

CALIFORNIA
COAST & OCEAN

VOLUME 16, NO. 3

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**What's that in the surf?
Megahomes hit a rural coast**

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HAL HUGHES

Cover photo: This orb weaver spider's web covered with dew was photographed by Wes Maffei in a Fremont marsh. He says: "It reflects the way that *Coast & Ocean* helps make us aware of the webs of life that make the California coast such a fascinating place."

Back cover: Cows by Tomales Bay by Elaine Straub



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

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VALLEJO NAVAL AND HISTORICAL MUSEUM



Four Trends

SO WHAT'S GOING ON along the California coast and around San Francisco Bay these days? I've been visiting the Coastal Conservancy's 250 active project sites for about three years now, and four trends seem to be accelerating at dot-com megahertz speed:

- There is a lot more money, public and private, for conservation than there was just a year ago.
- Costs for coastal lands, habitat restoration, and paths to the beach are climbing fast.
- Stronger land use regulation by the Coastal Conservancy tries to hold the line.
- Virtual and ersatz nature and outdoor experiences may increasingly substitute for the real thing.

These are exciting times.

First, money: thank you, thank you fellow voters, for supporting by a two-thirds majority the first state parks and natural resources bond issue in 12 years—a whopping \$2.1 billion, passed last March. The coast is still a popular investment in California, with the Coastal Conservancy named for \$250 million. The feds are poised to add tens of millions, and private donors such as the Packard Foundation and the Wendy P. McCaw Foundation are augmenting our public conservation funds.

But costs are up: wealth creation in California since the early 1990s recession has been spectacular. Some people want ocean views and can pay whatever is needed to secure a coastal homesite. Whether that site is an 80-foot-long strip of riprap in Malibu

or 300 acres on the far North Coast, the price is at least a million bucks and climbing fast. So we and our land trust partners are bidding against people for whom price is no object. Landowner expectations of value are up 25–50 percent in the last few years. So \$250 million is not much—maybe enough, in effect, to buy 250 lots on the 1,100-mile-long coast. The Coastal Conservancy bond funds will be mostly spent in a year. We hope you will support another bond act soon.

In the coastal zone, the major factor that keeps landowner expectations from zooming into space is the Califor-

nia Coastal Commission, created by the Coastal Act of 1976. While the courts have weakened the Commission's ability to require public access, the legal requirement to protect wildlife habitat is now even stronger. That helps us and our local government and land trust partners to acquire properties and easements that are scenic and valuable for wildlife, especially endangered species like the red-legged frog. Endangered species protection laws and regulations are prompting ever more public investment in habitat restoration as well as moderating landowner expectations.

Sometimes, in darker moments, I can't help thinking all this may be irrelevant. Easy substitutes for experience in nature are being offered, and many people find them more user-friendly than the real thing. Why preserve coastal wetlands and redwood groves if you can go to Disneyland's soon-to-open \$1.4 billion 55-acre California Adventure? A tour bus will take you in minutes from the Sierra to the coast, where you will see 135 smog-resistant Aptos Blue and Soquel redwoods (cultivars) brought to Anaheim from Santa Cruz for \$500,000, so tourists to California will not have to drive up the coast highway to see the coast redwoods. And they can munch a Wolfgang Puck pizza right after the tour before heading back to the car.

One deep breath of ocean air dispels such dismal musings. With further public and private coastal conservation investments and a continued strong Coastal Commission, we can preserve our living coast.

—Bill Ahern



Big Sur Coast

CAROL ARNOLD

DANGEROUS CURRENTS

THE QUESTIONABLE QUALITY
OF OUR COASTAL WATERS

MARC BEYELER

A WALK WITH DONNA FRYE along the edge of Tourmaline Surfing Park offers a quick lesson in coastal water pollution: Before our eyes is a picture postcard scene of California beach life, but lurking just under the surface is potentially dangerous water pollution.

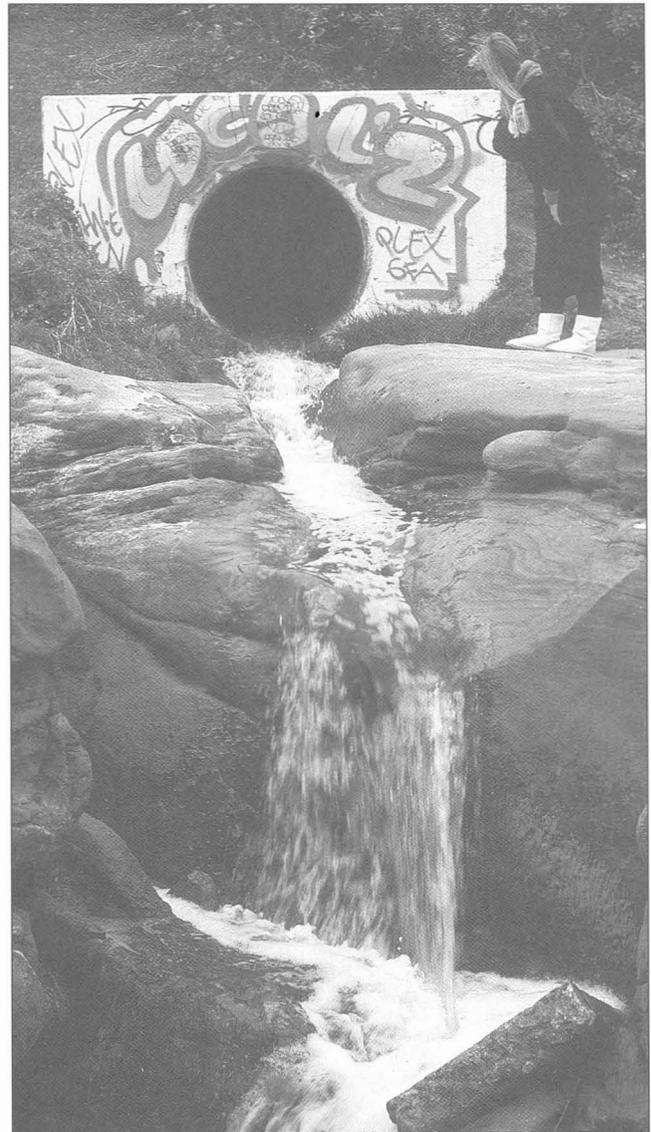
Tourmaline lies below the southern coastal bluffs of La Jolla, with a long view of the coastlines of Pacific Beach and Ocean Beach to the south. It is one of the best surfing spots in San Diego. The well-known surf break, formed by uplifted submarine terraces, attracts short- and long-boarders ranging in age from hotdogging teens to the over-50 crowd.

It is also the place where Donna's husband, Skip, had been surfing the day he came home and said he wasn't feeling right, about five years ago. "This is a man who never gets sick. I said maybe he was just cold and made him some soup," she recalls. "But he found it hard to get air and was disoriented, as though he was running a fever, only he wasn't. He had to sit in a chair all night with the window open to breathe.

"The next day we went to the doctor and he said he had seen a girl with the same symptoms the day before. Then one of Skip's friends, who had been surfing with him, came down with the same symptoms. It was a virus. Nobody else had it except people who had been in the water." A storm drain empties into the water directly in front of the surf break.

"I've lived in San Diego since 1957. I'm married to a surfer and surfboard shaper, and we have watched as our coastal waters have become increasingly contaminated. For a decade or more we shared stories about getting sick after water contact. So I just got fed up with everyone complaining and started Surfers Tired of Pollution."

Years of phone calls, meetings, and hearings have now begun to pay off. Indeed, because



DON BALCH

Storm runoff carries oil, chemicals, human and animal waste, and other pollution to Windansea Beach, La Jolla

of hard work by Donna Frye and many other citizens up and down the coast—from Humboldt Bay to Tomales Bay, Morro Bay, Santa Barbara, Santa Monica, and San Diego—ocean water pollution is now a hot issue. Moving beyond complaint, a diverse coalition of citizen stewards has emerged, and it has compelled government to respond, at both state and local levels.

Perhaps because they have intimate experience with the effects of ocean water pollution, surfers have taken the lead in documenting the problem and initiating action.

Others have been alerted while taking part in local creek restoration work, land trust activities, or other “place-based” conservation efforts. Local groups test or monitor streams or offshore waters, and also enlist school children.

The children learn about their watersheds, then educate parents.

The growing numbers of citizen stewards play an important role in building programs to control water pollution that flows to beaches from many diverse sources. The continuing participation of citizens in their communities will be crucial to improving and maintaining good water quality along our shores.

Surfers and Swimmers as Lab Rats

DONNA FRYE STOPS at the open storm drain that runs along the north side of the Tourmaline Beach parking lot. It had been sending runoff into the surf zone for years. Waste motor oil, pesticides, and animal and human waste flowed into waters where small children play, where people swim and ride the waves. She had seen children in the water by the storm drain. There were no warning signs.

Because they own and operate a business, the Fries were reluctant to take on an activist role: “Unfortunately, pollution gets political,” Donna explains, “But after a while we agreed we had no choice.”

To document the problem, she launched

the Ocean Illness Survey. People who had suffered symptoms associated with water contact were encouraged to report them to the County Environmental Health Department by mailing a form on a postcard.

To Frye’s dismay, however, “it didn’t seem that anyone was listening—not until ocean pollution became an economic issue.”

In January 1997, a *New York Times* travel advisory warned about health hazards from storm drains in La Jolla. Soon after, city and county officials agreed to post warning signs at storm drain outfalls, perform DNA testing to determine the source of the bacteria, and divert polluted runoff. Since then, the City of San Diego has built a concrete channel that takes dry-weather flow from the storm drain outlet emptying at Tourmaline and several other beaches into the sewage treatment system. “This simple action has already resulted in a reduced number of reported water contact illnesses” in dry weather, Frye says.

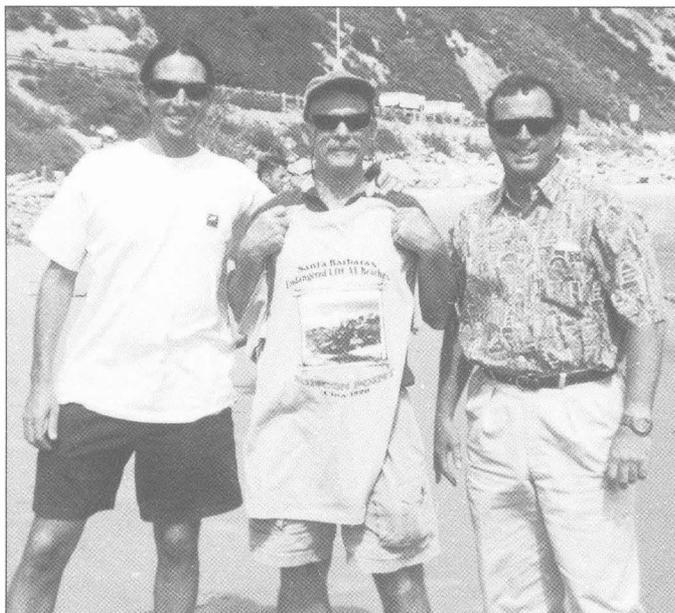
These experiences close to home have propelled Donna Frye onto a larger stage. She is now San Diego pollution control coordinator for the Center for Marine Conservation (CMC), attending more and more meetings, working for state legislation, watching land use issues in her watershed, flying to Washington occasionally. “It’s a difficult balancing act with our business,” she says, “but our customers are very understanding.”

From Point to Nonpoint

TOURMALINE EXEMPLIFIES the pollution problems of many California beach communities, especially those in urbanized watersheds. “We call ourselves ‘end of the pipe’ people,” says Frye.

But though the dirty water does arrive at some beaches via pipes—or, rather, culverts—it collects in the storm drains from many different sources. It is therefore called “nonpoint source pollution.” Since the 1970s, government regulatory actions have significantly diminished the amount of effluent from “point” sources, such as sewage treatment and industrial disposal pipes. Now most of the pollution reaching streams and the ocean is nonpoint source. Septic systems, animal waste from streets washed by hoses or rain into gutters, pesticides from lawns and agricultural fields, used motor oil, and many other land-based contaminants contribute. Nonpoint sources are hard to identify and much harder to control.

The growing chorus of citizens demanding attention to the problem has recently



MARC BEYLER

Paul Jenkin of Ventura Surfrider, Keith Zandona of Santa Barbara Surfrider, and Brian Brennan, member of the San Buenaventura City Council, at Rincon Point

Opposite page, top and middle: This storm drain sent filthy runoff straight into the water at the Tourmaline surfbreak. Bottom: Donna Frye watches a city worker clean debris from the new dry weather diversion system.

led to several important new mandates. Water quality at heavily used beaches must now be regularly tested and monitored in California from April to October. And, perhaps as significantly, funds have become available for remedies.

In spring 2000, California voters approved Propositions 12 and 13, bond measures that allocate hundreds of millions of dollars to address the problem, with such remedies as source reduction and upgrades of on-site septic systems. Members of the State legislature have provided additional general fund monies for related programs. The Coastal Conservancy, for example, was allotted \$3 million this year for innovative "treatment controls," to be carried out with local partners.

Growing Problem or Just Better Data?

STATEWIDE, BEACH CLOSURES and advisories increased more than fourfold between 1991 and 1998, from 745 "lost" beach days to 3,273, according to the State Water Resources Control Board and the Coastal Commission's *Nonpoint Source Pollution Control Plan*. The annual beach pollution survey of the Natural Resources Defense Council (NRDC), *Testing the Waters 2000*, found 3,547 "reported" beach closure "incidents" along the coast in 1999.

The beaches of Huntington Beach were off-limits for nearly the entire summer. In its annual report card on beach water quality from Santa Barbara to Orange County, Heal the Bay, a citizens group in Santa Monica, gave most southern California beaches A grades in dry months. During the rainy season, however, many beaches failed.

Do these figures prove that beach water quality has been deteriorating? Not necessarily, say many public and environmental health officials; they merely reflect increased testing, monitoring, and reporting. Citizen activists and environmental organizations disagree. "Way too much energy has been spent on this pointless debate," says Surfrider's executive director Chris Evans. "With greatly increased development in the watersheds, it's just logical that water quality would deteriorate because of urban runoff."

Volunteer Monitoring: "Surfer Epidemiology"

FOR THE PAST SEVERAL YEARS, the only information available on some of southern California's most popular beaches came from Surfrider's volunteer Blue Water Task Force, launched in 1990 because surfers

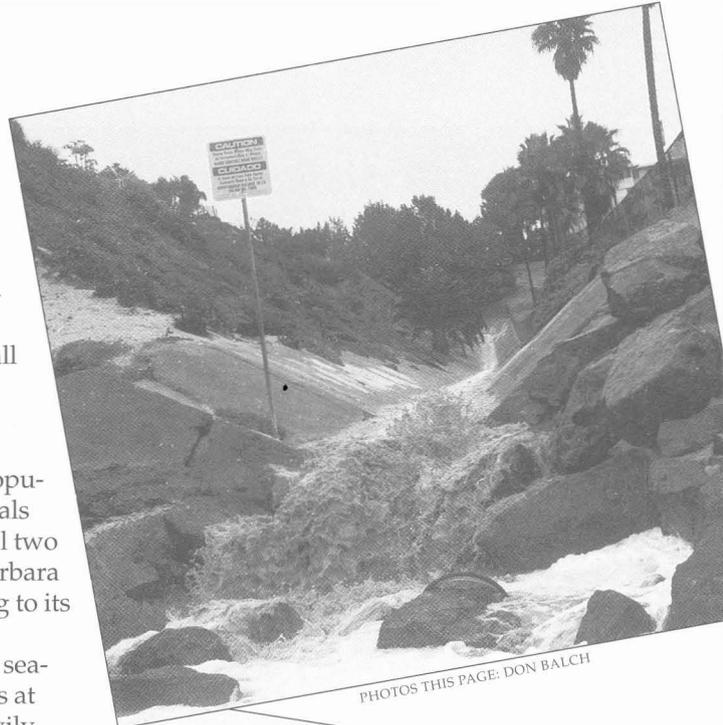
were getting sick but public health agencies were not regularly testing water quality at most public beaches.

Surfrider's Santa Barbara chapter, for example, began monitoring all south coast beaches in 1992 with seed funding from the Deckers Company, which makes a popular brand of beach sandals in Carpinteria. Not until two years later did Santa Barbara County allocate funding to its Environmental Health Department to conduct seasonal water quality tests at more than a dozen heavily used swimming and surfing beaches. In Ventura County, regular official beach water testing began only at the end of 1998.

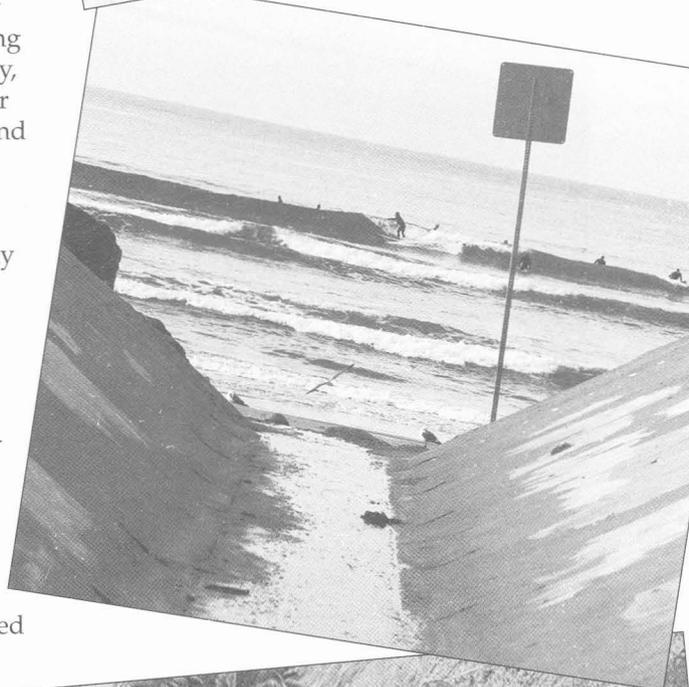
In Santa Monica, ocean water quality has been a major focus for Heal the Bay from its founding in 1985, according to Mark Gold, executive director. The group has been publishing its beach report card for almost ten years. Last summer it launched a web version for all of southern California, from Santa Barbara County to the Mexican border.

"If our vision of a restored Santa Monica Bay is to be at all a success, we must have strong volunteer programs," said Gold. "Heal the Bay has built a large constituency of citizen stewards. In the long term we know it's practices and behavior which need to change; our citizen volunteers are part of that change."

For example, he said, Heal the Bay runs a volunteer monitoring and testing program for Malibu Creek where it drains into Malibu Lagoon, with the help of Coastal Conservancy funding.



PHOTOS THIS PAGE: DON BALCH



Testing, Monitoring, and "Typing"

CALIFORNIA HAS SET UP a mandatory program to measure microbiological contamination in beach waters. The program applies to beaches adjacent to storm drains that flow in dry weather and are visited by more than 50,000 people a year. It was required by AB 411 in 1997, and went into effect in spring 2000.

Between April and October local health officials are required to test beach water quality at least weekly. They must test not only for coliform but also for fecal coliform and enterococcus bacteria. Advisory notices must be posted if test results exceed standards. Previously, each county determined its own test frequency and its own advisory notice and posting standards.

The new program will increase the frequency of testing at some beaches as well as the number of sites tested. It will provide more frequent and improved information about beach water pollution. The posting requirement is likely to lead to more beach advisories but fewer beach closures: the new legislation allows, but does not require, that beaches be closed when sewage has been spilled, and it does not require closure when bacterial standards are exceeded. Previously, local health authorities used their own discretion in deciding when to close beaches.

In 1996, a ground-breaking epidemiological study was undertaken on Santa Monica Bay by the Santa Monica Bay Restoration Project, coauthored by Mark Gold of Heal the Bay. It found an increased incidence of a variety of ailments, including colds and coughs, ear infections, sore throats, fever, chills, and gastrointestinal disorders, in people who had water contact near beach areas affected by polluted runoff.

Another study, conducted in 1998 by the Southern California Coastal Water Research Project, identified human enteric virus material in three of the four water samples that exceeded state recreational water contact standards for fecal coliform bacteria. No conclusive correlation has been established, however, between the presence of bacterial contamination and human viruses.

Citizens have called on government officials to allocate more staff and financial resources to identify specific sources of water pollution. In recent years a promising new use of DNA "typing" has helped to do this. When bacterial pollution was found in Rincon Creek, in Santa Barbara

County, DNA testing showed that part of it came from human sources. In San Diego County, Donna Frye and others persuaded the County to use DNA tests to identify sources of pollution at Tourmaline Beach and three other beaches.

An obvious question arises: What else is in the water? Environmental groups have long battled state and federal governments over toxic pollutants found in California's

rivers, bays, and nearshore waters. Such pollutants continue to flow down many of California's watersheds.

Chris Evans of Surfrider argues that beach water quality testing should be expanded beyond its current focus on bacterial contamination. Justin Malan, representing the local Environmental Health Directors in California,

adds: "We need to get a handle on viral contamination by ensuring closer cooperation between state and local health agencies and the regional water quality control boards."

Steve Weisberg, of the Southern California Coastal Water Research Project, believes that "more coordinated, integrated, and targeted monitoring is needed."

*an increased
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contact*

A Tough Problem to Fix

AS INFORMATION gathered by citizen volunteers accumulated, the Legislature took note. In 1997 a bill by Assembly Member Howard Wayne of San Diego was signed into law, requiring that water quality be monitored at heavily used beaches next to storm drains.

Documenting a problem at the beach is one thing, however; finding a way to fix it is quite another. There is much disagreement on what sources are culpable and to what degree, as well as on what should be done.

For instance, it is generally agreed that old, failing, or inadequate residential septic systems contribute to coastal water pollution. But to what extent? How can the problem be resolved? Who will bear the costs? These are hotly debated questions at Rincon Point in southern Santa Barbara County.

One of the best winter surf breaks anywhere was formed when Rincon Creek deposited a fan delta of cobble and sand along the shore here. Local surfer Tom Cur-

ren, many times a world champion, ranks Rincon among the top 10 surf spots in the world. Seventy-two homes stand on Rincon Point, with separate septic systems.

On a recent weekday afternoon, several local clean water activists met me at the end of the short trail descending from the parking lot toward the smooth breaking waves: Keith Zandona, chair of Surfrider's Santa Barbara chapter; Paul Jenkin, chair of the Ventura chapter; Hillary Hauser, co-founder of the Santa Barbara-based non-profit Heal the Ocean; and Joel Smith of CURE (Clean Up Rincon Effluent), an advocacy group of regular Rincon surfers. They all knew that many of the old septic systems on Rincon Point had not worked well at times, and sometimes did not work at all.

CURE was started almost three years ago by "three surf guys who had gotten sick," said Smith, who has been surfing Rincon and other spots in Santa Barbara for more than 30 years. "For us, things came to a

head in the summer of 1998, when Rincon beach was posted for closure for a good part of the summer."

That year was one of extraordinary rains, and many of the county's southern beaches were closed some or all of the summer months. Rincon Point was posted safe for water contact on only 35 days. Hauser said Heal the Ocean was formed that same year, in response to the closures.

At Rincon Creek, innovative "DNA typing" of bacteria revealed the culprit: human bacteria. Fingers pointed at the septic systems. But it was not possible to determine how much these septic tanks were contributing to the problem ("if at all," critics contend).

Frustrated that government action was simply "taking too long to address the problem," Heal the Ocean representatives approached the Rincon Point owners association with a proposal to study the costs and complexities of hooking homes to a nearby sewer system—specifically, that of Carpinteria, a few miles upcoast.

The homeowners' representative, Steve Halstead, said they were "interested in the sewer hookup as the most appropriate solution based on the specific conditions of our situation." These homes sit on very small lots, with poor soil and a very shallow water table. "We do not believe that retrofitted septic systems were the answer," Halstead said.

Based on a preliminary engineering report financed by Heal the Ocean, the homeowners, Santa Barbara County, donations from Surfrider Foundation chapters in Santa Barbara and Ventura, and proceeds from the fourth annual Clean Water Classic, a Surfrider fundraising competition held at Rincon, the homeowners voted for a sewer hookup. The Carpinteria Sanitary District began the process of expanding the district and developing a financing plan.

Then came a snag: A few of the residents filed a lawsuit against the Carpinteria Sanitary District, seeking a fuller environmental analysis of alternatives. The District put its plans on hold. The plaintiffs and proponents disagree over the role of the septic systems in causing the water pollution. Opponents of the sewer hookup also argue that transferring the effluent to the end of the outfall pipe may not be a real solution. In addition, questions over the cost-effectiveness of the proposed hookup are unresolved.

Runoff may pose health risks to recreational beach users.

In the wake of this controversy, at least three other communities along Santa Barbara County's south coast have suspended efforts to evaluate the costs and feasibility of connecting to nearby sewer systems to solve septic tank problems similar to those at Rincon. These communities include 100 homes in Carpinteria and 770 at Hope Ranch, just west of the City of Santa Barbara, the largest residential area on the county's south coast served by individual septic systems.

Assembly Member Hannah-Beth Jackson's AB 885, signed by Governor Gray Davis in September, requires that standards be developed for the operation of individual septic systems. "We need to make sure that if these systems are to be used, that, at a minimum, they do not contribute bacterial contamination to our coastal waters," explained Jackson, who represents Santa Barbara.

A Community Septic System

DESIGN SOLUTIONS to septic tank problems may exist. One is about to be tried in the tiny Sonoma County town of Monte Rio, which lies on both banks of a two-mile reach of the Russian River and on the tributary Dutch Bill Creek, ten miles from the river mouth at Jenner. While an estimated 95 percent of the residents live there year round, Monte Rio Beach and the town are also popular vacation and visitor destinations.

Individual septic systems, nearly all old and substandard, serve this community. They pour contaminants, including bacteria and nutrients, into the Russian River, which drains directly into coastal waters. Chronic public health problems and water pollution have been attributed to these antiquated systems. After several years of water quality testing identified serious water pollution problems, both Sonoma County and the North Coast Regional Water Quality Control Board began to develop a long-term solution for Monte Rio and the adjacent small communities of Northwood and Villa Grande.

For the past two years, Sonoma County



CREG MAYER

The Mission Resource Conservation District in Fallbrook, San Diego County, has enlisted children and youth in a campaign against pollution in the San Luis Rey and Santa Margarita watersheds. High school students study the problem, then visit elementary schools dressed as Phinnious J. Greene and Fancy Fin to speak in behalf of frogs, fish, and other creatures, including humans who appreciate clean water. In September they did their thing at a city-sponsored clean water event in Oceanside, where the San Luis Rey River reaches the sea.



DON BALCH

Volunteers clean up Windansea Beach in La Jolla.

*Septic systems...
pour contaminants,
including bacteria
and nutrients, into
the Russian River.*

has taken the lead in evaluating feasible alternatives that would address both the community's needs and coastal resource and water quality protection. The effort, which analyzed sewer hookup alternatives and upgraded septic systems, found in favor of a community septic system that would eliminate discharges into the groundwater and into the Russian River. Current plans call for some 600 parcels to be hooked up in an area surrounding downtown Monte Rio. The proposal, however, remains controversial, with vocal opposition.

"The proposed community septic system represents an innovative approach," according to Sonoma County Supervisor Mike Reilly, whose district includes Monte

Rio. "If we succeed in eliminating the septic problems here along the Russian River, other small rural communities may be able to use this model to develop their own plans. This project has the potential to greatly aid our efforts to improve coastal water quality along the Sonoma Coast and more generally along the California coast."

Statewide planning is also moving ahead. Earlier this year, at a signing ceremony on Santa Monica Bay, federal and state officials celebrated the federal approval of the *Plan for California's Nonpoint Source Pollution Control Program*. California is the first state to win this approval. The Plan, which the U.S. Environmental Protection Agency and National Oceanic and Atmospheric Administration found meets the requirements of the Clean Water Act and the Coastal Zone Management Act, was adopted jointly by the State Water Resources Control Board and the Coastal Commission. It identifies more than two dozen state agencies with varying responsibilities for implementing 61 management measures to address nonpoint source pollution in the state. (The Coastal Alliance gave the state a B grade for this Plan because it "has yet to prove an

ability to efficiently target and address nonpoint pollution problems.")

Plans don't mean much, of course, without staff and money to carry them out. But that situation is being remedied somewhat. An increase in both funding and staffing for coordinating nonpoint source pollution programs at the State Water Resources Control Board and the Regional Water Quality Control Boards is provided for in the approved state budgets for fiscal years 1999 and 2000. A new Interagency Coordinating Committee has been formed. The state's first five-year implementation plan is being revised and expanded to address a range of new initiatives. Several state agencies, including the Coastal Conservancy, are developing more and better partnerships with local citizens and governments to implement innovative approaches. New financial resources will be available thanks to the voters' passage of the "water bond," Prop. 13, and the "park bond," Prop. 12, for pollution prevention, source reduction, treatment control, and natural resource protection and restoration. From Proposition 13 alone, nearly \$300 million will go into cleaning up nonpoint source pollution in watershed and coastal resource improvement projects.

Donna Frye, one of the citizen leaders who catalyzed this flow of money and programs, cautioned, however, that "state and local governments cannot do it by themselves. Involving citizens in developing solutions will be necessary if we are to be successful in controlling nonpoint source pollution. Changes in behavior and practices are required, and everyone has to play a role."

She continues to recruit new citizen stewards. Some college students recently asked her to help with a project they might do for a class while also helping their community. She suggested that they look into the water quality impacts of a controversial development proposal in Santee, some 20 miles upstream from Pacific Beach. They did, found that it would aggravate the watershed's nonpoint source pollution problems, then presented their research results at a press conference in Ocean Beach, at the mouth of the San Diego River. "They made the connection between downstream and upstream," said Frye. "And the community voted against the development. This was their first involvement in local politics." ■

Marc Beyeler manages the Conservancy's Coastal Water Quality Program projects.



171 SICK OYSTER EATERS CAN'T BE WRONG

TOMALES BAY CONVERGENCE

JOHN HART

PHOTOGRAPHS BY ELAINE STRAUB

IF YOU DIDN'T KNOW better, you might think there was nothing left to fight about along Tomales Bay, the flooded, foggy rift in the land that halfway separates the Point Reyes peninsula from the mainland of Marin County north of San Francisco.

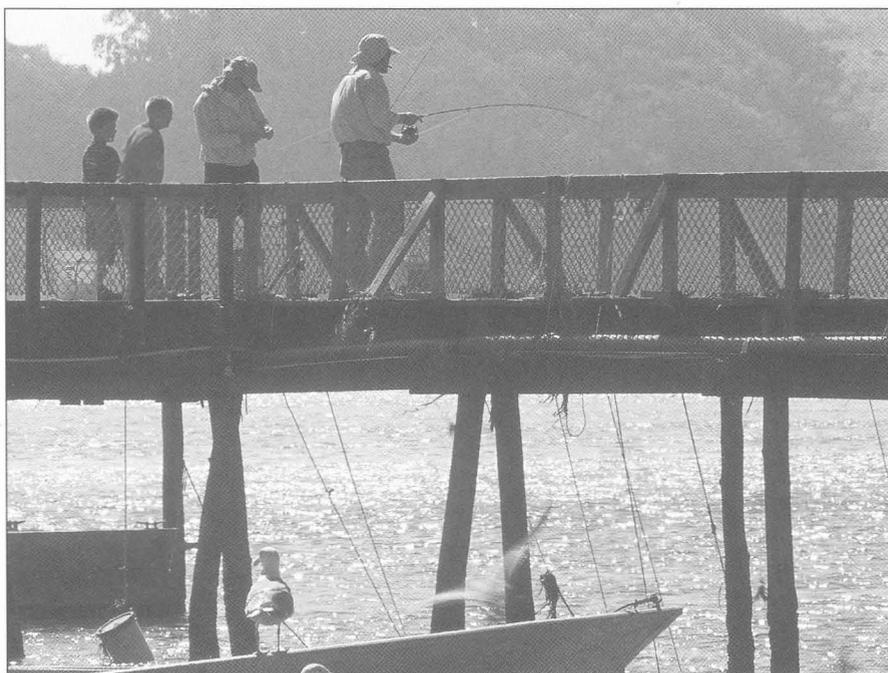
Since 1972, when the county decided to use all its powers to keep this landscape rural, the outward scene has hardly changed. The same herds graze the same gentle hills above the same wandering roads. The same small communities adhere to the waterside. The same mouthwatering local oysters grace local barbecues.

But those who know this place and its people see not a settled peace but a tenuous balance of forces. They see a landscape still at risk, a community split on several lines. The latest of many battles—about pollution of bay waters by livestock and human waste—has set neighbor against neighbor in a way not seen for years; yet it may open the way to a more secure future.

In May 1998, 171 people suffered nausea and diarrhea after eating raw oysters harvested in Tomales Bay. Because the gastrointestinal bug involved is carried by humans only, livestock, the usual pollution suspect, couldn't be blamed. The case proved that

Left: Congresswoman Lynn Woolsey enjoys an oyster at the fourth State of Tomales Bay Conference in Inverness.

Below: Lawson's Landing Dock





Cows graze near Lawson's Landing and Tomales Point.

every group in the watershed, not just the ranchers, had to do its part to protect bay water quality. The crisis led to a new conversation about how best to guard and restore this landscape in years to come.

The water quality issue has been slow to make it to the top of the agenda at Tomales Bay. Compared to most estuaries on the California coast, this one is quite clean most of the time; that's why it can support the kind of shellfish industry long since lost to urban bays. And there have been bigger problems to worry about. There was a time when three freeways were planned to converge on the tiny town of Point Reyes Station; a time when 6,000 acres around the bay were in the hands of a single land-speculation firm. The fear of massive urbanization kept people here on the alert for years. That threat has receded for the moment; the shellfish industry has grown prodigiously; priorities have shifted. The "pristine" bay seems not pristine enough.

Agriculture First

IN THE EARLY 1970s Marin County turned its back on schemes calling for widespread development of its coast. The Planning Commission and Board of Supervisors reduced the number of new dwellings permitted around Tomales Bay from over 50,000 to about 3,000. Most of the region was zoned "A-60"—"A" for agriculture, "60" meaning that parcels could not be split into pieces smaller than 60 acres.

Intended primarily to hold off urban sprawl, this down-zoning was legally justified as a means of protecting a viable

dairy industry in West Marin. If that industry collapsed despite the zoning, the regulation itself could lose its rationale and succumb to legal attack.

Recognizing this danger, the county adopted a policy of "agriculture first." Ranchers who feared that rezoning meant they would lose the potential development value of their land and gain nothing in return were pleasantly surprised. Egged on by environmental groups, the county government took step after step to support dairy farms.

In 1974, when the San Francisco Bay Regional Water Quality Control Board imposed rules to reduce manure runoff into the bay, the county paid one-

fourth of the cost of building waste-storage ponds and "loafing barns" to hold dairy herds during the rainy season. When a severe drought struck in 1976-77, the county again stepped in, trucking water to ranches where springs had dried up. Most disarming of all to the farm community was the moment when environmentalists joined local government in asking for an increase in the state-controlled prices paid to farmers for their milk.

Thereafter an extraordinary alliance of ranchers, conservationists, and government officials watched over rural Marin. The allies were on guard against developers, against intrusions like landfills and wastewater discharges from Sonoma County just to the north, and also against "overzealous" regulators who might be insensitive to the precarious economic state of the dairies. "We get a lot of help from the environmental community," a farm leader said in 1989. In how many regions would you hear a remark like that?

As land prices rose, buyers appeared who would gladly buy a legal 60-acre plot for a single lavish home and a few horses. The temptation to subdivide intensified. Zoning was no longer enough to keep the hills green and dotted with cows. Looking for a more effective tool, ranchers and conservationists founded the Marin Agricultural Land Trust (MALT), the first land trust in the nation designed exclusively to preserve farmland. Funded mostly by foundation grants, the Coastal Conservancy, and state bond issue funds, MALT has since acquired easements on about one-seventh of the

Tomales Bay watershed, protecting some 20,000 acres for agriculture in perpetuity.

At the start of the 1990s, development pressures again mounted, and the land trust was running low on money. For the next round of land preservation, the trust and its allies looked to Congress. Along the west side of Tomales Bay lay Point Reyes National Seashore. Wasn't there a federal interest in preserving the setting of this national treasure? In 1995, Representative Lynn Woolsey introduced the Point Reyes National Seashore Protection Act. It would extend the boundaries of the Seashore to include the east shore of the bay, and authorize the Park Service to buy MALT-like conservation easements there. Although no owner would have been forced to deal, the boundary expansion frightened some local ranchers, and caught the attention of national "Wise Use" lobbies opposed on principle to federal land preservation efforts. Second and third versions of the Woolsey bill, altering the provisions that had been most objected to, did not satisfy the opponents. The legislation went nowhere.

This debate split the Tomales Bay community, but it was trivial compared to the resurgent fight over dairy waste runoff. Cows produce a lot of manure, and inevitably traces of that waste wind up in local waters. The storage ponds and loafing barns built at great expense in the 1970s had supposedly taken care of concentrated, "point source" pollution, but water quality (as measured by counts of fecal coliform bacteria in the bay) had not improved very much. What was the source of the excess bacteria now? Nobody knew.

Neither environmentalists nor regulators seemed in a hurry to attack this problem again. After all, it was argued, pollution from ranches was nothing compared to the toxic brew that would flow from the suburban streets which might yet cover the landscape. Perhaps this rustic waste shouldn't even be called "pollution," in the sense of something that harms an ecosystem, at all. If a few critics muttered about cutting the farmers too much slack, they did so mostly in private.

Another growing interest group, however, did not feel so constrained.

The Turning Point

SHELLFISH HAVE BEEN raised in Tomales Bay since 1907, when urban pollution drove the industry out of San Francisco Bay. Today, 513 acres of state lands here are

leased to growers of Pacific oysters, bay mussels, and four other species of oysters and clams. Shellfish are filter feeders, concentrating whatever they ingest, including bacteria, protozoans, and viruses that can cause human illness if the meats are eaten raw. State and federal agencies monitor pollution levels, using as an indicator the amount of fecal coliform bacteria found in shellfish and in the surrounding waters. Everyone agrees that this indicator is flawed. Coliforms themselves rarely if ever make oyster eaters sick. But they are easy to count, and where fecal coliform is found (the argument goes), other and more dangerous organisms may be found also.

Whenever a storm moves in and runoff scours the hills, coliform counts in Tomales

PAUL ELMORE LIVES WITH HIS WIFE, JEAN, in a bayside house in Marshall. It was built by Elmore's father in 1950 on the former roadbed of the Northwestern Pacific Railroad, which linked San Rafael to the Russian River via the shore of Tomales Bay until 1933. Old railroad spikes still show up in the yard.

Like many dwellings on this shore, it was built as a summer cottage for a family that lived outside the watershed—"over the hill," as the locals put it. Young Paul helped to build the house; in the years since, he has largely rebuilt it, adding modern insulation, double-paned windows, and a highly efficient wood stove that keeps off the foggy chill. Though Paul still goes "over the hill" to teach college classes, the Elmores have lived here full-time for five years.

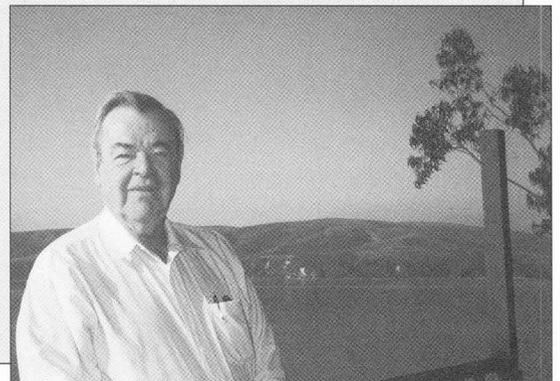
Their place is about three miles north of the the nominal center of town—a post office, a boat works, and a tiny general store. But the name Marshall really refers to the whole sparsely settled 11-mile eastern shoreline of Tomales Bay, and its residents are all the ranchers, homeowners, and shellfish growers who live there.

In 1984, Elmore helped to organize the East Shore Planning Group, devoted basically to keeping things as they are. As luck would have it, he was president when the Norwalk virus hit. He doubts that a Marshall septic tank spilled out the virus, but now that the suspicion has arisen, he knows that the community must respond to reassure the authorities (and itself). It must act, or be acted upon.

From his deck, Elmore looks over a quiet bay, grayed with a translucent wash of fog. "Like most academics, I'm a bit of an introvert. And this place allows you to be. It's a good place if you want to read, or think. Or hike, or boat." He pauses. "Anything but ride horses."

To Elmore, and to many others who live along this shore, horses symbolize the greatest current threat: the replacement of working ranches with rural estates centered on luxurious country houses. Quite a few such mansions have sprouted at Nicasio, a few miles inland but within the Tomales watershed. He dreads the thought that they could begin to appear on his horizon.

Paul Elmore



Bay go up, and the State of California forbids harvest. The ban lasts five days every time an inch of rain falls within 24 hours. In a wet winter, closure periods can run together and halt operations for months at a time. A Christmas shutdown is particularly costly.

In the late 1980s, drought years with few winter closures, the industry prospered and grew enormously. When wetter conditions and frequent closures returned in 1992, the growers decided to take action. They lobbied successfully for passage of the Shellfish Protection Act of 1993, a law forcing Regional Water Quality Control Boards to

act on behalf of shellfish raising areas. Wherever harvest is closed for more than 30 days a year, the regional board must appoint a Shellfish Technical Advisory Committee to study the situation and recommend corrective measures. A Tomales Bay committee, including state and local officials and representatives of shellfish raisers, ranchers, and other local groups, was formed in 1994.

The committee first mounted a water quality study. Though somewhat more sophisticated than previous efforts, it had the same essential flaw: most of the data gathered was on fecal coliform bacteria, the traditional but questionable indicator. Still, nobody seriously disputed the study's conclusions: Tomales Bay failed to meet water quality standards in winter, and agriculture was the principal reason. By law, corrective action would be required. Dairy ranchers fretted. What would they have to do, and at what cost?

Then in May of 1998—in what now appears to be the turning point of this story—at least 171 people who had eaten raw oysters got sick. (Because such illnesses are under-reported, the real count may have been much higher.) DNA testing of patients and shellfish showed that the cause was a virus of the family called “Norwalk-like”—among the most common and least dangerous of oyster-borne pathogens. Shellfish harvesting in the bay was shut down for three weeks. The pollution of Tomales Bay was suddenly front page news.

Livestock do not carry the Norwalk virus; only people do. Could the source be a leaking septic tank? Attention abruptly turned away from dairy cows and toward cottages along the east shore. The state Department of Health Services made a quick inspection, noting that many homes were within 100 feet of the shore and thus, because sewage had limited percolation space, might be polluting.

Now householders joined ranchers and oyster growers in feeling economically threatened, under the gun. Charges and countercharges rang across the water. Biologist Corey Goodman, a Marshall resident, suggested that the Norwalk source might have been a sick person in a boat. State officials kept pointing at septic tanks. Local people threatened to stop eating oysters. An exasperated oysterman, breaking an unwritten rule that keeps most local disputes local, blurted to the *San Francisco Chronicle*, “Those bovines on the hills are not our friends.”

FOR 60 YEARS there have been dairy ranchers and community leaders named Giacomini in the Tomales Bay watershed. Among the most visible Giacominis today is Robert, proprietor of a gently sloping hillside just north of Point Reyes Station, overlooking the head of the bay.

These days Giacomini finds himself in a somewhat lonely business. In 1972, when the county declared its intention of maintaining dairy farms, close to 100 ranches were at stake. Today only 30 remain in Marin and 14 in the Tomales Bay watershed. By some measures the industry has held its own—there are about as many cows on the ranches as ever—but year by year the families are being lost. Ranchers quit the life for many reasons: hard and unrelenting work; uncertain income; competition from huge inland feedlot dairies. Often what dooms a family ranch is the lack of a successor: no son or daughter is willing to pick up the load.

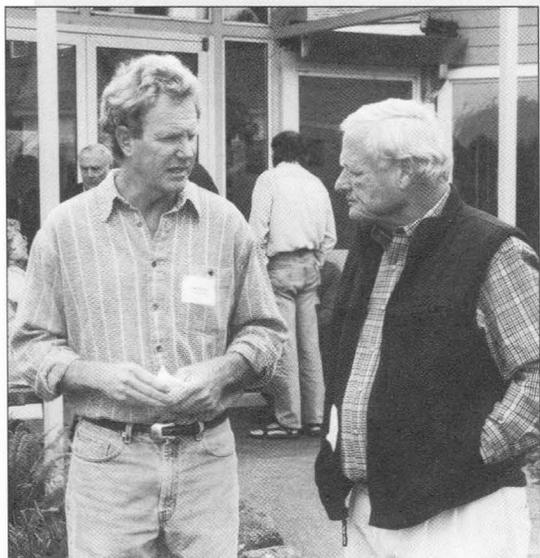
Every pressure that makes the business more difficult tends to tip the balance for another family or two. When the Tomales Bay Shellfish Advisory Committee report appeared, four more ranchers decided the time was ripe to leave. Giacomini has no such thoughts, but he worries that pollution concerns may force him to shrink his herd.

Yet Bob Giacomini is no pessimist. Tomales Bay farms, he thinks, must follow the example of Tomales Bay shellfish raisers and produce a distinctive, luxury product. This approach was pioneered by the Straus family, a few miles up the bay, which in 1992 began producing and bottling (in glass) its own organic milk, followed later by yogurt and butter. The products are widely distributed. Other farmers have gone the same route, diversifying or adapting to fill niche markets. One rancher is growing grapes, another olives, another specialty wool. Another has added a bed-and-breakfast on the farm. And the Giacominis have formed the Point Reyes

Farmstead Cheese Company. Next year they will roll out the first blue cheese to be made in California. They're calling it Point Reyes Blue.

About the Tomales Bay Watershed Council, Giacomini says: “I've got a lot of hope for that. Everybody is starting to come around.”

Marin County Supervisor Steve Kinsey (left) and Robert Giacomini



But as the Norwalk incident heated the discussion, it also widened it. The pollution problem now had several sides. In the ensuing months the question gradually shifted from "Who's at fault?" to "What can each party do, in its own interest, to keep Tomales Bay clean?"

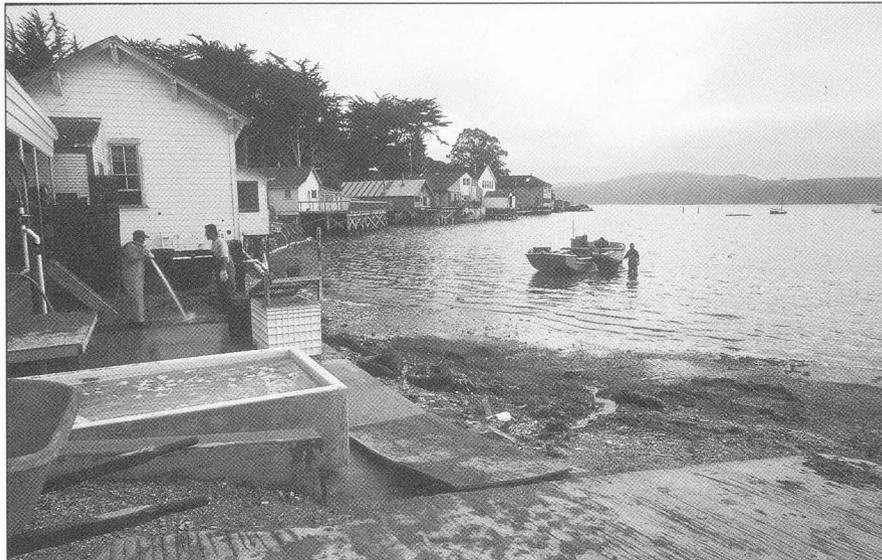
The 14 dairy families in the watershed stepped forward first. They contracted with researchers at the University of California at Davis to study their operations, singly and in detail, and recommend better ways of keeping animal waste and pathogens out of surface waters. Late in 1999, the Marin Community Foundation granted \$112,000 for this study.

Reluctantly—they were new to this role—the property owners on the east shore agreed to take some sort of joint responsibility for the state of their septic systems. A Marshall Water Quality Association may be formed. But the Marshall community was determined not to take this step alone: all homeowners around the bay and in its watershed must likewise do their share. In June 2000, the Shellfish Technical Advisory Committee staged a "Septic Social" in Point Reyes Station to inform West Marin about possible waste problems and solutions. In July, the circle widened further. A Marin County Grand Jury report attacked county government for failing to monitor septic systems throughout its jurisdiction, and a countywide Septic Technical Advisory Committee began to meet.

As Corey Goodman had pointed out, the source of the Norwalk virus might have been someone on a boat. There are a lot more boats, especially kayaks, on the bay than there used to be. So a representative from a local kayak concession was added to the shellfish committee, and Point Reyes National Seashore redoubled its efforts to prevent recreationists from polluting water and land.

In summer 1999, with tensions ebbing but still high, the Shellfish Technical Advisory Committee sought the diplomatic help of Harry Seraydarian, of the U.S. Environmental Protection Agency's office in San Francisco. Seraydarian is an expert in San Francisco Bay affairs (compared with which the Tomales scene is refreshingly simple) and an old hand at helping divergent interests move toward accommodation. Interviewing people of all stripes around Tomales Bay, he was able to find a bedrock of agreement. Everybody wanted the ecosystem protected and restored. Everybody wanted the rural character of

the landscape retained. Everybody wanted both agriculture and aquaculture to flourish. Everybody wanted to achieve as much as possible by voluntary action, minimizing the heavy hand of regulation. Everybody wanted more and better studies to help determine how best to accomplish these things.



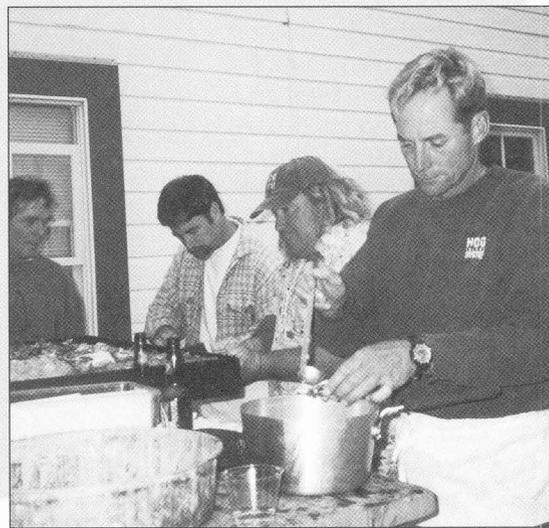
Marshall oyster workers

JOHAN FINGER, AN AQUACULTURIST ON TOMALES BAY, has a lot in common with his neighbors, the dairy ranchers on the hills.

Like them, he has been here a long time. Like them, he runs a small firm that competes with giants outside the region. Like them, he and his partners survive by raising products—notably Pacific oysters grown separately, not in clumps, and suitable for presentation "on the half-shell"—that require extra care and can be sold for correspondingly good prices. "This is the family-farm version of aquaculture," he says.

Like his rancher and cottager neighbors, Finger does not want much change in his world. Nor does he want to see commercial agriculture replaced by "rural estates." Like the ranchers, Finger practices a form of animal husbandry, and such operations don't always look (or smell) postcard perfect. He wouldn't welcome the intrusion into West Marin of urban escapees whose idea of community improvement might be to shut down local food-producing industries. Nor would he welcome a replacement of cows by horses. Where hobby farms border oyster waters, as in parts of Washington state, the same runoff problems occur. Manure is manure.

John Finger served his Hog Island oysters at the Fourth State of Tomales Bay Conference.





Tomales Bay house

Seraydarian asked if interests around the bay were ready to form a common, watershed-wide organization to prepare a common, watershed-wide plan.

There were some groans. The region has plenty of organizations—five groups with “Tomales Bay” in their titles already exist—and local activists have crowded calendars. The same patient faces appear under many hats. (At a recent meeting about shellfish, a woman was overheard asking another: “Are you the Farm Bureau today?”)

Yet the need seemed inescapable, and in January 2000 the Tomales Bay Watershed Council was formed. It has made creditable progress. It has adopted a vision statement offensive to no one. It has received seed money from the County of Marin and the Marin Community Foundation, and has good prospects for further grant support. It has begun to lay out topics and schedule for planning, and hired a Watershed Coor-

dinator, Neysa King (previously Coordinator of the Eel River Watershed Forum). To make sure that nobody feels overridden, the Council has adopted the Shellfish Technical Advisory Committee’s policy of unanimity: nothing major will be done if there is even one dissent. At the moment, Harry Seraydarian remains as facilitator, keeping the still-fragile process on track, but the need may be fading.

The bad time seems to have passed. There is hope—for better information as research dollars flow, for real solutions to long-standing problems, for money enough to pay for those solutions. A tentative new friendship among the various interests seems to hover in the air above Tomales Bay.

And the focus has widened from a stand-off between oysters and cows. There is much else to think about. What causes, and what can be done about, the rapid shoaling of parts of the bay? What should be done about predatory green crabs and other alien species disturbing the ecosystem, summer dieoffs of oyster seed, recent algae blooms? Can degraded tributary streams and salmon runs be restored? As the market for “rural estates” heats up, can real, working ranches be retained? How much more of the watershed’s land can be protected with agricultural easements?

Thanks in part to 171 upset stomachs, an overdue and comprehensive conversation is finally under way. ■

John Hart is the author of Farming on the Edge: Saving Family Farms in Marin County, California (University of California Press, 1991) and several other books on environmental issues.



Kayaking has grown more popular on Tomales Bay.

Silicon Coast, Dot-com Beach?

MEGA HOMES ARRIVE AT A RURAL COAST

JACK LIEBSTER AND RASA GUSTAITIS

HUGE NEW HOUSES that dwarf their neighbors continue to arouse anger in coastal communities from Malibu to the San Francisco Bay Area and points north. In response, local governments have been struggling toward new standards that might contain the "bigfoot" explosion. Meanwhile, as mansions of 5,000 square feet and more push up against cottages and beach houses less than a quarter their size, the character of coastal towns is rapidly changing.

In Malibu, long known for homes that display their owners' worldly success, a 5,000-square-foot place used to be large, but now people are building at twice that size or more. Mary Daly Riordan, wife of Los Angeles Mayor Richard Riordan, has a Coastal Commission permit for a 14,210-square-foot oceanfront home, with a deck of over 7,000 square feet that will extend along the ocean side of the Pacific Coast Highway across three combined lots. Cher's walled blufftop spread of about 20,000 square feet, nearing completion on the ocean side of the highway, is already a landmark.

The big house phenomenon "kind of snuck up on us, one house at a time, in Malibu," says Gary Timm, district manager for the Coastal Commission's South Central District. "Now it's spreading to other parts of the coast."



Neighbors were angered by the construction of this out-of-scale house atop an eroding bluff overlooking Tourmaline Beach in San Diego.

Lee Otter, chief planner for the Commission's Central Coast District, says "Houses of 10,000 square feet or more are being appealed in San Mateo and Santa Cruz Counties, in San Luis Obispo County near Harmony, and in Monterey County at Point Lobos Ridge, and with more sure to follow in Big Sur."

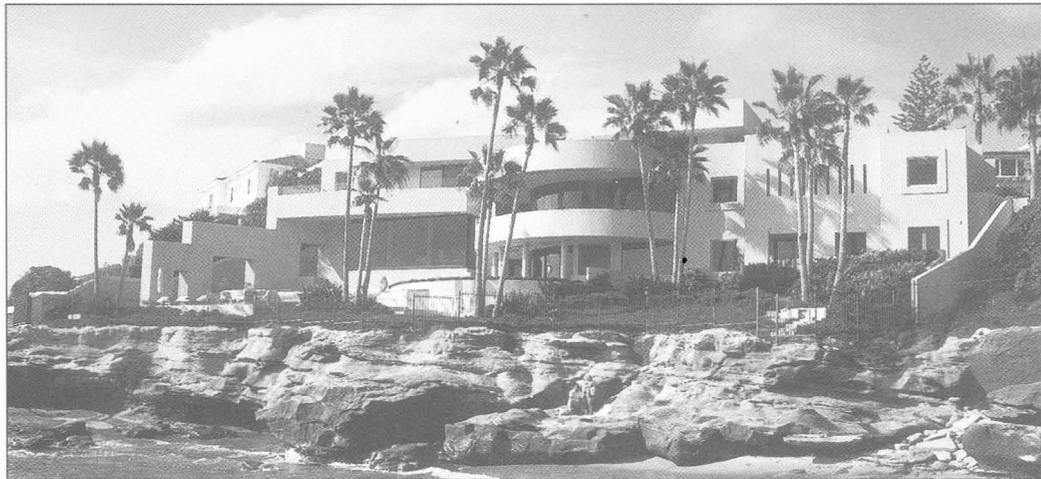
While a typical spacious three-bedroom ranch house might have 2,400 square feet, some of these houses are big enough to be museums or city halls. "They are monuments to affluenza gone mad," says Celia Scott, former mayor of Santa Cruz and a veteran advocate of coastal protection.

With rare exceptions, coastal towns have no size limits. (One that does is Pebble Beach, where tourists pay a fee to drive along Seventeen-Mile Drive in hopes of seeing luxurious estates. Monterey County's Local Coastal Plan, adopted in 1986, limits the "footprint"

of new houses to 5,000 square feet. At the time, that seemed plenty to all concerned, says Otter. Consequently—and ironically—Pebble Beach is one place where no oversized houses are being proposed today.

The impact of the big-house trend is, or soon will be, especially dramatic in rural areas—and nowhere more so than along the beautiful open stretch just over the ridge from Silicon Valley, between Santa Cruz and Half Moon Bay.

This house, south of Windansea Beach, is typical of beachside residences recently built in La Jolla.



This region, known locally as the Coastside, has a character all its own. To the north, Highway 1 clings to the steep edge of Montara Mountain and is often washed out by winter storms at Devil's Slide. Here it travels across fertile terraces, past lush marshes and abundant, accessible beaches backed by eroding bluffs. Forests of redwood, fir, and pine form a deep green background on hills to the east and, in some places, descend to the shore. With few roads leading into it and a strong agricultural heritage, the rural Coastside has managed to survive as an intact landscape, not much changed for more than a hundred years, despite explosive growth of the San Francisco metropolitan area.

Now, however, a wave of money has begun to wash over the coastal ridge from Silicon Valley, threatening to carve this landscape into building sites for megahomes on former ranches and farms. A few have already drawn public attention and controversy, and more are in the wings.

The money available for luxury living is immense in the heart of the new economy. In late 1999 there were 13 billionaires in Silicon Valley, and several hundred residents worth at least \$25 million, the *San Jose Mercury News* has reported. More than 65,000 Santa Clara County households—one in nine—had assets of a million dollars or more, not counting their homes. Add the homes—in seven Silicon Valley cities the median value exceeds \$1 million—and it is clear the number of people who could pay top dollar for coastal land is huge.

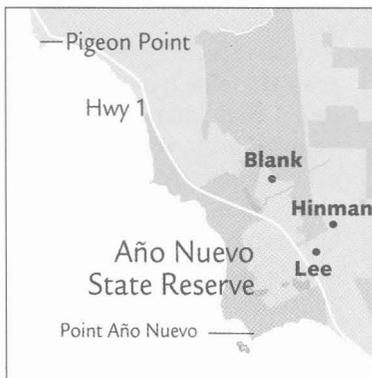
With real estate prices in the Valley spiraling out of sight, traffic congestion along major highways worsening almost daily, and land overlooking the Pacific available just over the ridge, it's only natural that building on the coast has appeal. New elec-

tronic technology has made "computer commuting" possible and, with it, a new kind of sprawl. That technology has opened the way to turning the Coastside into the Silicon Coast.

The Costanoa resort was a harbinger of changes to come. In the 1980s a complicated deal was struck to save as much as possible of the historic 4,000-acre Cascade Ranch, a few miles north of the Año Nuevo State Reserve. One part of it, fronting on Highway 1, was designated in the deal for a "low impact, low visibility visitor-serving use" and sold. The buyer wanted to build a health resort and spa that would have accommodated more people than live in any of the communities between Half Moon Bay and Santa Cruz. He met with community opposition and went bankrupt. After several years of permit appeals, lawsuits, and politicking, the next buyer built the Costanoa, scaled down from the original plan, with lodge rooms renting for up to \$350 a night and "pitch your own tent" sites for \$40.

Costanoa set off alarm bells that the up-scaling of the Coastside and the down-grading of its landscape were under way. Those bells began to ring off the wall in 1999, when construction began on the Pigeon Point Inn, directly in front of the Pigeon Point Lighthouse, the region's signature landmark. The inn had been approved years ago by a Coastal Commission distinctly more friendly toward development than today's, and the current Commission could do nothing to stop it.

Residents and visitors gazed in disbelief at new buildings being erected on the lonely point, at the foot of the lighthouse. A path to the cove beach on the Point was closed. When the *San Francisco Chronicle* ran a photograph on its front page, it set off shock waves.



Then, in a completely unexpected move, the Peninsula Open Space Trust (POST) stepped up like the royal messenger who saves the hero from the gallows at the final minute. POST bought the 2.5-acre property for \$2.65 million and announced that the new buildings would be taken down and given away. The view would be restored to the public, as would the path to the beach. "Our goal is to preserve the extraordinary rural character of the coast," says POST executive director Audrey Rust.

That was a happy story for Californians, but it is one not easily repeated. When development begins on a beautiful open shoreline within reach of a metropolitan region, it fuels the pressures for more.

Controversial Megahomes

Fifty-five miles south of San Francisco, a rocky point juts out into the ocean. It is part of the Año Nuevo State Reserve, where elephant seals mate, give birth, and rest. Since the 1970s, they have returned from the brink of extinction. Each year, tens of thousands of people take docent-led tours to see them.

You can stand on a 30-foot dune in the Reserve and listen to the bellows of two-ton bull elephant seals as they slam their bodies against each other in battles for domination. If you turn full-circle, you can see the land much the way it looked 150 years ago. As Rusty Areias, director of State Parks, recently put it: "This kind of experience, so near a major metropolitan area, is found nowhere else in the state."

In these same hills overlooking the Reserve, just across the coastal highway, two huge new houses have county approval. In late November, both were on appeal before the Coastal Commission. Brian Hinman and Suzanne Skees propose to build a three-story Gothic Revival mansion, modeled on the 150-year-old Rose Hill plantation in South Carolina. Hinman, who owns a broadband communications company, believes that when this one is finished, it will look like it had been there for 150 years, fitting right into the landscape. With 15,000 square feet of space, it would be a second home for him, his wife, and their two children. Also proposed are some accessory structures and a swimming pool.

Hinman's mansion, designed by Kirk Peterson, would rise three-fourths of a mile from the coastal highway and the Reserve. According to plan, a row of tall eucalyptus trees on the western property boundary would screen the 51-foot-high building, all but the top 10 feet of the chimney. A row of



RASA GUSTAITIS

Above: the Hinman site. Right: the South Carolina mansion Brian Hinman wants to replicate. Below: architect's rendering of the proposed new house.



KIRK PETERSON



KIRK PETERSON

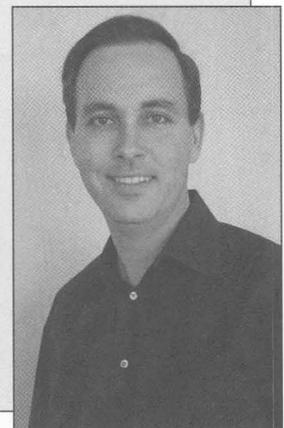
BRIAN HINMAN WAS SITTING IN TRAFFIC, en route from home in Los Gatos to the office of his company, 2Wire, in San Jose, so he had a moment to talk on the car phone.

"I lived in the Northeast for 10 years and came to love historic architecture," he said. "There's not a lot available here, so I decided to build a house that would look like it had been there for 150 years."

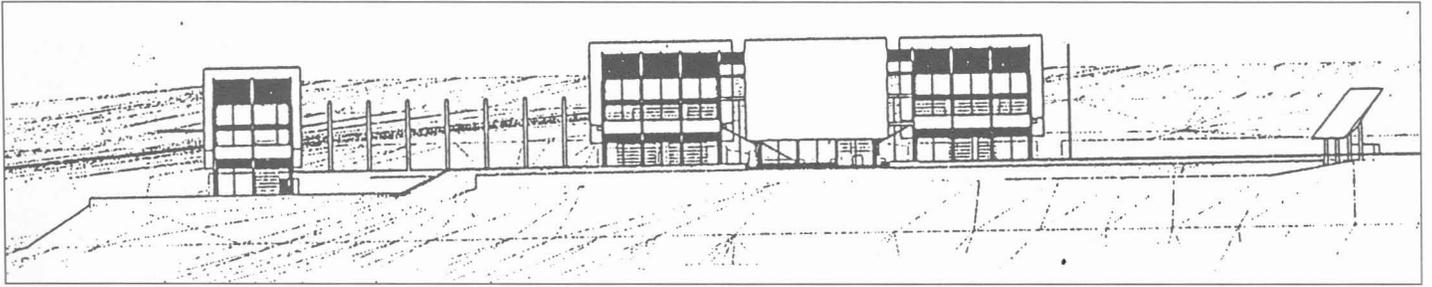
As he looked at ads in the back of *Preservation*, the magazine of the National Trust for Historic Preservation, his eyes fell on a Gothic Revival mansion built in 1858 on a South Carolina plantation. "It was a beautiful house, so we decided to re-create it here," he said, explaining that Gothic Revival was one of two styles popular in California 150 years ago, the other being Italianate. The Gothic was "a little bit more unique," had "a more romantic look," and would be "fitting in a pine forest," he decided.

The Hinman family does not foresee living in the house full-time, at least while the children (8, 7, and 5 years old) are in school.

—RG



DEWEY SCHWARTZENBURG



David Lee's house would be unseen from the highway, says architect Stan Field: it would be hidden by two 150-foot-long berms rising from ground level to 10–12 feet, with a 50-foot space between them to allow for ocean views. Planted with coyote bush, the earthen berms would hide the 600-square-foot accessory building (far left), shade structure and spa (far right), and the house, which is centered around a great room with a high, steep roof, flanked by two-story structures with bedrooms on the top floor and, below, family rooms, offices, gyms, and lap pool. Behind the berms, a pond is envisioned. A four-car garage would be underground. Above: Looking east. Below: Looking northeast.



DRAWINGS: STAN FIELD ASSOCIATES

Monterey cypress would be planted along the access road.

A Coastal Commission staff report has recommended that a permit be denied, partly because of the "enormous mass and scale in relation to existing agricultural north coast character and because it may induce a similar type of future development." Endangered species habitat is also at issue. A wetland on the 50-acre property is used by the red-legged frog. The northernmost of only four remaining stands of Monterey pine is in the Año Nuevo watershed and Hinman's house would be built among pines. Building farther down the hill, however, would intrude on the wetland.

Hinman has the support of several neighboring landowners and homeowners. Among those opposed to the mansion are the State Parks Rangers Association, Friends of the North Coast, and the Sierra Club.

Directly west, on the ocean-facing side of the eucalyptus row that would partly screen Hinman's mansion from Highway 1 and the Año Nuevo Reserve, David Lee, an attorney in Menlo Park, would build a two-story 6,500-square-foot home, its several elements extending 256 feet along a ridge that overlooks the Reserve and the highway. Together with its basement four-car garage, the accessory building, patios, lap pool, pond, and shade structure with spa, the Coastal Commission's staff report found that the proposed project would require a total of 23,590 square feet of developed area.

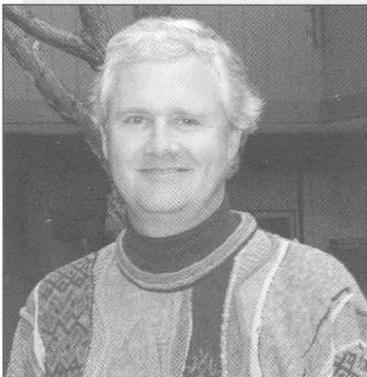
As first proposed, and as approved by the County, Lee's project would have been only half-hidden by landscaping, even after the years required for plantings to mature. After it was appealed to the Coastal Commission, Lee lowered the roofline and proposed to build two earthen berms in front of the structures. These would be planted with coyote bush. "The people in the house will have a framed view between two berms," said the architect, Stan Field.

While the Hinman and Lee projects are on adjacent parcels, they are in different counties, so two different sets of Local

DAVID LEE AND HIS WIFE HAD BEEN LOOKING for land for a year or so before buying one of the last coastal parcels for sale in the Año Nuevo Creek watershed. The 84 acres of open hillside offer sweeping views of Año Nuevo Island and the ocean. Here they plan to build a home and live, commuting—he to his law offices in San Mateo, she to her job at a large law firm in San Francisco—and sometimes working at home. They have been living on the San Mateo coast, in El Granada, for eight years.

"We had no idea what we wanted to build until we bought the site," Lee said. "We tried carefully to conform to the environment, so we took a lot of pictures of barns. The house is a modern interpretation of the barn look."

Why such a large house? "It's not a tiny house," he replied, "but any house in that location is very special." Lee does not understand why the Coastal Commission found "substantial issues" with his proposal. "I could put a huge greenhouse on the highway, with reflecting light, and there's nothing they could do because it would be agricultural," he said. "This house will be barely visible on the highway or any part of the coast." —RG



DEWEY SCHWARTZENBURG

Coastal Plan (LCP) standards apply. The Coastal Commission's staff report on the Lee proposal states that it "would be the first very large residence not associated with agriculture in the immediate area that would be readily visible from the highway, and would be visible from distance views of the Año Nuevo Reserve."

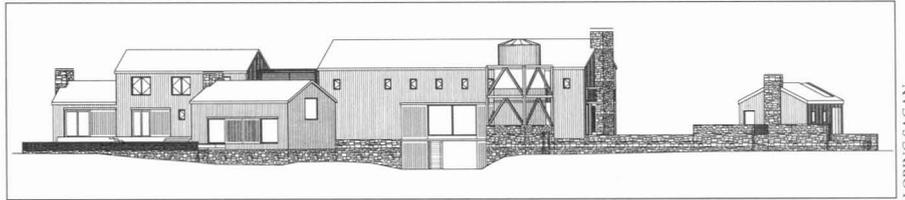
Three miles north of Hinman and Lee, a third large home is on appeal to the Commission. Steve Blank and Alison Elliott want to build on 250 acres behind the Costanoa resort and adjacent to the Cascade Ranch Farm, a working farm owned by the Coastal Conservancy. From the beginning Blank was committed to making his home invisible from the highway and nearby park trails. To achieve that goal, he planted numerous trees as soon as the house site had been chosen. Later, after discussions with Coastal Commission staff, two berms planted with brush were added to the design. The total square footage is 15,000, like Hinman's, but 6,000 would be underground: the site is between two faults and the basement is designed to be an earthquake-safety feature. Blank's architect, Loring Sagan, designed the house to resemble a complex of barns built over time. Steve Blank, who retired a few months ago at age 47 from his software company, says he will live here year-round with his family, and that his two daughters will attend local schools and learn to take care of the land for their grandchildren. They intend to have horses and grow raspberries.

The Commission's decisions on these proposed projects will affect not only the character of their immediate surroundings, they will also set precedents for other proposed megahomes. And there will be many more. The wholeness of the Coastsides landscape is illusory. Hundreds of invisible lot lines have carved it into plots ready to be snapped up by people who can afford them.

Hinman, Lee, and Blank have different goals and visions, reflected in the homes they propose. Individual decisions such as these will play a part in the future of this beautiful coastal region. That future will be shaped by the interplay of three forces: planning and regulation, conservation purchases, and the grace, or lack thereof, of new wealthy landowners and home builders.

Regulation Is Not Enough

Coastsides citizens have been careful stewards of their natural wealth. In both Santa Cruz and San Mateo counties, policies are in



LORING SAGAN

Steve Blank wants his barnwood home to be invisible from the highway and park trails. It is a three-part structure meant to resemble a barn complex that was transformed into a house. The main entrance, through the "watertower," leads into the living, dining, and kitchen area, which is big enough for large gatherings. It is connected by a greenhouse atrium to the family sleeping barn. The outer bedrooms, with separate entrance, are for guests. The small separate building in the foreground is an office/library. The separate structure on the far right is an exercise room, with a lap pool behind it. The buildings stand on a stone base, designed for earthquake protection.

STEVE BLANK GREW UP IN A SMALL APARTMENT in New York, where his parents, both escapees from the Nazis, ran a corner store. He grew up to found Epiphany, a \$3.5-billion software company in San Mateo. He can afford a large house on the coast, and he wants one roomy enough to accommodate his family, guests, and larger gatherings. When he bought land to build a home on the Coastsides, he was determined "to build for a hundred years, when our children's grandchildren will be around; to connect our family for 100 years as stewards for a critical property."

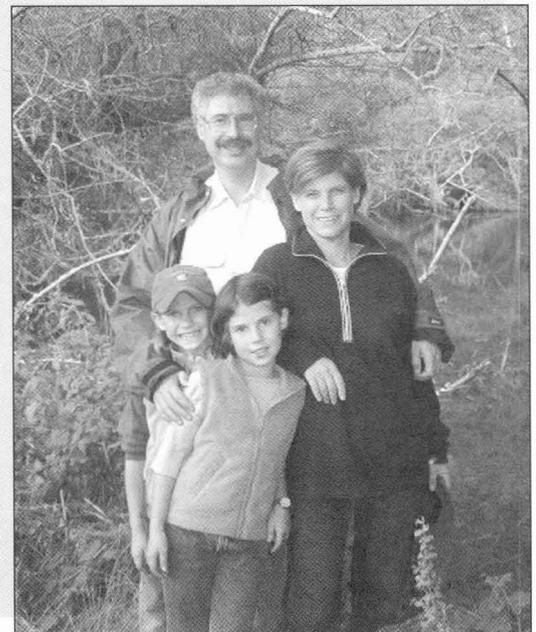
Having lived in the Santa Clara Valley for 22 years, he can still remember the orchards. "It was the death by a thousand cuts, by incrementally bad decisions," he said. "You can do it without thinking and without malice."

To make sure he took the right path, Blank teamed up with John Wade, who had been on the staff of POST for more than 20 years, working to protect coastal land and agriculture; and he chose as his architect Loring Sagan, who is known for his environmentally sensitive designs and came recommended by Lennie Roberts of the Committee for Green Foothills.

The house was to be nestled in the land, so that anyone traveling the coast would continue to see the landscape much the way the Spanish explorers saw it 300 years ago. Excluding the scenic corridor land, prime soils, riparian areas, and geologically unstable lands, only five acres of buildable land were found on the 261-acre property. Here the rough timber structure would be built, with greenhouse connectors sheathed in glass. It will have striking views inland. "Watching the moon rise behind the Santa Cruz Mountains—it's spectacular," says Blank.

A few months ago, at age 47, Steve Blank retired. He now has time to investigate the possibilities of growing raspberries and to work for the preservation of the land around him, so it does not become an expensive commuter community. "All the land from Pigeon Point south should be a whole big park," he believes.

—RG



DEWEY SCHWARTZENBURG

place to safeguard agriculture and the countryside. Those who would build new homes on undeveloped land must demonstrate that adequate water (a locally scarce resource) is available, and must show that residential use will not diminish water supplies for agriculture or in-stream wildlife. Farmland must be kept intact; geologically hazardous and significant natural resource lands must be avoided. New structures must fit the area's character, be as unobtrusive as possible, and not detract from natural and visual qualities or from open space.

The impact of new homes on open land goes far beyond the buildings themselves. When paved drives and entrance gates replace dirt farm roads, and when fences, outbuildings, and other country estate features appear on the land, the change can be dramatic. It is not just the size of a new home but its relation to the local environment that affects the character of a place. In Carmel, known for its cottages built on tiny lots, a house that would be small in another town may be way out of scale, altering an entire neighborhood. On a forested slope in the Año Nuevo Creek watershed, the appearance of a new house on a hillside is a momentous change in the landscape. The Coastal Act and local policies address these issues, but they require interpretation.

To date, the push and pull of the regulatory process on the Coastside has produced mixed results. A landowner recently proposed to build a 3,500-square-foot Mediterranean-style house on a bluff next to the Cowell Ranch agricultural preserve just south of Half Moon Bay. The Commission required the house to be reduced in size, moved off the open terrace to a spot adjacent to preexisting development, and redesigned to reflect the historic farmhouse architectural style characteristic of the

Coastside. The applicant sued, contending the Commission did not have the authority to require such changes, but the Superior Court upheld the Commission. The applicant subsequently sold the property (for considerably more than the original purchase price) to a young couple who enthusiastically embraced the new design requirements as consistent with their desire to live in harmony with the special qualities of the coast.

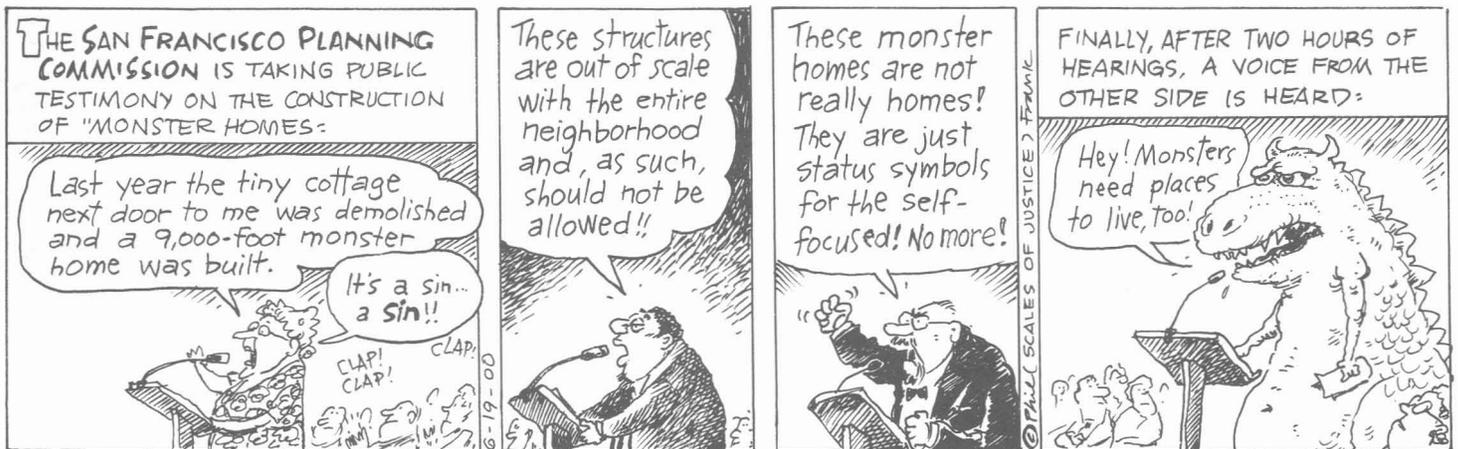
Planning and regulation are essential for coastal protection, but—as the example of the Pigeon Point Inn shows—they are not enough to realize the citizens' goals embodied in the 1976 Coastal Act. The values and attitudes of landowners play a key role, as do acquisitions for conservation.

Cultivating New Stewards

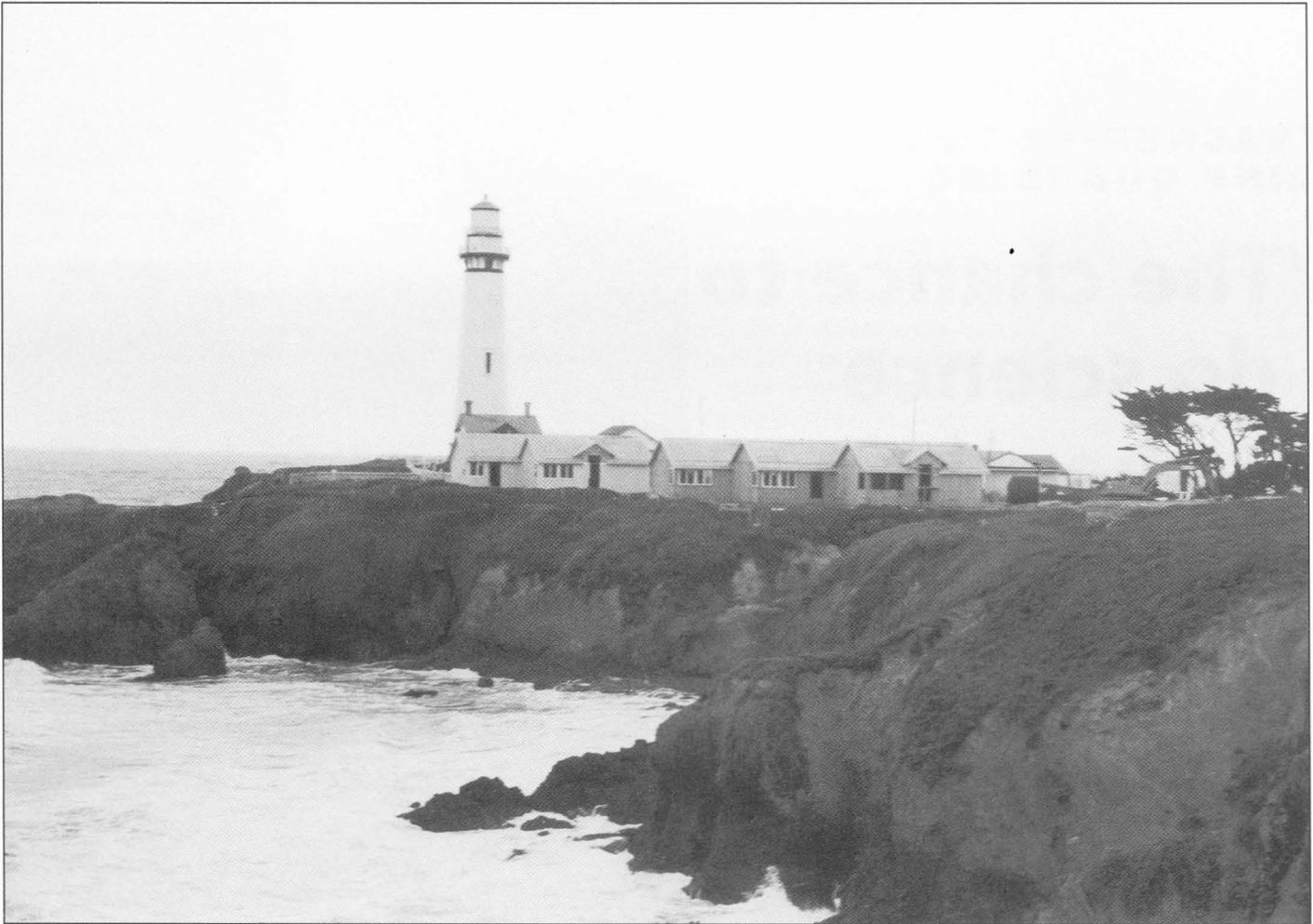
"The only solution we've found in Santa Cruz County is to acquire the land and take it out of the market," says Celia Scott of Friends of the North Coast. "In Santa Cruz County, from the western edge of the city, where city voters passed a bond measure November '98 to purchase a greenbelt to the San Mateo County line, almost all the land along the coastline is protected," she says. "Citizen involvement has kept the land open until it was possible to acquire it."

Thousands of acres have been purchased for agricultural, habitat, and open space conservation by POST, Coastal Conservancy, Trust for Public Land, Save the Redwoods League, Packard Foundation, Wildlife Conservation Board, and others. Much more acquisition will be needed.

In the 1970s, a city of 30,000 was in the works for land that is now Wilder State Park, Scott points out. There are legal lots for 51 houses at Bolsa Point, north of Pigeon Point, on the 1,700 acres that POST is now



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USHA MOSS

trying to buy for \$39 million. "That's an incredible amount we have to put together," says Rust. "We're hopeful that with the help of the Coastal Conservancy, the Wildlife Conservation Board, and private donations we'll be able to do it. I do see increasing donations for land conservation—by all kinds of people in many walks of life," she says. "That's a bigger trend than big houses."

"It's not the housing that's an issue, it's the nature of the land use and how it affects the resources," says Rust. "Practices that cause erosion and damage natural resources are doing more damage to the environment than a big house per se. We have every intention of continuing acquisitions at an aggressive pace." Toward that end, she is trying to enlist some of the wealthy newcomers, the very people whose purchasing power has raised land prices enormously.

Steve Blank is one who is already engaged. "There are several trillion dollars sitting over the hill. What are we going to do about it?" he asks. "How can we get

people who are interested connected to people who historically have protected the coast? Some conservation and community organizations make it difficult by assuming that if you can afford to build a big house you have to be a rapacious guy."

Silicon Valley is a hothouse where new ideas are nurtured and grow. As the coast falls increasingly under its sway, will the old patterns prevail, with development destroying the very things that attracted people to the place, or will a new model for conservation-minded land ownership take hold? If the affluent newcomers from Silicon Valley contribute creativity and financial resources to the patient efforts of longtime coastal stewards, this tranquil coastline may yet survive to be passed on intact to future generations. ■

Jack Liebster was on the staff of the Coastal Commission for 22 years, and from 1996 through 1999 was responsible for reviewing plans and projects on the Coastside, including the Lee proposal. He is now a project manager at the Coastal Conservancy. Rasa Gustaitis is the editor of California Coast & Ocean.

These buildings in front of Pigeon Point Lighthouse will come down, restoring the view and beach access for the public.

**TEACHER-IN-THE-SEA
MIKE GUARDINO**

**“The chance to
do science
rather than
talk about it”**

ANNE CANRIGHT

SINCE EARLY 1999, Sustainable Seas Expeditions has been systematically exploring each of the 13 National Marine Sanctuaries. SSE is sponsored by the National Geographic Society in partnership with the National Oceanic and Atmospheric Administration. Its leader is marine biologist and ocean crusader Sylvia Earle, an Explorer-in-Residence at National Geographic.

The main focus of this extraordinary five-year venture is exploration and discovery. As Earle points out, “The submerged part of the continent is less well known now than the western United States was to explorers Lewis and Clark when they set out across North America nearly 200 years ago.” Scientific research is another key component, as is the use of new technologies. Last but not least, a major aim of SSE is to raise public awareness about the marine environment: its fragility and magnificence, as well as its importance to human survival.

Ling cod such as this were counted inside and adjacent to Point Lobos Reserve.



MIKE GUARDINO



Mike Guardino piloting the DeepWorker 2000 submarine in Carmel Bay

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Wrapped up in all these strands is a unique educational project piloted by the Monterey Bay Sanctuary: the “Teacher-in-the-Sea,” which involves a local teacher and students directly in the research efforts of the Sustainable Seas Expeditions. (In the original vision, four teachers were to be trained in various parts of the country, but only one position has materialized.) Selected for this incredible opportunity, from among 10 applicants, was Mike Guardino, an advanced placement chemistry and honors physics teacher at Carmel High School. He fit the criteria for this experimental project perfectly: he’s very involved in working with other teachers, so could serve as a mentor; he’s a motivated science instructor; and—perhaps the clincher—he has a strong diving background.

As Teacher-in-the-Sea (and as a qualified SCUBA instructor), in 1999 and 2000 Guardino certified 18 students in SCUBA diving, taught them underwater research

techniques, then supervised a student-driven subtidal marine research project. Their goal was to survey bottom topography and compare organisms within and outside of an existing no-take zone at Point Lobos Marine Reserve. To this end, the high school students had to learn some 200 organisms—about 120 invertebrates, 80 bony fish, and 20 algae. That's a lot of Latin! In addition, Mike learned how to pilot the *DeepWorker* submersible, a high-tech vehicle being used by SSE researchers to explore nearshore waters to a depth of 2,000 feet. The project was designed to complement studies that Mike later undertook with *DeepWorker*. It also tied in with a rockfish study being conducted along the Big Sur coast by SSE scientist Mary Yaklovich.

I recently talked with Guardino about his experience as Teacher-in-the-Sea.

• • •

C&O: *What are you doing as Teacher-in-the-Sea?*

MG: The Teacher-in-the-Sea obligation involved four things: to learn how to pilot the *DeepWorker*, which has been about a two-year process; to write a curriculum that would be disseminated on the SSE website; to do public appearances, about 65 over the course of two years; and the most important one, I think, was to involve the students.

I recruited high school students, and rather than have it just be the more affluent kids from Carmel High, I opened it up to any high school student in the county. I spread the word by contacting other teachers in the area. Fifty-five applied the first year, and we got 18 certified, 11 boys and seven girls. Eleven came from Carmel High, three from Monterey, two from Pacific Grove, and two from Aptos, in Santa Cruz County. I originally accepted two from North Salinas, but transportation was a problem; car trouble eventually forced those two to pull out. [The second year, because of funding stipulations of a benefactor, all the students came from Carmel High.]

C&O: *How did you choose them?*

MG: I had them write an essay expressing why they were interested. I looked at their ability to swim; I wanted them to be comfortable in the ocean. And I wanted to see what they had done previously in the sciences. For the students I didn't know personally, I got recommendations from teachers.

C&O: *Once you had selected the students, how did you proceed?*

MG: I decided that the best way to teach science, since we had some field opportu-

nities, was to follow the scientific method. After certifying the kids to dive, we started looking at issues in the Monterey Bay National Marine Sanctuary, not the least of which was, how do you manage a fishery, especially one that has had historical declines, like the sardine, and more recent declines, like rockfish. We did some literature searches, and found that one of the more creative recent proposals is the establishment of marine protected areas, or MPAs. [For a description of the MPA concept, see *Coast & Ocean*, Winter 1999–2000.] We wanted to find some empirical data to back up what most people would say they already believe: if you had a small protected reproductive stock, that breeding stock could replenish places outside the reserve that experience a lot of fishing pressure.

We looked for two reefs that were virtually identical—in bottom composition, percent coverage by kelp, types of currents, water clarity. One [study area] was inside the marine protected area of Point Lobos, one was outside. So one had a higher degree of protection from fisheries, which in that area would be long-liners, commercial party boats, hook-and-line people from shore, spear fishers on SCUBA.

I steered development of the project, but the students were closely involved in giving it shape, brainstorming details, doing research, and of course they did all the empirical work.

C&O: *How often did you get together?*

MG: We would dive every Monday and Saturday.

C&O: *Monday after school?*

MG: Yeah, it worked out because it was after daylight savings time; we would meet at 3,

Kyle Evans, Mike Hicks, and Paul McReynolds reviewed compass navigation with Mike Guardino.



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and by the time we got to Whaler's Cove it was 3:30, then we'd do two one-hour dives.

We started off by doing site characterizations and very carefully studied both the reserve [at Whaler's Cove] and south Monastery [the southern end of a broad cove outside the reserve, adjacent to Whaler's], to try to show that they were as close to being the same type of reef as possible. Probably the biggest difference is the obvious one: one is more exposed, and one is more of a cove.

To show that the two reefs were biologically very similar, we picked 20 ubiquitous invertebrates that were all sessile on the

granite reef and did a bunch of quadrat studies [studying an area .625 meters square]. That was easier diving, because rather than active diving, it's putting a quadrat down and literally kneeling down for ten minutes and taking very exact data.

C&O: *How many quadrats did you study?*

MG: Hundreds. Because on one dive the kids would do five or six quadrats, and there were *many* dives: 208. To try to show that there was no difference between the sites for invertebrates, we used chi-square statistical analysis to test a null hypothesis that there *was* a difference, and then that was rejected. The conclusion was that there was no difference. And that held true for virtually all the different invertebrates. To get that result, we needed a huge sample.

After the quadrat studies, the kids graduated to doing fish transects. We did them the way the Department of Fish and Game does: they swim a corridor—one meter to the right, one meter to the left, one meter above the diver's head, and one meter above the substrate—on a compass heading for 50 meters, and they count the absolute number of our twelve target fish, groundfish that are of commercial importance: nine species of rockfish, vermilion, blues, blacks, black-and-yellows, chinas, gophers, coppers, olives, kelps, and also lings, cabezon, and kelp greenlings.

C&O: *How many transects did you run?*

MG: About 90; per dive, kids would average seven or eight. We only compared studies that we did when the conditions were the same. We rated each day as 1 through 5. On a 1-day we wouldn't dive because it was too rough; a 5-day was a pristine, flat, calm, clear day. We found that the best way to compare and to control the variables was to compare a 5-day to a 5-day, a 4-day to a 4-day.

In the end, the original hypothesis was not completely supported: we thought we would find more of all of those fish inside the reserve than out, but we actually found more reproductive, mature fish inside, and more juveniles outside. We probably could have nailed that down earlier because of course, if a reef has been denuded of fish, juveniles would colonize that area first, and juveniles were extremely abundant outside the [Point Lobos] reef. It actually gives some reason for hope that it's not too late [for rockfish], because if those juveniles are given the chance to mature, they can certainly perpetuate their species.

So after coming up with a hypothesis, designing an experiment, and statistically



MIKE GUARDINO

Kyle Evans, Will Hincks, Allison Haupt, Michele Noble, and Janet Owens prepared to begin a research dive at South Monastery Beach.

ALLISON HAUPT worked with the SSE program during her senior year at Monterey High School, and she's definitely reaping the rewards. Currently a sophomore at UC Santa Barbara, majoring in aquatic biology, she's a diving fool: she spent the summer conducting experiments and doing survey work for a doctoral candidate studying Kellet's whelks, and she has just begun working with another lab group as a research diver.

She firmly attributes the path her career is taking to her experience with Sustainable Seas—or more specifically, to Mike Guardino. "Mike's whole class profoundly affected me," she says, "especially Mike; his personal involvement in his classes is what makes him so awesome. I got really involved in the diving, so he suggested that I take a class at Hopkins Marine Station, the Subtidal Communities class with Jim Watanabe. But to take that class I had to have all my own SCUBA gear, and I

had nothing. So Mike gave me a b.c. [buoyancy compensator vest] and a weight belt, and he helped me track down all the gear I needed, some \$400 worth. And that was an awesome class. Through it I earned most of my research certification, which really put me ahead. But without Mike I never would have taken the class."

The research with Guardino was useful to Allison as well. "I was working for the Department of Fish and Game at the time, doing data entry and analysis, but I didn't really know what the organisms I was entering were. Learning all the species names, all the invertebrates and fishes, was great."

Haupt says she gained a sense of direction from her work with the SSE program. Although she's not sure exactly where she's headed—pelagic invertebrates, such as siphonophores and ctenophores, hold considerable fascination for her—she knows that she's found the road she wants to follow.

analyzing it, the kids came up with some conclusions, and that paper was presented at a number of different places, like Coastal Zone '99 [in San Diego] last summer.

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Guardino's original proposal tied his students' work to his dives in the submersible *DeepWorker*. In the end, however, the two sets of information could not be strictly correlated, because different species of rockfish congregate at the two depths. The two parts of his "job description" as Teacher-in-the-Sea thus became somewhat separate. But that's science: you propose a hypothesis—in this case, that the two investigations could be linked—and test it. This particular hypothesis failed. Fortunately, the students' work did contribute in a significant way to our understanding of the ocean, as did Guardino's work with the submersible. And so they became two separate pieces in a huge puzzle that we're only beginning to piece together.

As a *DeepWorker* pilot, Mike made two sets of dives in Monterey Bay, the first in May 1999, the second in July of this year. The first expeditions proved frustrating: high winds canceled half the scheduled dives, and the truly deep-water submersible that they were supposed to use, rated to 2,000 feet, wasn't yet ready, so dives were made in a sub that could go to only 350 feet. This year's dives, however, in the true deep-water vessel, went well, and Mike had two opportunities to visit the study area he had mapped out with his students.

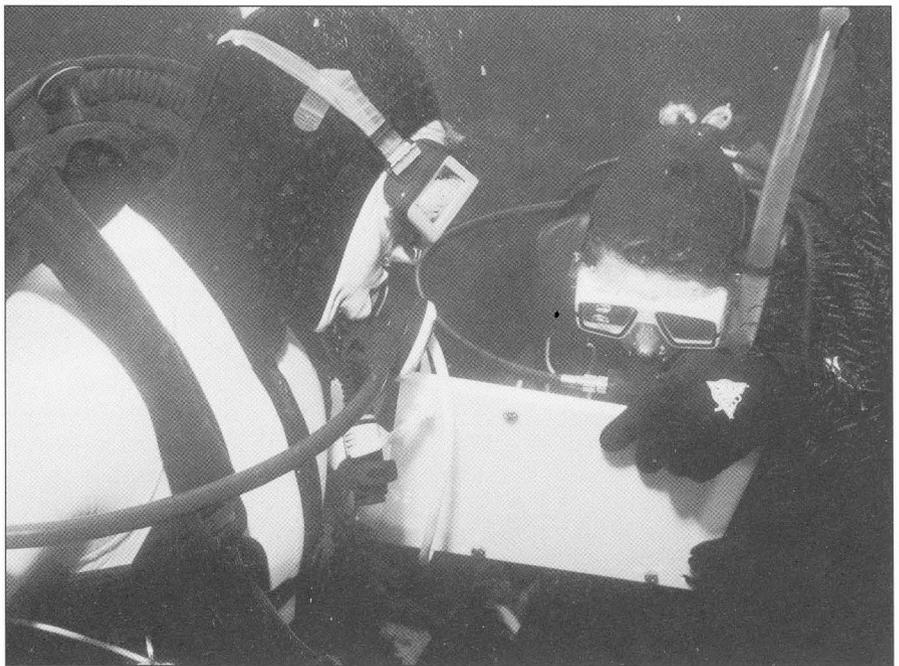
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C&O: How deep did you go on the first dive in your study area?

MG: This dive started at 280 feet and ended at about 150. I stayed between 92 and 160 most of the time. At 92 I could have gathered a lot more data [pertinent to the students' work], but I decided not to stay there because of the kelp. Kelp and submarines are not very compatible—if you foul a thruster, the dive is over. So I radioed back to topside, and they said, "Fine, you can go a little bit deeper." I headed away from that area, and [at one point] I was looking at this canyon, it just rolled right off the table. That really intrigued me, and I ended up going back there [on the second dive].

C&O: And you were taking detailed notes the whole time?

MG: Not only notes, but you're talking to topside and they record you. Every 15 minutes, too, you have to go through a checklist



MIKE GUARDINO

Paul McReynolds and Michele Noble collected data on a fish transect at Whalers Cove in Point Lobos Reserve.

KYLE EVANS is now a student at Cal Poly San Luis Obispo, majoring in electrical engineering. He says the SSE project probably helped him get into college, and it made him more committed to the idea of someday joining MBARI (the Monterey Bay Aquarium Research Institute), possibly working on the electronics or guidance system of their ROV (remotely operated vehicle).

"Through this program I met people like Dr. [Steve] Webster [of the Monterey Bay Aquarium, also a *DeepWorker* pilot] and other scientists who opened up all sorts of possibilities, and I got background and experience," he says. "I never would have been this interested in the ocean unless someone reached out and got me involved."

"To learn all the scientific names and common names of marine organisms" was especially interesting, Kyle says. "It was really cool to be able to go down and know and recognize the animals. We really studied hard. Also, learning the different research techniques. The hardest thing was doing the quadrat, because you're sitting on the bottom counting things and you get really cold, and sometimes you have a huge surge and you have to hang on to keep from getting swept away. Other than that, another neat thing was to go visit the SSE research vessel. We got to

meet the scientists, and meet Sylvia Earle, we got to sit in the sub." Besides that, "all the kids got to know each other really well."

The research findings "were exactly what we expected," he says, although "I didn't know it was quite so bad. The difference between the two areas was so night-and-day, it was amazing. There were almost no adult fish at Monastery, and at Whaler's Cove there were some very large fish. We looked at it and we said that the no-take areas were an effective way of replenishing the fish life in the sea, because in places where there's lots of fishing you find just these small juvenile fish. There's no adults to propagate the fish, so the juveniles must be coming from somewhere, through dispersal and tides. We figured that those adult fish must be taking refuge there [at Point Lobos], and juveniles are going outside the reserve."

The experience gave Kyle valuable exposure to "real science," including library research and data analysis. Along with fellow students, he went to several meetings and conferences and spoke. He also talked to sixth graders at a summer oceanography camp at Cal State University Monterey Bay. "It was amazing," he says, "to show people that it doesn't matter how old you are, you can get involved in the ocean, you can make a difference."

Subtidal Marine Research students on the NOAA Ship *McArthur* getting acquainted with the *DeepWorker 2000* submarine

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of about 20 different things that are happening in the submarine that have to be just right to make a dive a success.

C&O: *And that's a checklist that you actually speak out.*

MG: Yeah. You memorize the order, but there's so many things to check, and some of them require hitting a computer touch screen or manipulating a flashlight so you can read a gauge, that it's easier to settle down onto the substrate when you do it. You also have to get to a place where there's good communication, like where there's no surface layer of jellies that can

interfere—because it's not a tethered submarine, you're depending on a transceiver and transducer to get a kind of scratchy transmission through the water. Sometimes it can be frustrating, but other times it sounds like the person you're talking to is inside the submarine with you. It varies tremendously.

C&O: *So are you talking nonstop as you go along?*

MG: Yes; you wear a microphone on your shirt lapel. I talk the whole time so that I can have a record of what I'm seeing, because sometimes, you can see something over your shoulder, like a jelly, and by the time you pan and tilt and find that thing on camera, it's gone.

C&O: *What else did you explore in Deep-Worker?*

MG: The first week of July 2000, the [NOAA ship] *MacArthur* went over to Point Lobos and we took a look, and we decided that it was too rough to dive. So they asked me what areas around here could bear some investigation. Well, squidders are out here daily, so I proposed to dive off Hopkins [Stanford University's marine research station] to take a look at the squid egg populations and whether I could find some squid. That dive was a lot more shallow—it maxed out at maybe 170 feet. When I got down there I found masses of squid eggs—I'd had no idea. Many places looked like a snowfall, white fingers of squid eggs were all over. I got some great footage of that, and of a siphonophore, an octopus, a lingcod—some neat anecdotal stuff.

The next day it was still kind of rough, and I went back to the same spot. This time I wanted to see if I could find a squid school, because the day before I never did see any schooling squid—or shoaling squid, to use the proper term. About halfway through the second dive I did find a huge shoal: all of a sudden it was like the light from the surface was being eclipsed. I looked up, and there was a school of squid so thick I couldn't even see light through it. I raised the submarine up into the middle of it, and I started doing very slow, meandering circles, and filming this school that I was right in the center of. And I got some amazing things on film, I got the entire school, dark, turn light, or the entire school light, turn dark—with no visible cue, and no fear response to the submarine. Because they did not look at the submarine as being a predator. But on one occasion, a sea lion came through, and they scattered—so they

PAUL MCREYNOLDS, now a student at Stanford University, learned about the subtidal research program from his Pacific Grove High School teacher Patti Long—who just happens to be Mike Guardino's wife. "It turned out to be one of the most amazing experiences in my life," he says. "It was real research, it was real science—actually coming up with new data that's useful to scientists and ecologists working in the field now."

Applying the concept of larval dispersal to the group's research findings brought relevance to the study, he says, and made it that much more meaningful. Paul also learned some of the hard practicalities of doing scientific research: "Before I had no way of knowing how politics, science, and the environment all meshed together. Protecting the environment and protecting the diversity of species in Monterey Bay is very important, but so many people's lives

are dependent on that environment too." By focusing on a question relevant to fisheries management, he says, the students gained a better understanding of the various interests at play, and of how difficult it is to arrive at a balance.

The research project wasn't all work and no play, however. "Once we got to explore some small shallow caves at Point Lobos," Paul recalls. "That was my favorite dive; the visibility was just great. I loved to flip over and look at the bubbles collecting at the top of the cave. It looked like puddles of mercury."

When asked what about the Sustainable Seas experience meant the most to him, he said: "To be involved as a high schooler. If I could advocate anything in particular about this program, it would be that. Anyone who has anything to do with ocean conservation or ecology has everything to gain from working with young people and getting young people involved."

obviously recognized the sea lion as being a worthy opponent.

I thought that was going to be the end for me, because I'd gotten three really good dives and I'd been on the boat for seven days. So after my third dive I went home and relaxed, and then on the evening of July 4 Sylvia Earle called and said: "We'd like to give you one more chance to dive at Point Lobos, because we know that the weather was rough and you did two dives that were out of your study area." Of course I jumped all over that one and said, "Sure, when can I get back on?" So the morning of the 6th I picked up the boat, and they asked me for my new way points, and I said I wanted to look at this canyon [*pointing at the one he'd caught a glimpse of in the previous dive*]. I wanted to take a look at the spot prawn populations and try to do a vertical transect of what was happening in this canyon

c&o: *Straight on down!*

MG: And because I'm still relatively a rookie, they said, "Your maximum depth is 500." So I shot straight for 500, and then I started zigzagging my way back up. I did that for about an hour and a half, and I just got amazing things. I got fields of spot prawns—which are about 10 inches—and every animal is one spot prawn away from another animal. It's like they all have their own don't-violate-my-space type of thing. And when one of them is disturbed and moves, it's like dominoes in all directions; there's this rumble of activity as they all settle into their own space again, and their antennae are all out as they figure out just where they can be. I got footage of a basket star that had a central disk about that big [*making a circle with his fingers several inches in diameter*]—the largest basket star that I have seen at SCUBA depth had a central disk about the size of a quarter, and this thing had to have been many, many, many years old, because it was just enormous. I got into a rocky rubble area that had about two dozen basket stars. I always thought they were rare, but at that depth they're actually quite common. I found fields of crinoids so thick that every rock was covered, crinoid after crinoid all across the rock. At 588 feet I got footage of one of the deep-water octocorals, the mushroom corals that you see in the deep-sea exhibit at the Aquarium.

c&o: *Five eighty-eight? Weren't you limited to 500?*

MG: Well, after I'd filmed about two hours I



MIKE GUARDINO

A female squid laying eggs at one of the study sites in Carmel Bay

radioed back up to topside and said, "Is it okay if I go a little bit deeper?" and they said, "Yeah, you can go to 600." So I immediately shot right down to 600—which is a cool thing, because it's a one-atmosphere sub, and you don't have to worry about how fast you ascend or descend. And it goes four knots, so you can cover a hundred feet in no time. So after I shot that octocoral at 588, I went down to 600. I actually made it to 603, and I radioed back up and said, "I can't stay here," because the wall was vertical, there was no place to settle the submarine. Most of the canyon wall was at a 60-, 65-, 70-degree angle, sometimes it was just sheer vertical wall. The same kind of geology that you'd find in shallow water, just granite walls, but then there'd be areas of really, really thick detritus that had rained down from above.

c&o: *And animals settled uniformly on the walls?*

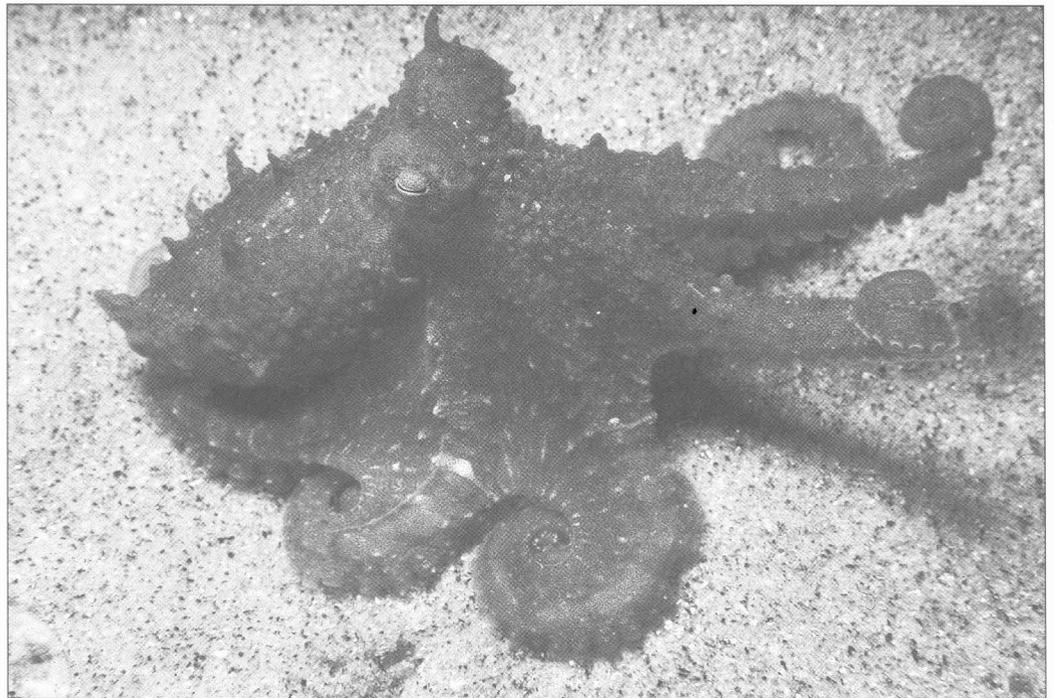
MG: If it was a gradual slope, you'd always find spot prawns. But anytime it was more than a 40-degree-or-so angle, no more spot prawns, and it would give way to mostly crinoids and basket stars and that type of stuff. But the assemblage of animals was totally different from up above. I saw mostly rosy rockfish at that depth, but there wasn't a lot of diversity.

That dive was just the best. I dove for about two and a half hours, shooting footage the whole time. A lot of the places I was in, no one has ever been to. Many of those places are pristine.

c&o: *What about the future, especially with your students?*

MG: Things are looking really bright. We got \$10,000 in grant money last year, and I spent over \$7,000 of it on really good SCUBA equipment. The rest is used to

Both research sites were rich in invertebrate life such as this tiny red octopus.



MIKE GUARDINO

THE CURRICULUM materials that Guardino worked on have been published, and can be accessed on the web at: sustainableseas.noaa.gov/aboutsse/education/teacher_materials.html. The Teacher Resource Book is targeted for grades 9–12, but can be adapted to other grade levels

Information on the Sustainable Seas Expeditions can be found at: sustainableseas.noaa.gov or nationalgeographic.com/seas.

The National Marine Sanctuaries website is www.sanctuaries.noaa.gov.

maintain service contracts on the regulators and incidental rentals. I didn't buy wet suits because kids come in so many different shapes and sizes, so we rent those. There's no cost to the kids. The educational opportunity the kids are getting is tremendous: they're learning how to dive, which is a lifelong skill; they're learning how to apply the scientific method in the field for a research project that they're authoring themselves; and they're collecting data on something that's of importance to the community. We're making the data available to the rangers at Point Lobos, because they've expressed interest and helped us out a lot. Plus they very graciously allowed the *MacArthur* to work within the reserve. You're talking about a 175-foot ship dropping anchor there, so they've got to have some concerns. They were really great.

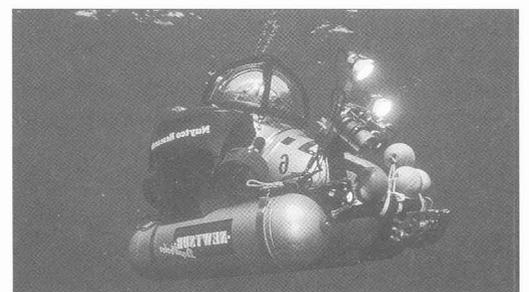
C&O: *To wrap up, is there anything else you'd like to say about working with the students?*

MG: Just that that's been the best part of it. It was cool for me to learn how to pilot the *DeepWorker*—that was thrilling. And it was challenging writing the educational curriculum. But working with the students was just great. It was the most legitimate way to teach the sciences—the best teaching experience I've ever had. It was a chance to *do* science rather than talk about it, using prior knowledge to provide new data. The kids were amazed at the differences they found in two places adjacent to each other. It also was a way for them to recognize and overcome built-in prejudices, since of course they preferred to dive inside the reserve; outside, because of overfishing,

it was boring for them, frustrating. But the research taught them the value of investigating both types of habitat, it gave them a real understanding of human impacts on the ocean. Finding a lot of juveniles outside the reserve was encouraging, suggesting the viability of the MPA concept. At the same time, they got an appreciation for the job of fishing, how hard it is to make a living, so they didn't immediately advocate more restrictions on fisheries. They gained a lot of understanding about how complex these issues are.

• • •

Officially, the future of the Teacher-in-the-Sea position is unclear. No further visits of the *DeepWorker* are scheduled for Monterey Bay, and no other teachers are being trained for the position. Mike Guardino, though, will continue to steer student-driven research activities, possibly in affiliation with the Monterey Bay Aquarium (where he is an active volunteer diver). His love of diving, of the scientific method, and of his students gained full expression in this endeavor. The position may fade away, but Mike Guardino will always be a Teacher-in-the-Sea. ■



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Abatement and Amazement by the Bay

HAL HUGHES

DRAWINGS BY
WESLEY A. MAFFEI

CROUCHING ON A LANE of soft silt surrounded by pickleweed, with ants scurrying around our shoes, Wes Maffei and I squinted ahead across the cracked mud.

"There he is," Maffei said, pointing, "just past that reddish pebble—he's coming right toward us. See how he holds himself high off the ground?"

"He" was a tiger beetle (*Cicindela senilis senilis*), the first one we'd spotted. He had jumped ahead of us in looping arcs as we walked, always landing so that he could keep an eye on us. Now we'd been still for a while, so he seemed bolder, feinting from time to time at a passing ant.

"He won't eat ants, but he's very sensitive to movement," said Maffei. Indeed, as I raised my camera, he leaped toward the weeds. "Tiger beetles need clear spaces for hunting, to take advantage of their speed."

Eventually others appeared, and danced warily around each other, or zipped across a swath of salt crust to nab brineflies (*Ephydra cinerea*) that swarmed in brackish brown puddles. A mating pair appeared, one carrying the other on its back.

We were in Mezzetta Marsh, a degraded tidal marsh about five acres in size, near the Napa River and the city of American Canyon. We were looking at tiger beetles because Maffei sees them as indicators of marsh health. Their presence or absence can signal disturbance in the marsh habitat.



HAL HUGHES

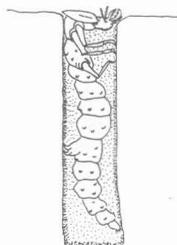
Later, in his home laboratory, he showed me specimens of tiger beetle species he's collected, their backs marked with white glyphs like musical eighth notes. One large species has a bright red belly, another iridescent blue, a third is tinged with purple. In the marsh we couldn't get close enough

to the skittish beetles to make out these details, but as we focused on them, we began to notice an array of other insects. Red or bright blue damselflies hovered, darted, or perched on swaying plant stalks. Little black spiders joined in the brinefly hunt. "They can run right across the water," Maffei said. Firebrats—primitive relatives of silverfish, with wiggly tapered bodies—slithered through clumps

of bright yellow brass buttons. Insect study is Maffei's passion; keeping peace between insects and people is his job.

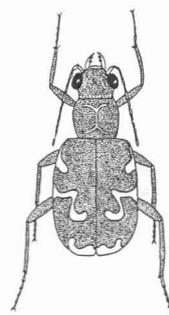
In Mezzetta Marsh, Wes Maffei tried to rouse tiger beetle larvae by poking a straw into their holes.

Left: Tiger beetle larva (*Cicindela senilis senilis*)



Right: Tiger beetle
(*Cicindela senilis senilis*)

He has been manager of the Napa County Mosquito Abatement District (NCMAD) since 1997, and before that worked at mosquito control for nine years in Alameda County. A man of apparently boundless energy, he also teaches general biology at a community college; consults for numerous boards, panels, and committees; and maintains an impressive entomology library, lab, and collection (including "voucher specimens" of Bay Area insects that may be used for teaching or photographing). In his "spare time" he studies the insect biology of the Bay shoreline.



I met Maffei at his office, a low metal building next to county sanitation department headquarters. A couple of pickup trucks, a small boat, and a little "creeper" ATV, all equipped with sprayers, were parked outside. Four full-time (and one half-time) employees serve the entire county, on an annual budget of \$450,000.

Mosquito abatement may not sound very glamorous, but the Napa County staff—most of them have been there for many years—are enthusiastic about their work. They are aware of its importance, and enjoy an easy camaraderie.

WES MAFFEI WAS IDLY SKETCHING at a meeting of the Baylands Ecosystem Habitat Goals Project, when he realized that he'd drawn a previously unrecognized food web. When a speaker later dismissed salt crystallization ponds as being of limited biological value and essentially lifeless, he produced his sketch.

In the Baumberg salt crystallizer ponds along the Hayward shore on the southeast side of San Francisco Bay, the threatened western snowy plover lays its eggs in scrapes it excavates in dry salt pans. Scattered across the pans are highly saline pools, home to diatoms and algae, and small raised hollows—tiny "salt caves" that resemble the insides of geodes, with their open sides facing the prevailing winds.

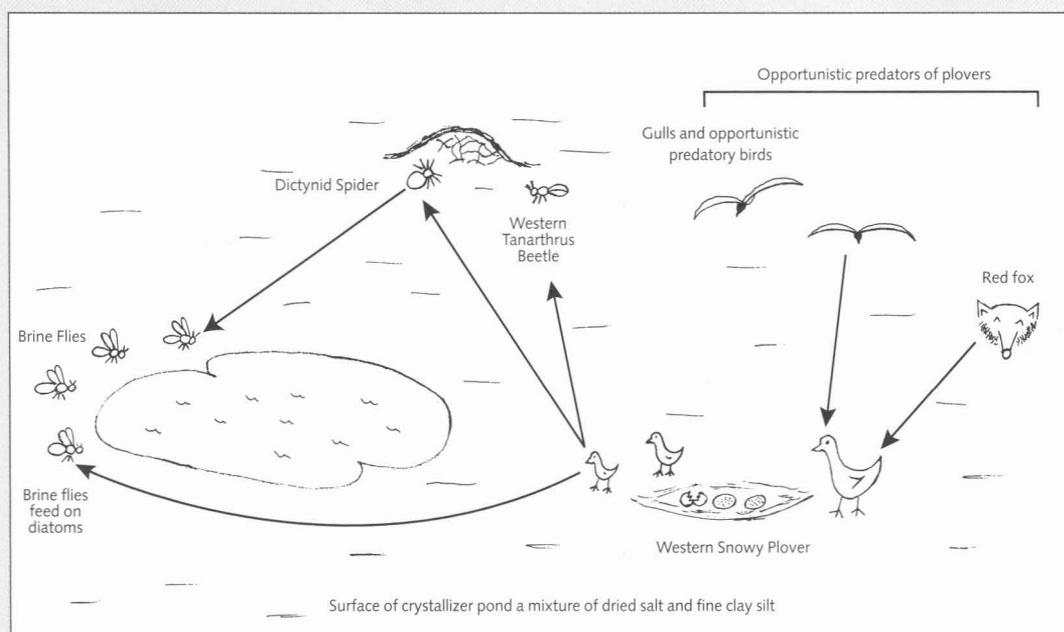
The diatoms and algae are food for two species of brineflies, the common *Ephydra cinerea* and the

more unusual *Lipochaeta slossonae*. In the mini-caves the spider *Dictyna* builds its loose webs. *L. slossonae* has a torpedo-like shape, and when it closes its wings, winds blow it rolling across the salt pans—often into the mini-caves, where it becomes trapped in the webs of *Dictyna*. The spider sucks the juices from the brinefly, then cuts the dry husk loose to fall to the floor of the cave.

The western *Tanarthrus* beetle (described in 1978 as a new taxon unique to the South Bay) enters the caves and devours the brinefly husks. Snowy plover chicks—"run and peck" predators—eat the brineflies, the spiders, and the *Tanarthrus* beetles. They in turn are prey for gulls, raptors, and occasionally red foxes. All this goes on in the "lifeless" salt pans!

Because mosquitoes need standing water to develop, agents monitor wetlands, riparian areas, drainage ditches and other likely sources of mosquitoes. Agents also respond to complaint calls, trap and identify mosquitoes and other insects, and inform the public about insects and their roles in local ecology.

They try to control mosquito infestations by using methods that cause the least possible damage to the environment and other species, even when more toxic methods cost less in dollars. Sometimes it's enough to improve water flows or supply mosquitofish (*Gambusia affinis*), which feed on mosquito larvae. When something more is needed, they prefer to use target-specific methods that cause no known damage to other life forms: either bacterial spores of *Bacillus thuringiensis* var. *israelensis* (Bti), which cause internal tissue breakdown when ingested by mosquito or blackfly



larvae, or Methoprene (Altosid), an insect growth regulator that prevents mosquito larvae from maturing. The District however, will spray with pyrethrins, made from chrysanthemum flowers, at ultra-low volume (one ounce per acre) when large populations of adult mosquitoes are present, especially when they pose a threat of disease. As a last resort, a petroleum-based pesticide, Golden Bear 1111, may be used to prevent adult mosquitoes from emerging. Both this pesticide and pyrethrins break down quickly in the environment, but they do affect other insects.

I followed Maffei to a corner of the District's workshop, where he keeps county maps with colored pins that indicate locations of complaint calls answered each year and what species of insect was found at each site. A dense cluster of tan pins on the 1998 map showed many calls from near a wetland where a dike had been breached. "The disturbed conditions caused by the breaching led to huge hatchings of opportunistic midges," Maffei explained. "Whole walls of nearby buildings turned brown with midges. We told the callers that the midges were harmless, and that they would provide lots of food for birds." The 1999 map had no tan pins in that area. As conditions in the marsh stabilized, the midge population had diminished.

Larger pushpins showed sites where mosquito-fish had been released, where light traps had been placed to attract and capture adult mosquitoes (especially to check for carriers of encephalitis), and where flocks of "sentinel chickens" are checked periodically: some disease-carrying mosquitoes feed on chickens—blood drawn from the birds' combs is tested.

I learned that a mosquito is not "just a mosquito." Napa County has ten common mosquito species, and at least ten others. Among them are several that can spread malaria, encephalitis, or dog heartworm. These diseases occur only rarely, thanks to modern abatement procedures. However, as more and more Californians travel abroad, the risk grows that exotic strains of malaria could be transmitted to endemic malaria mosquitoes, which could then

spread the disease. Because local medical practitioners tend to be unfamiliar with malarial symptoms, mosquito control agents are concerned and extra careful.

What most fascinates Maffei is insect life in the context of larger biosystems. Very little has been published about the role of insects in Bay Area ecology, he says. Protection and restoration efforts have focused on mammals, birds, and fish; yet "how can we say we've restored clapper rail or salt marsh harvest mouse habitat if one of their main food supplies is gone?" he pointed out. "And how many presentations about insects have there been in all the State of the Estuary conferences we've had? None."

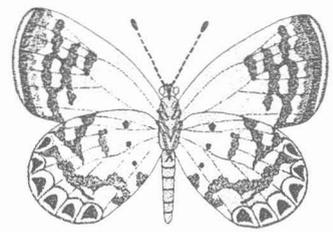
To illustrate his point, he told me about the burrowing owls that live near Oakland Municipal Airport. In a 1971 study, examination of owl droppings showed that their most common prey was the finger-sized Jerusalem cricket (*Stenopelmatus fuscus*)—also called potato bug, old bald-headed man, and *niña de la tierra*. Tests in the late 1990s, however, found remains of only one cricket in the droppings, along with many fragments of earwigs. No one seems to have noticed the disappearance of the

crickets, though we can guess that much of their habitat was lost to airport expansion and other development. "The owls still have food," Maffei said, "but it takes a lot more time and energy for them to get adequate protein from earwigs."

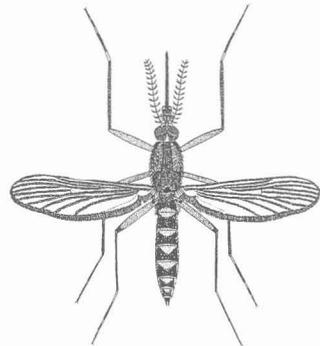
In 1989, Maffei was asked to survey insects in inactive salt ponds in Hayward. Since then he has continued, on his

own time, collecting and observing insects and arachnids in wetlands and adjacent uplands from Alameda to Alviso, and now in the North Bay, gradually piecing together patterns that can reveal intricate and unsuspected relationships.

Maffei says his family and friends roll their eyes when he wanders off to watch insects by the hour. But crouching near him in Mezzetta Marsh, I was able to share some of his enthusiasm and fascination. That ability to sit quietly observing in fields and marshes, day and night, year after year, enables him to find and assemble myriad puzzle pieces into stories and pictures that show us how these habitats work. ■

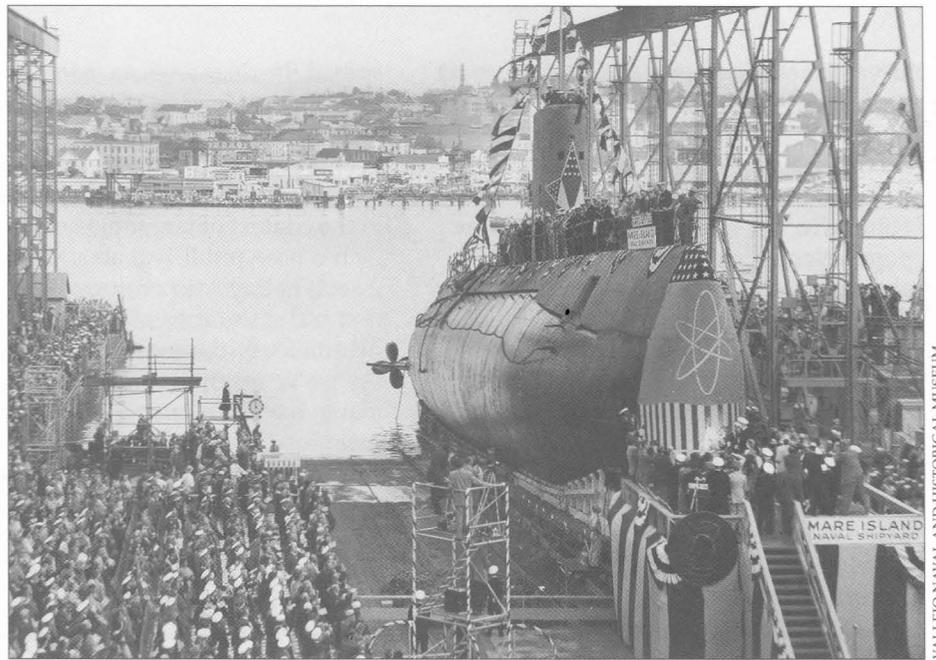


Above: Pygmy blue butterfly (*Brephidium exilis*)



Left: Winter salt marsh mosquito (*Aedes squamiger*)

Developers assume responsibility for cleaning up toxic hazards at the old Navy shipyard on San Francisco Bay.



VALLEJO NAVAL AND HISTORICAL MUSEUM

The Mare Island Experiment

MARK SIMBORG

MARE ISLAND on a warm, sunny day seems like a tropical island in the quiet aftermath of a hurricane. Shards of wood and glass are strewn across boarded-up neighborhoods. Palm trees shake in a gentle breeze, and the sun hits hard on tractors and towering mounds of rubble.

Near the old military housing area lies a huge remnant of wartime activities—a zone of abandoned, one-level cement buildings that held the weapons of vessels brought in to be cleaned or repaired in the days when Mare Island was known as the Mare Island Naval Shipyard.

The “island” is actually a 5,000-acre peninsula, about one mile wide and 3.5 miles long, jutting into San Pablo Bay 30 miles northeast of San Francisco, within the city limits of Vallejo. On it are three giant drydocks, an 18-hole golf course, more than five million square feet of industrial building space, 13 colonial-style mansions dating back to the early 1900s, a



JOE HLEBICA, SCRIPPS INSTITUTION OF OCEANOGRAPHY

Top: The first nuclear submarine built at Mare Island, U.S.S. Sargo, was launched October 10, 1957.

Above: The vast tidal wetlands of northern San Francisco Bay near Mare Island have sometimes been used for illegal dumping.

chapel with 16 original Tiffany windows, a medical school with more than 440 students, an old hazardous waste dump, and more than 3,700 acres of wetlands.

Across the Mare Island Strait, some 1,500 feet away, is downtown Vallejo, with its minimal foot traffic, dilapidated storefronts, and endless CLEARANCE SALE banners. Yet Vallejo's similar-sized neighbors to the west and south have thriving downtowns. And San Francisco, where real estate prices have soared to unprecedented levels, is only 55 minutes away by ferry and 45 to 60 minutes away by car, depending on traffic.

Mare Island is within Vallejo and city officials have drafted a mammoth downtown revitalization plan that will rely on its transformation into a major residential, commercial, and industrial center. But before that vision can be realized, toxic residues accumulated in the environment during 142 years of military use must be removed. And that's a giant task. Reuse plans at many other bases have languished pending cleanup.

Until two years ago, decommissioned military base properties could be relinquished only after they received a clean bill of health from the federal Environmental Protection Agency (EPA) or its state counterpart and the regional water quality control board. In 1998, to speed up reuse, Congress passed legislation providing for "early transfer," with responsibility for cleanup going to private developers. So far, this procedure remains virtually untested on such a grand scale.

The Navy, the City, the State, developers, and a passel of regulatory agencies have been working together for over a year, trying to effect a complex real estate transaction that would allow the Navy, through the City, to transfer ownership of roughly 80 percent of the developable part of the

military base—some 1,500 acres—to two developers before it is clean. The task of completing the cleanup would be carried out by these developers, whom the City of Vallejo has already selected, under regulatory agency supervision.

What's at Risk?

The mess is huge: leaking underground gas storage tanks, volatile organic compounds, asbestos, lead-based paint, fuel, PCBs, maybe radioactive materials and unexploded ordnance, and more. Although the Navy has been studying the island's contamination since 1982 and working to remove it, its full extent is still unknown.

"I guess you could say the disposal practices (on Mare Island) didn't always envision future land use that might include something besides military use," said Dan Murphy, who heads a team of engineers and geologists that oversees base closures for the Navy. "The investigations are ongoing in terms of what's out there and how to go about cleaning it up."

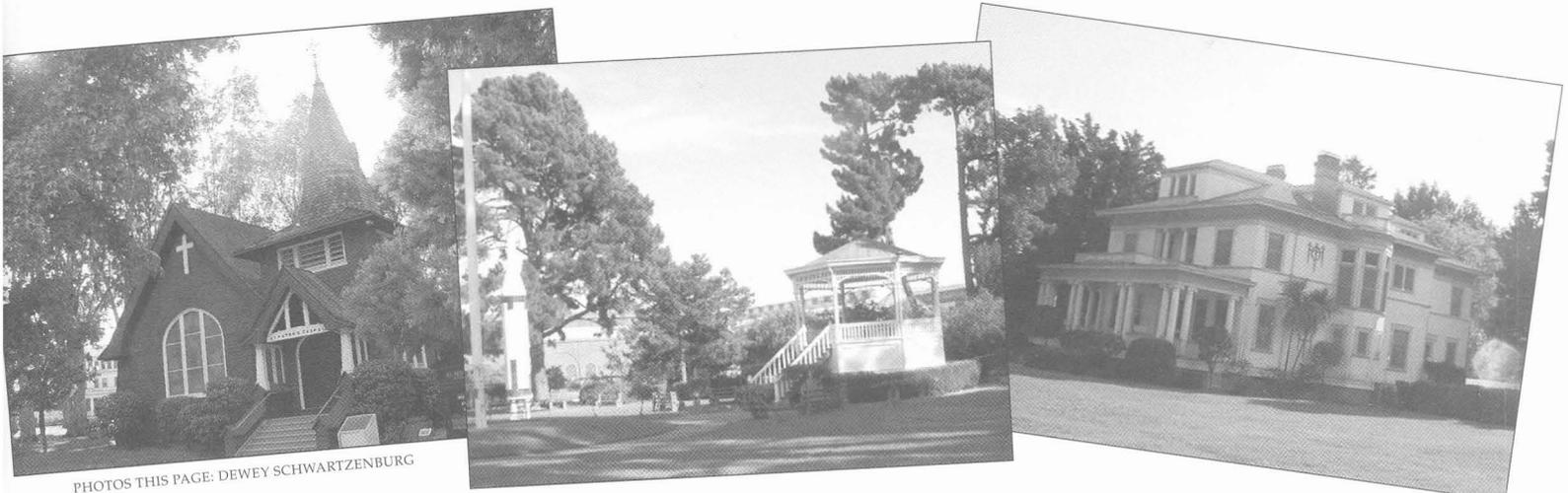
In light of such uncertainties, "early transfer" (or "dirty transfer," as some call it) could be fraught with perils. Could the City, future property owners, or the general public be facing some unwelcome surprises later?

The negotiations now under way are meant to eliminate that risk if they succeed—and if all involved subsequently honor their commitments to each other. By late November, it had been agreed that the developers will clean up already identified pollution, with the Navy funding the work up to an agreed-upon cost ceiling. Should the cost exceed the agreed-upon amount, the developers will be responsible. The Navy retains responsibility for toxics that might be discovered later, as well as for any radioactive hazards and unexploded ordnance.

Left: St. Peter's Chapel is currently rented for weddings. It has Tiffany windows.

Middle: Bandstand and mounted missile

Right: A house on Captains' Row



PHOTOS THIS PAGE: DEWEY SCHWARTZENBURG

Unlike some other bases, Mare Island is not a federally designated "Superfund" clean-up site, so the U.S. EPA is only minimally involved. The California EPA is the lead agency, thus Governor Davis needs to give overall approval. The parties involved — the Navy, the City, the state Department of Toxic Substances Control (a division of the California EPA), developers, and the San Francisco Regional Water Quality Control Board—hope to have two packages of agreements (one for each developer) on the Governor's desk by late spring 2001.

"This is all new stuff. It is certainly going to set a lot of precedents," said Dennis Kelly, a mechanical engineer for Dynamac Corporation Environmental Services, and a consultant to the Navy on the early transfer process. "And the experience of the developers at Mare Island will probably dictate how these proceed in the future."

From Sailing Ships to Nuclear Subs

Mare Island has been a Navy base since 1854—four years before California became a state—when the Navy purchased it. In time, Mare Island Naval Shipyard grew to be the largest naval ship construction and repair facility in the world.

From the Civil War through the Korean and Vietnam Wars, Mare Island was the Navy's flagship Pacific Coast operation. During World War II, 45,000 people worked there and hundreds of vessels were serviced. From 1957 to April 1996, Mare Island specialized in the construction and repair of nuclear submarines.

"They built every type of ship at Mare Island, from sailing to steam to gas turbine to nuclear," said Gill Hollingsworth, Mare

Island Project manager for the City of Vallejo. "Nearly the entire history of the U.S. Navy has passed through there at one time or another."

In 1993 Mare Island Naval Shipyard was designated for closing, along with 178 other Navy facilities in the country, including 14 other Navy bases in California. This was a heavy blow to the local community. Some 10,000 jobs would vanish, local businesses and property values would suffer. A reuse commission was established, bringing together people from Vallejo and nearby communities in an effort to plan ahead, agree on reuse choices, and try to avert the conflicts and delays that had followed many other base closures. People in Vallejo were well aware that Hamilton Field in Marin County and Hunters Point in San Francisco still aren't clean decades after closing. If that happened at Mare Island, the results would be disastrous for the local economy. Mare Island's rich cultural, historical, and natural assets cannot be tapped until the hazardous waste is gone.

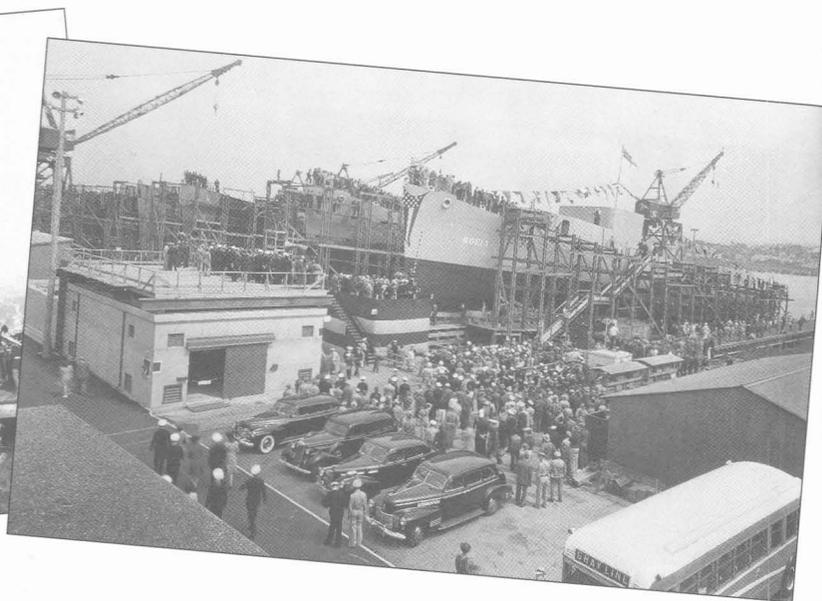
Before officially departing in 1996, the Navy spent \$120 million surveying for hazardous materials. "Contaminants here included radioactive materials, unexploded ordnance, PCBs, heavy metals, and petroleum products. It's a big base with very complex environmental issues compared to the other ones," said Murphy. Mare Island was the oldest and largest shipyard west of the Mississippi.

Speeding Up the Process

In 1998, Congress amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to

Left: Launching the U.S.S. Pawtucket, 1898

Right: Built for the British Navy, H.M.S. Bentinck was launched August 22, 1942.



PHOTOS THIS PAGE: VALLEJO NAVAL AND HISTORICAL MUSEUM

speed up conversion of military bases to new uses by allowing transfer before cleanup is complete.

"It was taking years for communities to get in there and develop the property, so I think in many cases (the delays) turned off proposals," said Bill Neville, the Navy's base closure manager for early transfers. "The idea was to facilitate the reuse of the property."

The City of Vallejo asked the Navy for early transfer, reasoning that if developers were placed in charge of the cleanup, the job would be finished more quickly and at lower cost. Cumbersome bureaucratic procedures would be avoided and the required work could be molded around the development schedule. "Any time you bring a federal agency in you have a significant amount of management overhead that you don't have with a private company," Hollingsworth explained.

On paper, the Navy deals only with the City, not with the developers. The City in turn has a contract with the developers, and the developers contract with the cleanup firms. However, the specifics of the City's contracts with the developers, which must be worked out beforehand, will be contained in the City's contracts with the Navy. If all agree on the transfer process, with all the details involved, and the Governor approves, about 80 percent of Mare Island will be signed over to the City. The City will transfer almost all of that land to the two developers it has selected. The developers will hire environmental cleanup contractors to do the dirty work on a schedule that allows construction to start as soon as possible.

Federal law (CERCLA) requires that when military land is transferred to new owners, the deeds contain assurances that (1) if unexpected contamination is later

found and development restrictions are consequently required, these restrictions are passed along to the new owner; and (2) the Navy can access the property at any time for inspections or to deal with emergency environmental issues.

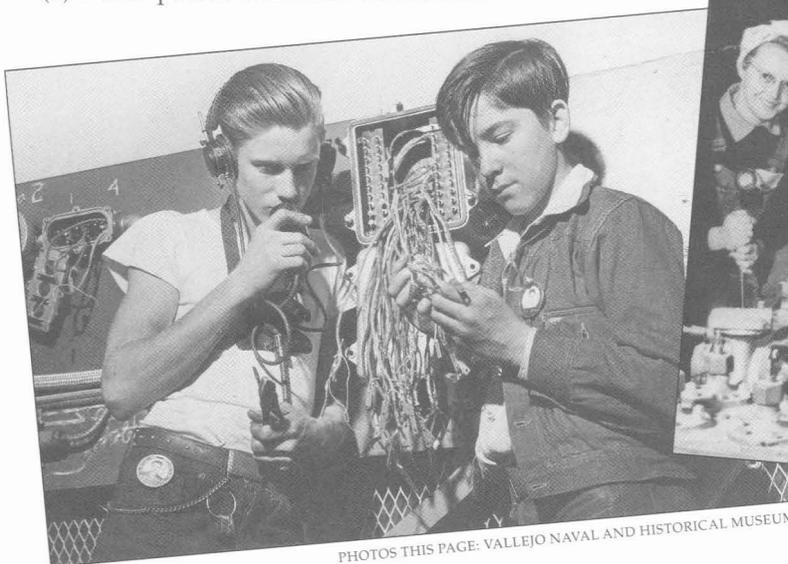
Eventually, the deed would also have to include an assurance that reuse of the land poses no risk to human health and the environment. The early transfer process, however, allows for postponement of that certification until cleanup is complete. Asked what would happen if toxic pollution turns up after land is sold and homes or other structures are built, Chip Gribble, project manager for the Department of Toxic Substances Control, said: "If we do our job well, the likelihood of that happening would be remote. However, the Navy remains always responsible and liable."

The Department of Toxic Substances Control would oversee the developers, first certifying land as suitable for development, and later for habitation or other types of reuse. Areas to be used for residences have much stricter cleanup standards than land slated for industrial development.

At least two contracts will be sent to the governor. One would enable the City to transfer 700 acres to Lennar Mare Island, LLC, which intends to build 1,400 "dwellings" of various types and to lease out the industrial part of that property. This acreage includes historic "Captains' Row," with its spacious old houses shaded by large trees. Lennar has agreed to clean up known pollution, with up to \$81.6 million from the Navy. The City will receive a percentage of the profits Lennar makes from leasing or selling its land. The size of that percentage is still being negotiated.

Left: Students learned state-of-the-art electronics in 1943 at the Mare Island Apprentice School, established in 1858.

Right: World War II shop workers



PHOTOS THIS PAGE: VALLEJO NAVAL AND HISTORICAL MUSEUM

The second contract would allow for the transfer of 200 acres to Legacy Partners for commercial development. Legacy will pay the City at market rate. The City will be required to reinvest this income on Mare Island for streets, sewers, plazas and other common areas, and other infrastructure. Lands that are to become parks will be designated in specific development plans. The developers will rededicate these to the City after cleanup.

Both Lennar and Legacy have hired environmental cleanup firms. The contractor working for Lennar would have to clean up underground gas and oil storage tank sites, pipeline systems (storm water, sanitary, industrial waste, and water and fuel distribution), and also asbestos, lead-based paint, and PCBs.

Legacy will have to deal with possible PCB and other leaks, such as an area where chemicals used in paint manufacturing seeped into the soil, according to Jim Davies, project manager for Harding, Lawson, & Associates, Legacy's contractor. The Navy has taken care of most of the PCB leaks and most of the paint chemical problem, he said.

At the Department of Toxic Substances Control, however, Gribble offered a more cautious assessment. "I don't know about 'most,'" he said. "The Navy has gone to considerable effort to reduce the contamination out there, but there's no question more work needs to be done to remediate the problem." He added: "We're not at a point where we fully understand the impacts."

Toxic cleanup is a relatively new practice, especially when the poisons are underground, in wetlands, or underwater. Surprises can be expected, and cost estimates could need drastic revision as a consequence. Despite such uncertainties,

Hollingsworth said that Mare Island should be able to meet specified reuse standards in about two years, at a cost of about \$100 million. (Under the Navy's broom, City officials estimate it would take about 20 years.) Navy officials refused to estimate the timeline or cost of the cleanup.

The Stickiest, Muddiest Part of the Job

Some of the old base, including old ammunition depots, will stay with the Navy. The 3,000-acre wetland area includes 2,200 acres of tidal and nontidal wetlands that will be transferred to the State Lands Commission (SLC), which has jurisdiction over state tidelands. Once it accepts title, the Commission would lease the wetlands to the U.S. Fish and Wildlife Service to be incorporated into the San Pablo Bay National Wildlife Refuge along with another 162 acres to be directly transferred to Fish and Wildlife. That agency hopes to renovate a 60-year-old building on the edge of that property as a visitor center for the Refuge.

The 3,000-acre wetland area includes 320 acres with an old hazardous waste landfill (40 acres, used between 1982 and 1986), an oil dump, a lead battery dump, a former industrial wastewater treatment plant, and a 120-acre landfill used at the turn of the 19th century. About 80 percent, including most of the historic landfill, is within filled tide and submerged lands granted by California to the Navy many years ago. At present, the State does not intend to accept title to the hazardous landfill area. The Navy has tentatively agreed to retain ownership. "We're not an agency that deals with cleanup," explained Dave Plummer, SLC regional manager. "We've made it very clear to the Navy that we have no intention

Left: Mud flats at Green Sands Beach have been discolored by nickel-zinc slag from decades of shipyard activity.

Right: Wetlands near the old ammunition depots will stay with the Navy.



JOE HLEBICA, SCRIPPS INSTITUTION OF OCEANOGRAPHY

DEWEY SCHWARTZENBURG

of taking title to the landfill area until it has been cleaned up."

The Navy owns an undeveloped area of roughly 200 acres at the southern end of the island. That land will be transferred to the City, which will transfer it to the State Lands Commission, which will then lease it back to the City with use restrictions to ensure it remains a natural park area.

Landfill, Dredge Ponds, and Wildlife Refuge

Some local leaders want the Navy to retain ownership of the hazardous landfill area indefinitely. "It's a liability for ever and ever and ever," said Myrna Hayes, co-chair of the Restoration Advisory Board, a group of local residents that acts as a community watchdog for the cleanup. She and some others feel the same way about the historic landfill of some 120 acres, a part of which would be transferred to the City. "What city do you know of that is clamoring to get a landfill into their asset package, for God's sake?" asked Hayes.

The City, however, is prepared to take ownership of its part of the historic landfill, which is mostly filled with construction debris, and to transfer it to Lennar for cleanup. The Navy, the developer, and Lennar's cleanup firm, CH2M HILL, have agreed on this.

In 1999, disagreement over the cleanup price tag killed negotiations to transfer ownership of the Navy's Alameda base to developers. But Ron Plaseied, the manager for that base closure, said the Mare Island negotiations are "much further along than we ever got."

From the City's standpoint, once all the contractual details are worked out, there

should be no liability concerns for Vallejo. "That's why we have all these lawyers and experts representing us, to make sure that all these liabilities and costs are covered," said Hollingsworth.

The developers also said they are not concerned about the liability involved with taking ownership of the land. "We've done a lot of due diligence on what is there to clean up and what it might cost to do it," said William Moore, project director for Lennar.

If the agreements succeed, Vallejo will have the green light to take advantage of a rare and lucky development opportunity. The developers are courting high-tech and biotech firms. They envision a mini-Silicon Valley feeding a new and vibrant downtown Vallejo, and restoring in a different form the 10,000 jobs lost when the Navy pulled out in 1996. Mare Island's historic waterfront area, with its colonial mansions and chapel, will play host to a diverse mix of shops, restaurants, and entertainment venues while preserving the island's almost legendary character forged by more than 145 years of naval history. The signing of a cooperative agreement with the first developer, Lennar, was a promising first step.

Mare Island could become a model for other bases in the country that are now on the brink of the early transfer process. If so, it will come with a warning label: "Use with great care." ■

Marc Simborg is a freelance writer and former environmental reporter for the Fairfield Daily Republic.

Left: This rebar sculpture of a salt marsh harvest mouse was made by a shipyard worker. It stands on a rock, surrounded by pickleweed, at the restored marsh.

Right: Dr. Lee He and Scripps Institute of Oceanography graduate student Meriah Arias collect mud cores for laboratory analysis of residual toxins and bacterial activity.



DEWEY SCHWARTZENBURG



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COASTAL CONSERVANCY NEWS

HUGE GAIN FOR S.F. BAY WETLANDS

THE LARGEST WETLAND restoration project on San Francisco Bay took a giant step forward in September when the Coastal Conservancy agreed to buy, at a cost of \$16 million, 1,613 acres of wetland and wildlife habitat in Marin County on San Pablo Bay. This land, known as the Bel Marin Keys V property, will be added to the 1,000 acres of diked baylands and runways that will be restored as marshlands at adjacent Hamilton Air Force Base.

The Conservancy's action opens the way for construction to begin next year. It is the payoff for years of hard work by dozens of public agencies and citizens groups. It marks a major transition

from paper to reality for the San Francisco Bay Area Wetlands Ecosystem Goals Project, a multi-agency planning effort.

"When restored to tidal wetlands, the Bel Marin Keys property will be a highly productive addition to San Pablo Bay wildlife habitat," according to Conservancy chair Gary Hernandez. "The restoration is also likely to benefit the San Francisco Bay shipping industry by using materials dredged from bay ports."

This property in southeast Novato was once part of a system of sloughs and tidal marshes that extended along San Pablo Bay between Corte Madera and Vallejo. Parts of these marshes

were filled with sediment that flowed to the Bay from hydraulic mining in the Sierra Nevada foothills during the Gold Rush years. These were subsequently diked for agriculture and other uses. Cut off from the tides, many of the diked baylands subsided. Those at Bel Marin Keys have dropped to an average of five feet below sea level. Restoration could be speeded up by applying materials dredged from other parts of the bay, as was done in the Sonoma Baylands project.

Most of the property is now leased for oat-hay production. After its purchase by the state, it will continue to be leased for agriculture or other compatible uses while the restoration plan is being developed.

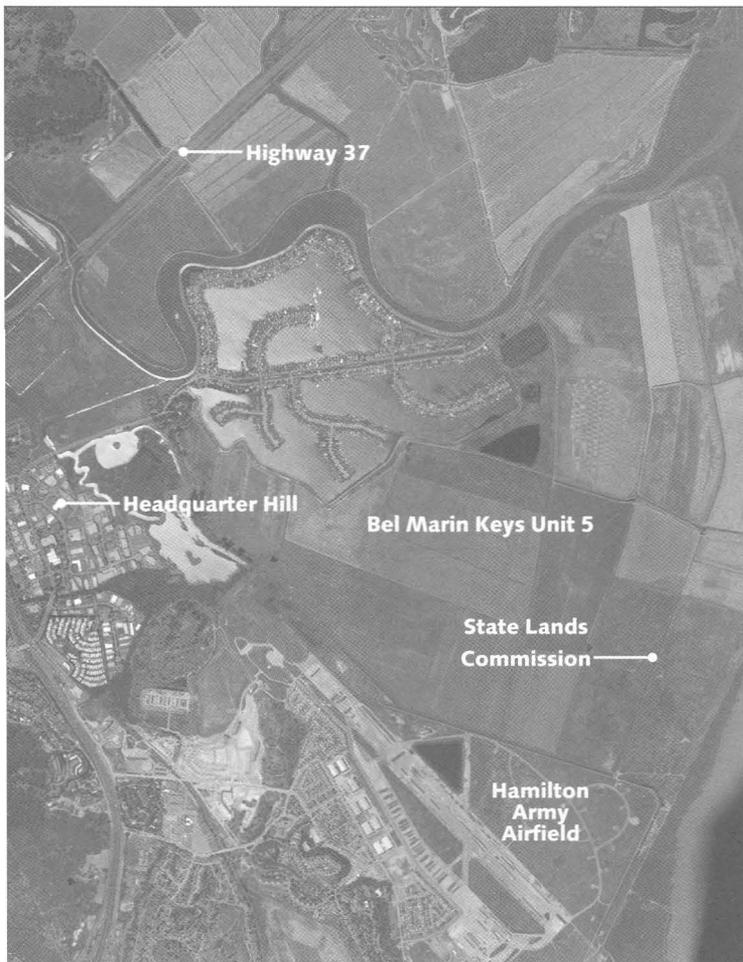
The timing of this

acquisition is critical to the final design of the 1,000-acre wetlands restoration project planned for Hamilton Field. The Conservancy and the U.S. Army Corps of Engineers are preparing a design for this restoration, and for a limited time modifications to the current plan could be developed to include the Bel Marin Keys property. Doing this would decrease the cost of the Hamilton Field project by over \$4 million, because a joint restoration would minimize the need for perimeter flood-protection levees. The estimated construction cost of the combined restoration project is about \$100 million.

The Bel Marin Keys purchase would also resolve a long-standing dispute over the use of the property. The current landowner, California Quartet Ltd., earlier applied to the county for permits to develop 796 residential units, an 18-hole golf course, a recreational boating lagoon, and other facilities. The firm later filed lawsuits against the county for zoning changes that affect the property's development potential. The county and the landowner have since entered into an agreement delaying the litigation in order to give the public an opportunity to acquire the property for habitat restoration.

The Conservancy will pay for the purchase, in part, using a \$9 million loan from the State Water Resources Control Board, as well as funds available through Proposition 12, the Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Bond Act of 2000, passed by voters last March. Although the legislature appropriated \$16 million in the current state budget for purchase and restoration of the property, \$10 million of those funds require at least an equal match from non-state sources.

The Marin Community Foundation has already committed \$500,000 in matching funds for the purchase and encourages donations to its Marin Bay-



AIRPHOTO USA

lands Fund for the purchase and restoration of the rest of this property. After the land is acquired, the Conservancy will seek additional funds from a variety of federal, state, and private sources to pay back its loan.

Last May the Conservancy entered into an option agreement to purchase the property. That agreement expires on November 27.

EUREKA WATERFRONT ACCESS

THE COASTAL CONSERVANCY approved \$500,000 to the City of Eureka in September for a waterfront access project. The Eureka Redevelopment Agency has already committed \$3 million and the City has approved \$1.5 million to fund a boardwalk, plaza,

and other improvements between C and F Streets, adjacent to the Old Town historic district.

The boardwalk will open a section of the waterfront that until now has been inaccessible, allowing the public to enjoy views of the harbor and the bay. It will also be a link in the proposed Humboldt Bay Trail. Derelict waterfront structures will be demolished and the boardwalk and plazas will be constructed along a four-block stretch of the waterfront.

This is the first stage of a larger plan for Eureka's waterfront. Later, the City intends to build a fisherman's work area and dock to the west of C Street, a plaza area at C Street, and a floating dock. Final designs for these improvements are being developed. The City is

working with the Humboldt Fishermen's Marketing Association to identify funding sources.

The Conservancy's newly approved contribution will come from Proposition 12, the Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Bond Act of 2000, passed by California voters last March. Since the late 1970s, the Conservancy has contributed \$1.3 million toward improvements for the Eureka waterfront.

INDIAN ISLAND PLANS

THE NORTHERN CALIFORNIA Indian Development Council, Inc. (NCIDC), will prepare a plan to protect archaeological sites and improve habitat on Indian Island, just north of Eureka, with the help of \$85,000 approved by the Conservancy in September.

The 275-acre island, which is mostly salt marsh, lies within the Humboldt Bay National Wildlife Refuge. The northernmost coastal rookery of the American egret is in the Monterey cypress trees on the island's southern end. Great blue heron, Virginia rail, and black-shouldered kite are present, among other species. Plants include the endangered Humboldt Bay owl's clover. Wiyot Indian shell mounds date back over 1,500 years.

Wiyot people lived in two villages on the island and gathered here from numerous other villages for the World Renewal Festival every year until the night of February 25, 1860, when some white men came ashore and massacred about 188 people, mostly women and children (see *Coast & Ocean*, Spring 2000). Earlier this year the Table Bluff Reservation purchased 1.5 acres from a private owner. The Wiyot hope to come together here again for their ceremony, for the first time in 140 years.

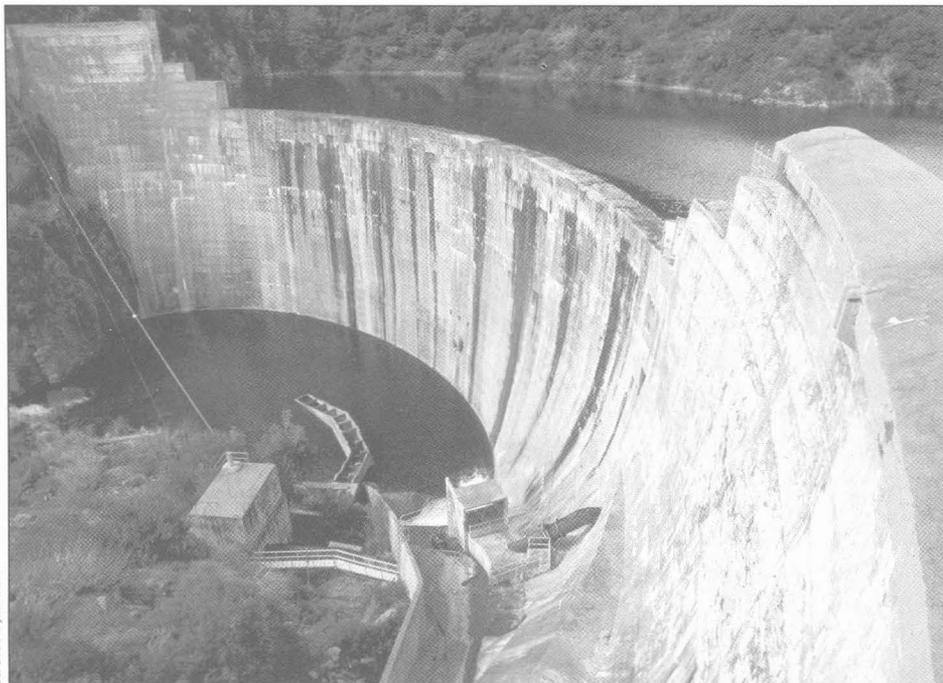
The plan to be prepared by NCIDC will protect ancestral Wiyot sites from erosion. It will also identify ways to improve nesting, feeding, and resting habitat for waterfowl, diving birds, wading birds, shorebirds, and raptors, and ways to increase salmon and steelhead habitat.

The City of Eureka owns about 90 percent of the island and is a principal participant in the project. (There are a few private homes.) Other participants



EUREKA COMMUNITY SERVICES DISTRICT

No longer useful to fishermen, this stretch of Eureka's downtown waterfront will be transformed for public enjoyment. A boardwalk will connect the city's Old Town to the Adorni Community Center. The burned-out structure at the bottom will be replaced by a new pier and fisherman's work area.



Matilija Dam today

include the National Park Service, the California Department of Fish and Game, the California Conservation Corps, and North Coast Seafoods. Funding for the plan will also be provided by the California Endowment Fund (\$25,000), Table Bluff Reservation Sacred Site Fund (\$10,000), and private donations.

FIRST CHIP OUT OF MATILIJA DAM

THERE IS VIRTUALLY UNANIMOUS agreement that the Matilija Dam, on a tributary of the Ventura River, should be torn down. This was abundantly evident at an event sponsored by Ventura County on October 12. Secretary of the Interior Bruce Babbitt was there, as were Assemblywoman Hannah-Beth Jackson; representatives of Senator Barbara Boxer, Congressman Elton Gallegly, and State Senator Jack O'Connell; and numerous community activists, members of river protection groups, and government agency representatives. All agreed that the Matilija Dam should be demolished to open up spawning areas for the endangered southern California steelhead and to allow sediment to pass downriver to Ventura County beaches.

The event celebrated the taking of the first nick out of the dam, which was built for water supply and flood control in 1947 but soon began to crumble and

fill in with silt. Several blocks were removed from the top to determine the most cost-effective means of dismantling the structure, which is 160 feet high and 620 feet long. This was paid for in part by the Southern California Wetlands Recovery Project, which is administered by the Coastal Conservancy. Also contributing were the National Fish and Wildlife Foundation, Ventura County, and several Ventura cities.

On October 26, the Coastal Conservancy agreed to fund a much larger planning study, for \$1.75 million, to determine how best to deal with the six million cubic yards of sediment behind the dam and to establish the capacity of the downstream channel. The Conservancy will continue to work with the multiple federal, state, and local agencies that have taken the lead on the project so far, including the U.S. Bureau of Reclamation, County of Ventura Flood Control Department, U.S. Army Corps of Engineers, and Department of Fish and Game.

OTHER COASTAL NEWS

"ROSIE THE RIVETER" HONORED

HUNDREDS OF PEOPLE who worked in Richmond's Kaiser Shipyards during World War II gathered at Marina Bay, part of the former shipyard site,

on October 14 to dedicate the Rosie the Riveter Memorial. Designed by artist Susan Schwartzberg and landscape architect Cheryl Barton, the memorial includes a 441-foot walkway (the length of a Liberty Ship), panels with photographs and quotes from women workers, and a lookout platform at the water's edge. Thousands of women worked alongside men to build supply ships and other ordnance for the armed forces.

In October, President Clinton signed legislation creating the Rosie the Riveter/Home Front National Historic Park, which will include the memorial, other sites at Marina Bay, and other historical resources in Richmond. The park and memorial are the first to give national recognition to the women, minorities, and other home-front workers who played a significant role in the war effort and, in so doing, contributed substantially to the transformation of the American workplace. (See *Coast & Ocean*, Spring 1998, and www.rosietheriveter.org.)

GRANTS FOR COMPUTER MAPPING

NONPROFIT CONSERVATION and environmental organizations that need computer mapping technology can apply now for Conservation Technology Support Program (CTSP) grants of computers, software, and training. About 50 grants are available, with computers and printers donated by Hewlett Packard Company, and Global Information Systems software from Environmental Systems Research Institute, Inc., Clark Labs, and perhaps other companies. This opportunity is available to U.S.-based (501c 3) land trusts, watershed organizations, groups working to save plant and wildlife habitat and urban open space, groups for environmental justice, organizations promoting sustainable development, and others. Indian tribes are eligible. International groups with U.S. 501c 3 sponsors may also be eligible, and should refer to CTSP guidelines. Applications are due January 9, 2001; decisions will be made by mid-April 2001. Application guidelines and news updates on software additions to the grant packages are available at www.ctsp.org.

Upscale Poem

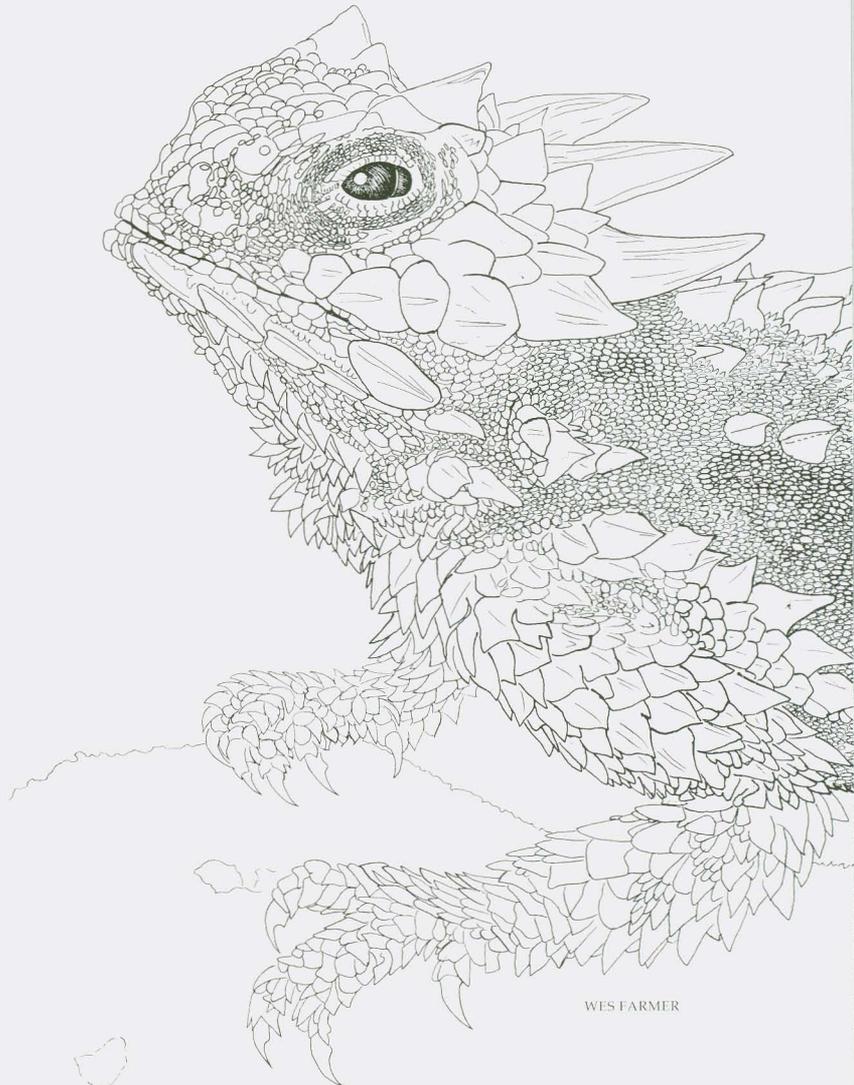
Is your house the monster that ate
Your Space
and licked up every piece of Your Mind
you don't keep at the office—
still hungry,
chews your heart
while the furniture
snickers
and your car talks
behind your back—
Harvard should have told you,
The Dweller must be worthy of The House.

This poem is worth a cloud,
you can have it for \$750,000.

Put it on a coffee table
or other altar—
and your house will feel good
about its self—

While your sex life
perks,
muscle tone improves,
you sleep without pills
and anyone can see,
you are Very Rich
and a Real Person
too.

—*Robert Anthony*



WES FARMER



Coastal Conservancy

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