beach. The Open Space District will remove exotic plants from these properties, restore them as salt marsh, and manage them as part of the Bolinas Lagoon Open Space Preserve. The Conservancy also approved a restoration plan for the parcels.

Marsh in Hayward to Be Protected

The Conservancy approved a plan for protecting and enhancing a 155-acre diked bayland, known as the Oliver property, in Alameda County, and authorized the disbursement of $400,000 awarded to the Conservancy by the California Department of Transportation for acquisition of the property. The Conservancy also authorized $78,000 to the Hayward Area Recreation and Park District to prepare a comprehensive management plan for the site and adjacent wetlands. The diked bayland had been used for salt production. Its acquisition and management for resource protection will further enhance the Hayward shoreline, which has outstanding natural resource values, educational programs, and public access.

Laguna Lakes Enhancement

The Coastal Conservancy authorized the restoration and enhancement of the Laguna Lakes, which are central to the Laguna Canyon watershed and are the only natural lakes in Orange County. The Conservancy's action, in May, culminates over 20 years of acquisition and enhancement planning.

The three lakes are connected and directly linked to the coastal zone by Laguna Creek, which discharges into the Pacific Ocean at the main beach of the City of Laguna Beach. Restoration of these lakes will improve the quality of water flowing into and out of them, reduce flooding, and enhance aquatic and riparian habitats for hundreds of birds, mammals, amphibians, and reptiles in the lakes, Laguna Creek, and the adjoining uplands.

The Laguna Canyon watershed encompasses over 5,600 acres of steep slopes and alluvial valley floors. Streams flow from the San Joaquin Hills into the canyon and then south to the Pacific Ocean. The lakes formed where alluvial fans from steep tributaries were deposited on the valley floor, blocking the flow of Laguna Creek.

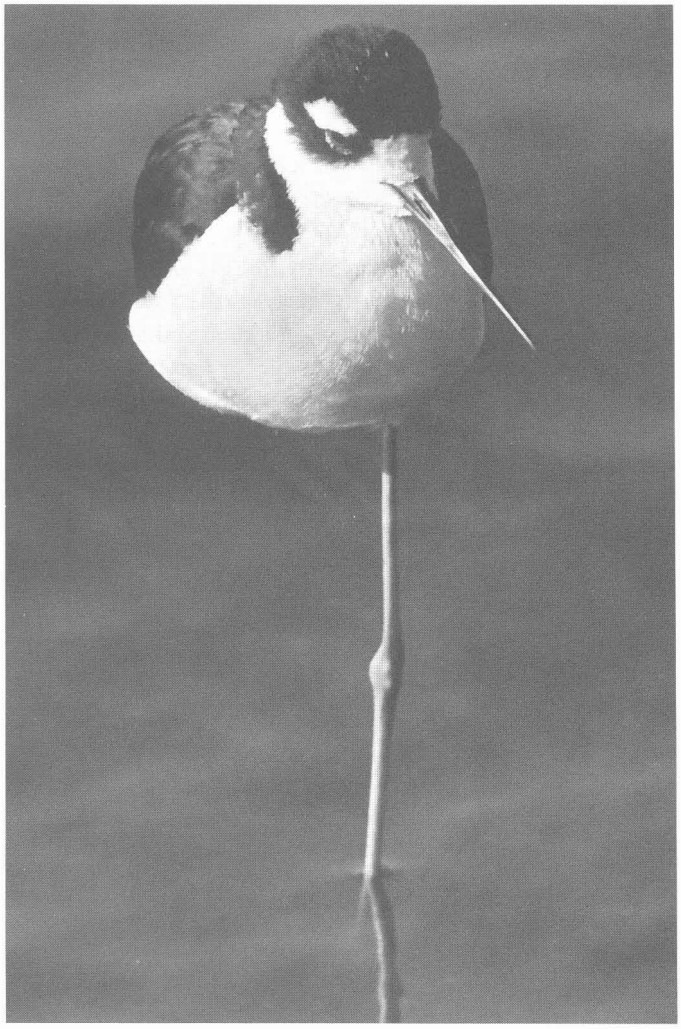
Laguna Canyon and the Laguna Lakes connect the various pieces of land that compose the Laguna Greenbelt, which consists of 15,000 acres of publicly owned land stretching from the coast to the City of Irvine. The lakes also provide one of the few sources of fresh water for mammals and birds moving from one part of the

(See **Ebb and Flow,** *p. 47)*

THE SONOMA BAYLANDS

A marriage made in mud

LAUREL MARCUS



KENNETH W. GARDINER

The new marsh will provide habitat for this black-necked stilt and many other birds.

IS IT REALLY NECESSARY to put people out of work to protect our environment? Must we sacrifice natural resources and wildlife for the sake of jobs and industry? A major marsh restoration project now under way on San Francisco Bay shows that such a choice need not be made.

This pioneering project was made possible by a diverse coalition that has united environmentalists, industries, labor leaders, government agencies, and elected officials. It demonstrates how economic and environmental needs can be integrated, with benefits all around and no losses; and how a unique political coalition can form around a creative solution.

Sound too good to be true? No such coalition was envisioned at the project's inception. It was accomplished by means of innovative thinking and a diligent effort to understand and accommodate the needs of all whose interests were involved.

The Sonoma Baylands Tidal Marsh Restoration project, developed by the California State Coastal Conservancy and the Sonoma Land Trust, will restore a hayfield to its historic condition as a tidal wetland and use more than 2.5 million cubic yards of clean dredged material in the process. This dredged material will come from the Port of Oakland, allowing the deepening of channels to accommodate larger container ships. San Francisco Bay will gain a 322-acre tidal wetland designed especially to aid two endangered species, the salt marsh harvest mouse and the California clapper rail. The port and the region will benefit by increased economic activity.

PORT OF OAKLAND

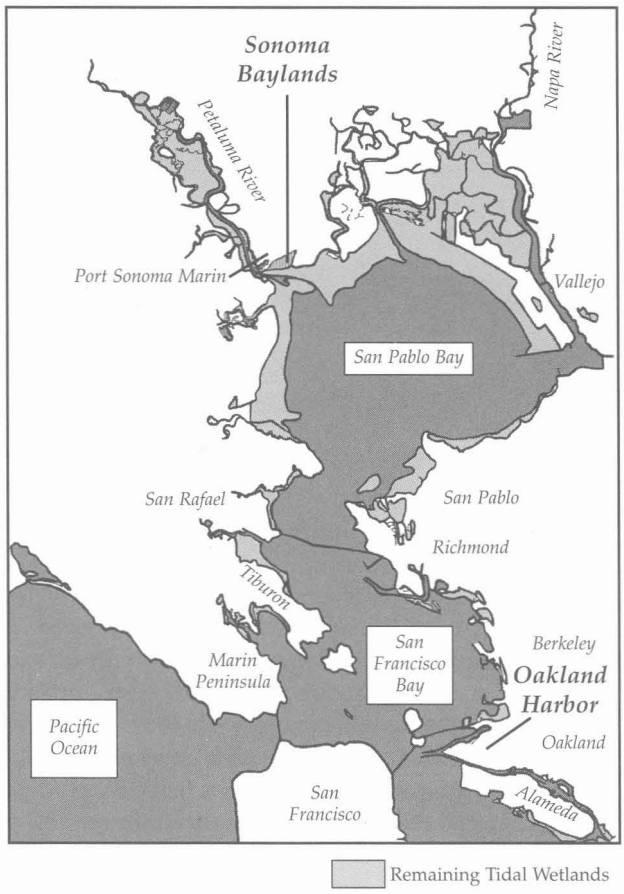
Port of Oakland waterfront, with downtown Oakland in the background. Because the port will now be able to deepen a channel to accommodate large container ships, a job increase of up to 2,200 is expected. The Corps of Engineers has projected a total of $135 million in economic benefits.

The seed: a good idea

THE SONOMA BAYLANDS project began in 1988 as a wetland and open space preservation project. The nonprofit Sonoma Land Trust had negotiated a purchase option for a large hay ranch near the mouth of the Petaluma River and had approached the Coastal Conservancy for funding to acquire the property. The Land Trust seeks to protect agricultural and environmentally sensitive lands in a rapidly urbanizing county by outright purchase or acquisition of conservation easements. The Conservancy undertakes projects toward these same purposes, as well as for public access. Prior to acquiring the property, the Conservancy and the Land Trust prepared a resource enhancement plan to identify natural values and the possibilities for their restoration.

Like much of the north bay shoreline, the hay ranch had once been a tidal wetland, part of the vast, productive marshlands that bordered San Francisco Bay. About 90 percent of these historical tidal marshes have been diked and drained for agriculture or filled for urban development. Some have been permanently lost. Others could become wetlands again.

The enhancement plan found that the property's southern 322 acres, which adjoin the bay, were suitable for restoration as mudflats and salt marsh. The mudflats would feed numerous bird and fish species, and the salt marsh could help the salt marsh harvest mouse and California clapper rail to survive.



Clean dredged materials from the Port of Oakland will be barged 25 miles to expedite the largest marsh restoration project ever undertaken on San Francisco Bay.

Conservancy Funding Was Vital

WE MEET at the construction trailer, put on hard hats as required, get into the Corps of Engineers jeep, and ride up and along a levee to view the work under way. The tidal marsh restoration project is a giant excavation and construction site that extends from the edge of the bayside pickleweed marsh north about a half mile toward Highway 37, and well over a mile eastward from Port Sonoma-Marin, a marina on the Petaluma River, toward Lakeville Road. Over two miles of new levees have been built. Soon mud dredged from the Petaluma River and Oakland Harbor will be pouring in from pipes that will be placed on the levees. In the distance, giant bulldozers are shaping the foundations of the new marsh.

We stop above a weir, on a levee that separates the restoration site from the natural marsh that formed during the past century, after the Baylands were diked and drained. Water is seeping in through the weir. It will pour in and this enormous construction site will again begin to turn into a marsh.

C&O: *Is this typical work for the Corps?*

SCOTT MINER: Yes, as far as the type of construction—earth work, levee construction, excavation, and movement of dredged material. But it's very unusual in that it's not mitigation for a project with some other purpose and it's not restoring an area that was previously affected by a Corps project. It's one of the first Corps projects where habitat restoration is the central purpose.

C&O: *This fact gives you personal satisfaction?*

SM: It's the type of project I've looked forward to for 16 years with the Corps of Engineers. I'm an ecologist by profession, with no engineering background at all. I have a graduate degree in wildlife management.

We walk down the levee to the foot of one of the poles that have been installed for measuring the height of the dredged material as it is placed in the site. The top of the pole is pointed, to keep hawks and other raptors from perching and hunting endangered salt marsh harvest mice and clapper rails.

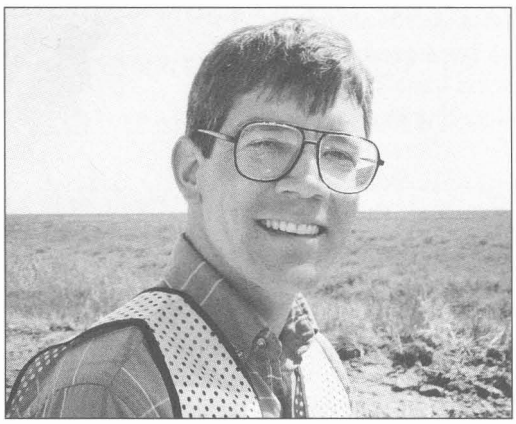
C&O: *We don't actually know that there are salt marsh harvest mice in that marsh between here and the bay. Have any clapper rails been seen?*

SM: There are clapper rails using marsh channels near the levee. We delayed construction near those areas until after the nesting season.

We look out across the excavation, imagining the future marsh, filled with birds.

SM: I think the toughest part of this project is the patience that will be required for about ten years after tidal action is restored, while the marsh is becoming established.

C&O: *Can you foresee this type of project recurring?*



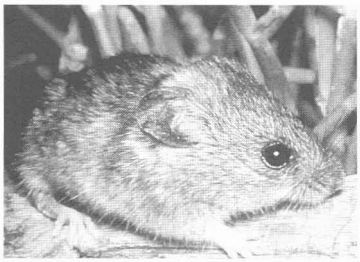
Scott Miner
Project manager for Sonoma Baylands
U.S. Army Corps of Engineers

SM: The Corps right now is very interested in this type of project because the current administration is trying to promote projects that have both environmental and economic benefits. That actually started before the change of Presidential administrations, but it's been greatly accelerated. There is a lot of potential for more such projects. Right now the main constraint on the Corps is the lack of nonfederal sponsors who are willing to provide funding. Federal policy is that 25 percent has to come from nonfederal sources.

Initially the Coastal Conservancy had the idea that the Corps and the ports would pay for the whole project and reimburse the Conservancy for its planning costs. What allowed the project to go ahead was the Conservancy's decision to participate financially.

C&O: *The Conservancy certainly expects to do more projects like this. But to do so it will need new sources of funding.*

TOM TUTT



Salt marsh harvest mouse

Such restoration, however, would require far more than flooding the site with tidal water. The hayfield had subsided as much as four feet below sea level. Salt marshes occur at three and a half feet above sea level. Therefore, up to seven and a half feet of new mud would need to accumulate before the marsh could form. Left to natural tidal sedimentation, this build-up would take many years—years the endangered species did not have.

Joan Vilms, project manager for the Sonoma Land Trust, and I realized that the process could be speeded up by bringing in some clean fill, such as clean dredged material. We discussed the option for several months, as our enhancement plan neared completion and we contemplated ways to fund its implementation. We understood that if we pursued this option, we would have to work with the industrial ports and the U.S. Army Corps of Engineers, rather than just with the typical supporters of environmental and wetland projects. This idea was both intriguing and frightening.

Both of us knew from other experiences that we would have to negotiate very carefully so that the needs of the ports and the Corps to dispose of dredged material did not subvert our wetland restoration project. But as the Conservancy and the Land Trust would design the project, and as ownership of the site would stay with the Land Trust during the negotiation period, we felt we could afford the risk. One day as we sat on the levee that extended between the verdant marsh on its bayward side and the hayfield to the north, we decided to take a chance. We would try working with the Corps and the ports to use dredged material, but remain ready to abandon this idea if the project veered away from its original intent.

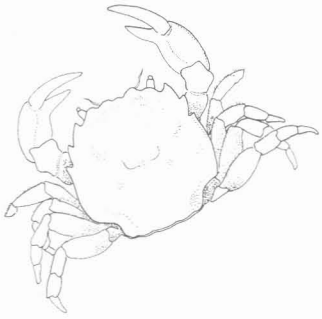
In 1990 we convinced our superiors and the Coastal Conservancy board of the logic of our arguments. The Conservancy approved the enhancement plan, authorized $1.5 million to the Sonoma Land Trust to purchase the entire 830-acre ranch, and provided $250,000 for a design plan for the southern piece of the property. Together, the Conservancy and the Land Trust assembled a multidisciplinary team consisting of wetland ecologist Ted Winfield, tidal hydrologists Philip Williams and Joan Florsheim, and Rick Olejniczak from Gahagan and Bryant Associates, a dredged material engineering firm. This team began a detailed engineering and biological design for the marsh. It studied not only the site's physical conditions, but also the outcome of earlier wetland projects in the bay (see pp. 19 to 27).

During this time, the Port of Oakland was in the midst of a battle with many interest groups over proposed sites for disposal of some 6.6 million cubic yards of clean dredged mud. Until acceptable sites were found, the port could not proceed with an essential channel-deepening project to accommodate larger ships. The port is San Francisco Bay's largest maritime shipping center and the nation's fourth-largest port. With its related industries, it employs over 100,000 people and fuels over $5 billion in regional economic activity. As the debate over dredging wore on, shipping lines began to use other ports, and Oakland's share of the maritime market dwindled.

The Corps of Engineers, which is primarily responsible for dredging in navigable waters, had proposed to dump the mud back into the bay near Alcatraz Island, as it had been doing for years. It had also proposed disposal in the ocean, near Half Moon Bay. Both proposals had evoked angry opposition from commercial and sport fisherman, environmentalists, and even bay swimmers. The Half Moon Bay Fishermen's Association won a court battle to protect its productive fishing grounds. By 1989 all sides in the conflict were embittered and angry, and no solution was in sight. Even before our design plan for the Baylands was completed, the Corps and the port began to inquire about our idea of using dredged materials to restore a marsh.

SAVE SAN FRANCISCO BAY ASSOCIATION

California clapper rail



Mud flat crab

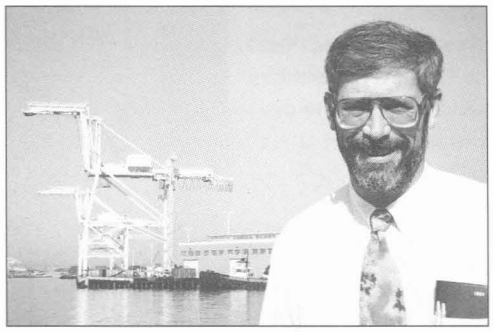
The port's 38-foot project could only have gone forward on a trust relationship. People had to rely on each other's word because there was no way to make a formal deal.

A Handshake Agreement Was Basic

C&O: *What would the Port of Oakland have done about its dredge-disposal crisis if the Sonoma Baylands project had not materialized?*

JIM MCGRATH: The material would have gone to a deep sea site and the borrow pit off Oakland Airport and Bay Farm Island in Alameda. But dredging would probably have been tied up for years in litigation.

Let me give kudos to three people: first, to Laurel Marcus, not just for her hard work but for her vision. She looked at the North Bay hayfields and realized there could be marsh and open space and habitat between the Napa River and the Petaluma River. To have that vision, to go for it against tremendous odds is a rare talent. The other two heroes of this are Laura King of NRDC [Natural Resources Defense Council] who originally suggested what ended up being the political coalition responsible for making this project possible, and Barry Nelson of Save San Francisco Bay, who managed the legislative efforts that directed it.



Jim McGrath
Environmental Manager, Port of Oakland

One of the keys to this, in addition to the vision, was putting together and testing out a political coalition of environmental groups and industry. One very large part of that was the organization of the industry into the Bay Dredging Action Coalition; the other was the outreach effort by environmental organizations. Barry Nelson worked very hard on the negotiations, as did Dave Nesmith with the Sierra Club.

The third key was the legislative process. In 1992, APL [American President Lines] went to Congressman Dellums and said: "We can't wait." Environmental groups realized that the port's political power was greater than its finances and decided to cooperate. Laura King suggested that the port join a coalition to support reform of water policy. The port agreed to back the Miller-Bradley bill [for comprehensive federal water policy reform] and the environmentalists made a handshake agreement not to litigate the deepening of the port's inner harbor channel to 38 feet, with disposal off Alcatraz, on condition that the Alcatraz site would not be used for the 42-foot project. Barry Nelson, working out of Congresswoman Nancy Pelosi's office, wrote authorization for the Sonoma Baylands into both the Water Resources Development Act and the Miller-Bradley bill.

The port's 38-foot project could only have gone forward on a trust relationship. People had to rely on each other's word because there was no way to make a formal deal. When that worked, everybody looked back and said: "We can trust each other a little bit. And, more importantly, in trusting each other a little bit we can come out with the environment as a whole enhanced, even considering the environmental effects of dredging."

And that coalition held—an unlikely coalition. Save the Bay accomplished 100 percent of its water policy reform goal and the port's clout helped. So you have three pieces: Support for the Miller-Bradley bill, a handshake agreement that Alcatraz would not be used again for the 42-foot project, and the political muscle to do the Sonoma Baylands.

Another very important factor—and again the Conservancy's efforts deserve a lot of credit—is the fact that it wasn't tremendously more expensive.

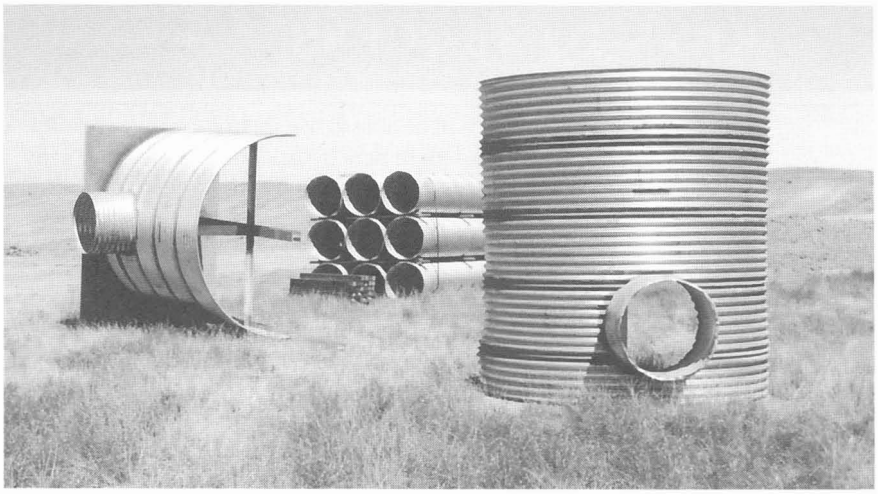
C&O: *Was the port losing business because of its inability to dredge its channels?*

JM: The completion of the 38-foot project started an upturn for the port and that's continued. Even though we didn't have the depth we needed, the shipping lines were confident that it was going to be there in 1995-96. The Port of Oakland wasn't embattled anymore.

C&O: *The Sonoma Baylands will only take clean dredged materials, and only a portion of these. What about the rest of the 6.6 million cubic yards you need to dredge?*

(continued on p. 12)

JAY JONES



JAY JONES

How to proceed?

THE DESIGN TEAM had identified two alternative ways to proceed at the Sonoma Baylands. Both required that a new levee be built and the old perimeter levee breached, flooding the site with tidal water. Beyond that, the restoration job either could be left to the process of tidal sedimentation, which would take some 35 to 50 years, or that process could be considerably shortened by raising the elevation of the site with suitable dredged material, allowing a vegetated marsh to form within 10 to 25 years. (See p. 26.)

The design team concluded that the Baylands would benefit from 2.5 to 2.8 million cubic yards of dredged mud. The exact quantity would depend upon the ratio of sands, which are larger and take up more room, to the smaller silts and clays. This amount of material was significant: the project could take over a third of the mud that was to be dredged from the Port of Oakland.

Our cost estimates were encouraging, showing that barging muds 25 miles from the Port of Oakland would be cost-competitive with barging mud to the most recently proposed ocean disposal site 70 miles outside the Golden Gate. The primary environmental issue remaining was to assure that all the material placed at the Baylands was clean and passed the rigorous ocean disposal testing.

The Environmental Protection Agency (EPA) and the San Francisco Bay Regional Water Quality Control Board oversee testing programs, assure the validity of test results, and determine the suitability of the materials for disposal in bay, ocean, and wetland environments. They base their conclusions on the results of chemical testing and the results of bioassay tests which evaluate the toxicity of water and sediment from the dredged materials to various species of zooplankton. Only dredged material deemed suitable for aquatic disposal would be allowed at the Baylands.

In addition, to make sure that chemicals from Oakland's material did not bioaccumulate in wetland plants and animals, the Corps grew these plants and animals in the sediments for a year in a laboratory. Results of these tests showed no significant uptake and concentration of persistent chemicals, even for dredged materials that were not considered suitable for ocean disposal. These tests assured us that we would not be creating a problem that would appear many years from now. As a matter of fact, much of the dredged material was cleaner than the samples tested from the existing natural marshes near the Baylands site.

MICHAEL BURGESS

Top left: **Components of a weir built to allow water to return to the bay as dredged material is placed on the marsh site.** ***Bottom:*** **The completed weir.** ***Top right:*** **Overlooking the site from the top of the weir. When the required marsh elevation is reached, the weir will be removed and the levee will be breached to allow the tide to flow in and out.**

Mustering support

A NEW IDEA THAT CAN HELP to resolve a crisis while serving the purposes of many divergent interests can quickly gain support and bring

KEYS TO SUCCESS

(continued from p. 10)

JM: Some will go to deep sea; some that is not suitable for marine disposal will be placed on the Galbraith Golf Course. This material is not suitable for the bay but it is by no means the kind of stuff we would dig up in cleaning up old industrial or military sites, or in a building project right here in the city. What's in the outer harbor, and goes to Sonoma Baylands, is mud. Inside the channel there's more sand, which is not useful for wetland creation, and that will go into the ocean.

C&O: *What happens when you have to dredge the channel again?*

JM: Now ships have a 38-42 foot draft. On the drawing boards are ships with a 45-foot draft. We will need to deepen the channels again, but that should be possible. We will have removed the dirty material that has been in the harbor since World War II. What will be left will be ancient geological deposits, so they will not present the same problems. I expect we will be able to use them for habitat restoration—right here in Oakland, I hope. That's my dream.

C&O: *What are the cost-benefit estimates for the channel deepening project?*

JM: The Corps of Engineers has calculated a direct increase in jobs of 900 to 2,200 and projects a total of $135 million in economic benefits. That's 14 to 1 net benefits—a rare critter. We do a lot of projects that are 1.1–1, 1.4–1, 1.5–1. And the Corps did not even calculate the implications of the fact that right now the ships are coming in riding high tides, without full loads, because of the shallow channels.

C&O: *Is there a useful lesson in all this for others?*

JM: This project shows the power of a coalition. And it shows that if we are bold enough, we can probably do habitat restoration. This is a good model for other ports, and for this port. We're trying to work for authorization in the Water Resources Development Act that will give further encouragement in this direction.

Sharing the Burden

WALTER ABERNATHY: According to the script, all dredged material would go into the water. But every time I've been involved with dredging, when we tried to follow traditional methods of disposal—even some that I thought were creative—we just couldn't get the overall consensus and environmental buy-in. So we determined we had to get some multiple disposal options so that the burden of dredging was shared by a number of different people, and for this we needed a realistic upland disposal alternative. So when we came up with one that was within reach—maybe it'll cost more money, but it was within reach—that brought everybody together. Laurel [Marcus] was just great in coming up with this project and bringing it to everybody's attention, and we played a helpful role in swinging a constituency that normally probably wouldn't have been allied with it but had vested interest to see dredging go forward.

Walter A. Abernathy
President of the Pacific Merchant Shipping Association, former Executive Director of the Port of Oakland

C&O: *What was at stake here for the shipping industry?*

WA: When we put BDAC [Bay Dredging Action Coalition] together, we knew it had to do with basic maritime survival of the Bay Area. This place is one of the biggest maritime centers in the world, the fourth biggest in the United States. It also has one of the shallowest ports in the whole world-wide system.

C&O: *The Port of Oakland's channels are too shallow?*

WA: One of them is down to 38 feet, the other is 35. Both will now go down to 42. These depths are measured at low tide. The deepest draft vessels have to time their arrivals to benefit from the tidal range, which is six or seven feet. They have a very narrow window to come in through the Golden Gate, cross the Bay, and come into that berth. That's very, very costly.

(continued on p. 14)

opposing factions together. The Conservancy held a meeting in 1991 for all concerned elected officials, government entities, special interest groups, and the ports to discuss the Baylands and how to implement the project as a part of the bay dredging program. The response was surprising. The entire Bay Area Congressional delegation, federal and state regulatory agencies, environmental groups, and ports expressed support; the Corps of Engineers, however, was not encouraging and reminded everyone that it lacked specific Congressional authorization to undertake the Baylands project. Corps policy did not favor wetland creation as an option for disposal of dredged mud. Bound by a tradition of aquatic disposal and a national policy to implement the cheapest alternative, the Corps adamantly opposed the idea.

At this point, the Conservancy began a campaign to create a coalition of allies strong enough to persuade the Corps to shift away from its traditional policy. I approached all parties who held an interest in the dredging of the ports: organized labor, business and development, shipping lines, the individual ports, regulatory agencies, as well as Congressional and state legislative staff. The goal was to convince them that the wetlands project was the key to resolving the dredging impasse and that their assistance was crucial. This process of persuasion required patience, tolerance, and listening to numerous opinions about the other involved parties.

The overwhelming support for the project by environmental groups, especially Save San Francisco Bay Association, Sierra Club, and Natural Heritage Institute, was a clear bargaining chip. These groups had successfully stopped the port in its previous attempts at dredging and had steadfastly opposed aquatic disposal. The Port of Oakland cautiously endorsed the Baylands, unsure of how much it might cost but very willing to help if that would aid its dredging project. Slowly, many different parties came to see the Baylands not just as a good compromise to get the port dredged, but as a good idea for reusing dredged material. Still, it would take an act of Congress to win the support of the Corps.

In 1992, the Bay Dredging Action Coalition (BDAC), newly formed by community, business, and labor leaders to resolve the dredging crisis, made the Baylands a cornerstone of its political agenda. The coalition's letterhead listed shipping lines, banks, chambers of commerce, numerous trade unions, and others with an interest in seeing the Port of Oakland channel deepening proceed. The project now had the broad-based backing it needed.

While environmental groups supported the project, it was largely this powerful coalition that pushed the Baylands through the system, helping the Bay Area Congressional delegation to overcome the Corps' resistance. In the 1992 Water Resources Development Act, Congress directed the Corps to build the Baylands project. Specifically it instructed the Corps to complete final engineering designs, to build the first stage of the project, including the new levee, and to place clean dredged material on the site for the purpose of restoring a wetland.

The federal public works system that for so many years had produced dams, flood control projects, and other environmentally damaging developments, treated this major habitat restoration project as one of its own. The pork

Longshoremen loading cargo at the Port of Oakland. The port generates more than 10,000 jobs and is the fifth-largest container port in the nation.

PORT OF OAKLAND

KEYS TO SUCCESS

(continued from p. 12)

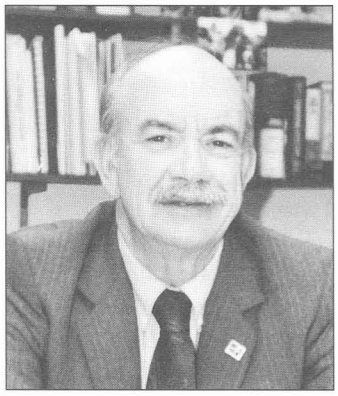
Going out, sometimes the vessel operator has a choice: put a full load in and wait six hours for the tide, or leave some of the load behind. The ship might be costing him $4,000 an hour.

The 42 feet we'll get at Oakland will be a big help, but it will be inadequate the day you get it. It's still not the depth you need for an efficient harbor. You'll still be functioning at a penalty in terms of being efficient for transportation and competitive with other ports. I think everyone recognizes that.

We're working with the Coastal Conservancy, the ports, everyone else, to see if we can learn from this project. Sometimes we on the industry side are criticized for being project driven. We have pledged to see if we could fix the system so that in the future it doesn't take acts of Congress and lightning bolts to make things move—so that the process itself would facilitate this type of solution. We're looking at language in federal legislation. It's a miracle, really, all the things that had to happen to make possible something that makes good sense. The system worked against it.

Consensus was achieved

OWEN MARRON: A number of years ago the organized labor movement in Alameda County became extremely concerned at the lack of progress in dredging the Oakland shipping channels. Thousands of jobs, many of which are good paying union jobs, depend on the maritime industry in the Bay. We were aware of the objections by many environmental groups and of the need to dispose of dredged material in an environmentally sound way. Our members live, work, and raise their families in the Bay Area, so we too shared their concerns. But over the years there had grown a communication breakdown over the issue. It was for that reason we helped form the Bay Dredging Action Coalition (BDAC), bringing together the various groups concerned with the future economic viability of the maritime industry while being sensitive to the environmental issue.



Owen A. Marron
Executive Secretary-Treasurer, Central Labor Council of Alameda County, AFL-CIO

With the help of such bodies as the Coastal Conservancy, the lines of communication with the environmental groups were opened up. We were able to openly discuss the economic concerns and the environmental concerns, and found we had more in common than we had thought. So, when BDAC was approached with the Sonoma Baylands project, it was a welcome contribution to solving the problem.

C&O: *What was the key to making this project possible?*

OM: We all agreed—local government, the ports, organized labor, and the environmentalists—that dredging was a necessity if the major industry in the Bay Area was to survive and grow. We all agreed that dredged material had to be disposed of in an environmentally sound way if the Bay Area were to remain a place suitable to live and raise a family. Consensus brings results. The Coastal Conservancy played a leading role in developing that consensus.

Enormous earth-moving equipment is shaping the new marsh.

JAY JONES

barrel system was made to work for environmental improvements—a change that could only have happened in the San Francisco Bay Area, and even here only because of the dedicated and powerful Congressional delegation—Congresswoman Nancy Pelosi, Congressmen George Miller, Ron Dellums, Vic Fazio, and Norm Mineta—and the coalition of business and labor forces. In the waning days of the Bush presidency, the Baylands slipped into this system.

A surprising setback

FOLLOWING THIS VICTORY, support for the Baylands became even stronger. In 1993, a major push was made to get the Corps to begin the work authorized by Congress and have the Baylands ready on the same schedule as the Port of Oakland channel deepening project. Individuals who previously had been on opposite sides of every major issue regarding the bay attended a meeting with representatives from Corps headquarters and voiced unanimous support for the Baylands. The Corps agreed to proceed with the next steps in the process. All the years of hard effort, persuasion, and alliance building were finally paying off.

Then a very strange thing happened. Just as we had persuaded the Corps of the benefits of the Baylands project, the federal agency with principal responsibility for the protection and recovery of endangered species responded to the Baylands with a very negative letter and recommended that the project be denied. The U.S. Fish and Wildlife Service requested a number of additions to the project, the most controversial of which introduced the assumption that tidal marsh restoration required mitigation for environmental impacts. Specifically, the Baylands hayfield retained low spots that ponded water in very wet years and thus created "seasonal" wetlands. The Corps had determined that 56 acres of such wetlands existed on the site. The Conservancy and the other agencies involved had agreed that a fully tidal 300-acre wetland would provide such high value habitat that it would more than compensate for the loss of these occasionally ponded hayfields. But Fish and Wildlife recommended that several hundred more acres of seasonal wetlands be created on another site as mitigation. This was a very expensive condition to accommodate, and it set a precedent that would make other future restoration projects impossible.

LAUREL MARCUS

Sunset view of a peninsula built to reduce the impact of waves while the marsh is under construction. Eventually, these peninsulas will disappear in the new marsh.

Perhaps the most difficult part of this request was its timing. The Fish and Wildlife Service had participated in the Baylands project for four years and had contributed to both the concept and the specific design. Why did it only now bring up such a fundamental issue? We were dumbfounded.

The other agencies—the EPA, the Regional Water Quality Control Board, the San Francisco Bay Conservation and Development Commission, the California Department of Fish and Game, and even the Corps—stood firmly in opposition to the Service's contention that tidal restoration projects required mitigation. Environmental groups, however, were split into two camps by this new requirement. On one side were those who had fought ocean and bay dumping and saw the Baylands as an environmentally beneficial answer to the dredging dilemma. On the other were people passionately concerned with seasonal wetlands, fearful of their destruction by future tidal restoration projects. After many emotionally charged months of debate, the Conservancy brokered a compromise. It offered to make an effort to restore seasonal wetlands on another nearby 250-acre parcel, a project consistent with our future plans for this site, and to add 24 acres of seasonally ponded area to the Baylands site. These concessions would not be permit conditions and therefore would not set a precedent for requiring mitigation for other wetland restoration projects. Finally both the Fish and Wildlife Service and the environmental organizations that had supported its position withdrew their opposition to the project.

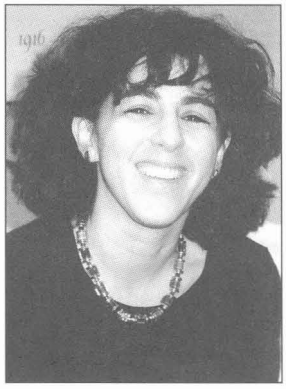
The final victory occurred in a particularly grand fashion. In December 1993, President Bill Clinton endorsed the Baylands project as a part of the Port of Oakland dredging effort. In the

. . . if you dump it in the water you may produce negative impacts; if you use it for a wetland, or as a landfill cover, you produce something useful—those benefits need to be factored into any economic equation.

KEYS TO SUCCESS

Fishermen's Suit Helped

CYNTHIA KOEHLER: In this case the fishermen and environmentalists are for all intents and purposes allied. Dumping large quantities of dredged materials has potentially very severe impacts on marine mammals, seabirds, and other species in the ocean and the bay. Given the large volumes projected for ocean dumping and the risk of harm to these resources, we feel it's very important to identify and develop disposal alternatives. Sonoma Baylands does not solve this problem but it's a valuable demonstration project. It shows that you can use this material productively in a socially useful way; and it demonstrates that the costs don't need to be widely divergent from the costs of dumping in the water. In determining the "cost" of a project, it is important to subtract a positive benefit—if you dump it in the water you may produce negative impacts; if you use it for a wetland, or as a landfill cover, you produce something useful—those benefits need to be factored into any economic equation.



Cynthia Koehler Attorney with the Natural Heritage Institute, representing the Pacific Coast Federation of Fishermen's Associations.

C&O: *Fishermen prevented the Port of Oakland from using a site off Half Moon Bay. Right?*
CK: That was my original involvement in the dredging issue. From our perspective, the LTMS [Long-term Management Strategy for disposal of dredged materials] was spawned by the Half Moon Bay litigation, which was brought by fishermen who had been left out of the process. There had been growing concern about dumping off Alcatraz and a compromise was reached that dumping would take place at a "temporary" ocean site 11 miles off the Half Moon Bay coast—right on the nearshore outer continental shelf, which contains some of the most productive fish habitat in the world.

The fishermen walked into our office and said: "We didn't know anything about this. This will destroy our industry and shut down our port." They were in a fairly advanced state of concern. We immediately filed a law suit and sought a preliminary injunction to halt the dumping. We lost the first round in federal court and refiled in state court, adding several new claims—in particular, that the Coastal Commission had not been consulted. We were successful in obtaining an injunction, which was upheld twice on appeal. Once that ended, there was a realization that to keep moving this problem from one back yard to another wasn't going to work, and that a comprehensive solution for the long term had to be developed, with the participation of everyone who had an interest and concern not only in the economic aspects of dredging and port development but also in the environmental effects associated with disposal.

C&O: *So there is a link between that battle and the Sonoma Baylands?*
CK: Oh, I think so. I'm not confident that without the litigation LTMS would have occurred. One of our concerns in the lawsuit that has remained central in our LTMS participation is the need for alternatives to open water dumping of dredged materials. The Ocean Marine Protection, Resources and Sanctuary Act (also known as the Ocean Dumping Act) specifically requires that ocean dumping be minimized, that multiple ocean dump sites should be avoided, and that ocean dumping which must occur be kept off the continental shelf and away from productive fishing areas. On this basis, we insisted that agencies develop alternatives such as Sonoma Baylands.

C&O: *Can we now hope for a qualitative difference in the way the issue of dredge disposal is handled?*
CK: The Sonoma Baylands project occurred after several acts of Congress and a Presidential order. We must have a fundamental change in the philosophy of the Corps in the way dredging disposal decisions are made. The next step is for Congress to direct the Corps to make the beneficial use of dredged materials its highest priority. Sonoma Baylands has not solved our problems. It demonstrates that without extraordinary—really extraordinary—political pressure, it's going to be business as usual.

wake of large-scale military base closures, the port was seen as especially vital to the local economy. The dedication and hard work of Congressional representatives, most particularly Congressman Ron Dellums and Lee Halterman of his staff, gave the Baylands the boost it needed. A White House task force was created to speed the dredging and the Baylands project along. Local Corps staff, many of whom had long supported the project despite the reluctance at their headquarters, formed a partnership with the Conservancy that has since brought the project to construction.

Lessons learned

THE SONOMA BAYLANDS IS MORE than just a tidal restoration project or a creative answer to a port's dredging problem. It represents an ideal: the transformation of a situation in which animosity and conflict dominate to a peaceful and beneficial settlement, backed by a successful political coalition. In California, where divisions are often stronger than alliances, the Baylands is a unique victory, demonstrating the ability of diverse people to agree, cooperate, and accomplish great things together.

The Baylands also owes its success to the power of the individual to make a difference. It began not as a government-mandated program or policy directive but as the vision of two people. This vision was reinforced by an enthusiastic design team, and it became a reality through the hard work of many people in government and private organizations, all of whom were ready to embrace a new and useful idea and to combine efforts to achieve its implementation.

The inclusion of a large-scale marsh restoration in an industrial port dredging project has opened the door for other similar projects nationwide. When evaluated only as a dredged material disposal site, the Baylands costs slightly more (five percent) than disposal at the newly designated ocean site 60 miles outside the Golden Gate. However, this economic evaluation does not account for the value of creating a 300-acre tidal wetland. When the value of the habitat is included, the Baylands is the clear bargain compared to aquatic disposal, which produces no environmental benefits.

The port's dredging project was expedited by the inclusion of this environmentally beneficial feature. All involved agencies were willing to accelerate their efforts to make the Baylands project work. Without the marsh project, the port could well have faced many more years of litigation and delays.

Largely in response to the Baylands proposal, the Long-Term Management Strategy (LTMS), a 50-year blueprint for disposal of material dredged from San Francisco Bay, includes wetland creation as an option. The LTMS agencies—EPA, the Regional Water Quality Control Board, the Corps, and the San Francisco Bay Conservation and Development Commission—have all endorsed this new concept in reuse of dredged material.

On July 18, 1994, Vice President Al Gore presided over a dedication ceremony for the Baylands. He spoke enthusiastically of the project as a national model. "The environment wins, the economy wins because you get a better port with more traffic and you create jobs in the process, so employment wins. The fourth winner is the nation because the project sets an unusual example of business, labor, and environmental groups working jointly to steer this innovative project through the bureaucratic morass." How remarkably far a simple idea can go.

GARY MARCUS

Laurel Marcus speaking at a dedication ceremony for the Baylands held at the Port of Oakland. Vice President Al Gore, who presided, is at her left.

Laurel Marcus, Sonoma Baylands project manager for the State Coastal Conservancy, has initiated and coordinated numerous wetland and watershed restoration projects on the California coast.

THE SONOMA BAYLANDS

This material is as clean as we know how to test it. We may be constructing a marsh that's cleaner than a lot of other bay marshes, which are contaminated by other industrial activities.

KEYS TO SUCCESS

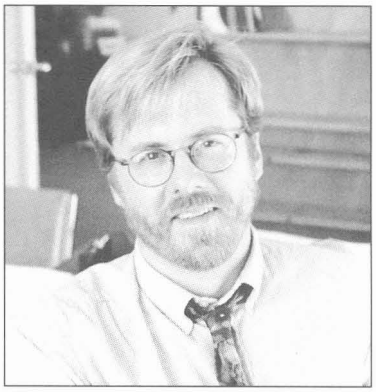
A Willingness to Listen

C&O: *Did you get 100 percent of what you wanted on the Baylands Project?*

BARRY NELSON: We did not give up anything. This is not a lowest common denominator project. It shows that you don't have to give up something to find some common ground with interests with which you sometimes disagree.

C&O: *Give us a little background, from your perspective.*

BN: This is a project we started working on with the Port of Oakland years ago. The port was facing the potential of additional dredging restrictions in the bay because of possible problems with winter run salmon. We went to the port and said they had two choices. They could take the low road and fight the Endangered Species Act, or they could take the high road and support a real solution to the problem the winter run salmon was facing. The solution was federal water reform. And the Port of Oakland, together with the ports of San Francisco and the mayors of both cities, wound up supporting that—they supported the Miller-Bradley water reform bill, basically because they felt that if the water policy issues were not solved, the ports would be damaged economically; that creating an endangered species project was going to affect the Bay Area's economy. Again, this was not a compromise process. It was a process of focusing on our mutual interests and on areas where we were in agreement.



Barry Nelson
Executive Director,
Save San Francisco Bay Association

C&O: Were you surprised that worked?

BN: Yes. There is always a tendency to stick with your own kind. It's true with environmentalists, it's true with members of the business community. I didn't know that the ports would be willing to look at a major industry in the [Central] Valley, at agriculture, and say that it had to change to protect the ports. They were. It was in the interest of the ports but it also showed that they were willing to take the high road.

C&O: *You also were sticking your neck out by standing in "bad company," no?*

BN: There were folks out there who felt that if the port was for it, it had to be bad. On this project we came to the conclusion that was wrong.

There were two major concerns with the project: the first was water quality. The Conservancy and the Sonoma Baylands required the material that was to go into the project to pass every test that has been devised. This material is as clean as we know how to test it. We may be constructing a marsh that's cleaner than a lot of other bay marshes, which are contaminated by other industrial activities.

The other concern was seasonal wetland loss. We felt that the project was modified to deal with that issue, by restoring seasonal wetlands on the site and making a commitment to do seasonal wetlands planning and restoration elsewhere. There's never been an acre-for-acre policy for wetlands restoration. We think that would be the wrong policy.

But the project would have gone more smoothly, there would have been less confusion, if we had had an overall North Bay wetlands restoration and management plan—one that lays out, from a biological perspective, how much tidal marsh we want, how much seasonal wetland we need, which sites can be restored as tidal marsh and as high-quality seasonal wetlands. We clearly need that for projects like this in the future.

C&O: *Is such a plan in the works?*

BN: It is. We've been working on that for quite a while. There's clearly a consensus now among all the agencies and the public that we need to move in that direction. There's a lot of land that is either publicly owned or might be publicly owned, and some private land where the owners might be willing to cooperate in joint management that will increase environmental values. But none of that will happen if

(continued on p. 20)

Designing the Sonoma Baylands Project

PHILIP B. WILLIAMS AND JOAN L. FLORSHEIM

THE SONOMA BAYLANDS project embodies the first large "second generation" design for a marsh restoration project on San Francisco Bay.

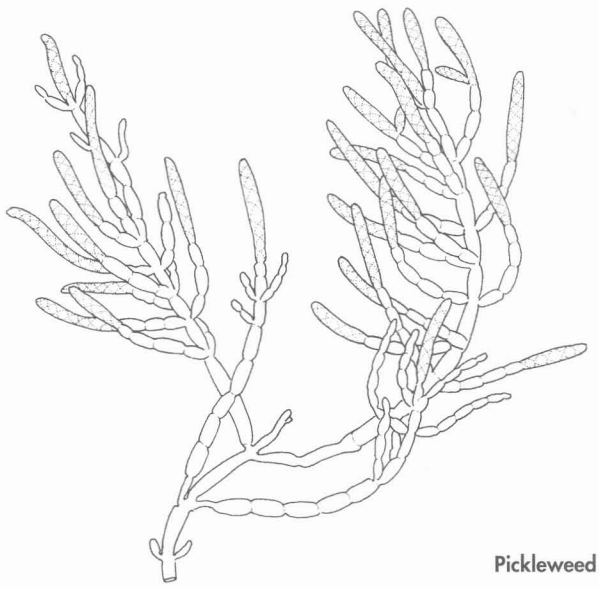
This design approach was developed in light of experience and data gained from earlier, "first generation" projects. The project is important in its own right, because it restores 322 acres of tidal marsh habitat to the bay. In addition, however, its pioneering design approach will refine earlier lessons and help to guide even larger restoration efforts anticipated on this estuary.

Like much of the vast area of tidal marsh that was diked and filled for agriculture on the margins of San Francisco Bay in the last century, the Sonoma Baylands site had subsided five to six feet—well below Mean Tide Level and well below the level at which marsh vegetation can survive. At first glance the solution seemed simple: just fill the site with dredged material back up to the level of the original marshplain, which is about the level of the tide at Mean Higher High Water (MHHW), then breach the levee and walk away.

In fact, this was the very approach used in the first restoration projects on San Francisco Bay about 20 years ago. At Pond 3 in Hayward (in 1975) and at Muzzi Marsh in Corte Madera (in 1976) (see sidebars, p. 24), dredged material was pumped onto the site, and, after the surplus water was decanted, tidal action was reintroduced by breaching the levee. Some major tidal channels were excavated by bulldozers, and some experimental plantings of cordgrass were carried out.

Now if you go out and look at these sites, at first glance they seem fine–they all are covered with salt marsh vegetation, mainly pickleweed. But a decade ago, these marshes looked different, and were the subject of intense controversy among academic researchers who disagreed on whether their restoration was a "success." One of the problems cited was that on portions of the sites dredge material had been placed at too high an elevation and remained sparsely vegetated for a long time. Now it is clear that if we were to use these projects as a model for Sonoma Baylands we would have to answer a key question: Twenty years later, how similar are these two sites to natural tidal salt marshes?

The design team for the Sonoma Baylands, seeking to learn from these early restoration attempts, was fortunate. The physical evolution (geomorphic and hydrologic) and performance of several restored marshes—including Muzzi Marsh—had been monitored for the past eight years. Much of this work was sponsored by Save San Francisco Bay Association, supported initially by the San Francisco Foundation, later by the Marin Community Foundation, Marin Audubon Society, and King & Lyons, a development firm. These nongovernmental organizations recognized that, unfortunately,



Pickleweed

KEYS TO SUCCESS

(continued from p. 18)

there isn't an overall management plan. And without that we will not be able to take full advantage of the potential for restoration. And there will continue to be controversy.

C&O: *Is there a key to success here that might help others?*

BN: The key was a willingness to listen to folks with whom you sometimes disagreed and look for common ground. There is an irony here. This started as an environmental project, then slowly the ports came on and helped bring in labor unions and shippers—Ron Dellums' office came on early—but the last to come on board was the Corps of Engineers. We had dealt with water quality, environmental cost issues, but the Corps of Engineers still didn't want anything to do with it—simply because of bureaucratic intransigence. And there was nothing behind the Corps' position except bureaucratic stubbornness. As an institution, the Corps of Engineers is hostile to environmental disposal alternatives other than the cheap and dirty way.

C&O: *May this project start a change?*

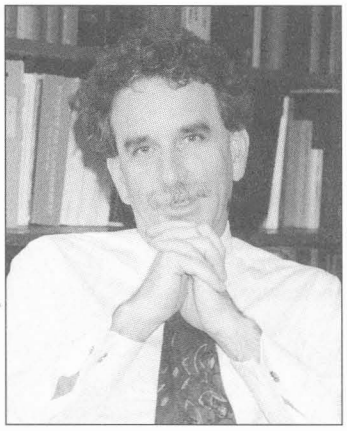
BN: It's definitely a watershed project, but institutions don't change overnight. The structural problem still exists. There's policy language already in place that says that environmental benefits must be considered along with economic benefits. But it's policy language that the Corps has simply ignored.

We'll never see another project exactly like the Sonoma Baylands, but by paying attention to its lessons we can find other innovative projects that allow us to restore the health of the bay in ways the business community will support. One of the things Sonoma Baylands shows is that we don't have to choose between a healthy bay and a healthy economy.

Keys to the Future

C&O: *Several people have described the Sonoma Baylands project as a breakthrough. Do you see it that way, and if so, what was the key?*

LEE HALTERMAN: There are a couple of keys to why it's a breakthrough and what made it happen. In terms of process, it was a willingness on the part of environmental organizations and environmentally oriented regulatory or other state agencies, like the Conservancy, to step up and engage with the commercial maritime industry—and vice versa—to develop a common strategy to solve a problem, the dredging problem. That created a precedent-setting coalition that will endure in some measure and with some degree of cohesiveness into the future.



Lee Halterman
General Counsel and Policy Director for the House Armed Services Committee, which is chaired by Rep. Ron Dellums

What's path breaking substantively is that we have developed a beneficial use project of some substantial scale, which hopefully will demonstrate that beneficial uses of dredged materials not only can produce a good product at the end of a process—in terms of wetlands and a dredged channel in this case—but can do it in a timely manner and with costs that are competitive with costs of other disposal options. Where in the past the choice appeared to be a dichotomy, with economic efficiency on the one hand and environmentally beneficial use or the least harmful deposition on the other, now we have shown this to be a false dichotomy. We will be able know that as a matter of policy we can pursue both those goals, and that our choice will be limited by the capabilities of different beneficial use options. And as costs come down for these beneficial uses and remain high for alternatives like ocean disposal, the gaps [in costs] will become very readily justifiable—to the extent that gaps even exist.

Where in the past the choice appeared to be a dichotomy, with economic efficiency on the one hand and environmentally beneficial use or the least harmful deposition on the other, now we have shown this to be a false dichotomy.

C&O: *Do you think it will be possible to make an assessment of cost-effectiveness on this one project within any reasonable time?*

LH: Yes, it's a large enough project and it's going to get done quickly enough—certainly within the stream of a lot of other follow-up

(continued on p. 22)

governmental agencies were not funding the kind of monitoring that would allow others to learn from early restoration projects. They stepped in to meet the need.

Building on early work

THANKS TO THE INVOLVEMENT of a number of individuals and institutions in the Bay Area who have developed a long-term interest in the success of marsh restoration efforts, we were able to locate original surveys of "first generation" tidal marsh restoration projects. For example, Tom Wakeman, of the U.S. Army Corps of Engineers, had worked on the Corps' Pond 3 restoration project in 1975. With the help of Wakeman and Scott Miner at the Corps, the design team located the early surveys from what was the first post-project monitoring of a restoration project, back in 1976. With these, we were able to go to Pond 3 to resurvey exactly the same transects in 1991 to help us understand what had happened and guide the ratio-

LAUREL MARCUS

PHILIP WILLIAMS & ASSOCIATES, LTD.

The natural tidal channels at the marsh in China Camp State Park, in Marin County, provide a model for restoration projects on San Francisco Bay.

KEYS TO SUCCESS

(continued from p. 20)

dredging projects that will be coming on line—at a time when we can hopefully deliver other projects for beneficial uses of dredged wetland material, such as landfill cover, dikes, wetland reclamation, or perhaps for creating beaches.

C&O: *Jim McGrath thinks that the ports' willingness to support water reform legislation was crucial to the Baylands' success because it opened the way for cooperation.*

LH: Horse trading has a pejorative connotation, but it's also a way of making sure that everyone has what they need. The horse trading that developed among the parties was important to confidence-building. I'm not sure that it was critical. Nonetheless, it was an act of good faith on the part of the ports to come to the table on behalf of water reform. I think this process created openings and dialogues between often-antagonistic sectors of our polity that may allow them to find common cause on a variety of issues.

My hope is that as we move forward, the maritime/commercial community as well as the maritime/environmental community will feel comfortable enough with this process to bring new projects forward. The ports recognize their critical need to identify other beneficial use sites, and the environmental groups recognize that the train is still moving down the track and they could grab hold of some of that momentum to try to drive policy forward. Those of us who are policy makers are saying, "Great. We've got strength on both sides of the political equation to hopefully drive some of this home."

C&O: *Scott Miner of the Corps said that the main limit on the Corps is the extent of willingness on the part of state agencies to pay a share of this kind of project. He thought funding from the Conservancy was critical.*

LH: It is likely that matching funds for these kinds of projects will be an element of one mechanism of establishing national priorities. That is not to say that there will not be times when we can't, on an ad hoc basis, establish a 100 percent federal payment. The key financially, I think, is to expand the character of what's authorized for the Corps to do—in what kind of circumstances do they pay for construction, what about the historical disposition method issue. There's a variety of issues on the table.

C&O: *In the range of conflicts that you work with, is this project a bright light?*

LH: After two and a half decades [of work with Rep. Dellums], this is one of the extraordinary outcomes. Definitely. This is a real big deal. It has the potential to affect national policy dramatically as well as to solve a very significant local issue. ■

Interviews and photos by Rasa Gustaitis

One day, in the foreseeable future, we might see flocks of pelicans on the restored marsh.

KEN W. GARDINER

JAY JONES

Packing down the foundations

nale for the Sonoma Baylands design. At Muzzi Marsh, we were able to resurvey earlier transects and understand the history of the site because Phyllis Faber, a wetlands botanist, the author of *Common Wetlands Plants of Coastal California,* and a co-worker in marsh monitoring efforts, had been tracking Muzzi's evolution since 1975.

Results of resurveying these marshes, which had been restored using dredged material, were very interesting. The surveys showed that both Pond 3 and Muzzi Marsh were now fairly close to the natural equilibrium marshplain elevation, which is at about MHHW for a mature marsh. The higher areas had subsided over time, and the lower areas had silted in with muds brought in by the high tide. But there was actually an important difference between the formerly high areas and the lower areas. In the former high areas, there were very few or no naturally formed tidal slough channels, while in the lower-elevation areas a dense, meandering slough system was evolving in newly deposited mud. These results showed that when dredged materials initially were placed at too high an elevation, tidal slough channels took a very long time to develop.

In restoration design, we now know how important it is to understand a tidal marsh as an evolving physical system that ultimately reaches a dynamic physical equilibrium. Tidal marshes evolve from mudflats and eventually reach a mature state in a dynamic equilibrium that involves tidal flows, sedimentation, rising sea levels, and land subsidence. Early marsh restoration projects attempted to replicate this equilibrium condition through precise grading or manipulation of tide levels. We are now learning that usually we are better able to meet our ecologic goal by creating a "template"—a physical design that allows a natural marsh to evolve as rapidly as possible toward a mature state. Unfortunately, we still do not have an adequate physical or ecologic characterization of how long it takes to develop a "mature" marsh, but we are fortunate in San Francisco Bay to have remnants of the original ancient marshes, several thousands of years old, that can provide important insight into marsh evolution. Like the ancient forests, they may have complex physical and ecologic qualities not yet discovered.

Saltbush

Luckily for the San Francisco Bay Area, one of the few research projects on the physical evolution of salt marshes has been carried out locally, along the Petaluma River. During the

past ten years, Josh and Laura Collins and Luna Leopold mapped and analyzed the complexities of a natural marsh system for the first time in great detail. Josh Collins, now at the San Francisco Estuary Institute, is continuing to build on this work. We now know that an intricate tidal drainage system provides unique habitat for many species, from benthic organisms to birds. We also understand how important the slough channel drainage system is in distributing water evenly over the marshplain during the highest tides and the effect of that distribution on the entire ecosystem.

Our monitoring of the first-generation sites at Pond 3 and Muzzi Marsh had shown that in the higher portions of the sites (where dredged materials had been placed), the tidal drainage system was evolving very slowly. So why use dredged material at all? The primary purpose of the plan was habitat restoration, and the design was driven by ecological, not disposal, goals. This fact distinguishes Sonoma Baylands

Pond 3

POND 3 was once part of an extensive tidal wetland that formed the margin of South San Francisco Bay north of Alameda Creek. By the 1930s the site was diked and in use as a saltwater evaporation pond. In 1965, Pond 3 was abandoned as a salt pond, and in 1974 the Corps of Engineers placed over 654,000 cubic yards of dredged material inside the levees. This placement was followed by subsidence. Because of difficulties in observing topography due to the turbid hydraulic slurries caused by construction and because the placement of materials was not supervised, the final elevation of the materials was uneven. The final elevation of the marshplain after filling was higher than intended in part of marsh. The landward portion of the marsh was initially 3.2 feet above MHHW (4.26 feet above MHHW at Pond 3). In 1975, the dike was breached, and a slough channel was excavated from the breach into the dredged material. Sedimentation occurred on the lower portion of the site. Currently the landward portion of the marsh is higher (1.7 feet above MHHW) than the lower portion (approximately MHHW). The lower portion of the marsh has few natural slough channels, and the upper portion has no natural slough channels because dredged materials were placed too high.

Muzzi Marsh

MUZZI MARSH was once part of a historic tidal marsh system that extended along the edge of Corte Madera Bay. It was diked in the late 1950s for use as a future industrial site. As the marshplain dried, it subsided. In 1976, the Golden Gate Bridge, Highway, and Transportation District acquired the Muzzi property as a mitigation site. The district restored a tidal marsh on a 130-acre portion of the site, using dredged materials. Approximately 750,000 cubic yards of dredged material were placed within the diked portion of the property, with the landward portion of the site at a higher elevation (about 1.3 feet higher than MHHW, which is 3.13 feet NGVD [National Geodetic Vertical Datum] in Corte Madera Bay) than the bayward portion (about 1.1 to 2.1 feet below MHHW). Tidal activity was restored by breaching the bayward dike in 1976. Since then, the two elevation zones have evolved differently. By 1980 the lower portion of the marsh had developed numerous sinuous slough channels, while the higher portion did not develop slough channels, even though it subsided to about MHHW. Some slough channels were excavated in 1986 to increase tidal circulation to the higher landward portions of the restored site. To date, there is still little natural slough channel development in the higher portion of the marsh.

U.S. ARMY CORPS OF ENGINEERS

Marsh restoration site with new levees and channels, before the addition of dredged materials. A natural marsh extends between the bay shore and the site at the mouth of the Petaluma River. To the right is Highway 37 and Port Sonoma-Marin.

from prior restoration efforts. Though this project is coming to be known as a creative example of the use of dredged materials to create an environmental benefit, the urgent need of the Port of Oakland to find disposal sites for such materials was not a factor driving the design plan for the Sonoma Baylands.

In fact, our exploratory studies had shown that marshes would form naturally if levees were simply breached, without any further intervention. We had seen this process at several sites where land had subsided and the levee had been breached accidentally. Salt marshes were now forming as estuarine sedimentation filled the site. On the basis of observations of the evolution of marshes in the White Slough area of Vallejo, where a levee failed in the late 1970s, and at the California Department of Fish and Game's Toy Property on the Petaluma River, where a levee collapsed in 1986, it seemed reasonable to expect that the Sonoma Baylands could also become a salt marsh from natural sedimentation after its levee is breached.

Natural sedimentation rates could be fairly high at the Sonoma Baylands site because the restoration site adjoins Port Sonoma-Marin, which is dredged regularly. The design team was, again, fortunate in that the staff of the marina kept good records and had retained Professor Ray Krone, of the University of California at Davis, to advise on siltation problems. The design team used Krone's data from Port Sonoma-Marin to predict the rate of sedimenta-

tion at Sonoma Baylands. We estimated it would take up to 35 years to get to the natural marshplain elevation we wanted if we relied solely on natural sedimentation.

Giving nature a head start

THIS SLOW RATE MEANT that it was worth taking another look at using dredged material to speed up the evolution of the marsh system to provide habitat for endangered species. The crucial question then became: How high could dredged material be placed without subsequently impeding the evolution of a complete tidal drainage system? Results of our surveys of Pond 3 and Muzzi Marsh indicated that the highest elevation to place dredged materials and still be confident that a functioning slough channel drainage system would develop quickly was 1.5 feet below MHHW, or about two feet above Mean Sea Level (MSL). This meant that if we placed about four feet of dredged material at the subsided Sonoma Baylands site up to a maximum elevation of two feet above MSL, it would speed up the evolution of the system, so that marsh vegetation would start to appear after about 10 years. Incidentally, it would also provide a place to put about 2.8 million cubic yards of dredged materials. We proceeded to explore this option further.

The physical design rationale was, essentially, to allow about 1.5 feet of natural sedimentation to occur on top of about four feet of dredged material, so that the natural tidal drainage would rapidly evolve. Another physical problem still had to be addressed, however, and that was wave action. The northern part of San Pablo Bay is windy and exposed to both strong northwesterly sea breezes and southeasterly winter storm winds. At high tide, strong wave action will resuspend freshly deposited estuarine mud, which could then be carried away by the ebb tide. The shallower the water, the more intense the wave erosion. Eventually, an equilibrium is established at an elevation where sedimentation on a mudflat is exactly balanced by wave erosion—which, if the waves are strong enough, can prevent the formation of a salt marsh. This explains why the shallow broad San Pablo Bay is a bay, not a marsh, and why when the wind blows in San Francisco Bay you can sometimes stand on the Golden Gate Bridge and see a sharp contrast between the muddy ebb tide and the clear flood tide ocean water.

Gumplant

Two other restoration projects on the bay offered some guidance to the design team on the issue of wave action. At the 250-acre Warm Springs restoration site in the south bay, peninsulas were incorporated in the grading plan to limit wind wave fetches. (Fetch is the distance over open water that the wind can blow, and the longer the fetch, the stronger the waves.) Six years after completion of the Warm Springs project in 1986, monitoring of the physical conditions indicated that most of the site was evolving toward a marsh as expected, but some of the shoreline areas exposed to wind and wave action on the longest (2,000-foot) fetches showed evidence of erosion.

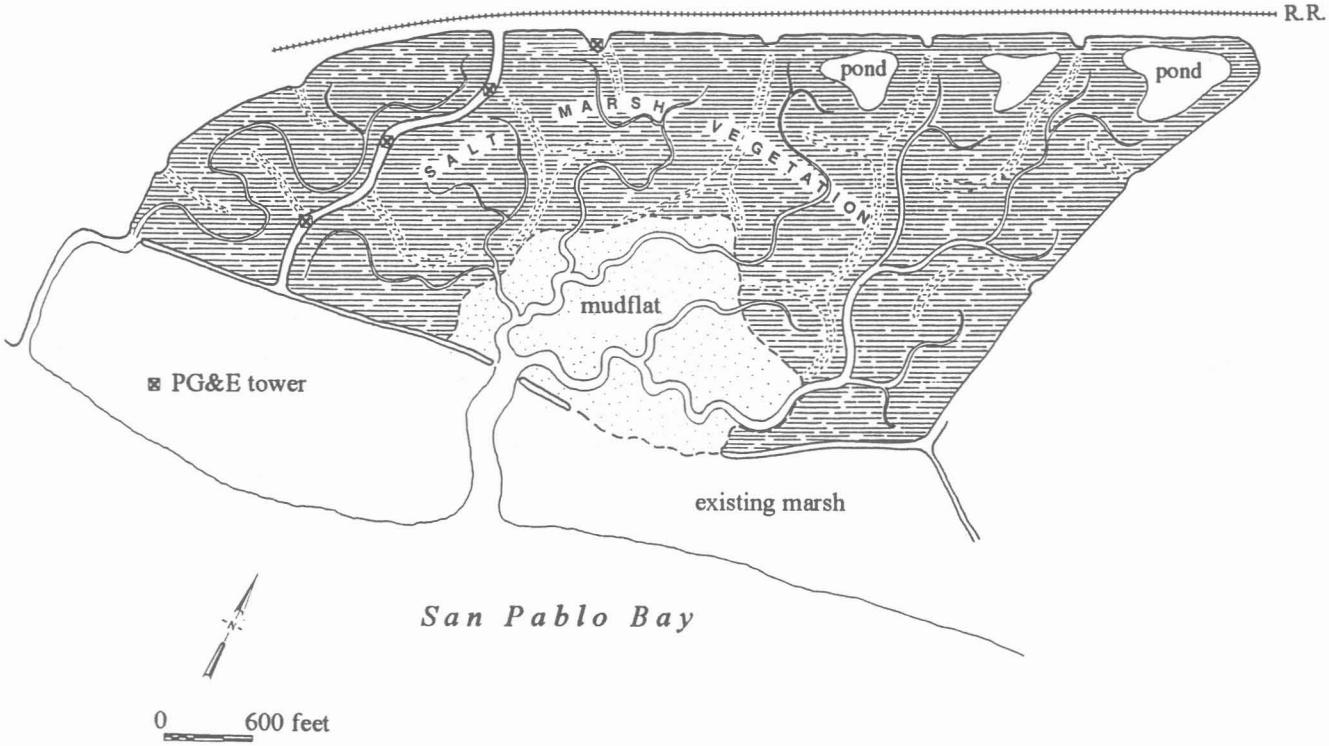
Meanwhile, at the Dickson property on Tolay Creek close to Sonoma Baylands, levees around a 90-acre field had been partially breached in 1982, allowing restricted tidal action and creating open-water habitat 3 to 4 feet deep. With wave fetches of about 2,000 feet, sedimentation rates were low, and there was no trace of emergent wetland vegetation anywhere on site. The steep banks surrounding the restoration site were eroding.

Review of these and other sites helped the design team to identify the maximum fetch length that would not significantly limit natural sedimentation and thereby retard the evolution of this marsh for the Sonoma Baylands. Based on this review, a distance of 1,000 feet was determined to be the maximum desirable wind wave fetch, and the design plan incorporated low peninsulas, oriented across the predominant wind direction, to limit wave action. The design also deliberately left a portion of the site without peninsulas to take advantage of the retarding affect of wave action on marsh evolution. The exposed area would create diversity by minimizing sedimentation in an "immature" portion of site. That portion would evolve more slowly than most of the site so that it would still be mainly colonized by cordgrass, while most of the site has developed into a pickleweed marsh. Over a few decades, the low peninsulas would subside into the marshplain and be barely distinguishable from their surroundings.

One issue remained in developing the geomorphic and hydrologic component of the design: How would tidal flows from San Pablo Bay reach the Sonoma Baylands site across 1,000 feet of existing marsh? Initially, the design team suggested enlarging an existing small slough channel. But at an interagency review meeting, the U.S. Fish and Wildlife Service asked us to look into other alternatives to avoid disruption of existing clapper rail habitat by construction equipment. After examining data from other restoration sites, the design team concluded that there was an excellent prospect that the small slough channel would deepen and widen rapidly with the natural scouring action of the tidal flow to the new Sonoma Baylands marsh. At both Warm Springs and the Toy Property, small ditches eroded to major channels within a few years of increasing tidal flow. Nevertheless, as a precaution for the Sonoma Baylands, the design team incorporated a requirement in the monitoring plan to identify whether the channel is scouring fast enough. If necessary, provisions to deepen the channel will be made.

As well as being an important restoration project in its own right, the Sonoma Baylands project can be seen as a pilot project for even larger future restoration efforts in San Francisco Bay, such as the 1,500-acre Cullinan Ranch near Vallejo or the 9,000-acre Napa Marsh (the former Cargill Salt ponds) in the north bay. A key part of the Baylands project will be the design and implementation of a monitoring plan to test our ideas and the analysis of the physical and ecologic evolution of the site. In this way, the "second generation" Sonoma Baylands design will quickly lead to a "third generation" design for other projects. Sonoma Baylands has taught us the importance and value of learning from past experience. ■

The Sonoma Baylands interdisciplinary design team consisted of Philip B. Williams, president, and Joan L. Florsheim, senior associate of Philip Williams & Associates, Ltd., consultants in hydrology; Ted Winfield and Christie Robinson of ENTRIX, wetlands ecologists; and Rick Olejniczak of Gahagan & Bryant Associates, dredging engineers. Laurel Marcus was project manager for the Coastal Conservancy, and Joan Vilms was project manager for the Sonoma Land Trust.



PHILIP WILLIAMS & ASSOCIATES

Sonoma Baylands about ten years after the project's completion

The CALIFORNIA-SIBERIA *Connection*

CONSERVING BERINGIA'S AVIAN LEGACY

JOHN TAKEKAWA

As trade and other exchanges increase among nations on the Pacific Rim, scientists in North America, Japan, and Russia are cooperating on conservation projects that use space age technology to increase understanding of the region's shared wildlife resources.

JOHN Y. TAKEKAWA AND HARRY R. CARTER

THE COUNTRIES along the North Pacific Rim face each other across the world's largest and deepest ocean. Vast distances separate them—17,000 km (10,500 mi.) from southeast Asia to southwestern North America—yet they are connected by ancient environmental ties. These include geology, ocean currents, and the pathways of migrating sea animals and birds.

An area of volcanic activity, known as the Ring of Fire, extends around the rim of the northern Pacific, along ridges formed between tectonic plates that continue to move, increasing the distance between Asia and North America. Ocean currents flow west to east, influencing the climate of the entire Pacific Rim and creating high biological productivity along the continental shelves. Polar bears and walruses sometimes cross from one continent to another on pack ice. The migration routes of whales, sea turtles, and birds weave invisible patterns across the ocean and sky, continuing an intercontinental exchange.

In the recent geological past, some 10,000 years ago, Asia and North America were connected in an area known as Beringia, stretching across western Alaska and eastern Siberia. During glacial periods a land bridge formed as ice masses increased, ocean water warmed, and the sea level dropped as much as 100 meters (325 feet) in the Bering Strait. This Bering land bridge extended for as much as 1,600 km (1,000 mi.) from north to south. Since the end of the most recent ice age the strait has been inundated, and only the string of islands known as the Aleutians partially bridge the gap between continents.

The disappearance of the Beringia land bridge confined land animals to one of the two continents. But some avian species, undeterred by water, have maintained the ecological connection between Asia and North America across Beringia. Of 89 species of tundra avifauna found in Alaska, 71 also occur in Asia. Six species classified as North American residents also breed in Russia, and four species considered Siberian residents also breed in North America. Many of these bird species once inhabited the Bering-Chukotka platform, which remained unglaciated at times when the rest of Beringia was covered with ice, and served as a northern refuge for animals. They dispersed from this refuge along the Pacific Rim, and either retained migratory ties or evolved into distinct species and subspecies, responding in different ways to climatic conditions.

At the present time, as human links between the Pacific Rim countries are multiplying owing to expanded trade and other contacts,

On facing page: Greater white-fronted and bean geese feeding on a rice field in Japan.

The Legendary Snow Goose

IN MAY, AS THE SNOW BEGINS to melt on Wrangel Island, 60,000 lesser snow geese arrive, completing their migration from North America and across Beringia to traditional breeding grounds here in the Arctic tundra.

They have stopped several times to feed on emerging vegetation following snowmelt. About 30,000 have wintered in California's Central Valley, the largest waterfowl wintering area on the North American west coast. They have flown more than 5,000 km (3,000 mi.), continuing an ancient cycle of breeding in the Arctic while wintering in warmer southern climates.

An urgent search for nesting sites immediately begins. Snow geese nest in dense colonies, and they often return to the same area year after year. The males may engage in territorial battles: only if they secure a nest will they mate successfully. All eggs are laid in early June within a period of a few days. Snowy owls and Arctic foxes begin to circle, waiting for an opportunity to raid the nests.

Within six weeks the goslings hatch and are ready to accompany the adults on an arduous overland journey, on foot, across streams and blooming meadows, in search of food. By now, there is little left to eat around the abandoned nesting colony. Sometimes the geese walk as far as 100 km (60 mi.) to find food, staying close together, with foxes and owls ever in pursuit. They must eat now to fatten up before the cold returns in August or early September and the autumn migration begins.

The lesser snow goose, with a total population estimated at 2.2 million adults, is one of two snow goose subspecies. The greater snow goose, *Anser c. atlanticus*, breeds on islands in north Baffin Bay and in Greenland, and winters on the Gulf of Mexico, in Louisiana and Texas. Almost all lesser snow geese, *Anser c. caerulescens*, nest in Arctic North America, with the exception of the single large colony that remains in Siberia on Wrangel Island. In earlier times, when these geese were abundant in Siberia, the month of their arrival was celebrated as the month of the snow geese. When they left, according to legend, they became beautiful maidens in faraway lands.

R. H. KERBES

The adult snow goose has pure white plumage, except for black primaries that are fully visible only in flight. The bill and legs are pink. In juveniles the upper feathers are pale grayish brown during fall migration. The adult male's wing span is 34–41 cm (15–18 in.), and the mean weight is just under 2.5 kg (6 lbs.). The female is identical, but somewhat smaller and lighter. This lesser snow goose family is feeding on spring wildflowers on Wrangel Island.

biologists from Asia and North America are increasingly working together to study and protect the avian legacy of Beringia. Discussing management problems and contributing toward their solutions, scientists from Russia, Japan, the United States, and Canada hope to accomplish more cooperatively than is possible by working separately. Here we describe some examples of this new cooperation in our research with lesser snow geese and seabirds, research that may help to protect and restore these species even as human demand for their habitat grows.

The Lesser Snow Goose

Each year in March, some 30,000 of the 300,000 lesser snow geese (*Anser c. caerulescens*) wintering in California's Central Valley follow their migrational urge to return to a unique breeding area on Wrangel Island, the only large land mass between the Chukotka Peninsula in far eastern Siberia and the North Pole. They flock together and fly the 5,000 km (3,100 miles) to arrive in time for snowmelt, find a nest, lay eggs, and raise chicks that will make the return journey, reappearing in the Central Valley in November. About half of Wrangel Island's snow geese winter in the Central Valley, the largest wintering area in western North America for these and other migrating geese. Once it was a vast wetland complex, teeming with birds. Now the snow geese crowd into remnant marshes, agricultural ponds, and flooded rice fields, together with greater white-fronted geese (*A. albifrons*) and numerous ducks and swans. About 60 percent of the Wrangel Island snow geese do not fly this far, wintering instead on the Fraser River delta of British Columbia. What was once this area's biggest wetland is now the city of Vancouver. A few snow geese continue as far south as the Salton Sea, in the Imperial Valley, or to the interior highlands in Mexico.

Lesser snow geese are among the most abundant waterfowl species, with a population estimated at 2.2 million adults, but their numbers and range in Asia have been severely diminished in this century, primarily by overhunting and loss of habitat. During the 1800s their distribution extended beyond the Canadian Arctic breeding areas across northern Siberia and from Pacific Coast wintering areas in North America to East Asia. Now breeding colonies exist only in the Canadian Arctic, with the exception of one colony in Asia, on Wrangel Island, 140 km (85 mi.) north of the Siberian coast and 400 km (250 mi.) west of Alaska. A recent

genetic study indicates that the Wrangel Island colony may be the oldest, or parent, population of all current lesser snow geese.

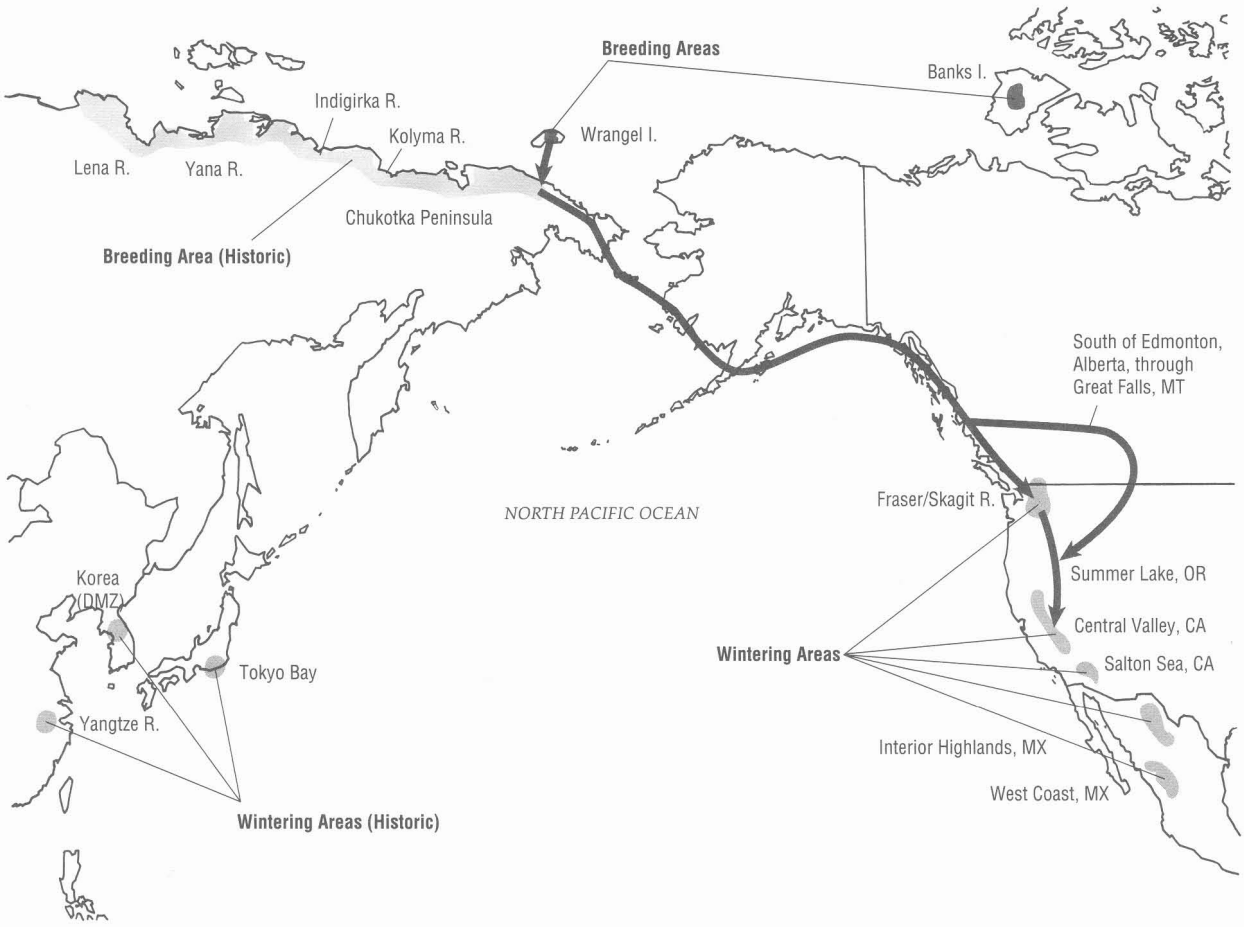
Before 1900, snow goose colonies in Russia ranged from the Lena River to the Chukotka Peninsula, a distance of some 2,000 km (1,250 mi.), and these *Bely-gus* migrated 4,000 km (2,500 mi.) or more to overwintering sites in Japan, Korea, and China. By the late 1920s, few colonies remained on the Russian mainland. On Wrangel Island there were several large colonies in 1926, when the first Soviet settlers arrived. Because of egg collecting and hunting, however, only two large colonies remained by the mid-1960s, with a total of some 200,000 birds. One of these colonies was destroyed when a geological expedition camped near it in 1967–68. In 1969 the surviving colony numbered about 120,000 adult birds, but by the early 1990s it had shrunk to only 60,000.

The precipitous decline in the Wrangel Island population created international concern. Wrangel Island has been protected by the Russian nature reserve system since 1976, and the snow goose is listed in the Russian red data book of endangered animals and is protected from hunting. However, with the collapse of the Soviet Union and the ensuing economic hardships, protection has become more uncertain.

Russian researchers had urged for 20 years that breeding colonies be reestablished on the Arctic coast of Siberia to buffer against catastrophic loss on Wrangel Island and to insure the survival of snow geese in Asia. In Japan, these recommendations fell on the receptive ears of members of the Japanese Association for Wild Geese Protection, who hoped to see the return of snow geese to historic wintering sites in their country.

Historically, geese from the Siberian mainland had migrated to China, Japan, and Korea. In Japan, historical records and artwork have documented the presence of *hakugan* in large numbers, especially on the island of Honshu. At the beginning of the Meiji period (1868), "snow geese appeared and landed flock after flock" in Tokyo Bay, according to a book written at that time. Soon after, as Tokyo Bay was developed and firearms were widely distributed, these flocks disappeared. Almost all snow geese from Russia now migrate to North America. However, bean geese and greater white-fronted geese have continued to migrate

Lesser snow geese along the North Pacific rim



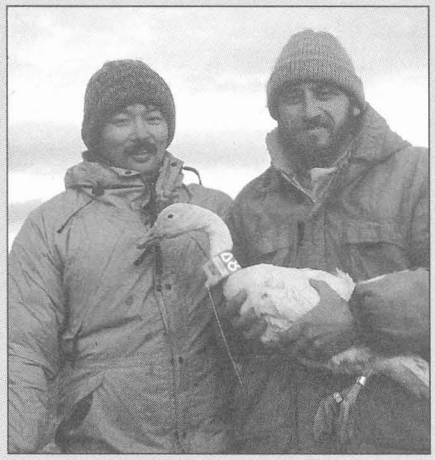
SOURCE: J. TAKEKAWA AND H. CARTER

Tracking Snow Geese by Satellite Telemetry

TECHNOLOGICAL ADVANCES in satellite telemetry are helping researchers in their efforts to learn about breeding, migration, and wintering areas of endangered bird populations. Satellite transmitters send a radio signal of fixed frequency to polar-orbiting weather satellites, which use the Doppler effect to calculate the transmitter's true location.

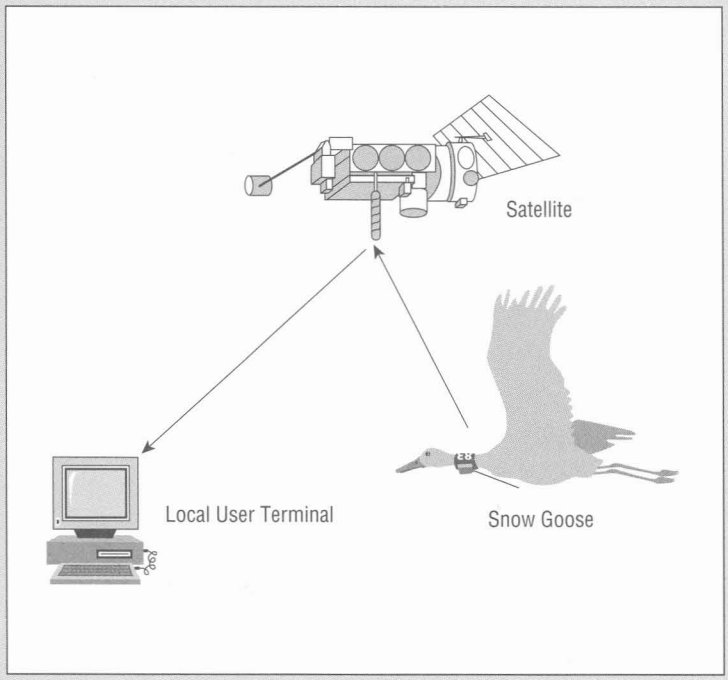
Satellite transmitters were originally designed to track buoys monitoring ocean environments. In 1970, a large transmitter was adapted to follow a migrating grizzly bear. Since then, miniaturization has made it possible to use the devices on several different mammal species as well as on migrating birds. In 1991, the first project to examine migrating geese documented the route of snow geese from Siberia to California. The smallest transmitters then available (40 g or 1.4 oz.) were attached to the necks of adult ganders on Wrangel Island before the autumn migration. Even smaller transmitters have since been developed (less than 25 g, or not quite an ounce), priced at a few thousand dollars each. These small transmitters enable researchers to gather previously inaccessible information on ever more species and their habitat needs.

Given the urgency of protecting endangered species habitat and the difficulty of studying limited populations with older research methods, satellite technology promises to be an increasingly valuable conservation tool.



DENNIS ORTHMAYER

Russian biologist Vasily Baranyuk of the Wrangel Island Nature Reserve and John Takekawa hold a snow goose with transmitter attached on a neck collar. The collars usually drop off within a year.



from Russia to Japan along the historic flyway. More than 30,000 greater white-fronted and 5,000 bean geese now spend the winter in Japan.

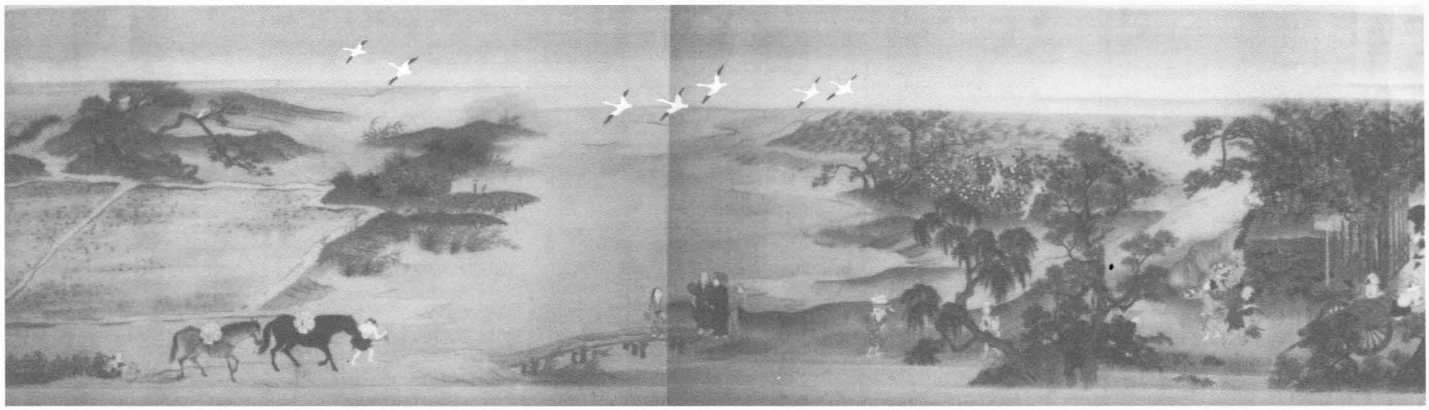
The similarity between Asian and North American wintering areas is striking. To begin with, the regions are on nearly the same latitudes. The largest wintering area for waterfowl on the west coast of North America, the Central Valley of California, extends from 36 to 39 degrees north latitude. Major wintering areas on the east coast of Asia include Japan and Korea (35–39 degrees N) and China (30–35 degrees N). In addition, climates in both areas are relatively mild. In recent times, the major habitat in most wintering areas used by geese in California is rice fields, as is the case in Japan, Korea, and China.

Lost National Treasures

All wild geese are recognized as national treasures in Japan. Hunting was prohibited in 1971, and snow and other geese are now protected by the Japanese Environment Agency and National Cultural Ministry. In 1989, the major wintering area for geese, Lake Izunuma, was given protected status under the Ramsar Convention as a wetland of international importance for waterfowl. But many of the traditional wintering sites have already been lost, and the enormous development pressures associated with the high economic value of land in Japan remain a threat. Development pressures on wetlands in wintering areas are severe in both the United States and Japan, although they are generally more extreme in the island nation of Japan.

The project of restoring snow geese to the Siberian mainland and Japan clearly required Japanese and Russian scientists to work together. To protect the Wrangel Island colony, the cooperation of North American scientists was also essential. The nations with breeding snow goose populations share many of the same problems—predation by the Arctic fox, for instance. In the past, there was not enough food to support large numbers of this fox through the winter in some northern wilderness areas. Now, though, with hunters and other humans present, it has found opportunities to scavenge even during the winter and has become established year-round, preying on snow geese in summer.

Each country on the Pacific Rim also has different assets and problems to bring to cooperative efforts. Russia has a great deal of land but is crippled by economic difficulties and change. It



Flocks of snow geese are depicted in a large mural (here seen in part) created by Sumiyoshi Gukei (1635-1705), a Buddhist monk, and titled *"Rakuchu rakugaizu-kan"* or "Inside and Outside Kyoto." The original is in the Tokyo National Museum.

has set aside huge reserves, but lacks adequate supporting funds. On Wrangel Island, reindeer have been introduced and could overpopulate the island if not managed carefully, as they are at present. Funding problems, however, are so large that the management staff may have to abandon the reserve. In August, an order of fresh food had to be turned back because the reserve lacked the funds to pay for it.

Japan has invested a smaller proportion of its gross national product in conservation than other First World nations, and environmental education in Japan is not as widespread as it is in North America. In Japanese universities, biology is taught in general, with little specialization in such areas as ornithology or wildlife ecology. Canada and the United States, meanwhile, have long-established conservation programs, technology that can be put to use, and the capacity to initiate cooperative projects. With advanced satellite telemetry, it would be possible to trace a migration in detail for the first time, and also to determine just which breeding areas on the Russian Arctic mainland are used by geese that winter in Japan.

Cooperative Projects

Recent political and technological changes have opened the way for the restoration of lesser snow geese to East Asia, and for cooperative international efforts the protect the migration route across Beringia, between Wrangel Island and California. Open exchanges of information between Russia and other countries are now frequent and have enabled Russian, Japanese, Canadian, and U.S. biologists to begin working together.

In fall 1991, a team of biologists from Russia, Canada, and the United States (a team that included J. Takekawa) followed Wrangel Island geese via satellite transmissions and documented the stops they made en route to North America. They captured 29 adult ganders, attached tiny satellite transmitters (see sidebar) to their necks, and tracked them, establishing this group's flight path for the first time.

The geese left Wrangel Island in early September and headed across eastern Siberia, where some disappeared, possibly felled by hunters. They stopped at several wetlands on the Chukotka Peninsula, then crossed the top of the Pacific Rim at the Bering Strait near its narrowest point. They paused on remote St. Lawrence Island, midway between the continents on the international dateline. After a few days of rest, the geese continued to the North American mainland, arriving at the Yukon River Delta of western Alaska in September. Here they stopped to replenish energy reserves before continuing southward to the Fraser and Skagit River deltas of British Columbia and Washington, and, in late October, to the Klamath Basin in northern California, and, finally, to the Central Valley in early November.

The entire migration took more than two months, with the geese flying at up to 80 km (50 miles) per hour. Many juveniles had been lost en route. Of the 29 ganders equipped with transmitters, seven stayed on the Fraser and Skagit River deltas, while four arrived in the Central Valley. A few geese were found dead of avian cholera, one of the diseases associated with crowding. The incidence of this disease has increased as wetlands historically used by migrating birds have been developed, confining most birds to limited reserves.

Now that the exact path of the migration has been traced, biologists are trying to find out why so many juveniles died en route and what protection measures are needed to save areas critical to Wrangel Island geese.

Restoring Snow Geese to East Asia

In January 1993, biologists from the Russian Academy of Sciences and Nature Reserves and the U.S. National Biological Survey (NBS) (J. Takekawa) were hosted by the Japanese Association for Wild Geese Protection in Sendai,

Japan. They met to develop a plan for the return of snow geese to East Asia. A committee was formed to discuss shared goals and responsibilities. This meeting received nationwide press coverage in Japan because few previous meetings about conservation had included these three countries.

During the summer of that year, members of the Japanese association traveled to Siberia to work with the Russian biologists. In June, the first snow goose eggs were transplanted from Wrangel Island to a site on the Anadyr River on the Russian mainland. The eggs were taken from nests (one egg from each of 100 different nests containing several eggs) and flown by helicopter (in slings and padded cases, to protect against vibration) to selected incubation sites. Some eggs were placed in nests of greater white-fronted geese, some of which were known to fly to Japan. Others were hatched in captivity, marked with leg bands, and released with greater white-fronted geese. Despite delays because of bad weather, 86 of the eggs hatched, and successful mixed families were observed among the white-fronted geese. These experiments were preliminary in nature, but when three juvenile snow geese were sighted in different areas of Japan later that year, biologists saw them as a sign of possible success.

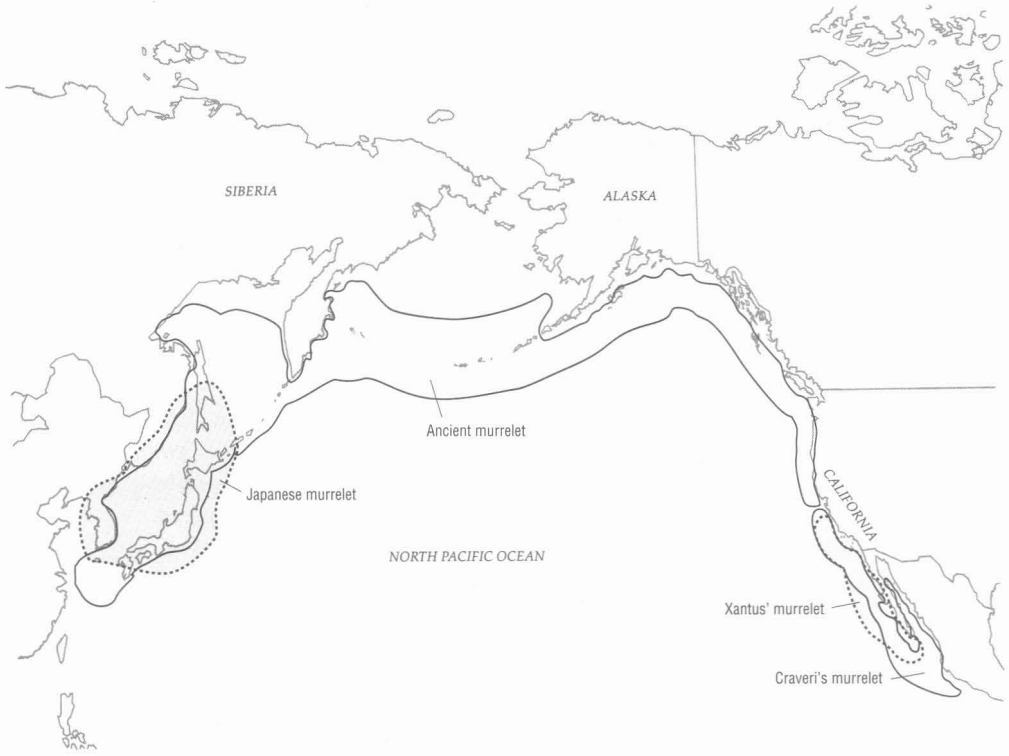
In January 1994, NBS biologists J. Takekawa and Dennis Orthmeyer traveled to Japan and captured 36 white-fronted geese, marking 10 with satellite transmitters. Eight of the 10 marked geese migrated back to their Siberian breeding grounds at the northern end of the Kamchatka Peninsula in mid-May, delineating the northern end of the migration from Japan for the first time. These breeding areas may be used to attempt to reestablish snow geese on the East Asian migration. Further studies are being conducted on the Kolyma River, where surveys have detected small numbers of breeding snow geese.

The lesser snow goose restoration project is one of several efforts that have recently brought together wildlife biologists and natural resource managers from Pacific Rim countries. The most successful restoration program for an Arctic nesting goose has been conducted on Aleutian Canada geese (see Winter/Spring 1992 issue of *Coast & Ocean*). The population rebounded from under 800 individuals in the 1970s to more than 10,000 in 1993.

Studies of Rare Murrelets

Also under way at this time is a cooperative venture to examine the status of rare murrelets on both sides of the Pacific. This project was initiated in 1993 by the Pacific Seabird Group (PSG), a nonprofit organization dedicated to the study and conservation of Pacific seabirds and their environments. In April 1993, the Wild Bird Society of Japan invited North American PSG biologists (including H. Carter and Leah deForest) to meet with researchers in Japan to discuss their similar conservation concerns for

Murrelets along the North Pacific rim



SOURCE: J. TAKEKAWA AND H. CARTER

murrelet species. For instance, problems that threaten the Xantus' murrelet (*Synthliboramphus hypoleucus*) in southern California resemble problems for the Japanese or crested murrelet (*S. Wamizusume*) in southern Japan.

Murrelets, which nest along the North Pacific Rim from China in the west to Baja California in the east, provide a good example of adaptive radiation from Beringia, which has resulted in speciation. They belong to the Alcidae family, a group of seabirds that also includes auks, puffins, auklets, and murres. All species in this family originated in the Pacific Basin, including seven species that now inhabit the North Atlantic Ocean. Alcids are wing-propelled birds that dive for their prey in near-shore and pelagic areas, and usually nest in burrows or crevices on islands or sea cliffs. Because murrelets are nocturnal in their activity on nesting islands, they are difficult to count.

Four species of murrelet belong to the *Synthliboramphus* genus: the Japanese, ancient, Xantus', and Craveri's murrelets. These species span much of the rim of the North Pacific Ocean, including the East China Sea, Sea of Japan, Sea of Okhotsk, Aleutian Islands, Gulf of Alaska, Pacific coast of North America, and the Sea of Cortez (see map, p. 34). The ancient murrelet (*S. antiquus*) is the most widely distributed of the murrelets. The center of its geographic distribution is on the Bering Sea, but its current numerical center, where a half million breed, is the Queen Charlotte Islands, British Columbia. The Japanese murrelet is the most endangered species among the murrelets (see sidebar). It may also be the rarest of the alcids. It is found only at the western edge of the North Pacific Rim, preferring areas of warmer water near the islands of southern Japan. These birds have been protected as a national cultural treasure since 1975 but, strangely, are listed in that country as only a sensitive or threatened rather than as an endangered species. Fewer than 5,000 Japanese murrelets are thought to be in existence.

The Izu Islands may have been the most important habitat area for this secretive species in the past, but several nesting sites there have been disturbed or lost because of egg collecting for human consumption, use of some islands for sport fishing, and target practice by the U.S. military. In 1993, PSG researchers visited one of the largest remaining breeding colonies, at Tadanae Island, near Kozu Island in the Izu Island chain. They had an opportunity to examine six nests and witness hundreds of birds arriving at night. They also learned about a

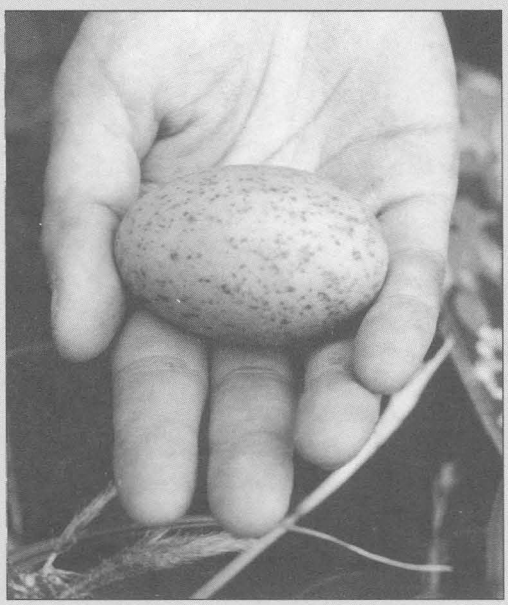
The Japanese Murrelet—A Very Rare Seabird

ALTHOUGH THE THREATENED marbled murrelet may be more famous in North America, the Japanese murrelet, *Synthliboramphus wumizusume*, is likely more rare. Scientists believe there are only 5,000 now in existence, though their secretiveness makes them difficult to count and study.

Japanese murrelets breed in rock crevices on islands off the coast of southern Japan. Mates take turns for 72-hour incubation shifts during a 35-to-45-day-long incubation period. The young are precocial (downcovered at hatch and very active) and leave the nest as early as two days after emerging from the egg. Their parents accompany them and feed them at sea (scientists assume they feed on fish, but do not know for certain). In fall and winter, murrelets disperse offshore and along mainland coasts from Sakhalin south to Korea. Many are killed in gill nets in the northwest Pacific. During the breeding season, Japanese murrelets appear to be tied to coastal waters influenced by the Kuroshio Current off the coasts of Kyushu, southern Honshu, and in the Izu Islands.

HARRY CARTER

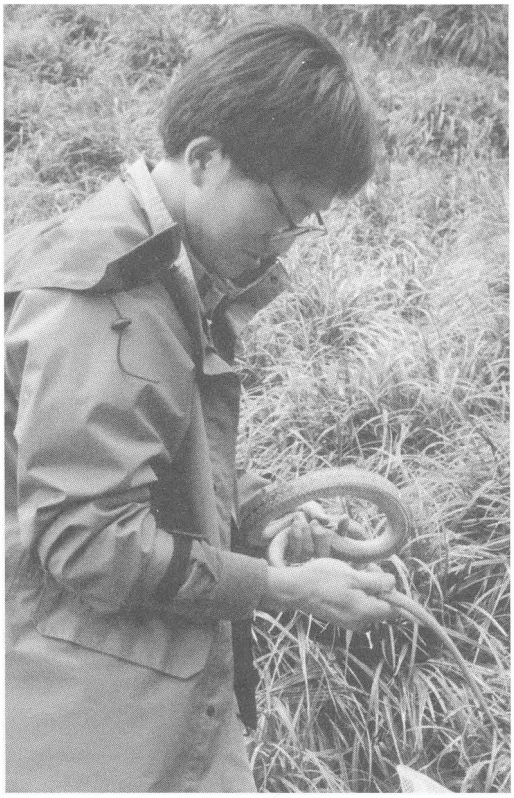
The Japanese murrelet is also known as the crested murrelet. The crest is formed from long black feathers that extend from forehead to nape. A broad white stripe runs along the sides of the head, meeting on the upper nape. The body's upper parts and flanks are grayish-black, the underparts mostly white. It is related to the great auk (*Pinguinus impennis*), which went extinct exactly 150 years ago (1844) in the North Atlantic, as well as to other seabirds in the alcid family.



HARRY CARTER

The Japanese murrelet lays two eggs per clutch. Together, they represent almost half her body weight.

HARRY CARTER



Masami Hasegawa, with the Chiba Natural History Museum, examines a large garter snake on Tadanae Island. These snakes eat murrelet eggs and chicks.

JOHN TAKEKAWA

Scientists capturing lesser snow geese during the molting period on Wrangel Island. The geese are flightless in midsummer.

threat to the murrelet that typifies the problems endangered species managers are increasingly facing as wildlife populations and habitats continue to shrink. A special population of a giant garter snake, *Elaphe quadrivirgata,* lives on the island. At higher murrelet population levels, these two-meter (six-foot) -long snakes probably consume a relatively small proportion of eggs and chicks, but now that the murrelet population is sparse, they greatly reduce the breeding success of the Japanese murrelets.

Researchers with the Pacific Seabird Group have found similar heightened levels of nest predation on the Channel Islands, where a protected endemic island subspecies of deer mouse, *Peromyscus maniculatus,* preys on Xantus' murrelet eggs. Meanwhile, in fragmented old growth forests on the North American west coast, corvids (crows and jays) are exerting heavy predation on nests of the marbled murrelet (*Brachyramphus marmoratus*), a federally listed threatened species, which lays a single egg high in the branches of old growth trees from California to Alaska. Since the marbled murrelet was listed as a threatened species in 1992 it has become a symbol, along with the spotted owl *(Strix occidentalis),* for the need to protect our dwindling coastal old growth forest.

At a meeting in Tokyo, the North American biologists were able to exchange valuable information with Japanese Environment Agency biologists concerning ongoing studies of, and the effects of predators on, various murrelets and other endangered seabird species. Japanese herpetologists and seabird biologists are planning further studies to address snake predation at Tadanae Island and other nesting islands where snakes are found.

To continue exchanging information regarding similar research, Japanese biologists Koji Ono and Yutaka Nakamura accepted an invitation to a special PSG-sponsored symposium on the status and conservation of rare alcids, held in Sacramento in January 1994. They presented a paper on the population status of the Japanese murrelet and provided a detailed picture of conservation problems throughout its range. Harry Carter and many other PSG biologists presented similar papers for the Xantus' murrelet and other rare alcids in the North Pacific. This exchange has highlighted the need to focus on specific nesting islands and to undertake restoration activities including removal of introduced predators (rats and cats, for example), reduction of other predation (by snakes, corvids, and mice, for instance), reduction of

human disturbance, and reduction of causes of mortality at sea (pollutants, gill nets). Many factors have contributed to the poor health of rare murrelets in various parts of the North Pacific Rim.

Participation in North American scientific meetings by biologists from East Asian Pacific Rim countries has not been sufficiently encouraged in the past. For seabirds, a beginning has now been made. In March–April 1994, PSG researchers (including Harry Carter) again visited Japanese biologists and Japanese murrelet nesting islands. They traveled to the four largest remaining colonies and briefly assessed their status. Two remote colonies had not been surveyed by ornithologists for almost 50 years, and it was a great relief to find that the birds still existed, although in low numbers. On all four islands the visitors found apparently high predation by jungle crows *(Corvus macrorhynchos)*, attracted by sport fishermen who leave garbage and bait on the rocks.

Through our interaction with colleagues from other countries, we have discovered that many of the conservation issues related to numerous bird species are similar on both sides of the North Pacific Rim. Our concern for these birds transcends national boundaries, and we hope to continue to work on cooperative projects, thereby improving our understanding. These endeavours, however, will succeed only if all parties continue them over the long term—a difficult task, but one well worth the effort. ■

John Takekawa is a research biologist with the National Biological Survey, California Pacific Science Center field station, in Dixon, California. He specializes in migratory birds and their habitats, including studies of greater white-fronted and lesser snow geese with satellite telemetry. He is currently continuing work on Arctic nesting geese and shorebirds, and initiating studies of salt marsh species and habitat restoration in the San Francisco Bay estuary.

Harry Carter is a contract biologist for the National Biological Survey in Dixon, California. He has assessed the status of seabird populations throughout California and British Columbia and has examined impacts from oil spills, gill nets, loss of habitat, human disturbance, and other marine conservation issues. Currently, he is studying Xantus' murrelets, ashy storm-petrels, and other threatened seabirds in the Channel Islands off southern California with funding from the U.S. Navy.

On Wrangel Island, Siberia

SEAN BOYD

A New Guide for Wetland Property Owners

IN CALIFORNIA, a wide variety of approaches has been devised to assist landowners in protecting wetlands according to their different needs, within the context of broader conservation goals. Now a new guide to these approaches has been developed by the State Coastal Conservancy. It describes the financial, advisory, and technical assistance available to those who choose to create, protect, or enhance wetlands on their land. The array of options includes financial contributions for projects or practices that provide long-term improvements in wetland values, and payment at fair market rates for placing permanent protections on wetland areas. The guide explains benefits that can be derived both from having wetlands and from making use of the available assistance.

Allen Garcia and Charles Rominger are among landowners who have used programs described in the guide.

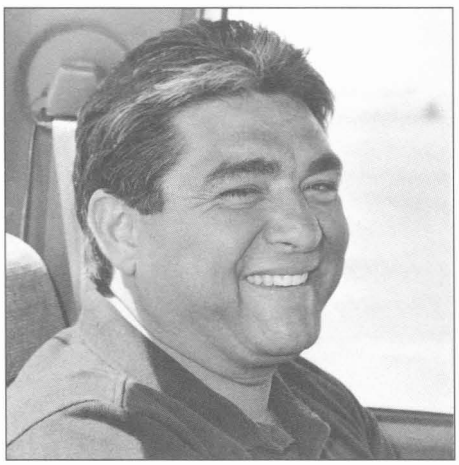
For a free copy of the 55-page guide, call or write the State Coastal Conservancy, 1330 Broadway, Suite 1100, Oakland, CA 94612. Tel.: (510) 286-1015.

RECIPE FOR AN INSTANT WETLAND

AT FIRST GLANCE Allen Garcia's property looks like a seasonal wetland, not a successful family-run rice farm. In fact, it's both. As you travel across Garcia's 900 acres, the signs of a working farm—large equipment, fence lines, and idle machinery—are visible among the rice paddies, the cattail-fringed ponds, spring-fed hollows, and seasonal creeks thick with willows and cottonwoods.

It was not love of birds and mudflat creatures that led Garcia to pioneer in wetland-friendly farming in Glenn County, however. It was the need to improve the soil for growing crops. When the family arrived from Spain three generations ago, they could only manage to buy shallow land underlain with hardpan. "You have to grow your soil on these marginal lands," explained Garcia. "The fact that my family settled here has a lot to do with my interest in, and practice of, sustainable agriculture." Rice farming is beautifully suited to marginal lands, he believes: the more you grow rice, he will tell you, the more it enriches the soil.

To help improve his land, and to increase his rice yields, Garcia has for many years participated in programs offered by the Agricultural Stabilization and Conservation Service and the Soil Conservation

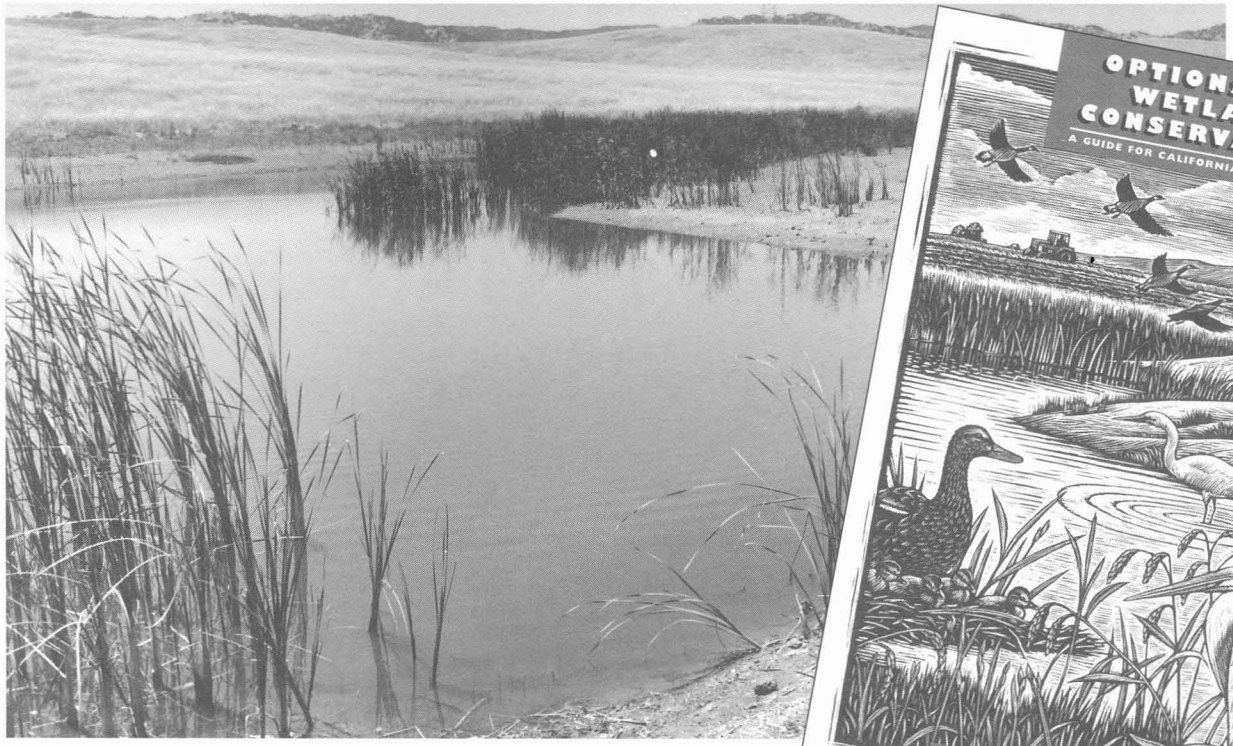


Service. These programs allowed him to rest some paddies and bordering lands, encourage plant growth around seasonal creeks and runoff channels, and to develop a chain of seven tailwater return ponds to supply inexpensive water for rice paddies. All these measures help to prevent soil erosion. Since 1971, he has also flooded his rice fields in winter instead of burning the stubble (the more common practice in the Valley). Winter flooding allows the rice stubble to decompose while, at the same time, recharging groundwater supplies and providing habitat for the migrating birds that begin to flock here shortly after the October rice harvest.

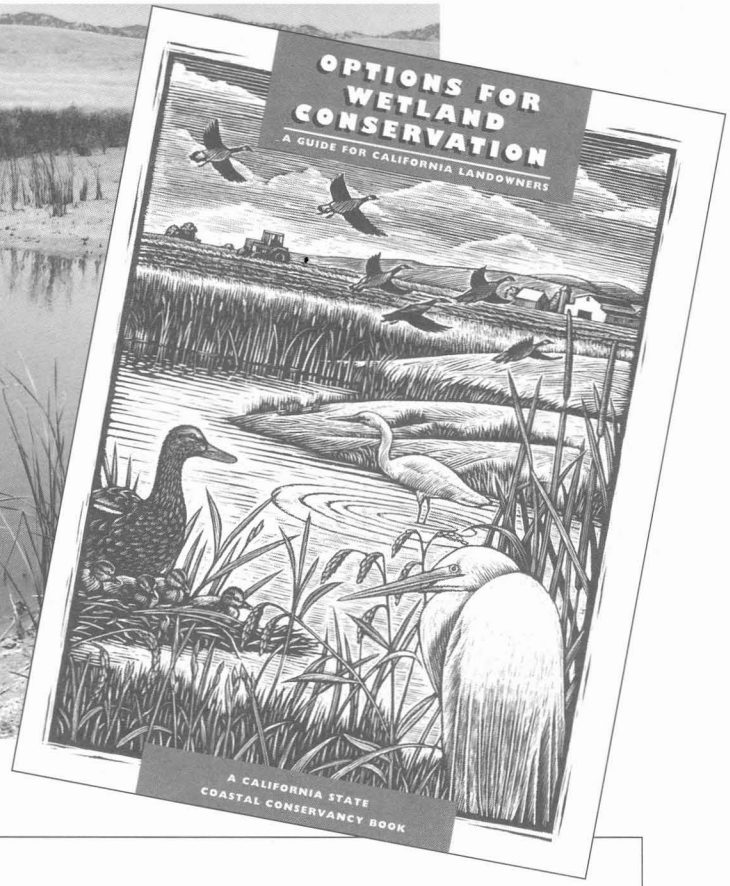
"No other system, beside managed wetlands, provides this kind of habitat," said Garcia, pointing to his series of ponds and paddies. "Sometimes you can come out here and see 500 acres of geese. By feeding in my flooded paddies, waterfowl help break down stubble while leaving fertilizer. Really, waterfowl perform a service for rice farmers. In China, they've been using this system for thousands of years." In California, it is now being encouraged by a law that prohibits burning stubble as of the year 2000 because of the air pollution the practice generates.

In wet years, Garcia's tailwater ponds fill with runoff. In dry years he purchases water to top them off. He moves water through his ponds and paddies using the land's natural topography and simple gravity. When the water reaches the last, and lowest pond, it is pumped back up to the highest pond for recirculation.

In the last five years, the cost of water has soared from $3 to $30 an acre foot in the Corning Water District. "That is just *one* reason this tailwater return system makes sense," said Garcia. But it's not *the* reason. "Every year I see new shorebirds and wildlife. When habitat is destroyed elsewhere, even in Nevada, we see an increase here. I have an instant recipe for improving land and creating wetlands," he added, with a smile:



On the Rominger land

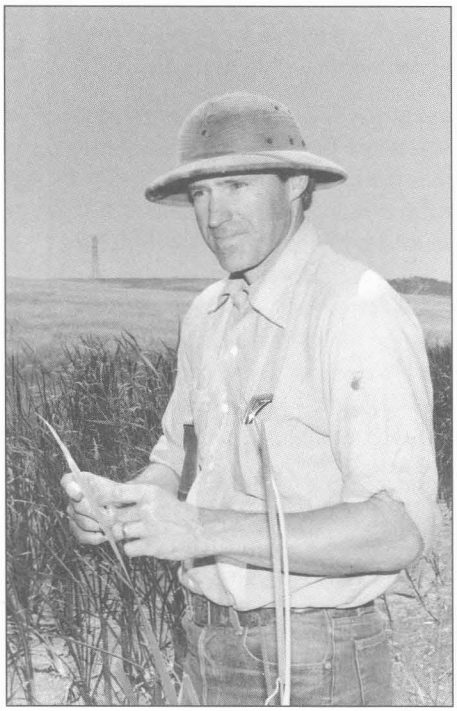


HOW TO GROW CROPS AND WILDLIFE

CHARLES ROMINGER'S great grandparents came to Yolo County in the 1870s, and his family has been farming there ever since. Today the Romingers grow a variety of crops on a patchwork of some 5,000 acres. In addition to wheat, rice, sugar, beets, tomatoes, and other cash crops, they also grow waterfowl, native grasses, and wildlife habitat.

Charles Rominger and his family have been participating in the federal Conservation Reserve Program since the mid-1980s. They became interested when the price of wheat was down: the program pays farmers to take sensitive cropland out of production to help prevent soil erosion. Participants must keep the land vegetated, protect it from livestock grazing, and can manage it for wildlife if they wish.

Today the Romingers have nine parcels, totaling some 1,800 acres, in the reserve program. They have also constructed dozens of ponds and return reservoirs across actively farmed land and within the reserve program parcels. In the flat-to-slightly-rolling landscape they work, hill ponds are created by building earth dams across shallow valleys that drain small watersheds. The family's most recent effort is a 10-acre hill pond in the corner of a 180-acre reserve program parcel. Although the project took longer than planned, and was more involved than he had anticipated, Rominger says it was worth it. "I've seen more species of ducks and shorebirds on these ponds than I knew about before I built them," Charles Rominger said as he watched a pair of incoming avocets.



It was conceived and constructed with financial and technical assistance from both the Conservation Reserve Program and the U.S. Fish and Wildlife Service's Partners for Wildlife program.

The pond is a work in progress. The gentle hillsides surrounding it have been sown with wide swaths of native bunch grasses. The shoreline nurtures young willows while the spillway channel has been seeded with more bunch grasses. Surrounding valleys have been planted with cottonwood saplings. Last summer, after a consultation with staff of the California Waterfowl Association, Rominger built several nesting islands to provide emergent cover for ducklings. "The amazing thing to me," he said, "is how much wildlife shows up when you give them a little water." ■

THE CALIFORNIA COASTAL TRAIL

Coastwalk 1994

RICHARD NICHOLS

PEOPLE CONSTANTLY POSE for photographs on the California coast. At Point Lobos, the Golden Gate Bridge, the Venice Beach Boardwalk, the Lost Coast, on hundreds of beaches, overlooks, parks, and piers they stand against dramatic backdrops, smiling for the picture that will prove: "I was here."

This year Coastwalk, a nonprofit foundation dedicated to promoting the California Coastal Trail by conducting coastal walks, also posed for pictures in all 15 coastal counties. The photos show groups of hikers—children with parents, seniors, teenagers, couples and singles—gathered around posters bearing the Coastal Access logo (bare footprints and a wave) and the words "California Coastal Trail." In a modest but meaningful "Name It and Proclaim It" ceremony, each group of Coastwalkers had just proclaimed a stretch of trail they had hiked to be a segment of the California Coastal Trail, which one day will extend along the state's entire 1,100-mile coast. By their ceremony, Coastwalkers called attention to some segments of this grand trail that already exist: the Kortum Trail at Sonoma Coast State Beach, the Atkinson Bluff Trail at Año Nuevo State Reserve in San Mateo County, the GGNRA Coastal Trail in San Francisco, and miles of public beach in San Diego.

The California Coastal Trail is part reality, part dream. It is envisioned as a continuous trail system linking coastal recreation sites in 15 counties and including the cities of San Francisco, Los Angeles, and San Diego; connecting parks and beaches, bicycle routes, hostels, and the state trails network. The Coastal Trail exists in the Resources Code and the California Coastal Plan and is identified in the statewide trails plan; it is part of the Joint Access Program of the State Coastal Conservancy and the California Coastal Commission. More than 700 miles are already in place, including existing trails, miles of beaches, boardwalks, streets, and roads. The rest is on paper, awaiting funds and opportunity.

One major component missing in this picture is an overall plan to identify the various trail segments by placing the California Coastal Trail sign at trailheads, with directive signs on roads. It was to call attention to this need that Coastwalk staged the "Name It and Proclaim It" events this year. Though numerous

If You Want To Help Complete the Coastal Trail . . .

A 20-minute narrated slide show about the Coastal Trail is available for group viewing. It presents the vision and history of the trail and its present status, and shows how individuals, cities, volunteer groups, and counties are working to complete trail segments within their areas.

The goal of the slide show is to increase awareness of the Coastal Trail's existence and to generate greater public involvement in efforts toward its completion. It was produced by Peeter Vilms, with funding from the State Coastal Conservancy to Coastwalk. For more information, and to arrange for a viewing, please call Richard Nichols of Coastwalk (707) 823-4071 or Richard Retecki at the Coastal Conservancy (510) 286-1015.

Also available from the Coastal Conservancy is *The California Coastal Trail: Missing Links & Completed Segments* (1992), an inventory of trail segments, with charts and maps. It was also prepared by the Coastal Conservancy and Coastwalk.

San Luis Obispo Coastwalkers

SIMONE WILSON

"Coastal Access" signs have been installed along the coast, they do not differentiate between simple beach access and trails.

Imagine driving on the Golden Gate Bridge and seeing the Coastal Trail sign at each end, or driving on Highway 1 and seeing directions posted to a trailhead. You might turn off, start to walk following further signs, and eventually arrive at a sign pointing to a stretch of beautiful coastline. Long stretches of trail already provide great opportunities to make multi-day jaunts, staying at campgrounds, inns, and youth hostels. And many sections of trail exist for day hikes.

The Coastal Trail, with its tremendous diversity, may be the most interesting trail in the world. It runs for miles along the beaches of Del Norte County, passes along the edge of the Lost Coast wilderness in Mendocino County, along the bluff tops of Marin County and San Francisco, through Monterey, along bustling Venice Beach, and, eventually, to the Tijuana River National Estuarine Reserve and Borderfield State Park. Thousands of people use parts of the Coastal Trail—hiking, strolling, riding, skating, running; for transportation, for fun, for contemplation, for nature study. But most of them do not know it exists: they do not realize that they are on a trail system that one day will reach all the way from Oregon to Mexico.

On Coastwalk 1994, 400 people enjoyed over 650 miles of the Coastal Trail. They were led and fed by Coastwalk volunteers, informed by experts about everything from the mating habits of sea lions to the doghole ports of the northern coast, from the role of the Coastal Conservancy in coastal preservation to the development proposals to build golf courses and mansions on scenic bluffs. At the end of each day's hiking, they found camping gear and a hearty meal awaiting them. These hikers spent from four to six days in each county getting to know one another and the unique coastal environment. Since the first Coastwalk, in 1983, many participants have come back year after year, discovering a new piece of coastline and trail each time. Maree Fink from Timber Cove, who is in her 70s, has participated on almost every walk since that first one.

Each year, Coastwalk has covered more ground than the year before . Each year it has advanced the cause the Coastal Trail in various ways, especially by calling attention to gaps in coastal access and to the need for public action to fill those gaps. Next year, we hope to hike the entire Coastal Trail. ■

Richard Nichols is director of Coastwalk.

New Coastal Reserve at Punta Banda:

THE COASTAL ESTUARIES of Baja California provide essential habitat for migrating birds along the Pacific Flyway (*California Coast & Ocean*, Winter/Spring 1993) and numerous North American endangered species. Extending from the border town of San Ysidro to Bahia Magdalena some 800 miles to the south, these vitally important wetlands are threatened by economic development projects, private and public, especially along the busy tourist corridor between Tijuana and Ensenada.

Recognizing that these coastal wetlands are within the same bioregion as coastal habitat areas to the north, citizens on both sides of the U.S.-Mexico border in 1988 formed *pro esteros*, a unique binational nongovernmental organization dedicated to the conservation of the estuaries of Baja California. With an office in southern California and another in Ensenada, *pro esteros* now plays a vital role in environmental protection efforts in Baja California. This past summer it succeeded in winning ecological reserve status for one of Baja's most important and threatened coastal lagoons and estuarine complexes, Estero de Punta Banda, in Bahia de Todos Santos near the city of Ensenada, a growing tourist and port city 60 miles south of the U.S. border. After five years of citizen education, organization, and lobbying by *pro esteros*, the reserve has been incorporated

LAUREL MARCUS

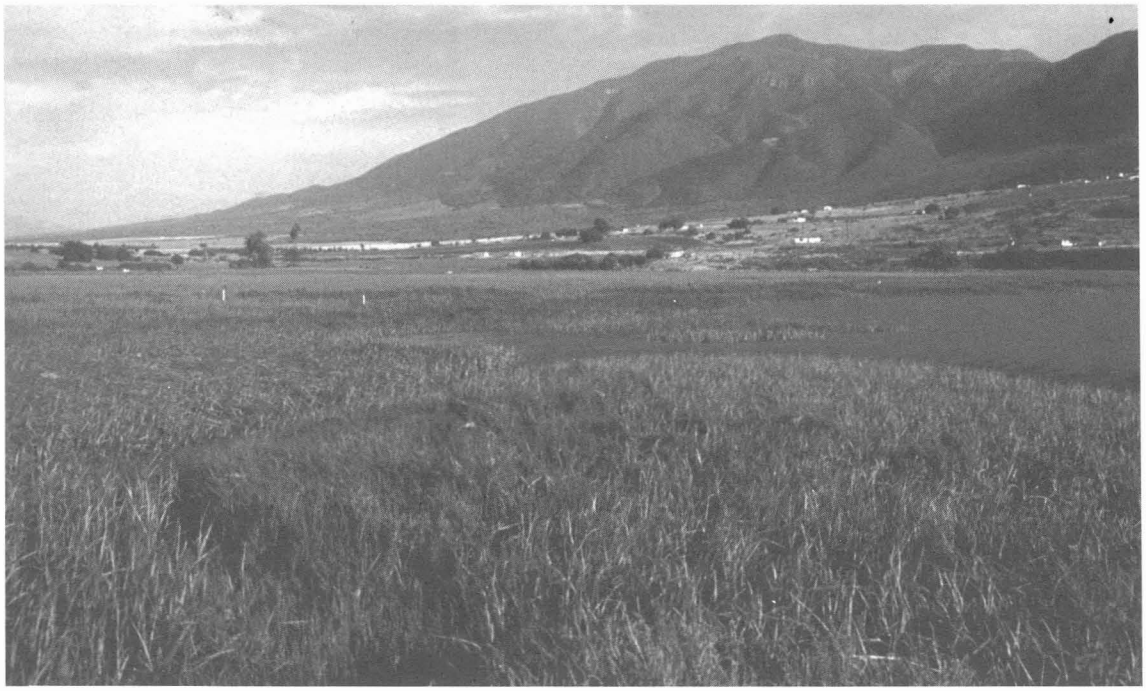
Welcome—but please respect the needs of the reserve

LAUREL MARCUS

Vacation houses on the dunes at the edge of the new reserve.

A Binational Citizens' Victory

BARBARA MASSEY



Landward view from the reserve, across marshland

into the coastal plan for the tourist corridor between Tijuana and Punta Banda. This plan was adopted by all levels of government. The reserve boundaries are the same as those *pro esteros* had requested in a 1990 petition.

"We know that this does not mean that everything is going to change instantly. We are very optimistic, but now the real work begins," commented Laura Martinez Rios, chair of the Mexican chapter of *pro esteros.* "To protect the estero, we have to do it personally." This means working with government authorities, private property owners, and the general public on such vital issues as fencing, signing, and controlling jet skiing and other tourist activities.

Threats to water quality in the estero include the continued presence of motor boats and jet skis at the mouth of the estuary, adjacent to the popular Estero Beach as well as in the estero proper; vacation home development on the sand spit of Punta Banda; and agricultural practices, including pesticide applications. Barbara Massey, chair of the U.S. chapter of *pro esteros,* emphasizes that "design, funding, and implementation of a long-term protection and restoration plan for the estuary are essential if the designation is to be meaningful."

Accurate data are essential if an effective restoration program for the Estero de Punta Banda is to be developed and other Baja California wetlands are to be protected. *Pro esteros* is supporting several research efforts to meet this need. It has participated in shorebird surveys and censuses in different wetland areas throughout Baja California in a joint project with the Point Reyes Bird Observatory and the Centro de Investigación Scientífica y de Educación Superior de Ensenada (CICRS). Most recently, it has won a grant from the David and Lucile Packard Foundation, matched by the North American Wetlands Conservation Commission, to map the wetlands of Baja California's west coast using geographic information systems (GIS). The project is designed to produce information for each estuary, based on about 20 habitat categories. This will be the first baseline survey of wetland areas of Baja California. It will be conducted by EarthSat in Rockville, Maryland and Ducks Unlimited Mexico (DUMAC) in Monterrey, Mexico.

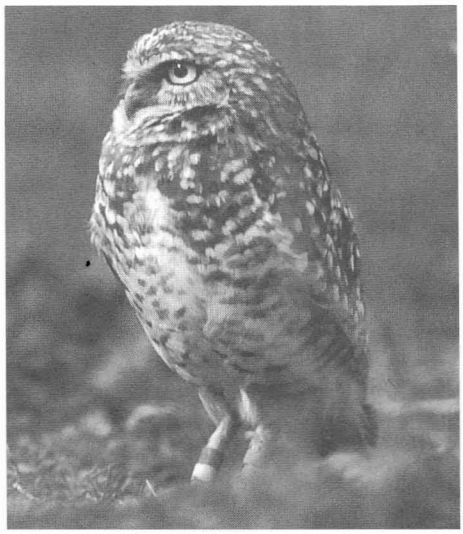
The work of *pro esteros* has become a catalyst for increasing efforts toward ecological planning in Baja California. It can also provide a model for community-based environmental restoration, and, potentially, for sustainable development. Much of the future economic growth of Baja California depends on healthy marine and estuarine environments.

For more information on *pro esteros,* write to 1825 Knoxville Avenue, Long Beach, CA 90815 or call (310) 431-9635. In Ensenada the office is at 1025-A Obregon. The telephone by direct dial from the U.S. is 011 52667 87000. ■

Marc Beyeler, manager of the Coastal Conservancy's Urban Waterfronts Program, has visited Baja California frequently during the past 25 years. He was in Ensenada and at El Estero de Punta Banda last August.

New Homes for Owls

CAMAS HUBENTHAL



DELEVORYAS/BURROWING OWL ALLIANCE

Burrowing owl

REDWOOD HIGH SCHOOL

Redwood High School students on the job.

THANKS TO SOME energetic high school students and their teacher, new homes are now available for six burrowing owl families in Menlo Park. Built in the grasslands of Bayfront Park, they are part of a wider effort to compensate for the extensive loss of natural habitat for these small ground-nesting birds along the San Francisco Bay shoreline.

Eleven students from Redwood High School worked for 30 hours last spring with their field science teacher, Roger Heathcote, to plan and construct the homes, modeling them after a successful project five miles to the south in Mountain View's Baylands Park. The new housing development consists of three dirt mounds, each about four feet high, covering two eight-foot terra cotta pipes that lead to two separate plastic utility boxes. Each box is designed to accommodate a burrowing owl family.

The student builders can empathize with an owl's struggle to find a suitable place to nest and raise a family. "They come from the hard end of society, where they have had the experience of not having food in the home or not having a home," said Heathcote. Three of them are young mothers.

Redwood High School is a "second chance" school for students who have fall-

en behind in one way or another and are now working towards their diplomas or the Graduation Equivalency Degree.

The burrowing owl is dun-colored, stands about nine inches high, and weighs about four ounces. Unlike other owls, it sleeps at night and hunts insects and small rodents by day. It is prey to coyotes, hawks, rattlesnakes, and foxes, but it is human activity that now threatens its survival. "These owls build their nests in ground squirrel holes and ground squirrels are being poisoned," explained student Jessica Irwin. Worse yet, the owl's preferred nesting grounds, the open flat grasslands near the bay shore, are also preferred by humans, who see them as prime real estate.

Heathcote and his field science class decided to help out the owl after a field trip to Coyote Point Museum, where they learned about the problem and the efforts of the Burrowing Owl Alliance to do something about it. The nonprofit Alliance is headed by Lynne Trulio, professor of Environmental Studies at San Jose State University, and includes the Santa Clara Valley Audubon Society, the Humane Society of Santa Clara Valley, Pacific Gas & Electric (PG&E), and the City of Mountain View.

With technical assistance from the Alliance, a grant from the Hancock Foundation to buy tools and equipment, and truckloads of dirt provided by PG&E, teacher and students went to work. They knew they were contributing to the Alliance's efforts to ring the bay with new nesting habitat, and that felt good.

By October, no owls had moved in yet, but as an educational experience the project had been proved a success. Perhaps the most important result for the students was the new sense of belonging to a wider community the joint effort provided. "My students have their own children," explained Heathcote, "and they have been bringing them into the park and telling them about the owls. They have a stake in what happens now. They're taking ownership of their community."

If the homes remain unoccupied in the coming months, they may be made available to owls that have been injured and treated at a wildlife rescue center. ■

BOOKS

Wetland Mitigation Banking, *Environmental Law Institute, Washington, DC: 1993, $20, 159 pp. plus appendices and bibliography*

WILL WETLAND MITIGATION banks speed development and also protect wetlands? Policymakers and permit applicants hope against hope that they will, beleaguered as they are by the continuing pressure to permit development in wetlands, the perils and pitfalls of finding mitigation sites to offset impacts of individual development projects, and the failure of many mitigation projects.

A mitigation bank is established when a bank sponsor restores or creates habitat and regulatory agencies agree that permit applicants can satisfy mitigation requirements by paying the bank sponsor for setup, management, and monitoring costs. Alternatively, the bank sponsor may periodically draw down the credits for its own mitigation needs.

It sounds simple, but it isn't. Most problems associated with mitigating the impacts of individual projects—disputes over allowing any impacts to occur, the acreage and value of existing habitat, proximity of development impacts to the mitigation site, the required ratio of habitat restored to habitat lost, the responsibility of permit applicants for long-term monitoring and remedial measures, etc.—accrue to mitigation banks too. In addition, the establishment of a bank requires substantial start-up funding to buy property, design restoration, carry out environmental review, negotiate terms for the sale of credits, carry out restoration, and manage the site and bank transactions.

Nevertheless, where there is a public agency or a private party willing and able to front the funds, set up the bank, and bear the risk of uncertain reimbursement, mitigation banks hold promise for easing the mitigation burden on individual permit applicants and improving the effectiveness of compensatory mitigation.

For anyone considering whether to establish a mitigation bank or develop mitigation banking policy, the Environmental Law Institute's *Wetland Mitigation Banking* will be an invaluable resource. Beginning with a succinct but comprehensive discussion of regulations and policies affecting wetland mitigation and mitigation banking, this exhaustive report provides a solid background regarding legal authority and agency responsibility, prerogative, and interpretation. The volume also examines the full range of ecological and policy issues and practical considerations that are critical for understanding and creating wetland mitigation banks. Lists of existing and proposed wetland mitigation banks and a bibliography provide leads for further investigation. The report concludes with 17 observations and recommendations relevant to efforts to establish successful banking programs and individual mitigation banks.

Reviewed by Melanie Denninger, a project manager for the California State Coastal Conservancy, who has participated in efforts to set up wetland mitigation banks in California.

Putting Transfer of Development Rights to Work in California, *by Rick Pruetz. Solano Press Books, Point Arena, CA: 1993, $25, 222 pp.*

ANYONE WHO HAS BEEN involved with land use planning within the last ten years has almost certainly heard of TDRs (Transferable Development Rights) or TDCs (Transferable Development Credits). The concept these terms embody has been used by local governments throughout the country to resolve bitter zoning disputes and other thorny land use issues.

Much of the information available to California planners and decision makers on TDRs has been rather general. Published articles tend to feature case studies from the eastern seaboard, with the result that most California planners know more about TDR use in the New Jersey Pinelands and Maryland's Montgomery County than they do about any of the sizable

number of successful programs in this state. Because land use issues and real estate markets in California differ greatly from those on the east coast, TDR programs from that region are of marginal use as models here.

Rick Pruetz's *Putting Transfer of Development Rights to Work in California* marks a major step toward remedying this situation. His book focuses entirely on TDR programs in this state and offers a wealth of information on 27 of them. An appropriate subtitle might have been "A Manual for Planners." Unlike many academic authors who have dealt with this subject in past years, Preutz spends almost no time exploring the theoretical issues so dear to the hearts of micro-economists or the legal issues that hold such fascination for attorneys. Instead he plunges directly into the practical questions: What are TDRs? Who should know about them? And why use them? He offers a straightforward, informative introduction to the concept, invaluable for anyone interested in establishing a TDR program in a community.

After a brief overview of TDR programs in other states, Pruetz proceeds to the heart of the book: detailed descriptions of various California programs. He has grouped programs together according to their objectives: natural resource protection, historic preservation, agricultural lands protection, etc. Each program is summarized, its purpose, background, and procedural features are described, and its strengths and weaknesses are evaluated.

Like most authors on the subject, Pruetz offers his own conclusions on the ingredients of a successful program. He notes that the success of a program cannot be determined solely on the basis of how many transactions are completed. Instead he gauges success according to the program's effectiveness in meeting the community's broader land use goals. This standard represents an insight that has been missed by writers who approach the subject strictly from an economics perspective. Pruetz recognizes that, first and foremost, TDR is a planning tool.

My one quibble with the book is slight. In his description of the Santa Monica Mountains program, one of the state's most successful, Pruetz fails to note the pivotal role of the Coastal Conservancy in establishing a TDR bank through its purchase of large tracts of small lots. He also does not list that program in his discussion of programs that have used TDR banks. My quibble is motivated by more than agency pride; I am firmly of the opinion that the Conservancy's large inventory of TDRs readily available to buyers was instrumental in establishing and preserving the viability of the program.

Despite this omission, Pruetz's book offers well-organized and ample information for planners and decision makers trying to determine whether a TDR program will work for their community. It would be an excellent addition to any planner's bookshelf.

Reviewed by Prentiss Williams, a project manager at the State Coastal Conservancy. She has administered several TDR programs for the Conservancy, including programs in the Santa Monica Mountains and Cambria on the central coast.

California's Rivers: A Public Trust Report, *prepared for the State Lands Commission. 1993, $15, 334 pp.*

THE STATE LANDS COMMISSION has produced a good basic reference on California's rivers. It contains numerous maps, tables, and brief case studies that provide an overview of the state's river resources. The report's five chapters cover historical use and changes to rivers of the state, threats to river integrity, river systems in the state's seven "river regions," physical and ecological processes of rivers, and tools available for river protection efforts.

Activists involved in regional river planning efforts may find the final chapter ("Restoration, Tools and Beginnings") most useful. It provides an extensive listing of public interest groups and federal, state, and local agencies that have some involvement in or jurisdiction over the management of California's rivers. A sampling of ongoing projects is summarized at the chapter's end; these may serve as models for new river protection efforts.

My only disappointment in reading *California's Rivers* was that the book has a slight bias toward northern California rivers. Few of the case studies and none of the project summaries in the last chapter cover rivers in southern California. Although rivers in the central and northern regions of the state are bigger and wetter, aquatic and riparian habitats in the arid portions of the state are some of the most diverse environments in the western United States. Their underrepresentation in this volume simply speaks to the need for greater awareness and increased efforts toward their protection.

Reviewed by Cat Brown, a wildlife biologist with the U.S. Fish and Wildlife Service, Ventura Field Office. For the past three years she has been working with others on a long-range management plan for the Santa Clara River in southern California.

Unequal Protection: Environmental Justice and Communities of Color, *edited by Robert D. Bullard. Sierra Club, San Francisco: 1994, $25, 392 pp.*

ALTHOUGH IT HAS DEEP historical roots, environmental justice is a relatively new social movement. Compelling and energetic, it has engendered a number of impressive books and articles, both scholarly and popular, which chronicle the struggles of ordinary people and the movement's conceptual development.

The editor, sociologist Robert D. Bullard, was the first author to take on the topic. In *Dumping in Dixie: Race, Class, and Environmental Quality* (1990), he exposed the disproportionate impacts of toxic dumping in primarily African-American communities in the Deep South. In his *Confronting Environmental Racism: Voices from the Grassroots* (1993), people involved in the day-to-day struggles articulate details of their campaigns against environmental racism.

Now, in *Unequal Protection: Environmental Justice and Communities of Color,* Bullard and more than 15 contributors continue to expose environmental injustice and further develop the key tenets and recommendations of the environmental justice movement.

Each essay builds on the following central points: detrimental environmental impacts are disproportionate and are based on race and class; environmental laws and regulations have not protected all citizens equally; civil rights law thus must also be applied to efforts to ameliorate and correct

unjust environmental conditions. This argument is developed most completely in the final chapter, "A Call for Justice and Equal Environmental Protection," by Deeohn Ferris. A careful reading of this chapter and its recommendations dispels any criticism that environmental justice is but ethnic politics in the environmental arena. As Ms. Ferris states, "What is ultimately at stake in the environmental justice debate is everyone's quality of life."

Unequal Protection reads alternately as manifesto, political history, science detective story, and legislative guide. It is a welcome and significant addition to the growing literature on environmental justice.

Reviewed by Running Grass, executive director of Three Circles Center for Multicultural Environmental Education in Sausalito, California.

ALSO OF INTEREST

Freedom for the Seas in the 21st Century: Ocean Governance and Environmental Harmony, *edited by Jon M. Van Dyke, Durwood Zaelke, and Grant Hewison. Island Press, Covelo, CA: 1994, $27.50, 504 pp.*

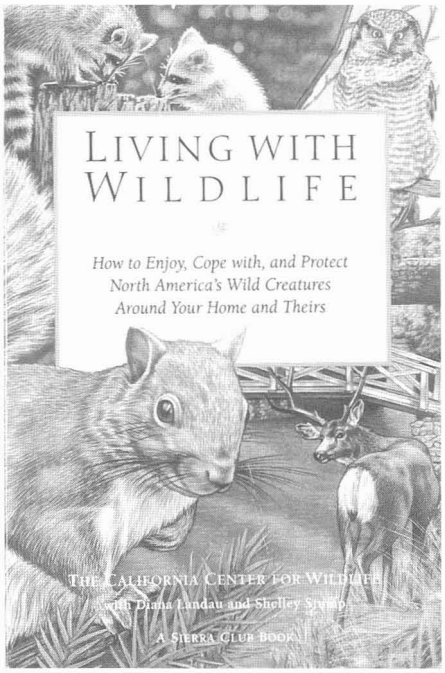
MAJOR TOPICS INCLUDE ocean governance and stewardship, approaches toward the ocean environment in the Pacific (including indigenous peoples' perspectives), issues concerning use and protection of living resources, ocean pollution control, the 1982 Convention on the Law of the Sea and nonliving resources of the deep seabed, and military activities vs. peaceful uses.

California Hiking: The Complete Guide, *by Tom Stienstra and Michael Hodgson. Foghorn Press, San Francisco: 1994, $17.95, 827 pp.*

TOM STIENSTRA, outdoors writer for the *San Francisco Examiner*, and Michael Hodgson, senior editor for *Adventure West* magazine, have produced this monumental guide to more than 1,000 hikes throughout California. Ranging from 10-minute walks to treks along all 1,700 miles of the Pacific Crest Trail, these hiking opportunities should accommodate nearly everyone's interests. Each hike described is rated for both quality and difficulty. The book includes 60 detailed regional maps and a 30-page index for cross-referencing, as well as directions to each trailhead and notes on additional maps, information, and special permits.

Monterey Bay and Beyond: The Best of California's Central Coast from Santa Cruz to San Simeon, *by Lucinda Jaconette. Chronicle Books, San Francisco: 1994, $11.95, 320 pp.*

THIS GUIDEBOOK provides suggested walking and driving tours, including restaurants, inns, picnic spots, and view points. Complete with a calendar of events and a resources listing, the book also encourages exploration.



Living with Wildlife: How to Enjoy, Cope with, and Protect North America's Wild Creatures Around Your Home and Theirs, *by the California Center for Wildlife with Diana Landau and Shelley Stump. Sierra Club, San Francisco: 1994, $15, 352 pp.*

PRACTICAL SUGGESTIONS for resolving conflicts with wildlife neighbors, ranging from woodpeckers to coyotes, mountain lions to rattlesnakes. These suggestions are based on the Center's philosophy that wild creatures rightfully share our living space and thereby enrich our lives. ■

EBB AND FLOW, CONTINUED

(continued from p. 5)

greenbelt to another. In the last 20 years, the City of Laguna Beach, the County of Orange, and others have acquired over 90 percent of the watershed. They expect to acquire the remaining 10 percent in June 1995.

If the Conservancy had not acted, these lakes would be facing a total ecological collapse.

Access to Islais Creek, San Francisco

The Conservancy authorized up to $100,000 in May to the San Francisco Conservation Corps for waterfront access improvements on the southwest bank of Islais Creek Channel in San Francisco. The improvements along the channel will be constructed jointly with the nonprofit Friends of Islais Creek.

Waterfront Improvements and Trail Access in Martinez

In June, the Conservancy authorized up to $500,000 to the City of Martinez for waterfront improvements that will provide better public access to the Bay Trail, the Ridge Trail, and the Carquinez Trail at the Martinez Marina. These improvements will also enhance the potential for visitor-serving commercial development along the Martinez waterfront and for employment opportunities in the city. The Conservancy's funds will be used to build a 2,310-linear-foot walkway, create a 5,000-square-foot public plaza, and provide historic and habitat information through an interpretive sign program.

Access Improvements at Richmond's Ferry Point

Also in June, the Coastal Conservancy authorized up to $130,000 in matching funds to the East Bay Regional Park District for the construction of a shoreline trail, beach accessway, and 25-car parking lot at Ferry Point, near Point Richmond in the City of Richmond. The park district is about to spend $700,000 to repair and restore the historic pier and buildings at Ferry Point. This project is being funded by $375,625 under the Intermodal Surface Transportation Enhancement Act, another $200,000 from the Wildlife Conservation Board, and $125,208 from the park district. ■

THE ABALONE SONG GOES ON

Editor:
In 1905, the poet George Sterling, one of the founders of the Bohemian Club—which once really was a stronghold of Bohemians—built a house "on a knoll at the edge of a large pine forest half a mile from the town of Carmel," according to Franklin Walker, in his book *Seacoast of Bohemia*, published by the Book Club of California in 1966, and by Peregrine Smith in 1973.

Sterling had a wide friendship among the artists and writers of his time—Mary Austin, Jack London, Ambrose Bierce, and Arnold Genthe, to name but four. Another of his contemporaries, Stanford professor Vernon Kellogg, who built a house not far from Sterling's at about the same time, once described him as "the proton which attracted the electrons at Carmel parties."

"One day Sterling and his friends took 55 sacks (!) of abalone in a few hours," Walker wrote. "There was really a feast that night. Already the Abalone Song was being composed as a sort of folk venture, a gay ditty started by Sterling and added to by many visitors. Custom demanded that it invariably be chanted while the tough abalone meat was pounded to its rhythm.

"Oh! some folks boast of quail on toast,
Because they think it's tony;
But I'm content to owe my rent
And live on abalone.

"Some stick to biz, some flirt with Liz
Down on the sands of Coney
But we, by hell, stay in Carmel
And whang the abalone."

You may already have stumbled upon a verse of the Abalone Song in Jack London's 1913 novel *The Valley of the Moon*, in which Sterling, portrayed as "Mark Hall," sings:

"The more we take, the more they make
In deep sea matrimony
Race suicide cannot betide
The fertile abalone."

BANCROFT LIBRARY

Jack London, center, with (left to right): George Sterling, Jimmy Hopper, Charmian London, Alice MacGowan, Grace MacGowan Cooke, Carrie Sterling

(In 1972, Walker commented that this stanza seemed particularly ironic "now that the colorful shellfish has become so rare because of the over-fishing of the area.")

Also taken with the Abalone Song was William Rose Benet, another of the Sterling coterie. In his autobiographical poem "The Dust Which Is God," Sterling appears as "Starr Gorham," while Benet, "Larry Harris," teeters on barnacled rocks and cackles:

"He he he
wanders free
beside the sea
where every crab's a crony
he flaps his wings
and madly sings—
the plaintive abalone."

Benet describes the festive times at Carmel in great detail, as does Arnold Genthe, better known for his photographic portraits.

Friends tell me that the number of verses easily reached more than fifty. My son Jock, a diver, can recall only three:

He lives in caves beneath the waves
On shorelines cold and stony.
And so 'tis shown that faith alone
Reveals the abalone.

Some can't cope, some live on hope,
And some on alimony.
But my tom cat grows nice and fat
On tender abalone.

To show my wit I'll transmit
By Morse or by Marcone.
But should the need for speed arise,
I'll send an abalone.

Do you have a verse or two of the Abalone Song rattling around in your memory, or in letters or literary reminiscences? If you do, please send a copy, together with its provenance, to me, c/o *California Coast & Ocean*. It would be fun to have all of this "folk venture" recorded.

Thank you.
Margot Patterson Doss

Editor's Note: Margot Doss is currently writing a murder mystery. With a little coaxing, she confessed that she has been helpless against a stream of new abalone verses that interrupt her work as she strolls along the shore near her home. Here's a sample:

They flocked to shores in the
Great Outdoors
To dive for abalone.
That treasure rare is now picked bare,
So stay home and eat spumone.

O there are jills who get their thrills
At malls or at Moscone.
But my big raves are for the caves
That hide the abalone.

A SHORELINE MYSTERY

IN JANUARY OF **1990**, HUNDREDS of smooth and powerful creatures invaded a charming and well known coastal city in California. Their loud bellowing roars and distinct and unpleasant smell had a strong impact along a popular waterfront. They claimed territory and caused some property damage. Their untranslatable language could be heard great distances.

Overwhelmed and intimidated by their landing, officials did not know what to do. The solution was to surrender the territory occupied by the creatures, some of whom weighed 700 pounds.

Now these creatures attract crowds of tourists who marvel at their ability to pursue their accustomed laid-back life style in these urban surroundings. Some visitors have noted a resemblance between the creatures and themselves, or other people they know: they are not unlike couch potatoes.

Who are these noisome creatures? Where did all this happen? Write us the answer and you win a free subscription to *California Coast & Ocean*. We will reveal all the facts in the next issue.

CALIFORNIA COASTAL CONSERVANCY
1330 BROADWAY, SUITE 1100
OAKLAND, CA 94612

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