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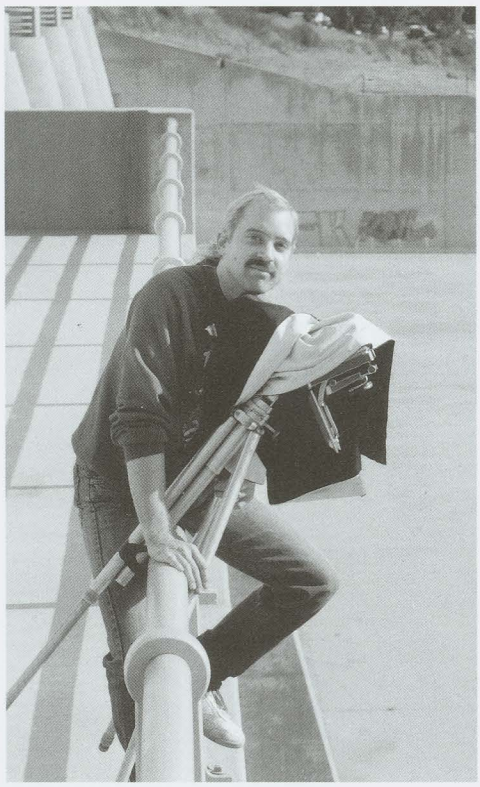
Cover photograph: view of Los Angeles River, under the Whittier St. bridge



Ford Lowcock atop Sepulveda Dam.

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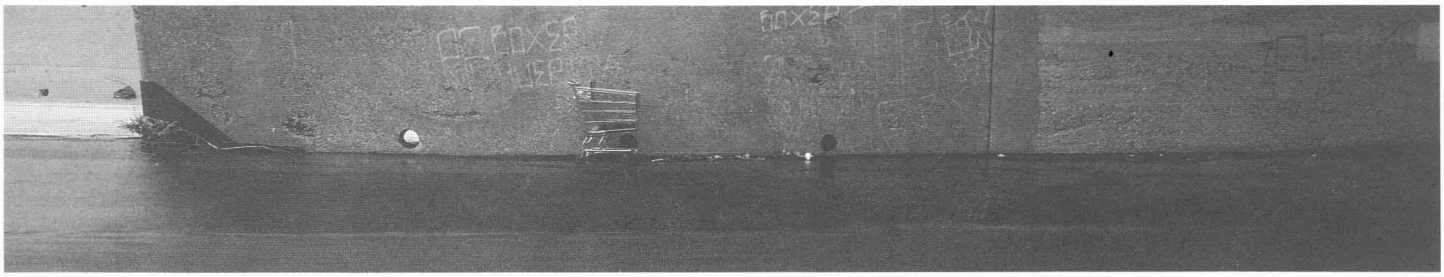

FORD LOWCOCK

Los Angeles RIVER

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FORD LOWCOCK

FROM THE EXECUTIVE OFFICE
• PETER GRENELL

IN THIS SUMMER OF OUR DISCONTENT, we have cause to be thankful. We have a budget, however grim, that is more or less on time and based on a longer time frame than the outmoded annual basis of past years.

Of course, the state's desperate economic and employment situation continues, aggravated by the prospect of military base closures, especially in the Bay Area; and there's no end in sight, at least for the next year or two. The farther horizon is clouded by demographics, images of 50 million Californians in another 20 years or so without an adequate revenue base to serve them. Our shrinking, ever more financially starved educational institutions face generations of young people who need a lot more help to lead or participate in the globally competitive work force the state will require. And, of course, our continuing pathological love affair with guns sustains our increasingly frequent and violent first choice for conflict resolution.

In this depressing context, the fiscal future of California's coastal protection effort is in grave doubt. For most of those without jobs, and those who are about to lose them, or see, at best, only a menial future for themselves, the issue is remotely relevant, if at all. "Indirect economic benefits" don't pay the rent. And, with public funds vanishing, those charged with the responsibility to lead us out of the economic morass must focus quite literally on a few budgetary essentials. The coast is but one of many important competing needs, and by no means number one.

No New Money in Sight

Both regulatory and nonregulatory coastal agencies face more budget reductions. With no coastal parks and wildlife bond act in 1992, agencies are hanging on by the barest margin until the next chance, in 1994. No other sources of sizable funds are available, either from the state or the federal government. Period.

Some profoundly important initiatives are emerging.

A modest (i.e., in the $600-million range) coastal, wildlife, and park bond act could emerge from the legislature for the June or November 1994 ballot. Currently, active legislative proposals call for coastal funding at the $60-million level. This is roughly equivalent to the money provided by Proposition 70 six years ago, and does not keep pace either with rising costs or current levels of need. With the state in continuing fiscal crisis, the funding dilemma clearly is Solomonic.

Outside the legislative process, the nonprofit Planning and Conservation League is now gathering signatures to place a $2-billion (that's not a misprint!) bond issue on the June 1994 ballot. This proposal provides for more coastal funding, but clearly has more serious implications for the state's bonded indebtedness. It is also more narrowly focused on land acquisition than the legislative proposals.

Whether either bond has a chance with the 1994 electorate—assuming that they are placed on a ballot—remains to be seen. Should no bond act pass in 1994, the state's ability to protect, restore, and enhance its priceless coastal resources will vanish, for all practical purposes.

And now for some constructive optimism. Some profoundly important initiatives are emerging. The preparations for military base reuse offer opportunities for reeducation, job development, and business investment in the top-priority task of hazardous and toxic waste cleanup. Government, especially the federal government, should lend immediate, visible, and solid support to these efforts. At the same time, many provocative ideas for reusing these installations are emerging. Further opportunities exist for real public (federal and state), private, and local government investment partnerships in base cleanup and reuse, each party with different, but complementary, roles. These could lead to major improvements in the use of some prime pieces of coastal real estate while addressing a number of pressing social and economic concerns.

The San Francisco Presidio, Mare Island, Treasure Island, Alameda Naval Air Station, Hamilton Field, and Fort Ord all have significant amounts of shoreline in very important locations. Possibilities for public access and recreation, natural habitat restoration, coastal-dependent industry, visitor-serving commercial development, housing, education, research, and other institutional development must not be lost because of an over-concern with the cost side of the ledger: They will pay off in the long run.

Sustainable Development is the Key

Less immediately visible but equally important for the long term, the concept of sustainable development is taking root both here and abroad. It is the key to long-term global economic and environmental health and survival. For instance, opportunities exist to restore degraded forested watersheds while developing new long-term sources of employment, maintaining profitable yet environmentally benign agriculture, significantly reducing if not eliminating urban and rural nonpoint source pollution, and enhancing the value-added end of production—while reducing the need for current levels of natural resource exploitation. The Coastal Conservancy is working with different local interests on several prototype projects dealing with some of these issues along the coast and on San Francisco Bay.

To be successful, such efforts require adequate levels of commitment over sustained periods of time. Correcting the negative impacts of past actions (restoration) and forestalling future problems (regulation) must be joined with forward-looking action, if lasting positive change is to be expected. No amount of bond money will lighten the current pressure for more of the same unless workable alternatives to present choices and behavior exist. Herein lies the real future for coastal protection. ■

RECENT CONSERVANCY ACTIONS

THESE STATE COASTAL CONSERVANCY projects were approved between March and June 1993:

North San Francisco Bay Wetland and Watershed Protection

The Coastal Conservancy agreed in March to work cooperatively with local, state, and federal agencies "to improve opportunities to protect, restore, and enhance the North [San Francisco] Bay ecosystem. "The Conservancy will join the Environmental Protection Agency's North Bay Initiative in an agreement that covers the region between Gallinas Creek and the Carquinez Straits. Most of San Francisco's undeveloped and unprotected historic bayland and historic wetlands are along this stretch of shoreline, which has recently become the focus of growing numbers of proposals for urban development. The Wetlands and Coastal Planning Section of the EPA's Region IX undertook the North Bay Initiative with the goal of building a framework for protecting and enhancing natural resources that are vital, such as fish and wildlife habitat. The initiative will develop a management plan in close cooperation with all interested parties within the region. This plan will be built on recognition of local needs, as well as of the inextricable connection between wetlands and their watersheds. It will provide for the protection of these natural resources.

Santa Margarita River Watershed Enhancement Plan

In June the Coastal Conservancy authorized acceptance of $100,000 in federal funds and disbursement of up to $300,000 of Conservancy funds to the Riverside County Regional Park and Open Space District to prepare a resource enhancement plan for the Santa Margarita River watershed. This 750-square-mile watershed extends from Palomar Mountain and the Thomas Mountains in Riverside County to Camp Pendleton in northern San Diego County. The plan will aim to protect the single most significant riparian and estuarine system on the southern California coast.

CITY OF MORRO BAY

After more than a decade of planning and design, Tidelands Park, at the southern end of the Embarcadero along the Morro Bay shoreline, was formally dedicated on July 3, 1993, with a community celebration. The park cost nearly $600,000, of which $180,000 was authorized by the State Coastal Conservancy. The city of Morro Bay contributed $340,000; state and federal monies completed the project funding.

The Santa Margarita watershed presents a formidable challenge to state and local agencies and interests seeking to protect irreplaceable downstream habitats while allowing and encouraging orderly development, flood control, and economic stimulus upstream. Riverside and San Diego counties have joined in asking the Conservancy to cooperate and assist in producing a coordinated resource enhancement plan for the watershed. The plan will focus on land uses, development, flood control, erosion, sedimentation, and the long-term effects of urbanization on the river's outstanding habitat areas.

Eel River Delta Agriculture Management and Enhancement Plan

The Eel River Resource Conservation District will prepare an agriculture management and enhancement plan for the Eel River Delta region in central Humboldt County with up to $30,000 authorized by the Conservancy in April. The dairy industry is of major importance to the economy of the Eel River Delta region and to the county. Recent studies have demonstrated, however, that dairy waste entering the hydrological system are damaging the delta's biological resources.

The 30,000-acre Eel River Delta is one of the most biologically rich estuarine systems in the entire state. It supports numerous species and is an important feeding and resting area for many birds migrating along the Pacific Flyway. It is also an extremely valuable nursery for many oceangoing, commercially important fish. The rich grazing lands of the delta provide seasonally important wetlands and, at the same time, support the dairy industry.

The Eel River Resource Conservation District (RCD) has formed a Sustainable

Agriculture Committee, consisting of affected landowners and resource agencies, to develop economically feasible ways compatible with the area's natural conditions to treat and/or store dairy wastes. The RCD's management plan will also evaluate other enhancement measures, such as the possibility of protecting and/or restoring riparian corridors on private lands.

The plan will recommend model projects that could be constructed to demonstrate the viability of the selected systems in meeting project goals. Conservancy funds will be used to research and evaluate potential systems, and to hire hydrologists and other experts to evaluate the area's hydrological conditions and for other technical assistance needed to develop the plan. Technical aid will be provided by the Soil Conservation Service, Regional Water Quality Control Board, U.C. Agriculture Extension, and the Department of Fish and Game.

Crissy Field Urban Waterfront Restoration Plan

The Golden Gate National Park Association (GGNPA) will prepare an Urban Waterfront Restoration Plan for Crissy Field within the Presidio and the Golden Gate National Recreation Area with up to $100,000 authorized by the Conservancy in June. This historic airfield on San Francisco Bay, extending from the southern anchor of Golden Gate Bridge to the Marina Green, is one of the most significant sites for regional and statewide recreation along the bay.

The GGNPA, the National Park Service's nonprofit partner, is planning for Crissy Field under an agreement with the Park Service. The GGNPA has already funded the preparation of a preliminary plan for part of Crissy Field. With the completion of the Draft Presidio Master Plan and Master Plan Environmental Impact Statement, the GGNPA is now prepared to begin detailed planning to provide a comprehensive implementation strategy for Crissy Field, including public access and recreation improvements, vehicular circulation and parking plans, resource protection and restoration plans for the bayshore, dune, and wetland habitat areas, and prototype plans for the reuse of buildings.

Coastal Trail Education Program

Coastwalk, a Sonoma County nonprofit organization, will produce an audio/slide program with a $10,000 grant from the Conservancy. The purpose of the slide show is to provide information about the Coastal Trail and promote its implementation. The Conservancy has played a major role in the effort to build this trail, envisioned as extending along the state's 1,100-mile coast from Oregon to Mexico, by funding important regional links in every coastal county. Coastal Trail segments currently under construction funded by the Conservancy include the Coastside Trail through Half Moon Bay and the Hammond Trail in Humboldt County.

Coastal Cleanup

Volunteer October 2 to help clean up California's beaches as part of Coastweeks, a three-week celebration of the nation's coasts. For information on volunteering in your area, contact Nicole Breier at the California Coastal Commission, (415) 904-5210. Teachers interested in receiving "Save Our Seas," a K-12 curriculum developed by the Commission and the Center for Marine Conservation, should also call the above number.

Bolsa Chica Wetlands Enhancement Plan

In May, the Coastal Conservancy approved the Bolsa Chica Wetland Enhancement Plan and authorized up to $138,000 to the Bolsa Chica Conservancy to build a temporary interpretive center overlooking the Bolsa Chica Wetland, one of the largest and most significant wetlands in Los Angeles and Orange counties. Some 477,000 people visited this wetland last year, according to the Department of Fish and Game. In 1992, volunteers from Amigos de Bolsa Chica also escorted more than 2,300 people on interpretive walks through the wetland.

The temporary interpretive center will allow the Department of Fish and Game, Amigos de Bolsa Chica, and the Bolsa Chica Conservancy to coordinate research, management, and interpretive activities. It will include a small interpretive display, library, work space, and public facilities. The prefabricated modular building (1,440 square feet) will be placed on an existing parking lot. The adjoining area will continue to serve as an off-street parking area for 24 automobiles. The temporary center will be the focal point for the wetland until a permanent site is acquired and a new facility is built. Once a new facility is opened, the temporary building will be used for storage by the Department of Fish and Game.

Sinkyone Wilderness

In a June action intended to ensure adequate time for the Intertribal Sinkyone Wilderness Council (a nonprofit group comprised of ten federally recognized Native American groups in Mendocino and Lake counties) to raise funds to acquire a 3,800-acre parcel of coastal redwood lands, the Coastal Conservancy authorized its staff to extend the holding period on the property by 18 months. Under the current agreement between the Conservancy and the nonprofit Trust for Public Land, the land would have been put up for sale by the end of June 1993. This property comprises the upper watersheds of the Sinkyone Wilderness area in the extreme northwest corner of Mendocino County and was the subject of a conservation compromise in 1986. At that time, it was agreed that the lower portions of the property, including its last old growth redwood groves, would be added to Sinkyone Wilderness State Park. The upland area was to be sold for multiple uses, including timber production. Shortly after the Trust for Public Land acquired the property from Georgia Pacific Corp. at the end of 1986, the

Intertribal Sinkyone Wilderness Council was formed to acquire the upland area and create the first intertribal park in the United States.

According to Conservancy project manager Neal Fishman, "The Intertribal Council has shown staying power and fund-raising ability. It just received a Ford Foundation grant to help in its fund-raising. Over the past six months I have received over 200 letters from all around the state and from as far away as Germany asking that we give them more time to make this thing work." While not proposing commercial timber production on the land, the Intertribal Council would thin the forest and practice "sustainable forestry." It would also restore watersheds and streams. The land would be open to the public and would provide new access routes to the ocean in one of the most beautiful but remote areas of the California coast.

The Conservancy also approved $40,000 to the Intertribal Council to complete a forest inventory of the property. This inventory will be used to create a management easement to ensure that a healthy forest will grow back on land that was heavily logged in the past few decades, and that an ecologically sound forest volume will be maintained.

Black Lake Canyon Enhancement Plan

Twelve miles south of Pismo Beach, directly east of the Nipomo Dunes and Highway 1 in southern San Luis Obispo County, Black Lake Canyon is a unique geological feature. About four miles long, the canyon cuts through southern San Luis Obispo County's Nipomo Mesa and drains into Black Lake in the Nipomo Dunes. It provides diverse vegetation and habitat types, and serves as a wildlife corridor.

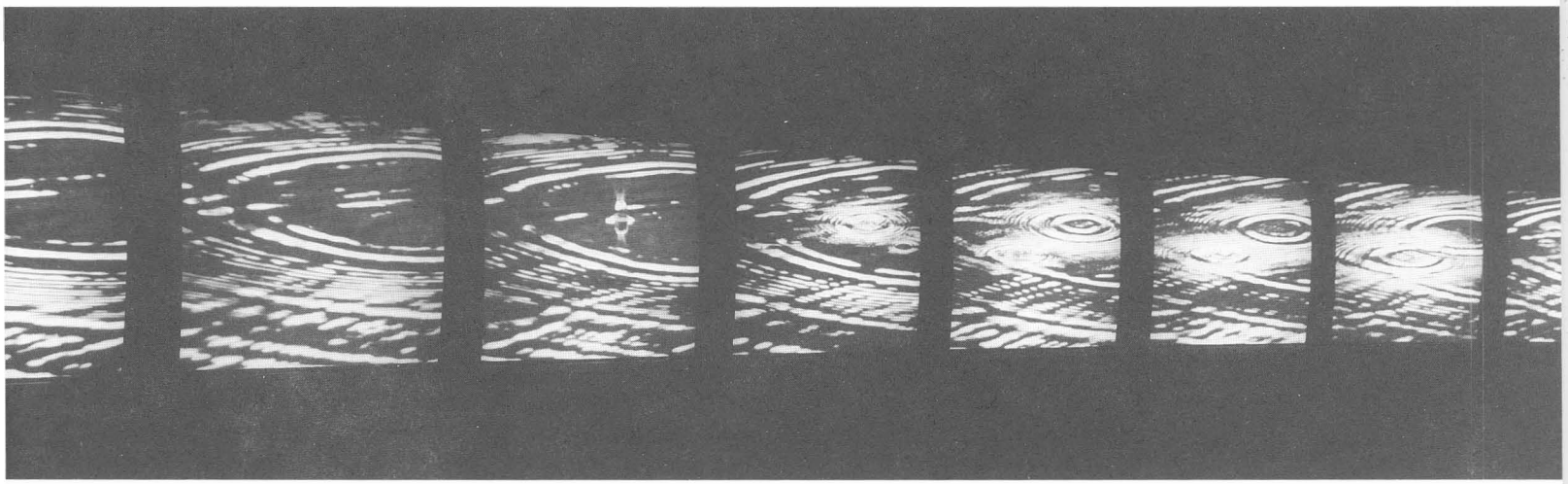
In May, the Coastal Conservancy approved the Black Lake Canyon Enhancement Plan and the negative declaration for the plan, and authorized up to $73,000 to the Land Conservancy of San Luis Obispo to implement portions of the plan. The Conservancy's action allows the Land Conservancy to implement the plan's first phase by restoring native vegetation and completing detailed studies that will allow subsequent phases to proceed. In future phases, additional eucalyptus might be removed, habitat restored, and fee-title or easement interests in parcels along the canyon floor acquired.

Carpinteria Recreation Trail

The city of Carpinteria will extend the Carpinteria Recreational Trail by one mile, from the eastern end of Carpinteria State Beach through Tar Pits City Park, using $40,000 authorized by the Conservancy in May. The city and Chevron USA are also contributing funds to extend this trail, which will end at the western boundary of the Chevron USA refinery property. Eventually, the city plans to extend this coastal trail farther east over the Carpinteria Bluffs to Rincon Point for a total of four miles. The trail segment funded by the Conservancy will connect with the recreation trail currently being developed at Carpinteria State Beach.

Point Cabrillo Public Access and Historic Restoration Project

Also in May, the Coastal Conservancy provisionally committed itself to providing the non-federal share of funding needed to support an application for federal funds for restoring the Point Cabrillo Lighthouse and to making minor access improvements. This action is contingent on the success of the Conservancy's application for funds under the federal Intermodal Transportation Enhancement Activities (ISTEA) program for this restoration project; the final decision on the federal funding, which will be made by the State Transportation Commission, is expected this fall. If the application is successful, the Conservancy will be able to restore the Point Cabrillo Lighthouse, built in 1906, to its original condition and increase public access to it. ■



***Water Waves*—A multi-monitor laser disc installation by Andrej Zdravic, at the Exploratorium in San Francisco, creates a mesmerizing illusion of water flowing in time and space across the 21-foot-wide video monitor horizon. The artist's unique exploration of water phenomena is enhanced by a multi-channel natural soundscape.**

Transboundary Water Conference

Regardless of the future of the North American Free Trade Agreement (NAFTA), the United States and Mexico must collaborate to find solutions to the growing transboundary water problems, which are emerging as a major issue affecting the future of the border region. Because the border cuts across watersheds and aquifers and much of the region depends on a common source, imported Colorado River water, any solution requires a recognition of interdependence.

This was the consensus of the workshop on "Water Quality and Provision in the Tijuana/San Diego and Mexicali/Imperial Valley Regions," the third in a series held by the Institute for Regional Studies of the Californias, San Diego State University, to assess critical issues related to water and the quality of life along the border between Baja California and California. Some 30 experts and authorities from both countries met July 7-9 at the Princess Resort Hotel in San Diego.

"The U.S./Mexican border is a political/economic discontinuity; it is a natural resource discontinuity," said Ahmed Meer, counselor of environmental, scientific, and technology affairs at the U.S. Embassy in Mexico. "If we want to remove tensions, we have to remove these discontinuities." To Rogelio Vázquez González, of the department of applied geophysics, Centro Investigación Científica y de Educación Superior de Enseñada, who discussed aquifer problems, the border is "an imaginary line." Failure to recognize that the border bisects a bioregion has led to decisions and actions that have caused environmental and economic disasters, human suffering, and created public health hazards in both the United States and Mexico, participants pointed out.

For the United States, a major transboundary pollution issue is the New River, which flows from Mexicali to the Salton Sea in California, carrying sewage, agricultural chemicals, and industrial waste—some of it from U.S. factories that have moved across the border, where enforcement of environmental laws has been more lenient than in much of this country.

To Mexican eyes, an equal, if not greater, outrage is the quality of water the U.S. supplies in partial fulfillment of its obligation to share Colorado River water. It mixes agricultural drainage and other wastewater with water coming directly from the river, noted Jesús Román Calleros, of El Colegio de la Frontera Norte. Water at the boundary has been found to contain "heavy metals, fecal matter, and considerable bacteria, which are a serious health problem for residents in the San Luis Valley," he said. "In the Mexicali Valley, every summer we have acute meningoencephalitis caused by free-life amoeba. The medical school has detected that fecal coliform are energy for this amoeba. So those sediments are a serious problem."

The city of Mexicali depends for 90 percent of its water on the supply from the north. Until last year, it had the capacity to treat only 30 percent of the water it received, by chlorination only. In June 1992, what came down was "thick as Mexican chocolate—nothing but mud," according to Alfredo Arenas, spokesman for the state commission of public services of Mexicali. With the mud came a large number of dead fish. Evaristo Villa Rodríguez, also of the commission, told the workshop that he had gone to Painted Rock Dam in Arizona to track this water to its source and found that it had been released from behind the dam, where it had been "stagnant for ten years." "They just sent it to us," said Arenas. "We have requested that the international treaty be revised to guarantee water quality."

...the All-American Canal Conservation Project looks like conservation north of the border, like robbery to the south.

A 1944 treaty regulates deliveries of Colorado River water to Mexico, but the only water quality standards, negotiated later, pertain to salinity. "The Colorado River is a river and a drainage system," Calleros said. "It carries water and wastewater, and we're at the end."

Also, of great concern to Mexico now is the All-American Canal Conservation Project, which looks like conservation north of the border, like robbery to the south. Plans call for lining 23 miles of this canal with concrete to save water that is now "lost" by seeping into the ground. Randall Stocker, manager of planning for the Imperial Valley Irrigation District, called this project "the largest water conservation program in any agricultural area in North America." However, this water is not being lost. It flows underground to the Mexicali Valley, supporting its extensive agriculture, Albert Utton of the University of New Mexico School of Law pointed out. The 1944 treaty is "ambiguous" on groundwater rights in that part of the valley, he said. U.S. courts have tended to protect the rights of established users.

The Colorado is "over-allocated," according to a "most complicated mosaic of allocations" that is based on total supply of 18 million acre feet a year, where in fact, there are only 13 million acre feet a year, said Utton. Every drop is being fought for. "It's a zero sum game," he pointed out. "If I can get a bit more, you will get a bit less."

In San Diego County, the water issue is not one of supply so much as one of disposal. Untreated sewage flows from the hills of Tijuana into the United States, polluting the Tijuana River National Estuarine Research Reserve and leading San Diego to close some of its beaches. This long-standing problem seemed on the way toward solution in 1991, when a binational agreement was reached to build an international sewage treatment plant north of the border. It is to receive wastewater from Tijuana and send it out into the ocean along with wastewater from San Diego. (The plant's design has been criticized because the wastewater will be dumped, not recycled, despite the increasing scarcity of water in the region.) The plant was to have been completed this year, but its con-

struction has been delayed. "We are greatly concerned," said Rubén Roa Quiñones, state director, Mexican federal commission of water. "We counted on the agreement. We are beyond our presently installed capacity." At the request of the United States, Mexico canceled a plan to build a treatment plant five miles from the border, which would have discharged into the Alamar River, which flows into the Tijuana River.

At the workshop's conclusion, James Malone, who was chief negotiator for the 1983 La Paz Border Environmental Agreement, said this accord remains "a good vehicle for cooperation" but should be amended to provide "a management and policy technique that brings in all concerned parties—state, local, nongovernmental communities, not just national bodies." U.S. Commissioner Narendra Gunaji, of the International Boundary and Water Commission, cautioned that binational border management efforts are "premature" because there are as yet no guidelines from Washington. Malone, and others, countered that regional planning and management are needed with or without NAFTA, and that some are already underway. The workshop, cosponsored by the Southwest Center for Environmental Research and Policy and the William and Flora Hewlett Foundation, was an effort to lay the groundwork for more. A Geographic Information Systems project has been launched at the Institute for Regional Studies, in cooperation with institutions on both sides of the border, to prepare a necessary data base on natural resources in the Baja California and California border region.

For more information, and a list of publications, write to the Institute for Regional Studies of the Californias, San Diego State University, San Diego CA 92182-0435.

—RG

Bay/Delta Plan Ready for Action

After five years of effort, the San Francisco Bay Estuary Project has arrived at a common vision for California's largest estuary as a sustainable ecosystem. This vision is embodied in the Comprehensive Conservation and Management Plan for the Bay-Delta Estuary. The project has also reached scientific consensus on standards by which to measure the estuary's health. At the State of the Estuary Conference, held June 5 at the California Academy of Sciences in San Francisco, scientists, policy makers, and others who worked on the plan said the future of the bay-delta now depends on whether the citizenry musters the political will to implement the plan.

"The future of the bay-delta depends on the next steps, and the future will not wait," said Rep. Nancy Pelosi, who has introduced The San Francisco Bay-Delta Estuary Act of 1993 (HR 2320) to provide legislative support for implementation of the plan. The bill is cosponsored by nearly the entire bay-delta congressional delegation. Pelosi pointed out that the population of the region, now about 9 million, is expected to increase to 12 million—a jump of 25 percent—in another 12 years. Any action to protect the highly urbanized estuary will become increasingly difficult. John Wise, acting regional administrator for the Environmental Protection Agency, Region IX, said that implementation of the plan will require "a collective and collaborative effort."

The plan contains nearly 150 recommended actions related to pollutants, dredging, diversion of freshwater flows, biological resources, and land use. One of the most important calls for adoption of standards to protect the estuarine ecosystem against further degradation associated with freshwater diversion. Although no specific standards are included in the plan, standards were developed by the Estuary Project's technical workshops. These workshops brought together "a group of the world's most distinguished coastal marine scientists, resource managers, and coastal policy makers," according to J.R. Schubel, dean and director of the Marine Sciences Research Center, the University at Stony Brook, New York, and facilitator of these workshops.

Freshwater inflow to the bay has decreased by 50 percent since 1980, Schubel said. Agricultural and urban users compete for the water, and "the estuary has been a poor contender in this arena," he noted. "Diversions have led to the loss of freshwater input and the recent prolonged drought exacerbated the situation. Diversions have also led to predation on eggs and larvae by the plumbing system.... The complex engineering system in the delta region for withdrawing and diverting fresh water away from the estuary acts like a giant 'predator,' particularly for ichtyoplankton and young-of-the-year fish," Schubel said. Samuel Luoma, of the U.S. Geological Survey, said, "The clearest correlation between the success of fishing species in the bay and any parameter we know is reduced river flow."

Water diversion is one of many chemical and physical processes affecting the health of the bay. Their interaction is incompletely understood. "I know of no other estuary that has as complicated a situation in the low salinity transition zone as does the San Francisco Bay/Sacramento-San Joaquin Delta estuary," Schubel said. Nevertheless, the scientists who studied freshwater inflows to the bay-delta agreed that a simple standard for measuring the health of the estuary was needed and could be developed. By strong consensus, they agreed on an index: salinity at 1 meter off the bottom. Using this index, they developed seasonal salinity standards as a tool for managing flows to achieve predetermined ecological goals.

Now that "science has spoken," Schubel concluded, the public must take the next step in securing a future for the estuary as a self-sustaining ecosystem. Citizens must secure adequate freshwater inflow and act on other recommendations in the conservation and management plan.

For more information, call the San Francisco Estuary Project, (510) 286- 0460.

—RG

Upcoming Conferences

- A California Shore and Beach Preservation Association conference to be held November 9-10, 1993, at Fort Mason Center, San Francisco, will honor Robert L. Wiegel's pioneering contributions to coastal engineering. Contact: Tom Kendall, San Francisco District, U.S. Army Corps of Engineers, 211 Main St., Room 922, San Francisco, CA 94105-1905. Phone: (415) 744-3360; FAX (415) 744-3312.

- The Land Trust Alliance's National Land Trust conference will be held September 30-October 2 at Big Sky Resort, Montana. Call (202) 638-4725.

- The 12th Biennial International Estuarine Research Foundation conference, November 14-18 at the Hyatt Regency Hotel on Hilton Head Island, SC, is entitled "Science and Management of Estuarine Coastal Systems." Call Rick DeVoe at (803) 727-2078. ■

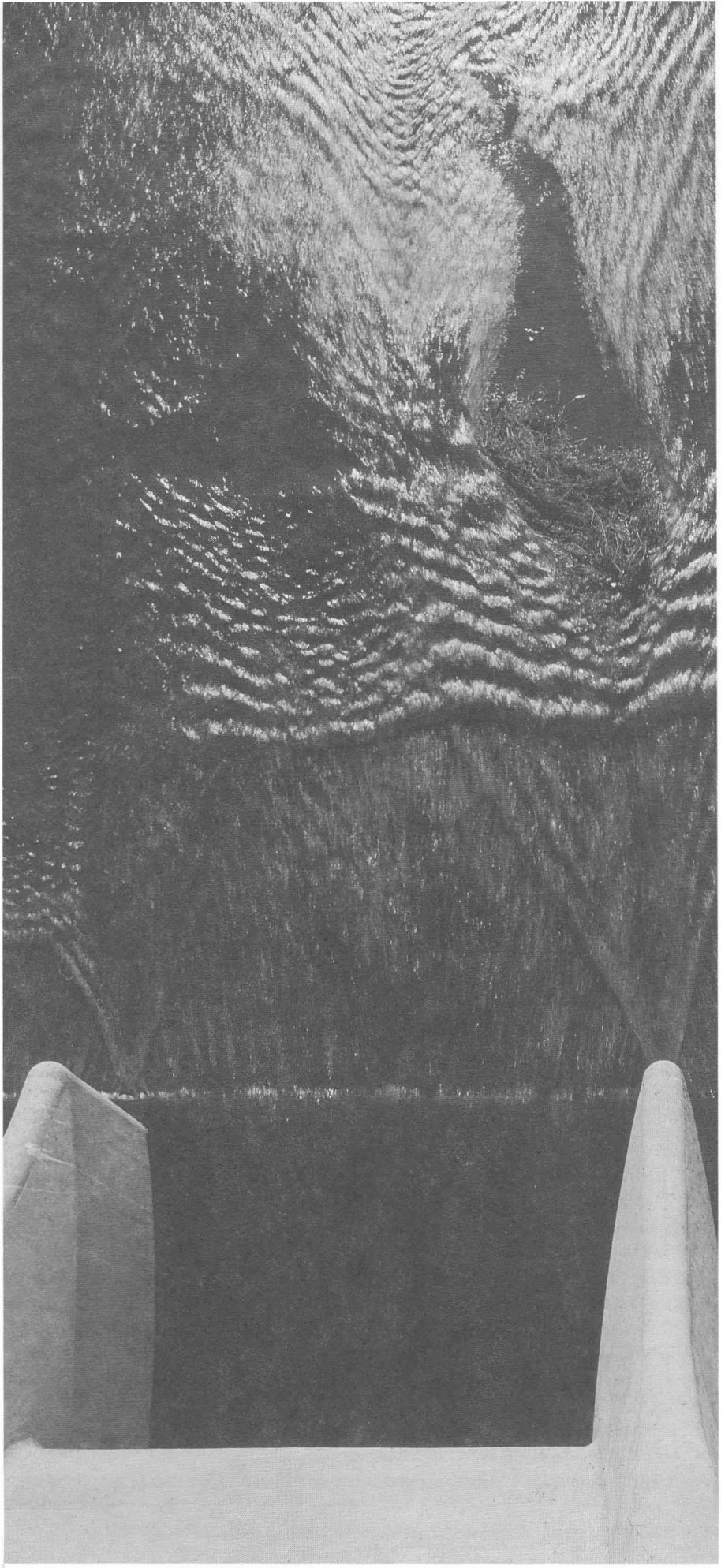
Is it still a river, or is it merely a flood control channel?

Los Angeles RIVER

Overflowing with controversy

PRENTISS WILLIAMS

THROUGHOUT THE COUNTRY, rivers long ago encased in concrete are being released to flow more naturally, their banks once again green and tree-shaded, welcoming wildlife and people. The great Mississippi flood has confirmed that it's dangerous to straitjacket a river. But surely it's too late to liberate some rivers—the Los Angeles River, for instance, trapped too long, turned into a monster by its confinement. Or isn't that right?



FORD LOWCOCK

ASK ALMOST ANY ANGELENO about the Los Angeles River, and the reaction is likely to range from outright laughter to a baffled "river, what river?" In its current incarnation the Los Angeles River looks more like a freeway than a river; except when it becomes a high-speed torrent sweeping huge amounts of water and debris from the mountains through a vast urban area and out into Long Beach Harbor. Contained in concrete for most of its 51 miles, its course straightened to move water downstream with maximum efficiency, the Los Angeles River is probably most familiar as the site for numerous cinematic auto stunts, among them the drag race in *Grease*. From the perspective of the commuters who battle traffic every day on the adjacent Long Beach Freeway, it may be just another blight on the urban landscape.

In recent years, however, the Los Angeles River has been the subject of growing attention. The Los Angeles County Department of Public Works and the U.S. Army Corps of Engineers, the agencies that operate and maintain the highly engineered river system, have come to realize that it will not withstand a 100-year flood, the standard for which it was originally designed. These agencies see an urgent need to increase the system's capacity and, to that end, are proposing a $280-million project that will increase the height of the channel walls along about 20 miles of the Rio Hondo and

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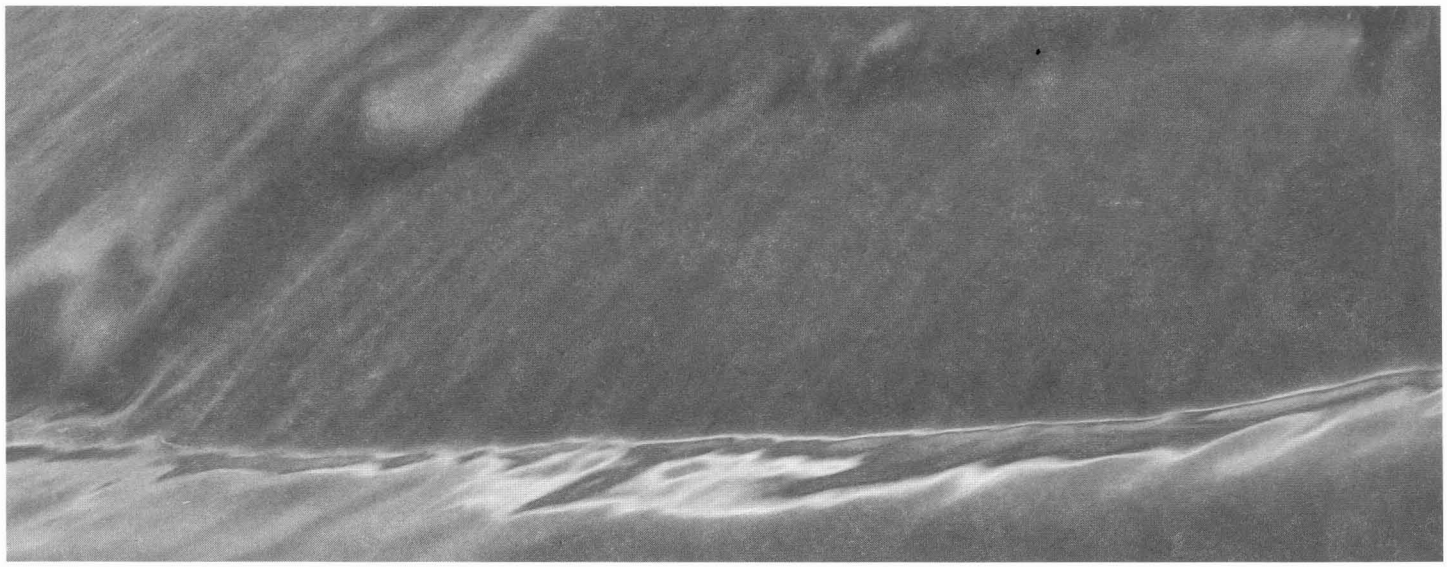


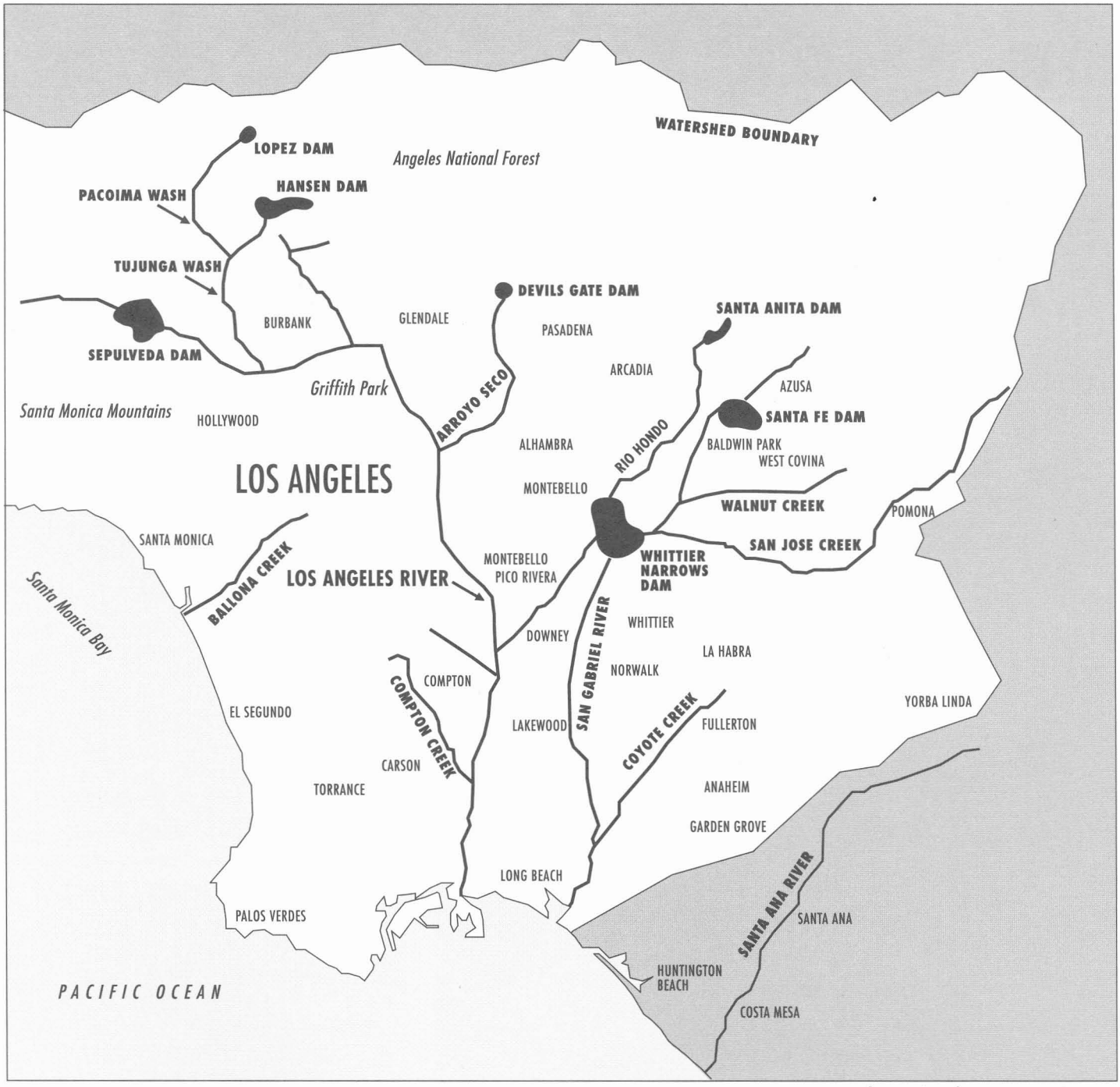
the Los Angeles River south of the city of Los Angeles.

At the same time, others are looking at the river's potential to serve as a recreational and environmental amenity for the greater Los Angeles area, which has less park acreage per capita than any other major metropolitan area in the nation. State and local legislators, local governments, and several environmental groups and community organizations are suggesting that the river could be much more than just a flood control channel, and some even contend that the Corps' current proposal is misguided and out of step with more modern approaches to flood control and river management. In addition, proposals have been made to use the Los Angeles River as a transportation corridor. In 1989, for instance, Assemblyman Richard Katz suggested that the riverbed be used as an additional lane for trucks, buses, and car pool vans during the dry season. (This proposal led some engineers who manage the river to shake their heads in amazement, for they are all too aware of the river's potential to grow in the space of a few hours from a trickle to a raging torrent.)

Clearly decision-makers are at a crossroads concerning the future of the river. To the engineers who manage the river to keep it from destroying property and taking human life, any talk of "restoring" the river seems naive and foolhardy, if not downright dangerous. Some of their critics maintain that the existing flood control system, although a marvel of engineering, was built with a disregard for the natural characteristics of the river and its watershed. They contend that alternative methods could provide flood protection as well as other benefits such as groundwater recharge and wildlife habitat. As ever more of the land is developed and covered with impermeable surfaces, more rainwater flows into storm drains, and through them to the main river channel. While the Corps' plan is designed to accommodate ever-increasing volumes of water, critics propose alternative flood control methods that would reduce the volume entering the system.

A Giant Drain

One thing is certain: The Los Angeles River system is an impressive example of river channelization. While standing on a levee overlooking a concrete channel wider than a six-lane highway, with steeply sloping or vertical sides, it is difficult to imagine that this was ever a river. Nearly the entire length of the main channel (and more than 400 miles of tributaries) has been encased in concrete. A 20-year effort on the part of the Army Corps and the County Department of Public Works transformed what was once a vast, flood-prone system of rivers, seasonal streams, and wetlands into what we see today: a 51-mile storm drain running from the mountains to the sea.



U.S. ARMY CORPS OF ENGINEERS, CHRISTOPHER KROLL, NAOMI SCHIFF

The Los Angeles County Drainage Area (LACDA) flood control channels extend for a total of 470 miles. The major channels are shown here.

Although widely thought to be dry, the river actually carries a considerable volume of water (up to 80 million gallons per day) year-round. This water is contained in a smaller "low-flow" channel that runs down the center of the main channel. During dry months the low-flow channel primarily carries discharge from two city of Los Angeles wastewater treatment plants. This discharge makes the Los Angeles River one of the few rivers in southern California to flow into the ocean year-round.

The headwaters of the Los Angeles River are in the Santa Monica Mountains at the confluence of Calabasas and Bell creeks. From there, the river flows east through the San Fernando Valley, bending around the Hollywood Hills before turning south onto the broad coastal plain of the Los Angeles Basin and eventually discharging into San Pedro Bay at Long Beach Harbor. This approximates the river's natural course when channelization began in the early years of the century, but the river has been considerably straightened to move water as swiftly as possible. Together with its several tributaries,

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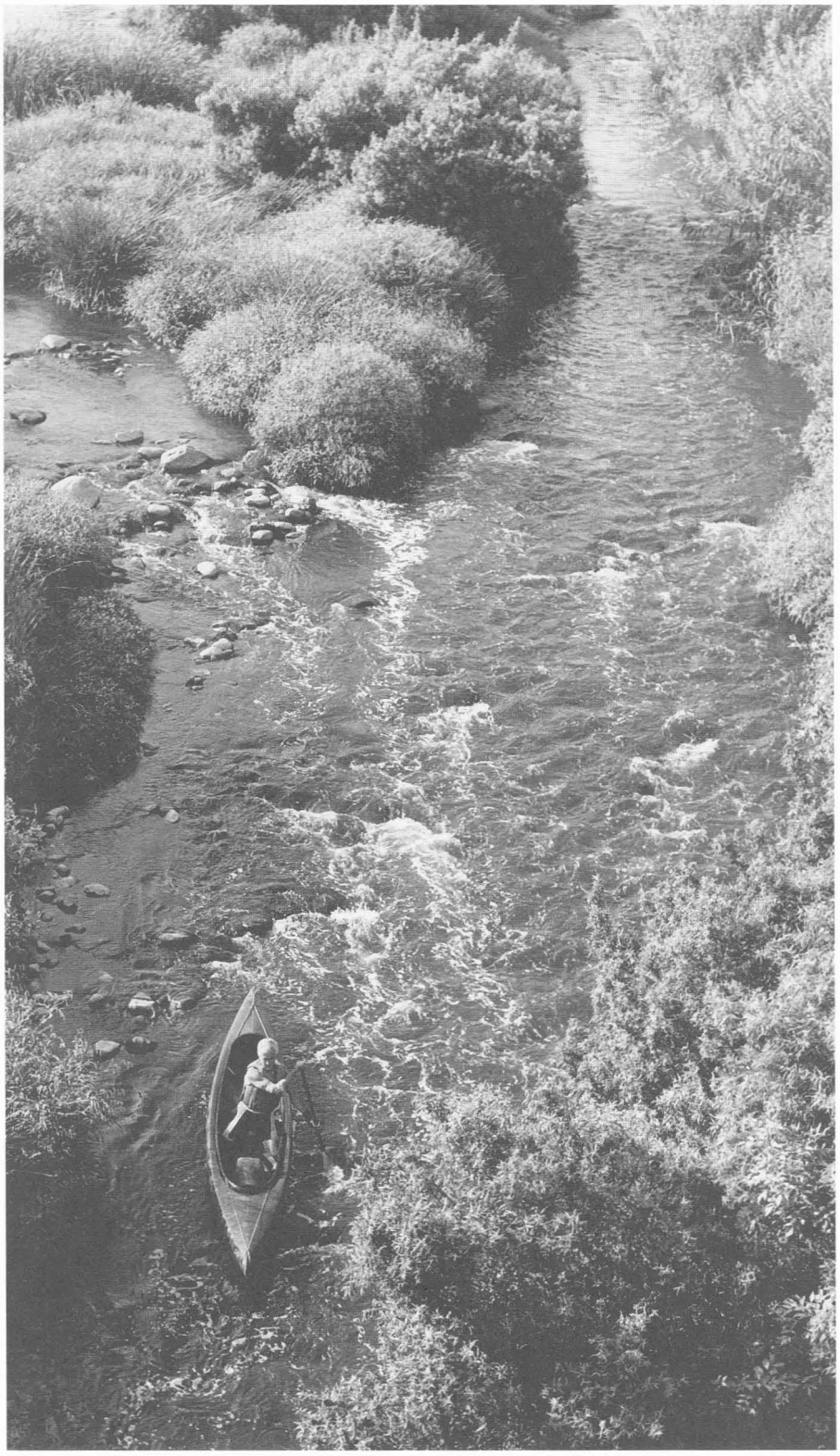


Denis Schure is a skilled canoeist. But for some boaters, the Los Angeles River's low-flow dams have been "drowning machines," safety officials warn.

notably the Tujunga Wash, Arroyo Seco, Rio Hondo, and Compton Creek, the river drains an area of more than 890 square miles.

Construction of the flood control system enabled land developers to build right up to the narrow strip of public domain next to the channel, and there is now very little vacant land adjacent to the river. Through the San Fernando Valley, it flows past heavily developed residential and commercial areas. From the Arroyo Seco, north of downtown Los Angeles, to the confluence with the Rio Hondo, it flows through industrial and commercial areas and is bordered by rail yards, freeways, and major commercial and government buildings. From the Rio Hondo to the Pacific Ocean, the river flows through industrial, residential, and commercial areas, including major refineries and petroleum products storage facilities, several major freeways, and rail lines and rail yards serving the ports of Los Angeles and Long Beach. The ownership pattern of the land underlying the flood control channel is a patchwork that includes private individuals as well as various public entities.

Glimpse of Nature

There are three locations where the river is more than a concrete storm drain. The largest is Sepulveda Basin, a 2,150-acre open space area immediately behind Sepulveda Dam in the San Fernando Valley. The basin is designed to collect flood waters held behind the dam during major storms in order to prevent too much water from entering the system too quickly. Because the area is periodically inundated, it remains in natural or seminatural conditions and supports a variety of low-intensity uses. The Army Corps owns the entire basin and leases most of the developable land to the city of Los Angeles Department of Recreation and Parks, which has developed a multi-use recreational area that includes a golf course, playing fields, hiking trails, and bicycle paths. The Corps has undertaken a riverside revegetation program here, and wind-blown seeds have taken root in the sediments that have collected in the soft riverbed and along

the stone and mortar banks. The resulting vegetation is dense and the atmosphere is cool, quiet, and inviting to people as well as other animals. The area supports populations of deer, jackrabbits, red-winged black birds, egrets, ducks, and many other birds.

Some 12 miles downstream, on the border of Los Angeles and Burbank, the river flows through Griffith Park, one of three places that remain soft-bottomed because the water table was too high to allow the laying of concrete. Here, the river looks most natural, flanked by stands of willows, sycamores, and cottonwoods that provide habitat for birds and other wildlife. The area is fed by natural springs, and water eddies and splashes around boulders year-round. The many trails and paths along the river in this area (some legal, some not) are heavily used by the public for hiking, horseback riding, and bird watching.

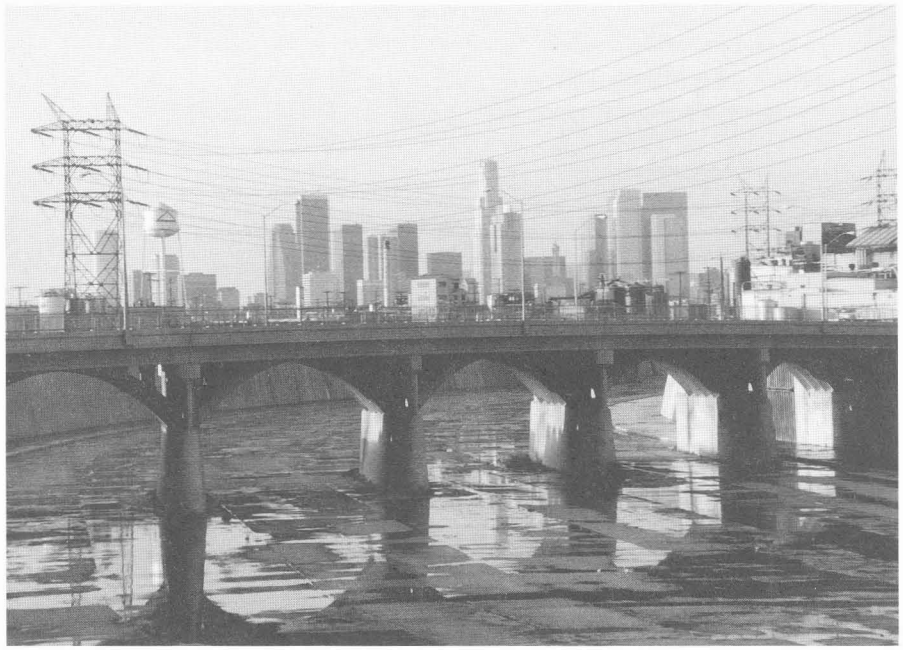
The third soft-bottomed area extends from Willow Street Bridge to San Pedro Bay in Long Beach and is influenced by tidal waters. Accumulated sand bars have been colonized by willows and sycamores and have become feeding grounds for ducks, brown pelicans, a variety of shorebirds, including black-legged stilts, western sandpipers, and American avocets.

But even in the most barren, urbanized sections, bits and pieces of a living river have begun to emerge. Seeds carried by wind and water have established themselves on accumulated sediments and in many areas one finds thick stands of willow, alder, and bulrushes, as well as quite a few exotic landscaping species. Humans have colonized the river as well: homeless people live on the banks in makeshift shanties under freeway bridges. These river inhabitants, primarily immigrants from Mexico and elsewhere, work as day laborers in nearby neighborhoods and use the river in much the same way as people have always used rivers. They catch fish, wash clothes and bathe in the water, and even cook with it and drink it. Some cultivate crops; it is not uncommon to see small vegetable gardens on some of the mid-channel sand bars. Discovering such life along a concrete channel gives one a strong sense that the forces at work in the Los Angeles River are timeless and beyond total human control.

A Built Flood Plain

To look at the greater Los Angeles area today, one would never guess that this sprawling, dense urban area encompassing more than 80 cities with a total population approaching 9 million is spread out over one of the largest river flood plains in the United States. The Los Angeles and San Gabriel rivers together drain the entire Los Angeles Basin south of the San Gabriel Mountains, a watershed of over 1,700 square miles. When Don Gaspár de Portola first arrived in the area in the summer of 1769, the Los Angeles River was a stream meandering down from mountain canyons shaded by sycamores, alders, and cottonwoods to a broad, flat plain scattered with marshes, sloughs, and lakes. The river drained into the sea near what is now Venice Beach, an area that was a vast system of lagoons and freshwater and saltwater marshes (see page 20). Evidence of the wetlands that once existed in the Los Angeles Basin is the prevalence of the place name *La Ciénega*, derived from the Spanish word for marsh, throughout the region.

Southern California's extremely arid Mediterranean climate is characterized by long periods of complete drought, interrupted by short, rainy winters. What little rain there is falls in intense



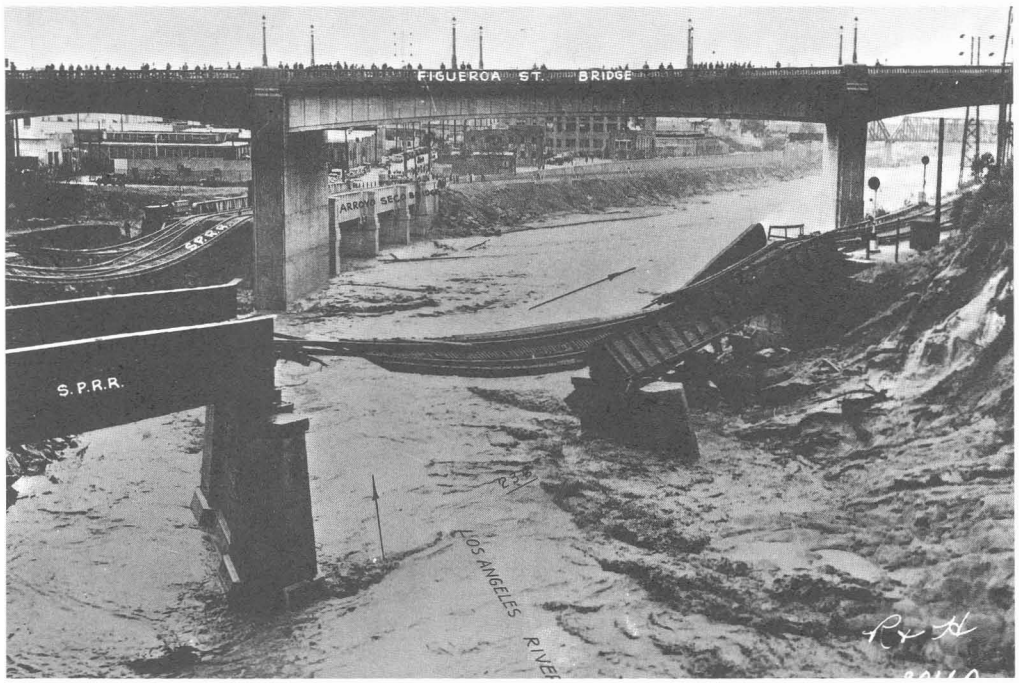
JIM DANZA

Soto Street Bridge, city of Vernon, looking toward downtown Los Angeles.

winter storms that can dump as much as 20 inches of rain in a 24-hour period. These rains fall most heavily in the mountains, pouring down upon parched, steep slopes composed of highly unstable, erosion-prone soils. High-volume flash floods send down vast amounts of water, dirt, sand, gravel, and debris.

Under such conditions, a natural river system meanders over a wide flood plain. During much of the year, little or no water flows above ground, but plentiful groundwater supports a thriving riparian ecosystem. During regular winter storms, water overflows the defined channels and spreads out over the flood plain, sometimes for miles. The spreading of storm waters serves two important purposes: It slows the rate of flow, allowing sediments to be deposited on the flood plain; and it enables water to percolate back into the ground, recharging underground aquifers.

U.S. ARMY CORPS OF ENGINEERS HISTORICAL FILES



The 1938 flood isolated Los Angeles. All roads were closed and all railroad bridges washed out. The mayor went on the air to announce that the sun was still shining, according to Anthony Turhollow, historian for the Los Angeles District of the U.S. Army Corps of Engineers.

Winter storm waters often cut new channels in the flood plain. In a major storm, the kind that occurs once every 100 years, very high volumes of water and debris can erode the channel and remove substantial amounts of existing vegetation, drastically reconfiguring the channel. Thus, this type of river system is in a constant state of flux, continuously tearing itself down and building itself back up; the river's ecosystem is well adapted to this dynamic system.

Human beings coexisted with the river's natural cycles for millennia, taking advantage of the abundant game and vegetation found on the flood plain during the dry months, and moving to higher ground during winter storms. The early Spanish settlers, predominantly farmers and ranchers, adapted their own agricultural practices to the river's pattern of flooding. Indeed, early accounts of these settlers indicate that they considered it more of a boon than a disaster because floods recharged groundwater and surface lakes and enriched the soils of the flood plain.

Floods continued to be a regular part of life in Los Angeles for years but as immigrants from the East Coast began to develop the area more intensely, these floods began to be considered a problem. However, no comprehensive attempts were made to control them until the Los Angeles County Flood Control District was formed in 1915 and began building a system of dams and catchment basins in the mountains. During the years following World War I, the Los Angeles region experienced unprecedented growth. Within ten years, between 1920 and 1930, southern California's population more than doubled. People came from around the country, and large tracts of residential and industrial development sprang up. Money from the motion picture industry and from oil production spurred real estate speculation, which resulted in intense development of the low-lying areas beside the river. Then, in 1934 and again in 1938, came a series of heavy winter storms that caused disastrous flooding in the newly developed areas; areas that, in fact, had always flooded. Now, of course, the low-lying flood plain had been transformed into valuable real estate, and its owners demanded that something be done. The existing system could no longer protect the rapidly growing region from flooding.

Enter the U.S. Army Corps of Engineers and the Great Depression. Congress created the Corps' Mississippi River Commission in 1879 to tame that giant river, but didn't grant it the authority to pursue flood control projects on a national level until the Flood Control Act of

JIM DANZA

Rebar is all that remains of a construction form for a bridge pier extender after an unexpected rainfall.

1936 was passed, giving the Corps jurisdiction over flood control investigation and improvements on all of the nation's waterways. The Los Angeles County Flood Control District had already applied to the federal Works Progress Administration for funding to construct flood control structures. The money was granted and work began in 1936 with more than 15,000 workers hired from Los Angeles County "relief rolls." Over the next 20 years, the county's demand for flood control on the Los Angeles River, the new authority of the Army Corps, and the availability of federal dollars for large public works projects all combined to transform this sprawling, dynamic river system into what we see today. The system was essentially complete in 1954 and is designed to collect and move storm runoff down the channel and into the sea as quickly as possible. This it has done for more than 40 years.

What To Do Now?

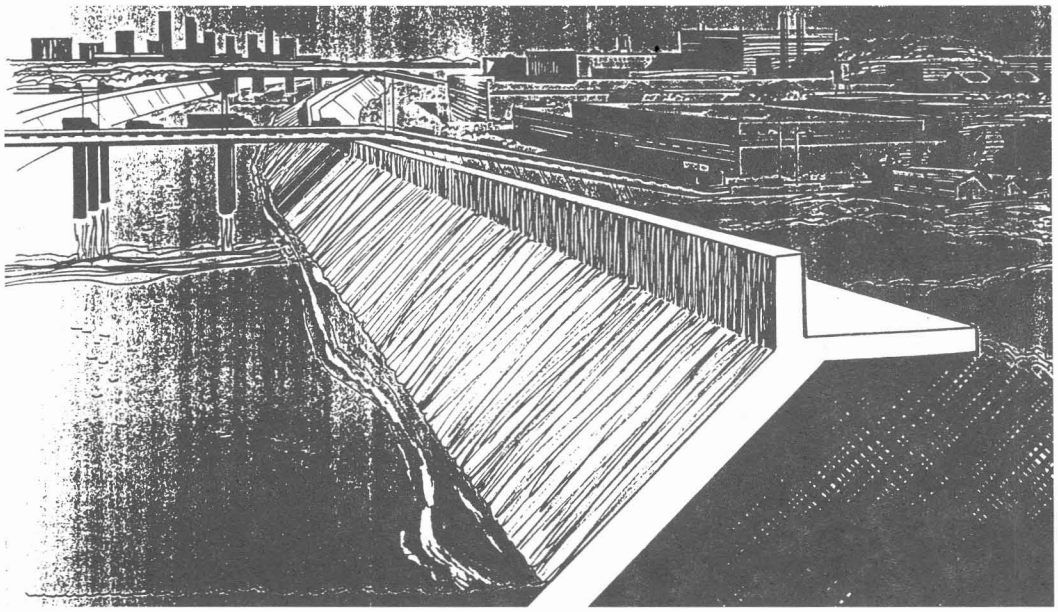
The system's success depends on its managers' ability to do two things: maintain a smooth, debris-free channel and accurately predict the amount of water that will enter the system. Evidence is mounting that both may be impossible as a practical matter. Although the river has been tremendously altered and controlled, the underlying natural processes influencing the system remain; and, as mankind seems to keep learning again and again, nature will out. In an inexorable geologic process, the mountains continue to erode; year after year winter rains wash debris into the river channel. It is impossible to keep the channel free of debris for very long. As the Mississippi River has reminded everyone this summer, nature can still wield a stronger hand than the Corps.

Meanwhile, the ongoing, seemingly endless development of the drainage area has resulted in more and more streets, roofs, parking lots, and other impermeable surfaces, all of which have increased the amount of runoff entering the system, especially during storms. The system is reaching capacity rather sooner than expected and the consensus at the Army Corps and County Public Works is that it will not withstand the 100-year flood. The question is, what to do?

The Army Corps and County Public Works propose to enhance the capacity of the current system by increasing the depth of the river channel in the reach south of the city of Los Angeles. They would do this primarily by constructing parapet walls, ranging in height from one to eight feet, on top of the existing levees. The project would require raising 13 street and railroad bridges as well as utility lines throughout Los Angeles County. The Corps estimates it would cost an estimated $280 million and take about 11 years.

The purpose of the project, the Los Angeles County Drainage Area (LACDA) System Improvement Plan, is to protect the communities in the lower watershed from devastating floods. Some critics contend that the parapets would further separate the river from the sur-

U.S. ARMY CORPS OF ENGINEERS



The county's Public Works Department has proposed to build parapets to increase the river's capacity.

rounding communities and all but eliminate the river's potential as a recreational and environmental resource. City Councilman Mike Woo, a vocal opponent, has called on the City Council to formally oppose the "walling in of the river." (Some critics say the walls would create an even greater flood hazard: the force of water overtopping the levees from a greater height is potentially more dangerous than existing conditions.)

The Army Corps' proposed solution is based on the theory that has driven all major flood control efforts until recently: Put the offending river in a straight, narrow channel and move the water downstream as fast as possible. But problems associated with this approach have begun to be recognized, resulting in a reevaluation of the way rivers are managed (see interviews on pages 28-31). While no one would suggest that the Los Angeles River could ever be returned to its natural state, some dissident engineers and hydrologists believe that flood control can be achieved in better balance with the natural forces at work in the Los Angeles Basin. The techniques they propose include the use of wider, soft-bottomed channels, greater use of flood water detention and spreading basins, stabilization of channel banks with permeable materials, and better management in the upper watershed to reduce runoff. All these techniques have flood control as the primary goal, but also provide maintenance and restoration of wetlands and other natural riverine ecosystems, groundwater recharge, and recreational amenities. Such an approach, however, would require that more land next to the river be used as detention basins and other flood storage facilities rather than for development. Since much of the motivation that has driven the flood control efforts in Los Angeles is the desire to develop as much land as possible, these approaches have been resisted by development interests. These newer approaches are also regarded with skepticism by the Corps and County Public Works because they represent a dramatic shift away from past practices.

Cost is a major factor in implementing the Corps' planned channel capacity expansion. Past practices have maximized developable land, but at tremendous public cost. Half the cost of the proposed improvements will be paid by the federal government but the rest must come from state or local sources. In all likelihood, the local share will be funded from County Flood Control District assessments. The implementation of alternative approaches would result in less development next to the river but may prove to be less expensive in the long run, due to lower maintenance costs. Which approach prevails will depend in large part on the relative power of various stakehold-

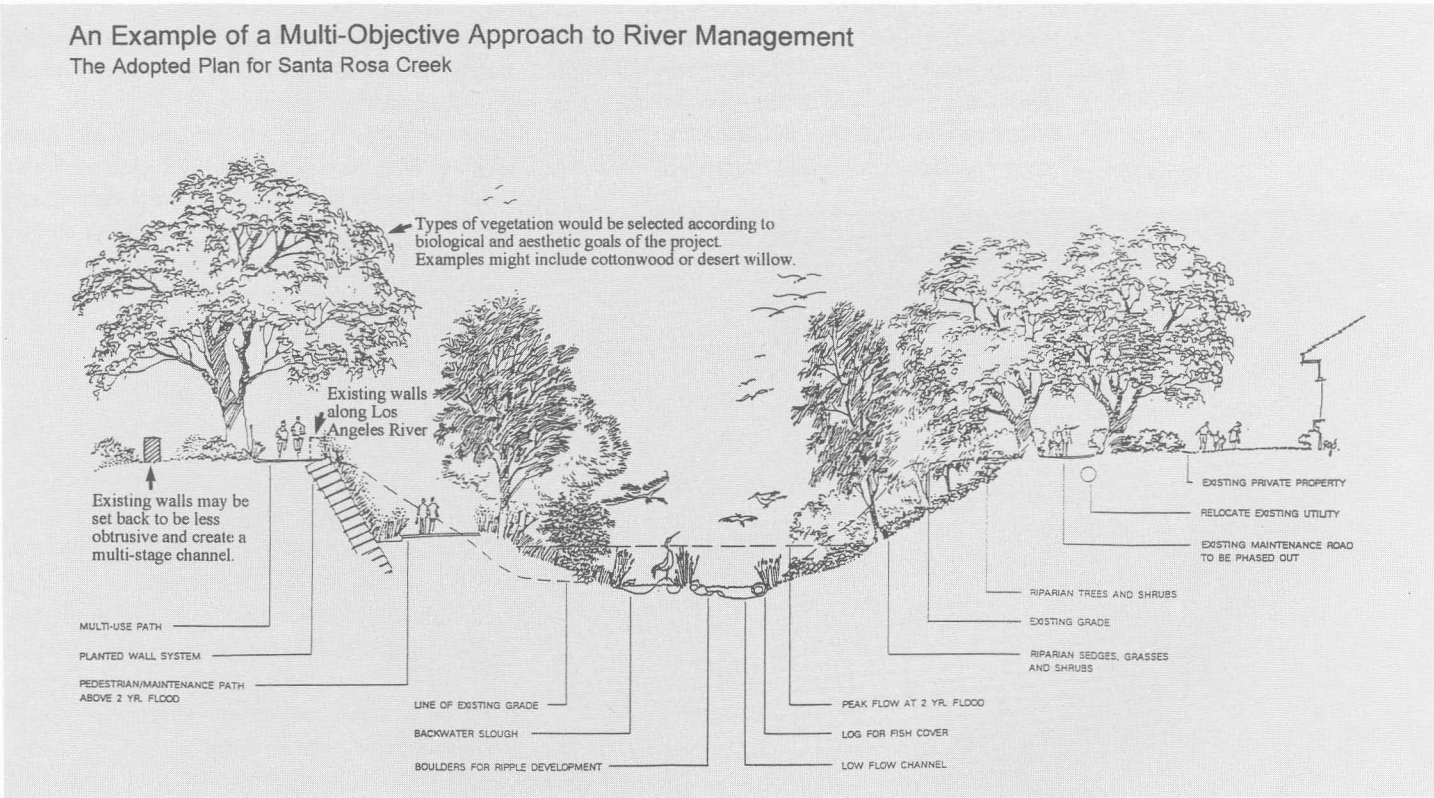
ers. Historically, development interests have had the most say in questions of land use and economics in Los Angeles. But other voices are beginning to be heard.

The city and county of Los Angeles have less per capita park acreage than any other major metropolitan area in the United States. The severe lack of parks and recreation facilities in most communities is being exacerbated by the region's increasing population. As newcomers continue to pour into the area, the pressure on such facilities grows, as does the need to ameliorate the problems of increased air pollution and traffic congestion. Enhancement of the Los Angeles River as a recreational and environmental resource could help to meet these needs, and this potential is being recognized by local politicians, community activists, and environmentalists.

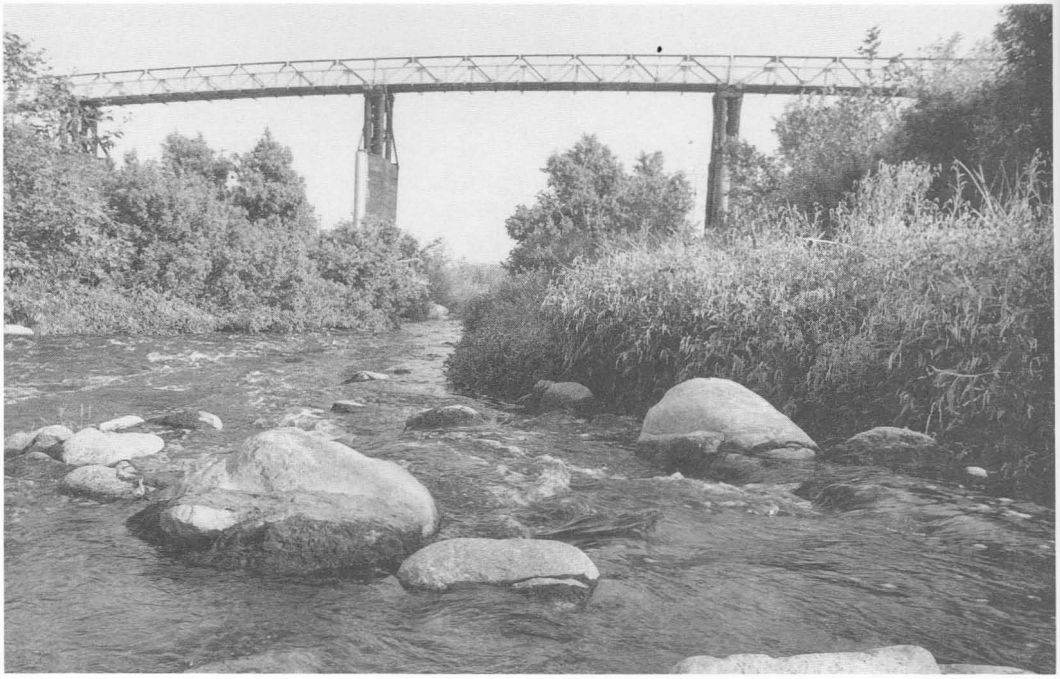
In 1987 a group of artists and environmentalists founded the Friends of the Los Angeles River, an organization dedicated to the restoration of the river. Starting with a fence-cutting event in the river channel, the group has grown into an established nonprofit organization with a full-time director, a technical advisory board, a monthly newsletter, and a mailing list of over 1,600. The Friends have shared their vision by sponsoring several river cleanup events, taking local politicians on tours of the more natural parts of the river, and initiating other lobbying efforts.

When he was re-elected in 1989, Mayor Tom Bradley announced that a major goal of his administration would be the "greening" of the Los Angeles River. In 1990 he appointed the Los Angeles River Task Force to reverse the years of "neglect and disregard" and to "articulate a vision for the future of the river." The Task Force's 1992 report recommended the creation of a master plan for the entire river and proposed three demonstration projects to enhance the river within the city of Los Angeles: environmental enhancement of the river in Sepulveda Basin to create a more natural setting; creation of a "greenway," a lushly landscaped bicycle and pedestrian path, along the river near Griffith Park; and a downtown "Bridge Event" to celebrate the river's history and its connection to the city.

Hydrologist Peter Goodwin favors an alternative approach.



PHILIP WILLIAMS & ASSOCIATES



Believe it or not, these three scenes are views of the Los Angeles River, as seen by photographer Ford Lowcock.

Also in 1990, at the initiative of State Senator Art Torres, the legislature requested the State Coastal Conservancy to assist in the mounting efforts to examine the potential beneficial uses of the Los Angeles River. The first phase of the Conservancy's effort has just been completed and consists of a *Los Angeles River Park and Recreation Study,* which identifies projects that could be carried out in the near-term along the river corridor. The second phase will consist of an analysis of the major issues, opportunities, and constraints involved in a large-scale restoration of the river corridor. This study is being carried out by the American Institute of Architects and is still in progress.

Other studies that view the river as more than a flood control channel have been recently completed or are in progress.

At the request of County Supervisor Gloria Molina, who represents many of the downriver neighborhoods most in need of recreation and open space, the County Department of Public Works is preparing a master plan for the river to explore its potential as a recreational amenity while maintaining the primary function of flood protection. The plan will include input from the 13 cities adjacent to the river, as well as citizens' groups and representatives from state and federal agencies.

The Department of Water Resources, at the initiative of state Senator David Roberti, funded a biological survey of the Los Angeles River. It was carried out for the Department of Fish and Game by the Natural History Museum of Los Angeles County. The report consists primarily of a series of comprehensive inventories of the plant and animal species currently found in or around the Los Angeles River.

Attention has also been focused on Taylor

Yard, a key riverfront parcel. This 241-acre railroad maintenance facility is the largest undeveloped parcel near downtown Los Angeles and is being offered for sale by the owner, Southern Pacific Railroad. The site's proximity to downtown, Elysian Park, several densely populated neighborhoods, and the junction of the Glendale, Pasadena, and Golden State freeways, as well as its frontage on the Los Angeles River, make it of particular interest to planners, developers, and elected officials.

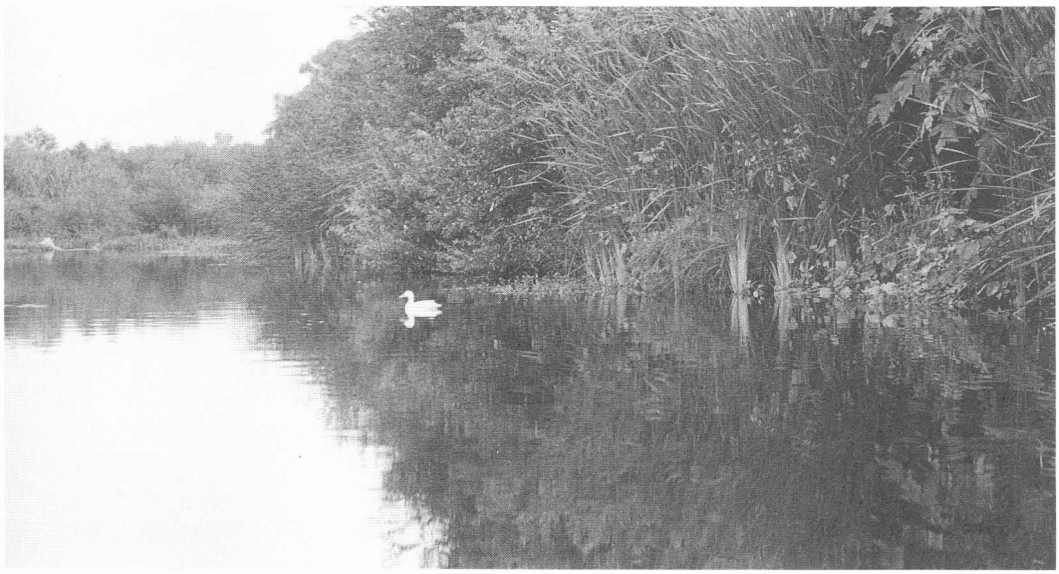
In 1992, at the request of City Councilman Mike Hernandez, the American Institute of Architects, the American Planning Association, the American Society of Landscape Architects, and other professional organizations sponsored a planning workshop to study alternative uses for Taylor Yard. The resulting report generally recommends the development of the Los Angeles River frontage as an intensive recreation-oriented corridor, containing bike, pedestrian, and/or equestrian paths, nature-study areas and other amenities, as well as extensive landscaping. The workshop outlined two general scenarios for land use and development: a mix of uses, including housing and community-serving retail; or the development of "big box" discount retail and large-scale industrial uses.

Another study of Taylor Yard is underway, funded by the Department of Water Resources and sponsored by the Los Angeles County Department of Public Works and the Friends of the Los Angeles River. It will explore the feasibility of developing a flood water detention basin in Taylor Yard. Such use of Taylor Yard could potentially provide flood protection for downtown Los Angeles, as well as providing park land and riparian habitat. Completion of the study is expected in September.

What does the future hold for the Los Angeles River? The answer depends in large part on the resolution of several issues. Whether or not the Corps' parapet walls go up is contingent on the county finding a funding source for its share of the costs. The continued viability of proposals to restore the river depends on support from local political leaders and other key decision-makers. Recent events on the Mississippi River may build public support for traditional solutions to flood hazards. On the other hand, this summer's disaster may have demonstrated the futility of human attempts to completely master such powerful natural forces.

One thing seems certain, however, the people of Los Angeles can no longer afford to ignore their formidable river. For better or worse, ways must be found to coexist with the natural forces at work in the Los Angeles Basin. ■

Prentiss Williams is a project manager for the State Coastal Conservancy. She and Christopher Kroll, also a Conservancy project manager, recently completed the Los Angeles River Park and Recreation Study. *Kroll contributed to this article.*



History: The Way It Was

MICHAEL JOSSELYN & SARAH CHAMBERLAIN

SEAVER CENTER FOR WESTERN HISTORY RESEARCH, NATURAL HISTORY MUSEUM OF L.A.

Los Angeles River near downtown Los Angeles (undated).

MUCH OF WHAT IS NOW THE CITY of Los Angeles was a vast rolling plain of native grassland scattered with oak trees when Portola's expedition arrived in 1769. In low-lying areas between hills and bluffs, rivers meandered through broad valleys on their way to the sea. Within these valleys stood riparian forests of sycamore, cottonwood, and alder interspersed with marshes, ponds, lakes, and impenetrable thickets of willow, wild grape, and brambles. The highest points of land were the peaks of the Baldwin and Palos Verdes hills. Chaparral covered the north-facing slopes of these peaks, while oak savannah blanketed the drier south-facing slopes. Coastal areas were a mixture of sand dunes, sage brush scrub, freshwater and saltwater marshes, and lagoons.

Four major river systems drained the basin: the Spanish named them *Porciúncula* (now the Los Angeles), San Gabriel, Rio Hondo, and the Santa Ana rivers. Each flowed through extensive flood plain wetlands. There were also several smaller perennial streams, of which Ballona Creek was the most important. The Los Angeles River meandered through extensive swamp forests, marshes, and lakes between the Baldwin and Beverly hills before entering Santa Monica Bay. Wetlands extended on level terrain

between present-day La Brea and La Cienega boulevards, and three large sloughs were on the eastern end of the Palos Verdes Peninsula. A long swale of marshes, pools, and lakes near present-day Wilmington ran between today's Sepulveda and Lomita boulevards, east of Vermont Avenue and west of Figueroa Street. Water from the swale overflowed into a slough, now named Harbor or Machado Lake and part of Harbor Regional Park. Another slough covered what is now Victoria Park and the Dominguez Golf Course in the city of Torrance.

A chain of wetlands extended from the Los Angeles River to San Pedro Bay, and a large lake, surrounded by wetlands, was near the present-day neighborhood of Bell. Springs and seeps were common along the base of Beverly Hills, discharging both water and mineral pitch. Native Americans used the tar from these springs to waterproof boats long before the arrival of the Spanish. The notes of Father Crespi during the Portola expedition provide the first written record of large marshes out of which boiled and bubbled a pitch-like substance. Geothermal springs also formed large marshes. Perhaps the most famous was Bimini Slough, which spread across an area bounded by Berendo Street to the north, Virgil Street to the south, 1st Street to the east, and 6th Street to the west.

The Portola expedition discovered two springs in the hills above present-day Santa Monica, near the Soldiers Home in Sawtelle, and settlers named them *San Vicente.* Because the flowing waters reminded them of the tears Monica wept for her wayward son Augustine, they named the town below the springs after her. Springs also marked the boundary between Rancho Sausal Redondo and Rancho Aquaje de la Centinela (Sentinel Springs) in present-day Inglewood. Today these springs are beneath Centinela Park, marked by a commemorative drinking fountain.

In winter, streams swollen with rain turned the lowlands into an inland sea from present-day Culver City to the ocean. The Kumi vit natives (usually referred to as *Gabrielinos*, the name used by the Spanish) called one frequently flooded area, now part of west Los Angeles, *pwinukipar*, meaning "it is full of water."

In the winter of 1824-25, storms changed the course of the Los Angeles River dramatically, sending its waters south to carve a new channel, which became a tributary of the San Gabriel River. In 1867, intense flooding sent the San Gabriel main channel south into Alamitos Bay. Still referred to on early maps as the Old San Gabriel River, its old channel became the new channel of the Los Angeles River. Today's San Gabriel was channelized in the early 1900s at its present location.

A Popular Place for Eons

Human remains discovered in West Los Angeles and in Orange County to the south indicated that the coastal plain of southern California may have been inhabited as early as 50,000 B.C. The earliest known people were Hokan-speaking Native Americans who were here at least 9,000 years ago. They were displaced by the Kumi vit about 1,500 years ago, who by 1769 had 40 to 50 permanent villages in the Los Angeles basin and on Santa Catalina Island. Their territory extended north to Topanga (Topanga is a Kuma vit name) Canyon, east to the Santa Susana, San Gabriel, and San Bernardino mountain ranges, and south to Aliso Creek near San Juan Capistrano. The closely related Fernandeno Indians lived in the upper reaches of the Los Angeles River, while the Chumash, descendants of the Hokan, were in coastal areas from Malibu north to Ventura and Santa Barbara counties.

Kumi vit villages were on high bluffs overlooking rivers, small pools, and swamps, as well as on the coast at today's Santa Monica (*Kuruvangna*), Culver City (*Sa'angna*), and Redondo Beach (*Engnovangna*). The Chumash had villages at present-day Malibu (*Maliwu*) and inland near present-day Thousand Oaks.

Village names reflect the historical extent and importance of wetlands to the native people. *Yang-na* ("place of the salty earth") stood on a high bluff above the Los Angeles River. The name probably refers to the alkaline deposits left behind when the river overflowed its banks. *Sa' angna* and *Masaungna* on the Palos Verdes Peninsula both mean "place of the rushes." These Kumi vit villages stood near a chain of marshy lakes and pools (*Cañada de Palos Verdes*) that overflowed into today's Machado or Har-

The valleys and the low curving hills of what is now Inglewood lay southwest of pueblo boundaries but they were richly grassed, the soil was black, and in some of the cañadas water was abundant. Viewed from the Baldwin Hills, it was an undulating expanse of land, neutral in color, stretching seaward to the sand bluffs back of the present Playa del Rey, El Segundo, and Manhattan Beach. Through it ran the Cañada del Centinela, its stream fed by perpetual springs of water . . . Since prehistoric days the springs had been a watering place for animals.

W.W. ROBINSON

bor Lake. The Kumi vit village of *Engnovangna* near present-day Redondo Beach means "place of the salt" and refers to salt pools, which were frequented by inland villages.

Spanish Colonization

In 1769 the Portola expedition initiated Spanish occupation of California and established missions as essential components of colonization. The mission served not only as a religious force but also to organize, control, and train native peoples to produce food and materials for the colonists.

Establishment of the first mission in the Los Angeles region had a profound effect on the surrounding landscape. Mission San Gabriel was built in an oak forest, next to a marsh and pond. The stream that flowed into a pond was deepened to supply water for a mill south of the church building. The oak forest was cleared to plant vineyards, and marshy thickets were replaced by a garden and croplands. A pond and marsh between present-day La Presa Avenue and San Gabriel Boulevard north of Huntington Boulevard was dammed and deepened for irrigation. The combination of rich croplands and native labor made the Mission San Gabriel the most productive mission in southern California. Overcultivation, however, soon turned the rich black flood plain into a barren wash of sand and gravel.

In 1781, the pueblo of Los Angeles was founded by skilled laborers and artisans and their families recruited to settle the Los Angeles frontier. Their first settlement was on the site of *Yang-na*, the Kumi vit village overlooking the Los Angeles River. What began as little more than a cluster of tule huts covered with dried mud grew by 1784 into a village with adobe houses, a public building, and a chapel. Los Angeles City Hall now occupies this site.

In 1784, land surrounding the village was granted to several soldiers who had served at the presidio of San Diego, ushering in the period of large-scale ranching and agriculture. A network of ditches was dug to supply drinking and irrigation water to the village and later to the ranchos. Flood waters soon deepened these ditches and in time they eroded, cutting jagged washes through the land. The system drained both marshes and swamp forests. A ditch constructed during the Civil War to supply water to Drum Barracks at Wilmington drained the extensive marshes, ponds, and lakes to the *Cañada de Palos Verdes*.

The natural landscape is reflected in some early Spanish place names. The name *ciénega*, which in the Spanish of the time meant swamp, occurs frequently in early descriptions of Los Angeles. Maps of Los Angeles in the late 1800s show both a *Rancho Las Ciénegas* and a *Rancho Ciénega O Pasa De La Tijera* northeast of the Baldwin Hills. The name *Ballona*, which probably was the precursor of the Spanish word for bay, *bahia*, was given to both *La Ballona* Creek and to *Rancho La Ballona*. Where Beverly Hills is today was the *Rancho Rodeo de las Aquas* or "Ranch of the Meeting of the Waters," referring to the streams that flowed down Coldwater and Benedict canyons, inundating the lowlands in winter and creating *Las Ciénegas*. The salt pools of Redondo were *Las Salinas*. Along the coast south of *Rancho La Ballona* lay *Rancho Sausal Redondo* or "Ranch of the Round Clump of Willows."

By the mid-1800s, most of the ranchos were deeply in debt, the demand and price for southern California beef fell, and land ownership was in question. A series of droughts in the early 1860s brought hardship from which the ranchos did not recover. By the late 1860s, U.S. citizens had purchased most of the ranchos from Mexican citizens or from Native Americans who were given land by the Mexicans. The land was divided and sold, usually at ridiculously low prices.

While agriculture first subdued the natural grasslands and wet meadows of Los Angeles Basin, residential development was soon to replace vegetation with steel and concrete.

Post-Civil War Development

In the post-Civil War period, successive waves of development came to the Santa Monica Bay watershed—agriculture, flood control, port development, and residential and industrial expansion. As human ingenuity and engineering capabilities increased, wetlands were rapidly removed from the landscape.

In 1914 a major flood caused $10 million in damage (approximately $470 million in 1990 dollars), stimulating the formation of the Los Angeles County Flood Control District in 1915. Reservoirs, debris basins, and channel improvements were constructed to retain and control flood waters. But flood events continued as the construction of facilities failed to keep pace with development. In 1938, a flood caused $45 million in damage ($800 million in 1990 dollars) and 113 lives were lost. In 1936, Congress approved the Flood Control Act and authorized the construction of five major flood control basins, debris basins at the mouths of 31 tributary channels, and improvement of 93 miles of

main channel and 147 miles of tributary channels. In 1937, the authorization was expanded to include Ballona Creek. With the completion of these facilities after World War II, riparian and flood plain wetlands within Los Angeles Basin were practically eliminated.

Numerous small booms in real estate (followed by busts) occurred after the Civil War. The "Boom of the Eighties" has been referred to as the grandest of real estate booms. Population growth was largely attributable to the arrival of the railroad from the east. Real estate agents were everywhere and lands platted, sold, and resold. Wetlands and riparian areas were typically used for towns as many of the alluvial plains provided good agricultural lands:

Azusa began as a typical boom town on the Santa Fe line. Although Jonathan S. Saluson owned 4,000 acres of the old Rancho Azusa, much of it good agricultural land, he platted the town "where it was practically all sand, gravel, and boulder wash." When somebody asked him why he placed it at that particular spot, he remarked, "If it's not good for a town, it isn't good for anything!" (R. Nadeau, 1960)

Venice, Playa del Rey, and other coastal areas were being developed at the beginning of the 20th century. The construction of electric trolley cars brought people to enjoy the clear air and clean ocean waters. Venice was built in 1905 by Abbot Kinney who bought 160 acres of sand and marsh to create an "American Venice," complete with canals, gondolas, and Italian architecture.

In 1920, the city of Los Angeles had a population of 575,000. Today nearly 18 million people live in the Los Angeles region. They drive and work over a landscape that was once rich with streams, lakes, and marshes, with riparian forests and native grasslands.

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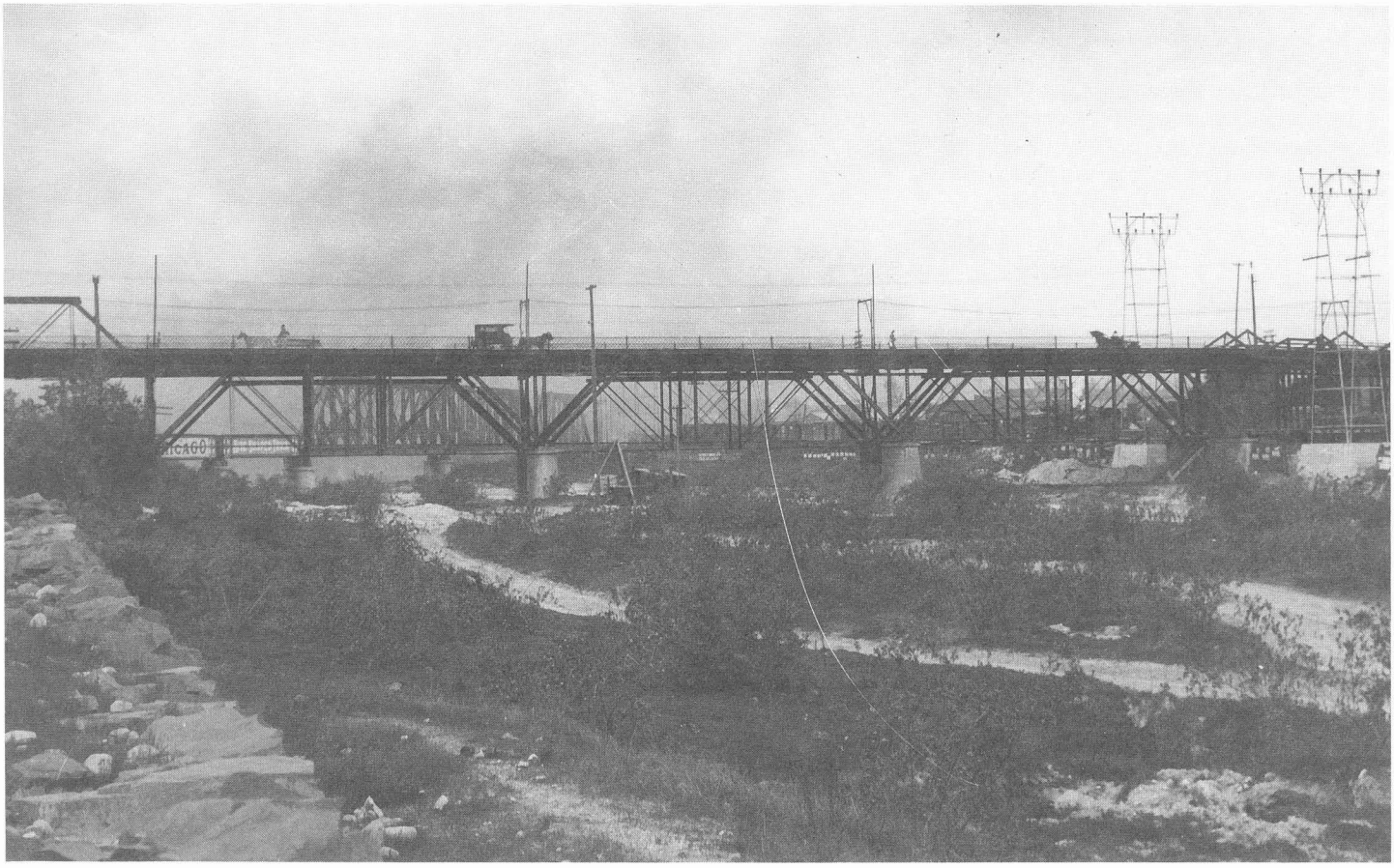
Los Angeles River channel near downtown Los Angeles, circa 1910.



SEAVER CENTER FOR WESTERN HISTORY RESEARCH, NATURAL HISTORY MUSEUM OF L.A.

Worried L.A. River Managers: Control It

FROM HIS OFFICE on the top floor of the huge silvery cube that houses the Los Angeles County Department of Public Works, Deputy Director Carl Blum has an expansive view of the San Gabriel Mountains and the densely populated Los Angeles River flood plain. He is acutely aware—especially when it rains—that much of the landscape below would be inundated, were it not for the superbly engineered flood control system his department manages together with the U.S. Army Corps of Engineers. In 30 years he has learned much that there is to know about this system, and he understands that it may no longer suffice to hold back the kind of flood that comes once in 100 years—and so does Diego Cadena, the department's project manager for the Los Angeles River.

CARL BLUM: The drainage system is very efficient and protects the people very well. That's what it was built to do. The Los Angeles River is one of the major trunk systems—we have the San Gabriel River about ten miles to the east—and these systems, with a series of dams up in the mountains, control the flows. But in 1980 we had water on top of the levees in the lower Los Angeles River, near Long Beach—and on all calculations, for the size of the storm we had, that should not have happened.

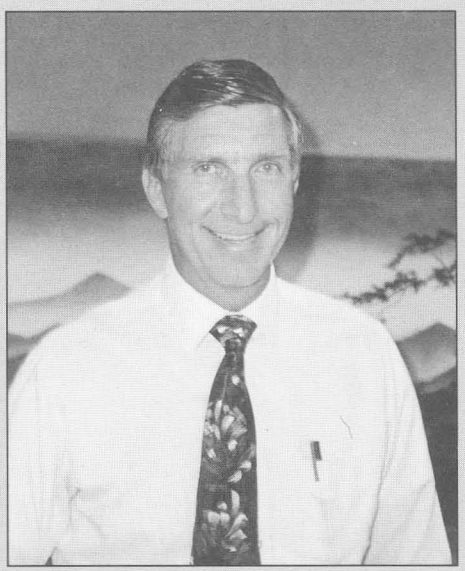
C&O: *Because of development in the watershed?*

CB: Development in the Los Angeles area. We're getting more runoff than we anticipated. So we realized this thing does not seem to be big enough, and we asked the Corps of Engineers to take another look. The river was built in the 1940s and '50s; it was designed in the '30s. The design assumptions were made way back when they thought there would be a lot more agriculture, orange groves still out there. And they are not out there.

So the Corps came back and said: The lower river needs to be upsized. We need more capacity there. The levees are above ground, if the water goes out of the levees, away it goes; there is really no way for it to get back into the river.

I have seen the river at its fiercest, and it is absolutely scary and awesome. It is a roaring river, and I've seen it go right up to the top of the banks. I've seen people get killed (though not personally) and I've seen it like today, when you're sitting here and saying: "Gee, what else can we do with the river?" This being a desert climate, many people today don't realize how much water comes down.

C&O: *Your plan, with the parapets and the raising of roads and bridges—it sounds as though you'll be rebuilding Los Angeles.*



Carl Blum

CB: We can't afford not to. Think of the alternatives. To put a large part of Lakewood, Long Beach—I think there are 11 cities—under water would be highly unacceptable. The Friends of the Los Angeles River are saying: Let's have a more natural river. So we took a look at what else can be done. There are conflicts. Some say: Let's make the river more usable. But then some are saying it's too dangerous. Some say: Plant trees in there: But that would mean the river would go over the banks sooner. We are trying to identify other compatible uses of the river. Most of the controversy came up after seven years of drought. But we know, historically, there are wet periods and dry periods. Almost every time we get rains, someone gets killed in the river.

DIEGO CADENA STANDS on the levee at the confluence of the Los Angeles and Rio Hondo channels. They are part of the Los Angeles County flood control system with open channels that extend for a total of 470 miles, the distance between Sacramento and San Diego. More than 2,000 underground storm drains feed into the system, which empties into the ocean with the Los Angeles and San Gabriel rivers. From the levee we look down and across a trapezoidal concrete channel of vast dimensions. It's some 400 feet to the top of the other levee—a third more than the length of a football field. The walls slope at a 25 degree angle and they are smooth. Were one to trip and fall on the levee-top path, there would be nothing to grab to break the slide to the bottom. At the moment, most of the riverbed is dry. Water flows only in the low-flow channel, and it's mostly discharge from two sewage treatment plants. A maintenance truck passes below, small as a toy from up here. It's hard to imagine that this immense channel would ever fill with storm water; and that even a little bit of rain can mean mortal danger.

C&O: *Couldn't you put some Astroturf in there to make a soccer field for the summer, roll it up in the winter?*

DIEGO CADENA: It's an idea. The problem is, we had a storm last Saturday, totally unexpected, and we lost one guy. He was doing some seismic retrofit on one of the bridges and went out there to remove some equipment. He got caught and washed out. The rain was only a little more than an inch and I heard that the water was only a foot deep. But he was swept downstream a couple of miles. (This was July, way past the rainy season.) And then sometimes we have releases from dams.

Because so many people are oblivious of the ever-present danger, the department, together with the Los Angles County Office of Education, has produced a safety education film, titled No Way Out. *Made for use in schools and elsewhere, it shows what can happen—what, indeed, has happened—and is utterly*

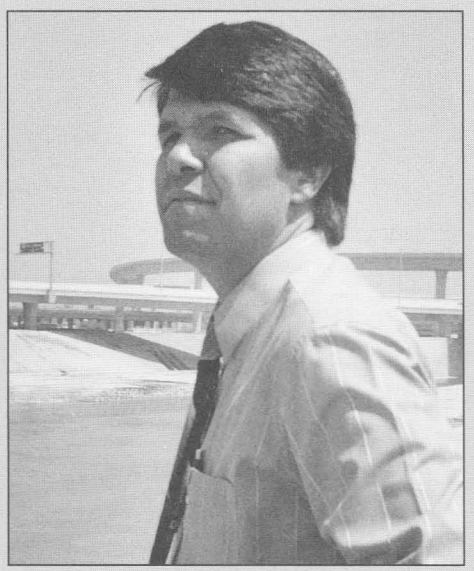
terrifying. A 15-year-old boy has been caught in the flooding Rubio Wash and is being swept down the main river channel. The current is constant and relentless, moving at 25-45 miles per hour, at the same velocity bank to bank. A rescuer manages to grab him, almost has him out, but the water's pull is too great, neither victim nor rescuer can hold on long enough. Only because there is a rope around his body is the rescuer saved from the same fate as the boy. The channel has been designed to move the water as quickly as possible, and everything with it. From the smooth banks, others call to the boy, reach out in vain, throw ropes in vain, as he is carried toward Long Beach and finally lost under sediment, invisible to rescuers in the helicopter just above. "Once you get in," warns the film, "you can't get out."

In dry weather, the more natural-looking sections of the river may be appealing, but to take a canoe into them is to court deadly peril. Hundreds of low-head dams (three-foot-high concrete walls across the channels) look innocuous but are known to rescue crews as "drowning machines." As the water pours over them it pulls down anything that floats and keeps it down. The effect is that of being knocked over by a wave and then being held down. Yet people keep ignoring the dangers. To Cadena, as to Blum, it is apparent that anyone opposed to the plan to build parapets on the levees is oblivious of the fact that the river can be a killer.

DC: From here to Long Beach is about 12 miles. The parapet would be 11 miles on the Los Angeles River; 7.5 on the Rio Hondo channel. The walls would be up to eight feet high, but 60 percent of the distance they would be four feet or less. Where we have it higher than four feet, we would raise the levee. Where bicyclists will be riding [on the levee] the difference in elevation will be four feet.

C&O: *It's hard to imagine wanting to look at this river view.*

DC: Some people say, put trees in here. But if you do, the hydraulics won't work. Water would have less area to go through. Think of a freeway: If you put up an obstruction, traffic starts backing up and pretty soon you're not going anywhere. Or say you stick your finger in a hose: You have more pressure; water starts going over the top. If you remove the smoothness of the concrete, the channel would not be able to carry as much water.



Diego Cadena

C&O: *Could something be done upstream to hold back the water, so you would not need higher walls here?*

DC: There's not much open space left in Los Angeles. The Corps of Engineers found that if something like 30,000 acre feet could be stored upstream, you would not have to build the walls. In what's left in Taylor Yard—probably the largest open space left in Los Angeles County—you would be lucky to store 1,700 acre feet. There's talk of doing it in small lots. But how do you enforce that, and how do you maintain such facilities? There are other ideas. Someone says reforestation can reduce runoff by 10 percent. But that's in the beginning of the storm. The first day you probably don't get too much runoff—but in the fourth day the trees have all they can take. The mountains hold about 30 percent of the watershed. If you take 10 percent of that, you reduce the flow only 3 percent.

We drive on the levee road, passing modest neighborhoods, trailer parks, a horse stable.

DC: If these levees were to fail, all these people would be under water.

Moving downstream, we have arrived in Long Beach, at the Willow Street Bridge. Here concrete meets soft bottom and tidal action begins. Because of high groundwater levels and the influence of the ocean, the bottom has been left unpaved. Willows and other bushes grow on sediment banks, draped with debris left by storm water. A cluster of 17 shopping carts forms a barrier in the middle of the river. Behind it, sand has accumulated and some black-necked stilts and other shorebirds are foraging. The rough banks and sand bars are littered with debris, especially yellow motor oil cans, disposable cups, and a surprising number of green tennis balls.

DC: That's one of our problems—debris; especially oil containers and Styrofoam cups. They could have come from miles away. We have to get people to realize that whatever they dump in the street gets into the catch basin and eventually into the river. Eventually a lot of it ends up on the beach in Long Beach.

Last stop is upstream, below the Los Feliz Boulevard Bridge and opposite Taylor Yard. This is another stretch where the flood control channel looks a bit more like a living river, with lots of vegetation along the banks, and a soft channel.

DC: Normally, when it floods, the vegetation washes away. We had seven years of drought, without any major floods, and it grew. There are opportunities for bikeways here. Personally, I'd like to see a bikeway from Long Beach to Sepulveda Basin and maybe farther upstream, so people can go 50 miles without ever having to go on a street. We already have the bottom 12 miles built and are working on another seven.

What we're looking at here is a retrofit. It's not like we can start from scratch. On the Santa Clara River, now that's different. It's an ideal situation: you're coming in on the ground floor and you can plan new development, recreation, and still preserve the river, without having to go back and fix something. You can have a river that's different from this one.

Friends of the L.A. River: Improve It

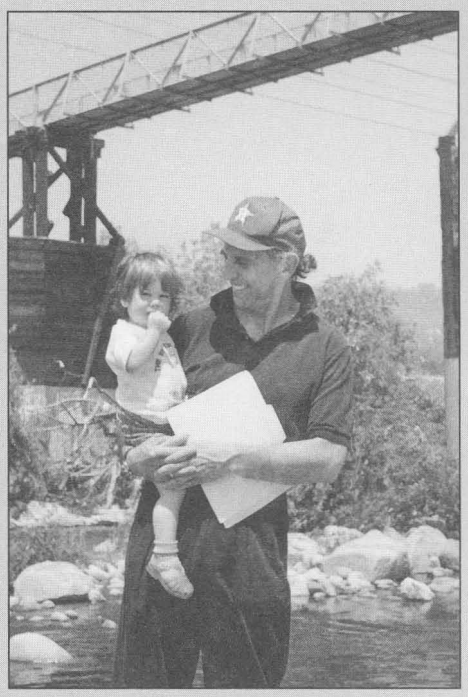
AT FIRST, WHEN Lewis MacAdams would speak about the Friends of the Los Angeles River, people would remind themselves that he was a poet. For surely any idea of restoring this mammoth concrete flood control channel into any semblance of its former self as a river was beyond the bounds of the possible. MacAdams had launched the idea as a performance piece with a few other artists and visionaries in 1986, and he talked of it as a "40-year artwork." Now, however, seven years later, the Friends has matured into a full-fledged citizens organization with a voice in Los Angeles basin politics.

On a bright July morning, MacAdams takes his little daughter and Coast & Ocean *on a riverside stroll near Griffith Park, just below Los Feliz Boulevard Bridge. Here the Los Angeles River actually looks and acts like a river. It eddies around boulders and sweeps around willows. On the levee that separates it from the Atwater neighborhood, native grapevines spill over a fence. Below, beside the water, one almost has the illusion of being in a rural place, as traffic noise disappears, yielding to sounds of birds, wind in the willows, and the cheerful noises of flowing water.*

C&O: *Why did you choose to bring us here?*
LEWIS MACADAMS: To point out the best-kept secret in Los Angeles—how nice this river is. We're 50 to 100 yards from the Golden State Freeway, and—except for the immense amount of garbage that is flushed into the river by storm drains—this is a place of actual beauty in the city. It's like this for about nine miles. Consider now: We're walking along the only river in Los Angeles on this incredibly beautiful day, there's nobody here but us, but we're trespassing. The penalty can be six months in jail, and a $500 fine.

C&O: *There's quite a bit of water here. How much of the year is it like this?*
LM: All the time, though it's a bit higher now than usual because of the recent rains. But 90 percent of the water—maybe 80 percent at this time—is reclaimed sewage, and that comes year-round.

C&O: *Aren't you concerned, with a small child?*
LM: I wouldn't want her drinking it, and I wouldn't want people to be here during the rainy season because it's too dangerous then, but I have no problem with it. We do canoe trips here all the time. The real problem is after the rains, when the storm drains flush into the river and it turns into a toxic swill.



Lewis MacAdams and his daughter

C&O: *Do you envision the entire river changing to something like what we see here?*
LM: You can't lose the levees: The city is built up too close to the river. But we're saying you don't have to have all that concrete. It will take time.

C&O: *People at Public Works believe it's too late to change course on this river, that the die was cast 50 years ago.*
LM: I think they don't know, and that I don't either. We haven't seen a proper study of the hydrology of the Los Angeles River. One reason we want to stop the LACDA project is to do such a study.

C&O: *In the meantime, if you have a flood. . . ?*
LM: This was the third most rainy year in the history of Los Angeles and the river was nowhere near the top. I will admit there is a hazard. But we're talking about a project that will cut off the lower river from human involvement for the next 50 years. According to the environmental impact statement, it will cost the county $380 million which the county doesn't have and is not going to get because the state is taking away money it needs to pay for just about everything else.

The [U.S. Army] Corps and the county have justified this project very simply. They estimated how much property damage there would be in a 100-year flood. But they didn't take into account the value of the water, or the effect on water quality. In last February's flood we lost a year's supply of water, it went down to the ocean. The future of the water supply is critically important, and all this project does is make the river more efficient in getting rid of the water. I think that's a grotesque misuse of public funds.

It also doesn't do anything for water quality or coastal improvement. The river is already the largest source of fresh water and pollution on the southern California coast, and this will make it a more efficient vehicle for despoiling the coast—while at the same time taking public money that could be used to clean up the river.

C&O: *When this flood control system was designed and built, the river was perceived as a menace to human settlements, a beast that had to be caged. If you release a wild animal that's been caged, it could be even more dangerous. No?*
LM: To claim the Los Angeles River has to be a wild river is absurd. You won't see the river be "natural." That sense of the wild animal in a cage is accurate. But you can work with it instead of against it. We see this as a battle over the definition of the river, and of what the river is going to be. Is it a storm drain, a flood control channel, or is it a river? All that public money is going to degrade the river further, to continue years of misuse. It's not going to do anything to improve the lives of the people along the river, to improve the river, to improve the coast. The walls will make these communities that much more separated, that much more afraid of

the river, and make the river that much more of a threat.

William Carlos Williams said, "A new world is a new mind." People had to be turned on to the fact that there is a river in Los Angeles. I think we have accomplished that.

C&O: *Do you come down here yourself to recreate?*

LM: Yes, I jog on the river, and I'm always taking people down. Now more and more scientists are involved. We're working with school groups, science teachers, people in communities along the river. We had a river cleanup at Elysian Valley, and 300 people from the neighborhood came down, mostly teenagers. It was really inspiring. We hire high school bands to play for people doing the cleanup, marching up and down the levees. And we had folklorica groups dancing on the levees.

Very few people use the river now. Those who do are mostly Spanish-speaking and of low income. Fewer and fewer people have cars; more and more have to rely on public transportation, and there's no place for them to go. No parks.

C&O: *It seems that many of those who find the river are young. They bicycle on the levee and below, skateboard, paint cat faces on the covers of storm drains, and less charming graffiti under bridges and on the levee walls.*

LM: If the parapet walls get built there will be some 20 miles of vertical walls for graffiti. The downstream neighborhoods get the walls; upstream the better-off neighborhoods have the parks.

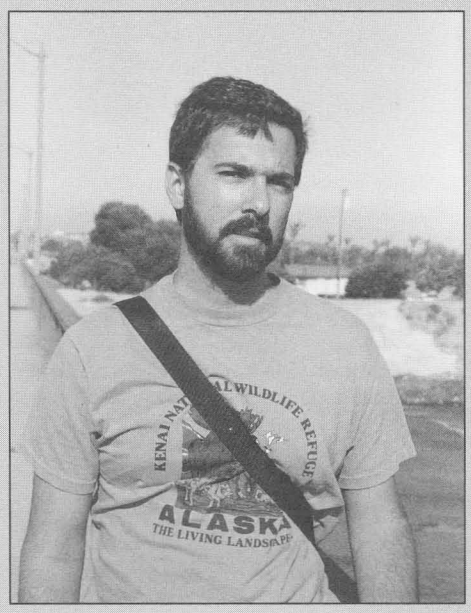
We turn back. The sun is hot on the concrete, but here and there a lacy plant has found a crack and now casts a shadow.

LM: What I love about the Los Angeles River is that everything here is tough. It's like the city itself. There are some natives—these willows are all natives—but most of the fish, frogs, most of everything are just invaders. See those Washingtonian palm trees on the levee across the river, coming up through the concrete? To me they're the heroes of this river. If the Corps and the county would let them grow, if they were to work with the river instead of against it, in 20 years this would be a healthy river. You would still have the levees, but you wouldn't see any more concrete.

JIM DANZA, *chairman of the Friends' technical advisory board, is waiting in the middle of Willow Street Bridge. He is working toward a master's degree in environmental studies at California State University, Fullerton, and his thesis is on the Los Angeles River. We descend into the riverbed, stepping over an amazing diversity of debris that includes car and bicycle parts, chunks of furniture, broken garden tools, the dry head of a pelican. Fifteen shopping carts cluster in a mid-river sand bar. River-washed scraps of paper festoon the vegetation growing on sandbanks. But it's not the trash, it's the life here that Danza wants to point out.*

C&O: *So tell me what's going on here.*

JIM DANZA: This is where the concrete ends and sand bars form, allowing willows and cattails and sedges to grow, which is habitat for species found here. Flocks of red-wing blackbirds nest in the cattails; American avocets nest in the sand bar right up here. We're three miles upstream from the Queensway Bridge, which is at the mouth of the river. There's an interaction of fresh and salt water, so we have both freshwater and saltwater species here. At the last Christmas bird count, 5,000 birds were counted here, about 3,000 of them black-necked stilts. Migratory ducks come here, herons, barn swallows. I saw one tern flying over today, fishing. Least terns have been spotted.



Jim Danza

One of the best opportunities here is for education. There are schools along here, and they can come down to learn about environmental engineering, wildlife, and biology. This can be a giant laboratory, from kindergarten to university level. It's already happening at the university level.

C&O: *Amid all this trash?*

JD: The trash is here because in people's minds this is just a flood control channel.

C&O: *Do you think this river can be more like the Seine? That's a channelized river, too, with concrete banks and not too clean, but it's the heart of Paris. There are beautiful trees along the banks, we've all seen them in romantic movies. Of course, the climate is rather different.*

JD: It's possible, especially downtown. It baffles me how this river was so forgotten. Long Beach has one of the best opportunities to do something with the riverfront. Downtown is right next to the river. We can have more than just a flood control channel. You can have open space, recreational opportunities, something for the human spirit.

As the sun sets we stop to visit with people enjoying the river. A boy with a guitar walks on the levee beside the Pacific Coast Highway Bridge. A smaller boy follows on a bike. An older man in overalls, carrying a hoe, disappears behind riverside castor beans, to cultivate the corn he has planted. Farther downstream, numerous fishermen stand waiting in the disappearing light. Under bridges, homeless people are settling in for the night. Most of them seem to be immigrants, who have not yet learned to think of the Los Angeles River as merely a flood control channel.

Peter Goodwin: Consider these Ideas

PETER GOODWIN, *of Philip Williams & Associates Ltd., is one of the growing number of hydrologists who believe that the conventional approach to flood control cannot meet future needs because it does not take sufficient account of the river's natural characteristics. For the last three years he has advised the Friends of the Los Angeles River, and has proposed alternatives to managers of the river system. He has also assisted the State Coastal Conservancy in hydrological aspects of the* Los Angeles River Park and Recreation Area Study.

C&O: *What alternatives do you see to the LACDA plan?*
PETER GOODWIN: We've been pushing for an overall management plan for the entire river, rather than looking at the river as individual sections and trying to design a flood control project for each. The LACDA plan concentrates almost exclusively on the downstream reaches. The [U.S. Army Corps of Engineers] study did consider the river much farther upstream, but there has never been a comprehensive, dynamic river model for the entire system.

C&O: *No model? That's amazing.*
PG: The Corps has a very impressive and well-engineered physical model, at Vicksburg, Mississippi, that covers the Rio Hondo, and the Los Angeles River from the Rio Hondo confluence to the ocean. What concerns us is that many potential alternatives have not been fully explored—alternatives that could result in a more environmentally sensitive project. It is very expensive to evaluate a range of alternatives in a physical model since each alternative requires some structural modifications to the model. Therefore, the range of alternatives studied in the physical model is limited, and the model cannot directly evaluate the effect of flood protection measures taken upstream. So a hybrid approach is required that combines a computer model of the entire system with the physical model.

C&O: *What are some of those alternatives?*
PG: For any flood control engineer and any consulting engineer, the number one priority has to be to protect property and the people of Los Angeles from flood hazards. That's the number one criterion—a common goal. The dispute is how to provide the best flood protection. We have seen over the years that many channelization projects haven't functioned as intended. Examples include what we're seeing on the Mississippi River. It's highly likely if a more environmentally sensitive flood management plan—with an emphasis on management rather than flood control—had been put in place 50 years ago, the increase in flood peaks due to channelization would be far less.

C&O: *What do you have in mind?*

"The shopping cart is the indicator species of the urban stream," says Peter Goodwin.

PG: There is a range of measures that require further study. If you look at the river as a system, it is possible to consider techniques for slowing the storm runoff flowing into small streams and eventually finding its way into the LA River. Revegetating some hill slopes in the upper catchment would contribute to a more successful project, in the long run. Planting trees would help reduce runoff, and would also help stabilize slopes, which would have the effect of reducing sediment loading on the upper reaches of the river.

Reducing runoff from urbanized areas by retention or infiltration would help. Most of Los Angeles has been concreted over, so that when water hits the surface, it finds its way into the river quickly. But if larger areas of porous material were recreated so that there is greater seepage, not only would flood flows be reduced, you would also replenish groundwater supplies. Porous driveways allow water to seep through, rather than running off. Runoff from the roof could come down a gutter and pass into a big pit filled with coarse gravel, then seep away. Retention ponds for new development could also reduce peak flood flows in the long term.

It's also worth looking into possibilities for widening the river in some places—Taylor Yard, for example. If it's possible to widen the channel, then it's possible to look at compound channels with raised berms, for vegetation or recreational access. It may also be possible to increase capacity by removing concrete from the channel bottom so scour can occur when a flood comes and there would be a greater cross-sectional area for water to pass down through the system.

C&O: *You increase the river's capacity by restoring a soft bottom?*
PG: This is a possibility that merits further study. You can't have scour with a concrete bottom. Now most of the sediment coming into the LA River is removed by the big debris basins (Hansen Dam is an example), so the river is sediment starved: There is less sediment moving through the system than the water can carry in a major flood. Consequently you're more likely to see overall scour than overall deposition. This could increase the effective cross-sectional area of the channel and provide greater capacity.

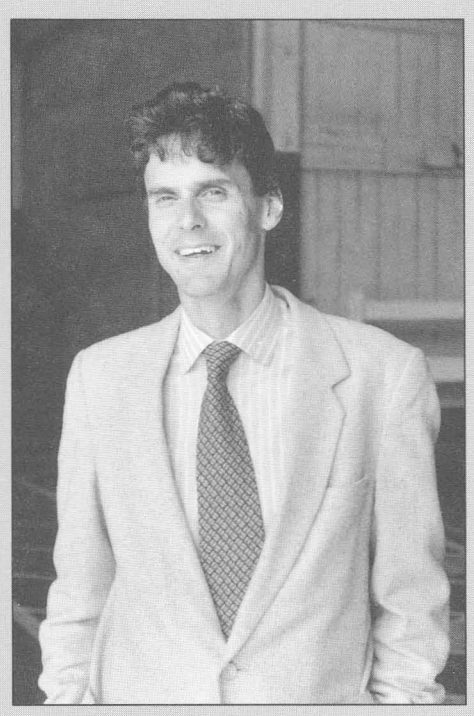
C&O: *Don't you need a smooth channel to carry flood waters away as fast as possible?*
PG: Smooth channels will convey flood flows more rapidly and transfer the water to the ocean but can result in worsened flood conditions downstream. However, there are technical problems associated with smooth channels. Any sediment

being transported along the bed will not move as a uniform sheet but tends to concentrate and move as ripples or sand waves through the channel. This can result in increased roughness and greater flow depths than might be anticipated by considering only the smooth concrete channel. The advantages of smooth channels are also diminished by debris transported during flood and constrictions caused by bridges. We have been recommending that a computer model of the entire river system be established to evaluate the cumulative effects of flow retention measures undertaken in the watershed, local channel widening, or increased scour. This model will allow the upstream and downstream impacts of local channel changes to be evaluated because it is essential that flooding is not worsened upstream or downstream.

C&O: *You propose that the Corps develop this model?*
PG: I think a model should be available for all to use. The Corps or another agency could develop it, and it could be located at the county offices or the district office of the Corps. Individual cities could then make proposals to evaluate alternatives for their reach of the L.A. River.

C&O: *Would such a model be expensive?*
PG: The cost would be small compared to the cost of constructing the project now proposed. This model would facilitate a phased restoration of the Los Angeles River. [The LACDA project is] looking at the river only in terms of flood control, while elsewhere in the United States and in other parts of the world multi-objective river management techniques are being promoted. Suppose it's shown, after a study, that it's feasible to remove the concrete riverbed. That would also help to recharge the aquifer, so you immediately have another benefit. The aquifer in the Los Angeles Basin has been dropping dramatically in recent years. If it could be recharged, and provide a greater source for pumping, it could take pressure off other water sources. Further study may show that the water quality in the river can be improved by restoring some of the natural channel. It may even be possible to pass limited quantities of sediment through the river system to reduce the accumulation of sediment upstream.

The fundamental question is: If the LACDA project goes through as proposed, is it really going to give us 100-year flood protection? Or will we, in another 30 years, have to go back to the drawing board and consider raising the walls further?


Peter Goodwin

C&O: *What about urgency as an argument for LACDA?*
PG: Certainly the greater the delay in upgrading the project, the greater the chance that the big storm will come along. But this is a project that will be in the ground for the next 100 years. And this may be the last opportunity to enhance or restore the Los Angeles River.

C&O: *You used the word "restore." Do you mean letting the river go where it wants to?*
PG: You have to be careful with that term on the L.A. River, because it is only within the past 100 years or so that it has followed the path it does today; and clearly there has been so much disruption to the lower reaches it isn't going to be possible to restore the wonderful cottonwood groves you read about in some historical accounts. That isn't the intention, to let the river do its own thing. What is possible—and has been done on other major river systems—is to set back the flood protection levees, and within those flood control levees allow the river to develop a more natural system. You still have the engineered flood defenses, but they are set back either under embankments, perhaps, or disguised in a park land. The river is still constrained, but if more area is provided to give a greater cross-sectional flow and reduce velocities, the result is more manageable flood levels.

C&O: *Are these new ideas, so novel that they are untried and risky, or have they worked elsewhere?*
PG: It's a new approach but it's been around for ten years and there are many examples where it's shown to be successful. The Rhine River in Europe and the Platte in Denver are examples of successful multi-objective projects.

C&O: *Is this the ultimate challenge, the L.A. River?*
PG: When this project was completed it was held up as the way to control nature, the way to manage rivers. And that isn't meant as a criticism of the engineers of the day. They were using the state of the art and the best possible understanding. Flood control and river management are evolving sciences in the same way as other branches of engineering. Now, 40 years on, we can see how channelization has affected river systems, and particularly how channelized rivers have responded in major flood events. So using this knowledge, we are taking the original work one step further. If the Los Angeles River was to go through some kind of enhancement or restoration, it could have international ramifications and represent the state of the art of river management. The project could also create an attractive focal point for communities adjacent to the river and a new identity for Los Angeles.

Dorothy Green: Return Storm Water to Aquifers

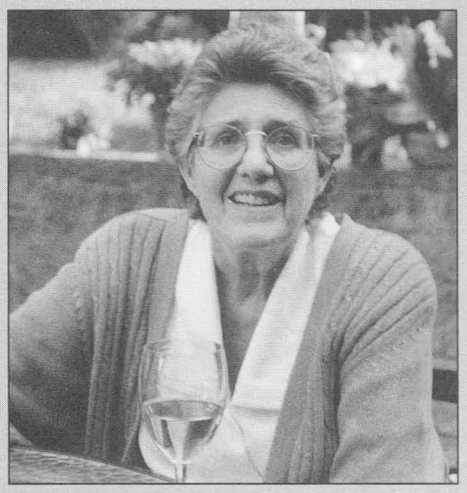
DOROTHY GREEN'S *was one of the early strong voices in the citizens' movement for water conservation in southern California and statewide. In 1990, Mayor Tom Bradley appointed her to the city of Los Angeles Water and Power Commission, a post she held until summer 1993.*

C&O: *Can anything be done to mitigate flood hazards on the Los Angeles River by decreasing the amount of water that goes into the river?*
DG: Oh, sure, lots. Detention basins, for instance. Several have already been built. Probably the best example of a really big one is Pan Pacific Park, just off Third Street. This is a big public park designed to hold rainwater when there's a flood, because the flood control channels are not adequate to capture all the flow that comes off the Hollywood Hills. So they have this huge dugout area that fills with water that can be pumped back into the storm drain system after the rain is over and the system can handle it. Then grass grows up through the muck and you've got people using it all year-round for football practice, for baseball practice, you have senior citizens running around doing their exercise on trails around this sunken area, you have picnic grounds, and it's wonderful. We would like to see more of these constructed.

C&O: *How about using treated wastewater to recharge aquifers?*
DG: The city of Los Angeles Department of Water and Power is working on a program to do just that: taking water from a tertiary treatment plant to spreading grounds, to be able to pump it up down-gradient as potable water. The State Department of Health Services has given permission to other water agencies to do similar things. In the Whittier Narrows area, they've been pumping up water down-gradient, reclaimed water that had already been put under ground, when I first got into water policy 15 years ago. An epidemiological study already existed, proving that no harm was done to a community using that water, as compared to a neighboring community that used water either from totally clean sources or from the Colorado River.

C&O: *The treated wastewater mixes with water already in the aquifer?*
DG: That's right.

C&O: *Where would these spreading basins be? There isn't much open land in the county.*
DG: There are some basins in the eastern and northeastern San Fernando Valley.



Dorothy Green

The eastern San Fernando Valley is the major aquifer for the Los Angeles Department of Water and Power. And there are spreading grounds in Pacoima, and just below Hansen Dam. Right now they're being used just to spread rainwater captured up in the mountains. But the plan is—and it's a plan that I've been pushing as strong as I can push—to build a pipeline to those spreading grounds from the Tillman Reclamation Plant to transport that tertiary-treated water up there for spreading also. [The Department of Water and Power has submitted the proposal to the California Regional Water Quality Control Board, Los Angeles Office, according to resource planning engineer Hoover Ng.]

State Health is so utterly conservative. It's irrational. For example: The Los Angeles Department of Water and Power has permission to spread urban runoff out of the Los Angeles River in spreading grounds near Griffith Park, in Burbank. ["There is a paradox there," Ng noted.] The urban runoff is really nasty stuff, full of used motor oil, and everything that washes off the city streets, animal droppings, pesticides, herbicides off people's gardens....

C&O: *Without treatment?*
DG: Yes! No problem spreading that, and in fact we have some wells down-gradient to check the quality of the water as it percolates through the soil, and it's been coming up perfectly clean.

C&O: *By building more detention basins, then, and recharging groundwater supplies with reclaimed wastewater, you expand the water supply and decrease river flows.*
DG: With the conservation that has been taking place during the drought, and the water saving measures put in place thus far and projected, the city is already beginning to project that a third unit that had been planned for Tillman Reclamation Plant may not be required, even as the [San Fernando] Valley grows out.

C&O: *Any other ideas on keeping flood waters out of the river?*
DG: Heal The Bay [a nonprofit organization working to restore the health of Santa Monica Bay] and the city of Santa Monica have worked out and adopted a model land use ordinance that would reduce both the volume and the toxicity of the flow off the urban landscape. It requires retention of at least 20 percent of any rain on site. Heal the Bay is now trying to get other cities in Los Angeles County to adopt it.

The Tree People folks [a nonprofit organization that promotes urban tree planting] are very interested in promoting cisterns on every home site. A cistern can be anything that holds storm water so it can be used for irrigation in the summer or between rain storms. It can be a tank on the roof or under ground, or above ground. If you're going to build a new [garden] wall, you might build it a foot thick and make it into a cistern.

C&O: *So your approach is to take many diverse measures to decrease water use and the amount of water that ends up in Los Angeles River; instead of increasing the river's flood water capacity.*
DG: Yes, these things I've mentioned are only a few of the things that can be done.

C&O: *Have you seen changes you find positive in the last 15 years?*
DG: Yes, lots of very positive changes—attitudes and programs that we were pushing as alternatives to bringing more water from northern California have now been adopted by the Metropolitan Water District of Southern California [wholesaler of water to coastal communities between Ventura County and the Mexican border]. We now have really positive conservation programs, groundwater management, conjunctive use programs, reclamation funding, funding for local programs like, for example, replacing conventional toilets with ultra-low-flush toilets—this is now a major program at MWD. In fact, I just got notice today that the 50-50 match the District was providing to local water agencies is being upped: now they will fund 60 percent of the cost of changing our toilets. In Los Angeles, low-flow shower heads are available free for the asking and, if invited, people will come in to install them, put in a toilet dam, and do an energy use survey in the home.

C&O: *Nothing this far-reaching is happening in northern California, as far as I know.*
DG: No, it's not, and we're way ahead of northern California in reclamation and reuse also, which people up north don't like to hear.

C&O: *The north was always ahead in conservation though, right?*
DG: No. In mandatory conservation, yes, but it has not put the hardware in place to make it permanent, as we have here.

C&O: *That's a big change. And the drought must have helped.*
DG: Oh, of course the drought helped.

C&O: *What other incentives exist?*
DG: Well, the MWD realizes that the supply is limited, and I think it has also acknowledged that the environment will be using a lot more water than it has; that there's going to be a lot less pumped out of the [Sacramento/San Joaquin] Delta and that it will have to adjust its policies and programs accordingly. The MWD is making arrangements to store water under ground in aquifers all over the state and in Arizona, to be pumped up during dry years. It also has an experimental desalination project underway. The [U.S.] Army Corps of Engineers is conducting a reconnaissance study to see if they can salvage more rainwater on the San Gabriel and Los Angeles rivers as drinking water. The city of Santa Monica has passed an ordinance for no net increase in water consumption, so that if a developer moves in and wants sewer space, he has to spend money on, for example, retrofitting schools or other public places with ultra-low-flow toilets to make up for the additional sewage the development would generate. In Los Angeles we don't have it spelled out as policy, but, with the conservation measures in place, we may have a *de facto* no net increase in water consumption.

C&O: *What, if any, is the connection between the Los Angeles River and water consumption in the Los Angeles Basin?*
DG: Everything is connected. The river is dependent on reclaimed water. As it's put under ground, there will be less. We have promised to maintain a certain minimum flow to maintain the vegetation that has become established because of the year-round presence of reclaimed water.

C&O: *The treated wastewater has helped to restore life to the river. Meanwhile, the Mississippi has asserted itself against levees and channels, bringing up doubts about the effectiveness of our flood control methods.*
DG: There are many lessons to be learned from the Mississippi—and they're relevant in the Los Angeles Basin too: that levees and concrete channels speed up the flow and make the river much more dangerous; that we need to put back the natural systems that nature put into place to slow the flow that is now so destructive, and to purify the water.

C&O: *The Corps has been putting meanders back into streams in some places. Are we in a new era?*
DG: Yes, we're seeing the dawn of a new way of thinking about storm water. We're realizing that we need to work with Mother Nature rather than struggle to control her—because we never will.

. The Founding of Friends of the Los Angeles River

Pat Patterson, Roger Wong, and me
meet Fred Fisher
at the old Challenge Dairy Building
on Vignes Street
for an early morning
cup of coffee.

We are on our way
down to the river
for the first time.

We are carrying heavy duty wire
clippers
to cut through the fence beside the
1st Street Bridge courtesy of Gregg
Gannon,
then we

climb down the steep
cement-covered bank
to the river.

We don't know where we're going,
exactly.
We're walking upstream
to where Arroyo Seco
flows into the Los Angeles.

It makes an unholy clatter,
so we address ourselves to the river.

We ask if we can
speak on its behalf
in the human realm.

We didn't hear the river say no
so we went to work.

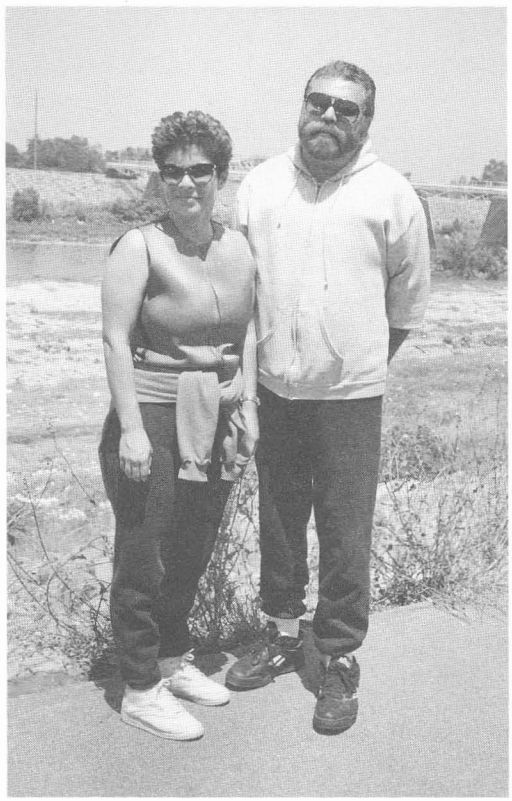
—Lewis MacAdams
Originally published in
Gas: High-Octane Poetry,
San Carlos, CA, 1993.

WHAT RIVER?

Changing Views of the River

THERE ARE PEOPLE NOW ALIVE in the Los Angeles area who remember the Los Angeles River before it was channelized. They still talk about their favorite childhood swimming hole and recall seeing businessmen in suits who took off their shoes, rolled up their pants, and waded through flooded streets in downtown Los Angeles. After its encasement in concrete 50 years ago, however, the river was forgotten. Its "taming" was so successful that most people saw only a flood control channel where a river had been.

Those who manage the river and can be expected to know it best confirmed this general impression. An engineer with the flood control district was quoted in the 1978 issue of *Aqueduct*, magazine of the Metropolitan Water District of Southern California: "Actually the river is basically a flood-control facility. . . . It may be the butt of a lot of jokes, but it's a very useful contraption."



Mario and Lillian Navarro of Long Beach like to hike on the L.A. River.

The article in which the quote appeared was entitled "The Los Angeles River is: ☐ a big joke, ☐ a killer in concrete, ☐ a 50-mile-long ditch, ☐ all of the above," and it described the river as a "killer encased in a concrete strait jacket," explaining: "Before its course was finally fixed in 1959, it flowed where and when it wanted to." By implication it was a wanton creature, deserving imprisonment. "It's a cement river because it has to be controlled," was the way the public affairs officer for the U.S. Army Corps of Engineers put it at the time. The Corps operates the river, much as the Bureau of Prisons operates facilities in which out-of-control people must be confined.

Most people in Los Angeles are unlikely to hold such harsh views. Indeed, most people give little thought to the river, no more than they give to their sewage pipes, or their wastewater treatment dumps, or highway maintenance yards. A senior official of a major city on the river was asked recently whether the city had any plans for trails along the river. He replied that he wasn't sure that the river was even in his city, he would have to check a map.

This is the river that William Mulholland, who brought Owens Valley water to Los Angeles, once remembered as "... a beautiful, limpid little stream with willows on its banks." Its course is still roughly in the same flood plain that a member of the first group of Europeans to see it, the 1769 party of Don Gaspár de Portola, described in his journal: "We entered a very spacious valley, well grown with cottonwoods and alders, among which ran a beautiful river ... which we named Porciúncula."

For the Spanish explorers who founded the pueblo *Nuestra Señora La Reina de los Ángeles sobre el rio de la Porciúncula* (Our Lady the Queen of the Angels over the Porciúncula River), the river was essential life support. It was the font of all that grew in the basin. They adapted to the frequent winter floods as neces-

sary evils, which brought water for the dry part of the year and replenished the soils. That view continued into the late 19th century.

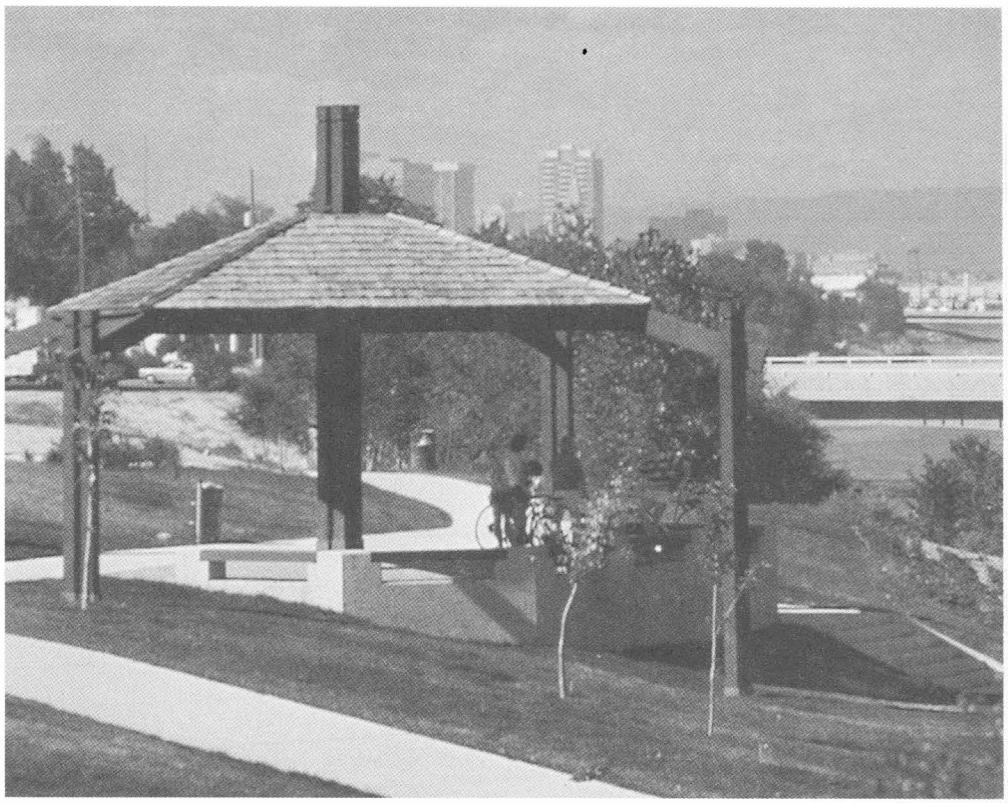
In 1889, J.M. Guinn, a California historian, wrote in a history of California floods and droughts that "while floods in other lands are wholly evil in their effects, ours, although causing temporary damage, are greatly beneficial to the country. They fill up the springs and mountain lakes and reservoirs that feed our creeks and rivers, and supply water for irrigation during the long dry season. A flood year is always followed by a fruitful year."

As the Los Angeles area urbanized, its population grew, encroaching on the river's flood basin. The demand for water exceeded local supply while the economy of the region diversified, and the river's wild and changeable nature became a menace to life, property, and progress. The floods of January and February 1914 wreaked considerable destruction and led to the creation of the Los Angeles County Flood Control District in 1915. From the late teens through the 1950s, the river was diked, dammed, diverted, channelized, and finally encased in concrete. Out of sight, out of mind.

Yet life still continues on and around the river. Where a piece of concrete has fallen away or a rock has been dislodged, a tree or shrub has usually established itself. And despite its "concrete strait jacket," the river remains an important stop on the Pacific Flyway. Many shorebirds feed in the river channel on their way to wintering grounds in the south. Several migrant shorebird species, not commonly found in southern California, have been spotted. The soft-bottomed section of the river in Long Beach may at times support the largest concentration of shorebirds in coastal Los Angeles County, feeding where willows, cottonwoods, and other riparian vegetation have taken hold.

People, too, keep creeping in, despite "No Trespassing" signs, locked gates, and other efforts to exclude them. Skateboarders find the smooth concrete banks irresistible, as do graffiti artists. They thrive on the man-made Los Angeles River. But many others, particularly immigrants who have not been told that the river is nothing more than a "contraption," keep finding the life on it.

URBAN EDGES, INC.

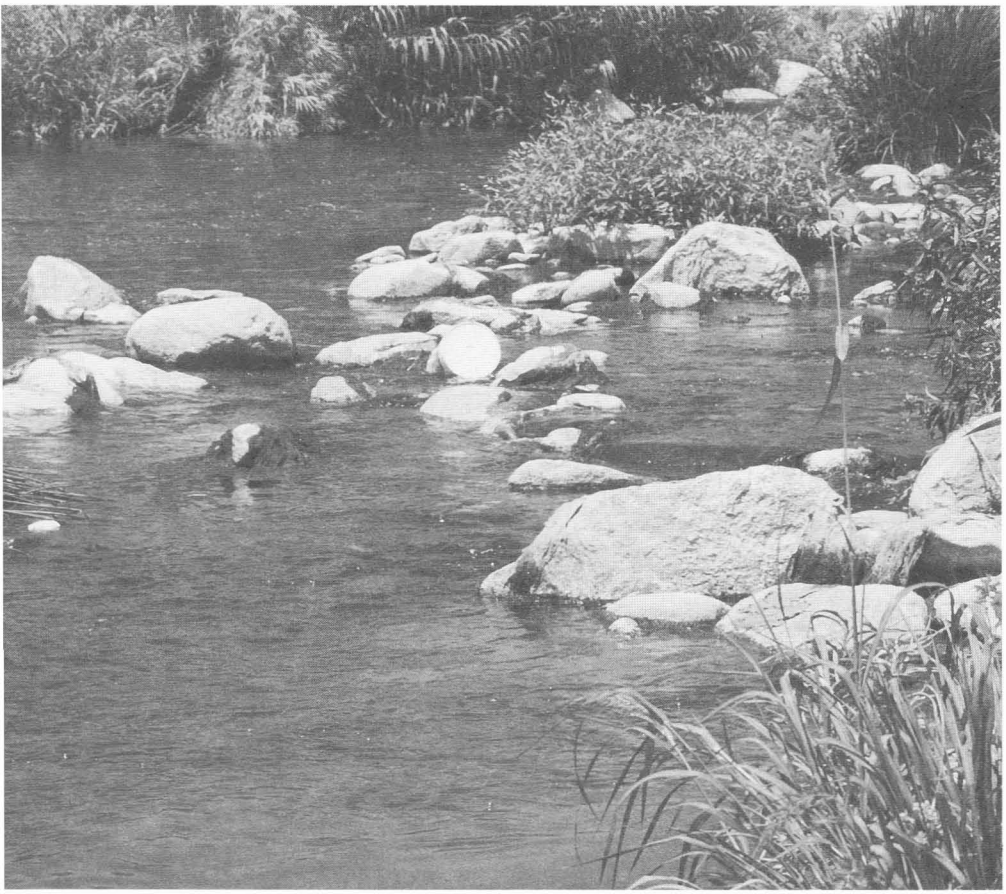


Some people hope that the Los Angeles River banks may some day resemble the Platte River's Denver Greenway.

One afternoon, Nenita Bangi was tending to the roses she had planted outside the fence surrounding her home at the foot of a levee at the Willow Street Bridge. She looked up to talk with a couple of passing strangers. Yes, she said, she did walk the levee trail. She liked to watch the birds with her grandson, she said, to show him pelicans and other birds. There were so many birds in her native Philippines. Did she ever worry about the levee during storms? Yes, she said. But she also worried about proposals to raise taxes for levee improvements.

That same afternoon, after his 5 A.M. to 5 P.M. workday at a local restaurant, Vicente Perez headed down to his corn patch, below the Pacific Coast Highway Bridge in Long Beach, near his home. The corn was higher than his hat already. This is his first year of planting along this bank, he said. He had worked for the agriculture department in Jalisco and wanted to try this. It made him feel quiet and peaceful, coming down here with his hoe after work, he said, glancing out at the water.

Farther down, meanwhile, opposite the channel where a boat returning from Avalon was



pulling in, Jose Guadalupe Vazquez, of Carson, was enjoying the sunset, relaxing beside his car in an informal parking lot while family members fished. Two boys had cast lines into the darkening water. Two little girls played in the dirty sand behind the car. There were clusters of other fishers along the riprap shore at the mouth of the river, continuing to treat the "contraption" as a river.

Lately, this quiet, continuing riverside life has attracted public attention. More people have noticed: It's a river. There has been talk of enhancing the shores to create a "green spine" for the Los Angeles Basin. Even a river poet has emerged. (See p. 31.) No longer just a joke, the Los Angeles River is being acknowledged as still in existence. In April 1993, the environmental group American Rivers listed it as one of the 15 most highly threatened rivers in North America, along with the Rio Grande, the Columbia, the Platte, and other well-known rivers. Ironically, the Los Angeles River stands out as one of the most obscure of the rivers named. More people have likely heard of the Rogue River in Oregon or the Penobscot River in Maine than of the largest river in the second-largest city in the United States. ■

—Christopher Kroll, with RG

The rhythm of its meanders is a part of the individual nature of a river. In a wide valley a river will swing in far-flung curves, whereas a narrow valley will cause it to wind to and fro in a "faster" rhythm.... Stream and surrounding terrain always belong together, and the vegetation unites both in a living totality. In comparison, a river that has been artificially straightened out looks lifeless and dreary. It indicates the inner landscape in the souls of men, who no longer know how to move with the rhythms of living nature.

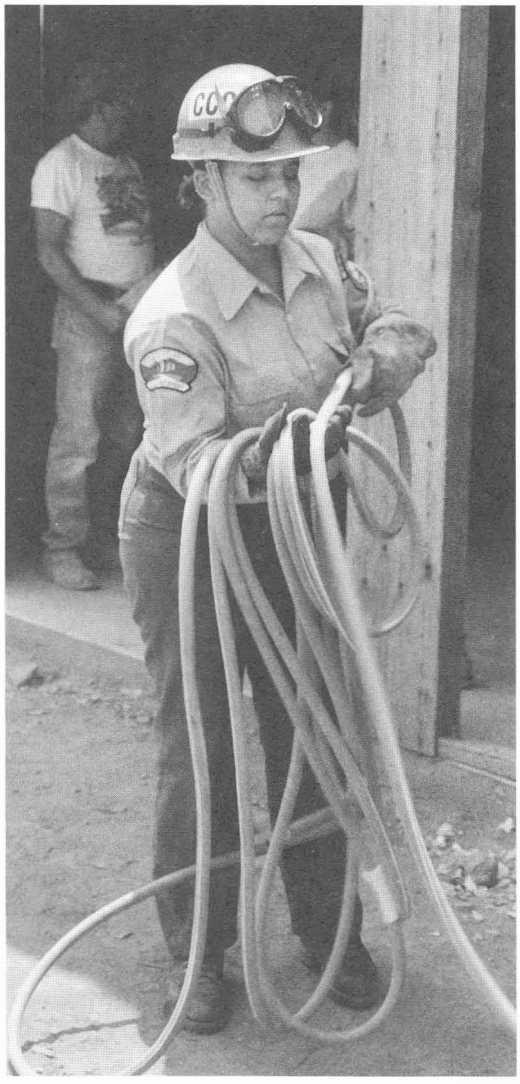
THEODOR SCHWENK
Sensitive Chaos, 1965

In 1969, during a severe flood, the LACDA system prevented over a billion dollars' worth of damage, which proved its effectiveness, Col. Norman E. Pehrson, of the Army Corps of Engineers, told a Congressional committee. Col. Pehrson was district engineer at the time.

CALIFORNIA'S CONSERVATION CORPS

Adapting to the Market Economy

RASA GUSTAITIS



Kathleen Kelly hopes to move on to community college.

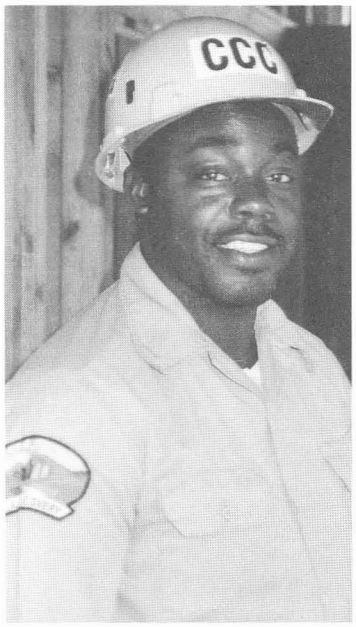
SINCE IT WAS FOUNDED TWELVE YEARS AGO, the California Conservation Corps has earned respect for its ability to respond to challenge. Offering "hard work, low pay, miserable conditions—and more!" it has deployed young men and women to fight forest fires, help after earthquakes and floods, clean up oil spills, and combat the Mediterranean fruit fly invasion. It has built trails and bridges in the wilderness, restored streams for salmon, and planted thousands of trees, in the process enabling young people, 18 to 23, to take pride in their work and gain a more solid footing in life.

The challenge now confronting the CCC, however, is one hard work and enthusiasm alone cannot meet. With the state's economy shrinking, and public funds shriveling, basic services are fighting for scraps of the general funds that have provided most of the CCC's support this far. Last year, a budget cut led to the closing of some facilities. The damage was mitigated by a special federal grant of $1.4 million to help Los Angeles recover after the riots, but that was only for one year. This year the budget has again been cut.

The future of the CCC as well as of the 11 local conservation corps in California now appears to depend on their ability to become more entrepreneurial and find a market for their work. Therefore, the trend is toward more sponsored projects, done under contract on a fee-for-service basis with other public agencies, and some nonprofit associations. CCC director Al Aramburu wants to see the corps' 13 residential centers run "more like businesses."

"We have gone from 70 percent reliance on general funds six years ago to 53 percent now," Aramburu said. "My goal is to decrease that to 25 percent while expanding the size of the corps, by the end of 1994, from 1,800 now to 3,000." To help the CCC move toward these goals, Assemblyman Phil Isenberg, of Sacramento, has introduced AB 202, which would give it first crack at some state contracts, and would also allow the CCC districts that bring in more than they require to run their programs to keep the difference and invest it in improvements. Now such extra money must go into the state's general fund.

Don Neuwirth, former director of the Marin Conservation Corps, who is now an independent consultant and fund-raiser for the CCC



The chance to "help young people get their life together" has strong appeal for Norris Luckey, who says he hopes to make a future of the CCC.

and other corps, agrees that's the way to go: "The future of the corps is in becoming more entrepreneurial. Some of the local corps have led the way." The Marin Corps, oldest of California's local corps, has built miles of trails and some handsome bridges at China Camp State Park under contract with the State Coastal Conservancy. It has done extensive habitat restoration work, and has numerous other fee-for-service projects. The East Bay Corps, which has a diverse program with a $6.5-million budget this year,also relies largely on fee-for-service contracts with public agencies, including some with the Coastal Conservancy.

New Territories

Driven by necessity, and alert to new job opportunities that have appeared as the economy shifts from a high-consumption to a more conservation-oriented mode, the CCC has also moved into some new areas of activity, especially in urban areas. In Los Angeles, it used last year's federal grant to provide training for emerging occupations. In partnership with Southern California Gas, some youth have learned energy auditing and weatherizing. In partnership with the Department of Water Resources Urban Water Conservation Office and local irrigation districts, ten trained to become landscape irrigation auditors: to find underground leaks in water systems and to measure water use on large expanses of lawn, such as golf courses and school or hospital grounds, for the purpose of water conservation. Six of the ten passed a test required for certification, and are now qualified for employment. Since the end of the drought, the demand for landscape audits has declined, but that decline may be temporary.

There are growing opportunities in recycling. The city of Anaheim had a program to encourage the installation of low-flow toilets, offering rebates for proof of purchase. The CCC collected and dismantled the old ones and sold the porcelain to a company that crushed it and added it to asphalt for road building. Many projects are more conventional: graffiti removal, clearing brush as fire prevention, cleaning up litter. Here the state and local corps have competition from prison labor—which costs little more than the day's pay for a guard compared to $11.75 per CCC member hour—and also from youth offenders doing community service, for free, under court supervision. The corps tries to sell themselves as reliable, competent, and able to guarantee high standards. Without the opportunities offered by the corps, some of their members could well drift in an antisocial direction. Neuwirth puts the case for society, and the corps, this way: "Do we want to pay to keep them out of jail, or get them for free and pay for imprisoning them later?"

"The days are gone when you'd just get into a truck and go to work," said Mel Kreb, who joined the CCC staff shortly after it began and is now district director in Humboldt County. "The more sponsors you have, the more papers you have to deal with." However, he said, "We are aware that we have to be very marketable. This district actually produces through reimbursement 78 percent of what it costs." It has a salmon restoration contract with the State Department of Fish and Game, contracts with the Department of Parks and Recreation, and others. "That's unusual," he added. Since 1980, he said, over 700 miles of rivers and streams in the county have been reopened for salmon, and more than 850,000 trees were planted, mostly in the riparian zone. Between 80 and 95 percent took hold.

"Money drives everything," commented Jose Phillips, district director of the CCC's Los Angeles Urban Restoration Program. "We try to get good projects, but the sponsor needs to have money to reimburse."

The ideal CCC project offers maximum opportunity to learn, and by that standard, the CCC members sent to Humboldt County have an ideal assignment. So do those selected to work with the nonprofit Habitat for Humanity on building eight two-story condominiums in Pacoima, in the San Fernando Valley. Habitat builds homes for people whose income is far too low to enable them to buy on the market, and enables them to become homeowners. Most of the building is done by volunteers, who include both skilled craftsmen and unskilled well-wishers. Part of the down payment is in "sweat equity," working alongside volunteers.

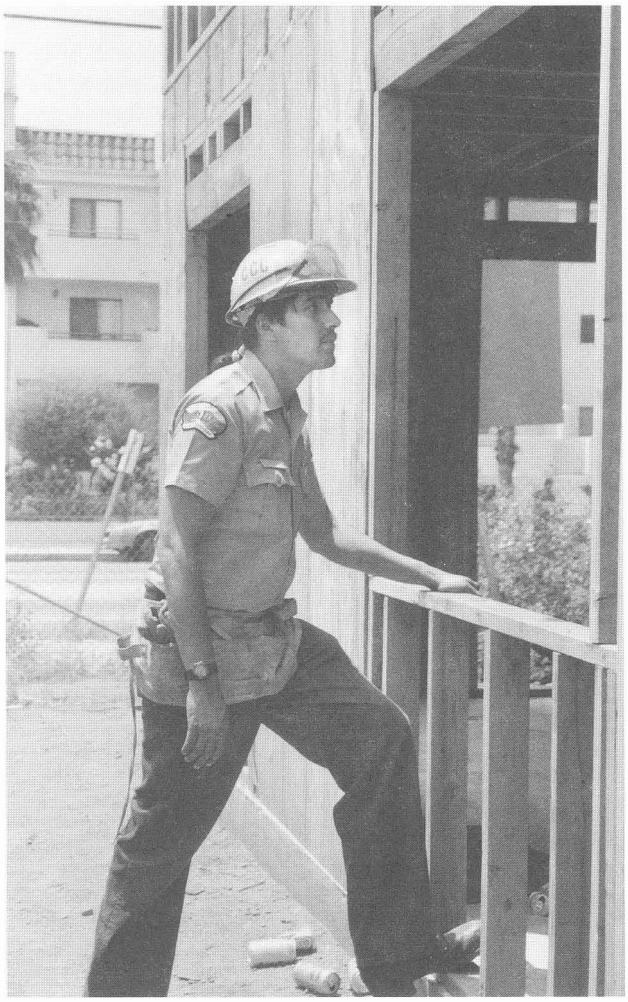
Without a doubt this is a great project. But how does it fit with the mission of the CCC? It was founded, in 1976, to protect and restore California's natural resources by employing young California residents. "We have expanded our definition to include human resources," Aramburu said. "But the core subject remains natural resources. The gratification of corps members is highest in a natural setting."

Culture Shock and More

It is CCC policy to send new members to a residential center far from home for the first four months. Los Angeles area residents usually go north. Some cannot adjust and leave. Some

make discoveries that shape the rest of their lives, and some find their calling.

"I started in Barstow, in the desert, 14 years ago," said Scot Schmier, conservation supervisor in the CCC's Los Angeles Urban Restoration Program. "We restored a ghost town. I stayed for 13 months, in the heat, the dryness, and now I really appreciate the desert. Behind the work was a lot of culture and history." Next he was sent to Humboldt County, "to wake up, walk outside and see redwood trees 15 feet in diameter. I had wanted to be a forest ranger. But after high school, looking at eight more years of full-time school, I wasn't sure. I had a friend in the CCC and he talked about working in forests, learning about trees. So I joined and found the best of what I wanted to do: working outdoors in conservation, and working with youth, helping them overcome obstacles and find a sense of direction."



CCC Conservationist Hector Garcia on a Habitat for Humanity job site.

Now back in Los Angeles, Schmier must often put his mind to the urgent issue of finding sponsors for more projects. It was he who made the link with Habitat for Humanity, through David Isaac, whose business, Resets, recycles materials discarded by film studios. Isaac was also the founder of the Habitat affiliate for the San Fernando and Santa Clarita valleys.

One summer morning, several corps members were working at the job site, with various degrees of proficiency with tools, under the supervision of contractor Bryan Bossard. They were redoing some plumbing that was not quite perfectly installed by volunteers during the past weekend. "We spend about half our time redoing what the volunteers have done," said Isaac. Nevertheless, "We have built for less than $100,000 what would normally have cost $250,000." For the corps members, the volunteers' mistakes are a learning opportunity.

Supervising the CCC team was Hector Garcia, who joined the CCC at age 21, in 1990. Like Schmier, he found his vocation—but not right away.

His first assignment was in the tiny community of Redwood Valley, in Mendocino County. He had never even heard of Mendocino County while growing up in East Los Angeles. Finding himself the only Latino on his crew, miles from the nearest town, and, in addition, worrying about his mother, whom he had been supporting financially, he quit after three months.

But the experience had left its mark and "nothing else satisfied me," he recalled. The corps has a second chance program. Dropouts can write the director of the district they left and ask to come back, giving reasons. Two years after he had quit, Garcia was back, this time to stay and go on to a staff position. He hopes to spend his working life with the corps. "There's a challenge here I don't think any other job could offer me. I'm using what I learned, and teaching it to others," he explained. "And when we finish something, we can say: 'We did that.'"

Unfortunately, family obligations keep some corps members from the kind of experience that Schmier and Garcia found so important. Some are supporting younger siblings and parents, others have children. Of six who were selected for the coveted back country program, behind Yosemite, this year, only two could go, Schmier said. The corps is adapting to these limitations by establishing some nonresidential programs, and accepting half-time work in some situations. It is considering the possibility of offering childcare in a residential center. It is also examining why only 18 percent of its members are women, Aramburu said.

The CCC is the oldest and largest of some 90 corps programs now in 35 states. It was modeled after the first CCC, the Civilian Conservation Corps of the 1930s, which hired thousands of those unemployed because of the Great Depression and left an enduring legacy of public amenities and art. As President Clinton's National Service Corps idea takes shape, the experiences of California's state and local corps may be valuable. "We have staffed a lot of nonprofit and state corps with our alumni," Aramburu pointed out. Were he to found a national corps, he offered, "I'd form a steering committee of former and existing corps members." ■

Rasa Gustaitis is the editor of California Coast & Ocean.

For information on joining the California Conservation Corps, call 1 (800) 952-JOBS.

Coast & Ocean invites readers to express their opinions about coastal issues in this space.

It's Up to Us

BILL PERRY

BILL PERRY

Mary Rhyne

IN 1965, A TRAVELING HORTICULTURIST, botanizing his way down the Mendocino coast north of San Francisco, discovered a new plant species perched on the ocean bluff near Point Arena. There were just a few of the small brown and white lilies, and in that exposed location, they were truly endangered, as the state agreed when it added the *Fritillaria roderickii* to its endangered species list. Since then these lilies have been saved from oblivion, not by government agencies and regulations, but by a dedicated woman, using knowledge of the flowers that has accumulated over the years. This is, in fact, an example of what seems to be happening along the northern California coast and perhaps all over the state: Individual citizens and organizations—using agencies and regulations as valuable tools—are shouldering much of the load in preserving our natural inheritance.

In 1982, Mary Rhyne, an amateur botanist, heard about the unique lilies that grew near her home and set out to find them. To her horror, she found that their bluff was crumbling and they were falling slowly, inexorably, into the ocean! Naturally, she went to work. After sending a report to the California Natural Diversity Data Base (the Department of Fish and Game's inventory of our state's rare species and threatened habitats), she contacted the landowner where the plants grew. The owner, both intrigued and wary of the sudden attention, stalled for two years before letting Mary replant some of the bulbs nearby on firmer ground.

Then in 1985 Mary read of a Caltrans highway widening project—directly adjacent to the faltering fritillaries. Again she went into action, enlisting the help of a Caltrans botanist. They succeeded in having a special fence placed around the lilies as protection from earth movers, saving them once again. Since that episode, Mary has been propagating the fritillaries and planting then on public land along the bluff, informing the data base of their new locations and success.

Three miles south of Mary Rhyne's home, in Anchor Bay, campground owners Mike and Jennie Henderson have also jumped into the scuffle to help out nature. They rescue marine mammals. Several times a month, when a call comes in, they head out to some remote beach to evaluate the health of an afflicted seal or sea lion. And, if necessary, they transfer their patient a hundred miles south to the Marine Mammal Center in Marin County for further attention.

Mary Rhyne and Mike and Jennie Henderson belong to an informal network of people that is protecting wild species in their area. This network includes river restoration and steelhead breeding projects, The Nature Conservancy's Register of Natural Area landowners, birders performing various counts and surveys, an activist California Native Plant Society chapter, and others, all keeping roughly in touch via telephone, newsletters, and the local papers.

Happily, there are few loose cannon, well-intentioned people who can do more harm than good: Mary operated under a specific "Memo of Understanding" from Fish and Game, and Mike and Jennie have received many hours of training from the Marine Mammal Center. What they are all doing, individually, collectively, is providing important protection for native species, endangered and otherwise, at minimal government expense. ■

Bill Perry lives in Anchor Bay, on the Mendocino coast. He is a contributor to the Ridge Review.

Spiders

(COME INTO MY PARLOR)

PAT MCRAE

COBWEBS IN SPOOKY OLD HOUSES, giant spiders that creep up your pillow—most people can't see past the horror movie version of spiders to focus on the good they do in the home and particularly in the garden. Yet spiders are pest control agents *par excellence.*

A single spider may kill 2,000 insects in its lifetime—one year for most, but 25-30 years for a female tarantula. They eat many insects that are harmful to people and crops, including mosquitoes, flies, grasshoppers, and locusts. They also eat the beetles and caterpillars that feast on green leaves of all sorts. Most spiders in this state are carnivorous—they feast on insects, caterpillars, or each other.

By injecting a powerful venom into its prey with its sharp fangs, a tiny spider can consume an insect larger than itself. The venom is actually a powerful digestive juice. It will liquify a juicy cricket or wasp, enabling the spider to suck it dry. Only the exoskeleton remains, hanging in the web until the wind blows it away, or wrapped in silk and discarded.

Of the 600 species of spiders in California (about half of which occur in the coastal zone), only two are highly venomous to humans: the black widow and the violin spider. The black widow, with its tell-tale red hour glass on the abdomen, is found throughout the state. It has two venoms: the venom found in all spiders, which predigests the prey, and a neurotoxin that, when injected into a person, causes serious but seldom fatal symptoms, ranging from muscle cramps to headache and nausea. The violin or fiddler spider lives in deserts in the southern part of the state (as far north as Merced County), usually in quiet spots in garages or storage rooms. It is distinguished by a small dark brown violin-shaped spot on its head. Although not fatal, its bite causes severe necrosis around the wound.

These two species are far more dangerous than the tarantula, the largest member of the spider family, which spends its entire life under ground or in hiding, and feeds at night. The male only appears in daylight during the mating season as he wanders in search of a mate.

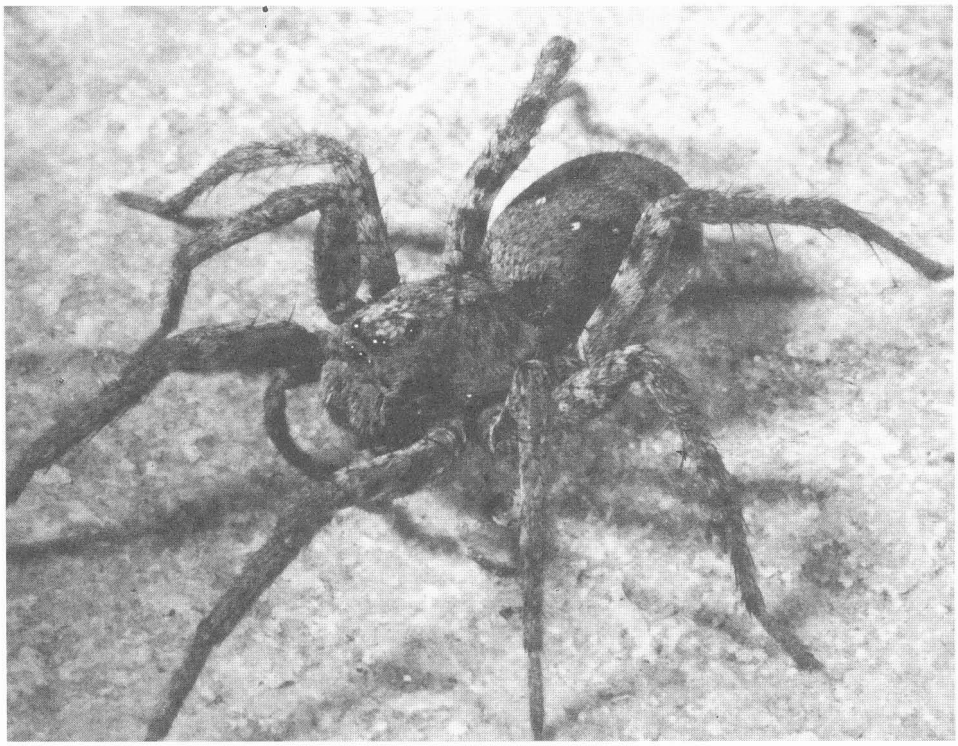
Insects a la Carte

As garden residents you'll want to cultivate orb weavers—spinners of large symmetrical webs that radiate from the center. These spiders are beautiful, yellow and black or bright orange, and they catch and devour many garden pests. The giant orb weaver should be easy to spot: its body is often one inch long and it has eight very long legs.

The wolf spider is familiar to coastal dwellers. Instead of lying in wait for its prey, it hunts and pounces. It is a great mosquito eater. The mother wolf spider actively tends her spiderlings, carrying them on her back as she hunts.

Spiders have plenty of natural enemies: frogs and toads, birds, other spiders, and wasps, including the tarantula hawk, a black wasp with curly antennae that glues its eggs on a tarantula with its saliva. The wasp's larvae eventually eat the spider alive. Instead of stepping on the next spider you see, get a good reference book (I recommend *A Golden Guide to Spiders and Their Kin* by Herbert and Lorna Levi, Golden Press, New York, 1989) and look up the species. Then place the spider in your garden where it can hunt, eat, mate, and have young. You'll both be better off. ■

Pat McRae is docent coordinator and spider expert at the Lindsay Museum in Walnut Creek, Contra Costa County. The Lindsay Museum specializes in educating children about wildlife. It also cares for injured and orphaned native wild animals, with the goal of returning them to the wild if possible.



BLAINE HÉBERT

Wolf spider.

WORKING TO END FISHING *with* CYANIDE

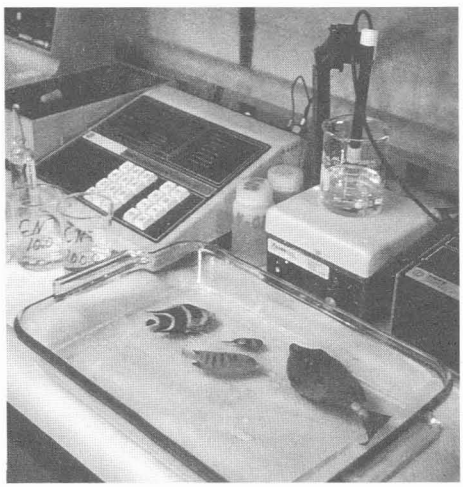
Your Beautiful Aquarium Could Mean Death to Tropical Marine Life

PETER RUBEC

MARINE FISH FROM tropical coral reefs are popular with aquarium hobbyists because of their diversity of species, forms, and colors. But despite many recent advances in aquarium maintenance techniques, these fish are difficult to keep alive. People who buy them are usually unaware that most of them arrive at retailers from the Philippines already damaged by sodium cyanide, which is illegally used to stun them for capture. About half the exposed fish die on the reef. Of those captured alive, more than 80 percent die en route from collectors to retailers worldwide. The corals and other marine life are also destroyed.

The practice of capturing fish with cyanide was called to public attention in 1983 by Steve Robinson, who now operates an aquarium fish import business in Inglewood, Los Angeles County. He lived with Filipino collectors and observed the widespread use of cyanide. To try to woo the industry to more benign capture methods, he joined with Vaughan Pratt, a wildlife veterinarian in the Philippines, and myself in 1985 to found the International Marinelife Alliance (IMA-USA). This conservation organization seeks to protect marine diversity and environments, and to promote sustainable use of marine resources. It has expanded to form IMA-Philippines and IMA-Canada (now independent as Ocean Voice International), and has worked with governments, public agencies, other organizations, and communities to help small-scale fishermen in developing countries to fish without destroying the marine resources that sustain them.

In the Philippines, cyanide is also being used to capture food fish, thus threatening the health of the fishers, their families, and others in the Philippines who eat fish. In 1986 the IMA uncovered an illegal trade using cyanide to capture live groupers for Hong Kong restaurants.



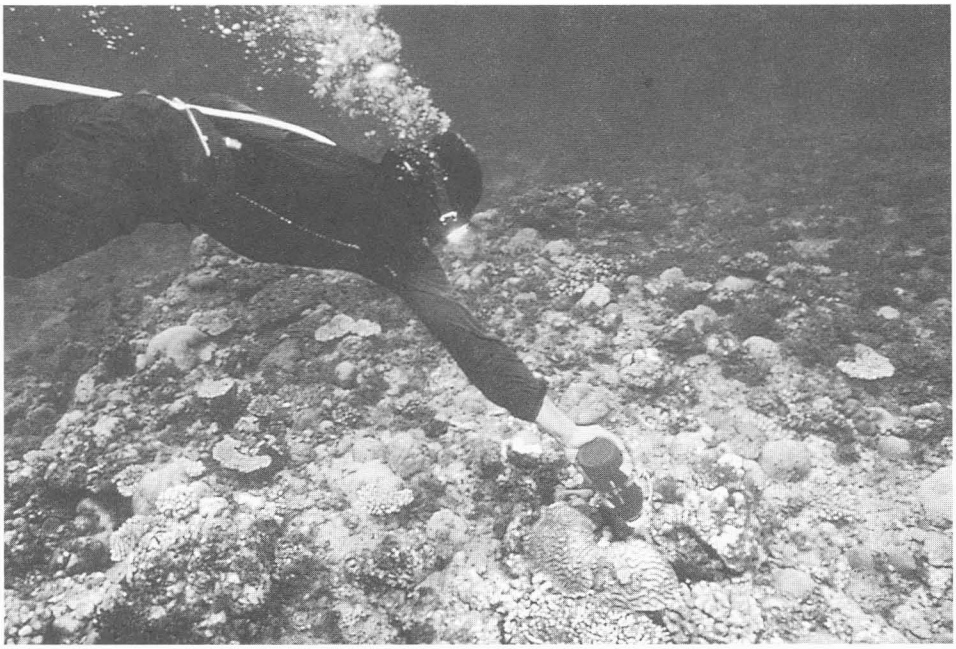
Lab tests can now be used for detecting cyanide

Teaching Net Fishing

Robinson conducted several pilot programs in the Philippines in 1984 and 1987 to train collectors to give up cyanide in favor of fine-meshed barrier and hand-held nets. Once trained, a net gatherer can capture more fish than a cyanide collector (100 fish a day versus 40 a day). Initially, net-caught fish were sold to exporters who mixed them with shipments of cyanided fish. Only one fish exporter in the Philippines (Reg and Rix Enterprises) switched to selling net-caught fish after IMA directors visited the Philippines in 1986. If net-caught fish are properly decompressed and shipped, about 90 percent survive. They also live considerably longer. Some marine fish, properly caught and maintained, have survived 20 years in captivity. This increase in fish life expectancy and the resultant customer satisfaction should more than compensate U.S. retailers for the increased cost of net-caught fish (about 20 percent more than cyanide-caught fish).

At first the IMA tried to solve the cyanide problem through cooperation with the marine fish trade in the Philippines and the United States. Pratt made numerous trips during 1987 to establish a National Net Training Program with the participation of the Philippine Tropical Fish Exporters Association, the Philippine Bureau of Fisheries and Aquatic Resources, IMA-Philippines, and the U.S. Pet Industry Joint Advisory Council. However, those in the fish trade made little effort to raise funds for net training, while some exporters continued to distribute cyanide to the collectors. Meanwhile, Robinson founded his own company in 1989 (Cortez Handcaught Marines Inc., in Inglewood, Los Angeles County) to import net-caught marine fish. He has conducted company-funded training in the Sea of Cortez off Mexico, the Marshall Islands, Palau Islands, the Philippines, and Indonesia.

In 1990, IMA-Canada, in conjunction with the Philippine Haribon Foundation, obtained a grant from the Canadian International Development Research Centre to train about 400 collectors to use nets. Although they readily accepted the training, more than 70 percent reverted to cyanide, partly because the special fine-mesh netting needed was not available. In 1992, Ocean Voice International received a



ALL THREE PHOTOS: LYNN FUNKHAUSER

Fishing with cyanide

grant to provide nets for all the trainees. The IMA has repeatedly offered to retrain all the estimated 2,500 Filipino fish collectors, for the benefit of the entire marine trade, but further funding is needed to support net training.

IMA-Philippines is now working with fishing communities to promote the health of the coral reef and the fish from which they earn their livelihood. With funding from the Philippine Department of Agriculture, Fisheries Sector Program, the organization has developed the Cyanide Fishing Reform Program to promote better understanding of the issues involved and enhance livelihood and productivity. The operating principle of the program is community-based management. IMA is also working with other government agencies in the Philippines toward marine resource protection.

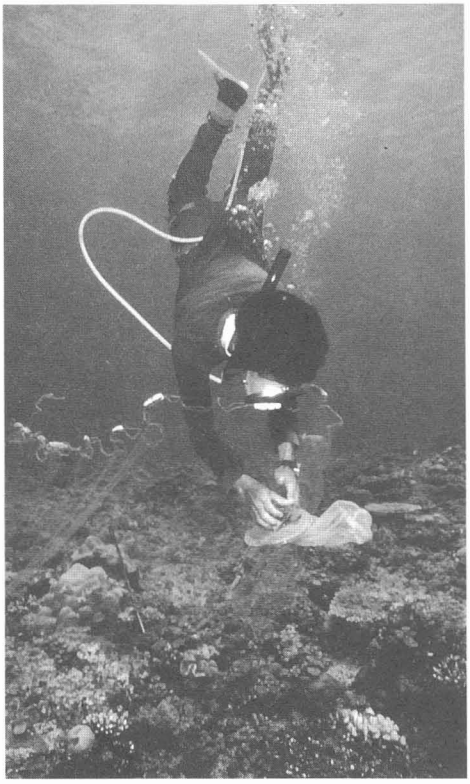
Consumer's Dilemma

A hobbyist who wants to help end fishing with cyanide by buying only net-caught fish is in a dilemma: It is virtually impossible to tell how the fish available for sale have been caught. The import of cyanided fish into the United States is illegal under the Lacey Act. The law, however, has not been enforced, in large part because no monitoring methods have been available until recently for detecting cyanide in fish.

In 1991, Rengarajan Soundararajan, an environmental consultant from West Plains, Missouri, developed the Cyanide Detection Test in collaboration with IMA-USA. It uses an ion-selective electrode to measure cyanide ion concentrations in fish tissues dissolved in solution. Though the test requires killing a few fish, it allows shipments to be monitored. In 1992, a testing laboratory was established in Manila and IMA trained personnel of the Philippine Bureau of Fisheries and Aquatic Resources to perform the test. A second lab was recently established in Puerto Princesa on the Island of Palawan. IMA holds that it is easier to stop the export of cyanided fish at the source than to have the U.S. Fish and Wildlife Service administer the test, as that would require setting up testing labs in this country at a dozen or more points of entry.

The Cyanide Detection Test will enable the Philippine government to determine whether cyanide is present in fish and to use the result as the basis for denial of export permits. Its potential for deterrence makes the test a vital component of the IMA's Cyanide Fishing Reform Project. Shipments that contain cyanide-positive fish will be confiscated, and their owners hauled into court and prosecuted. IMA's master plan is to stamp out cyanide use in the Philippines—and eventually throughout the world—through a mix of net training, information, enforcement, and alternative livelihood programs. The cyanide test is expected to help cleanse the Philippines of the cyanide stigma, and eventually to regain its status as the world's top supplier of tropical marine fish without killing the vital coral reef ecosystem in the process. IMA-USA has long-range plans to expand the use of the cyanide detection test to Indonesia and elsewhere. ■

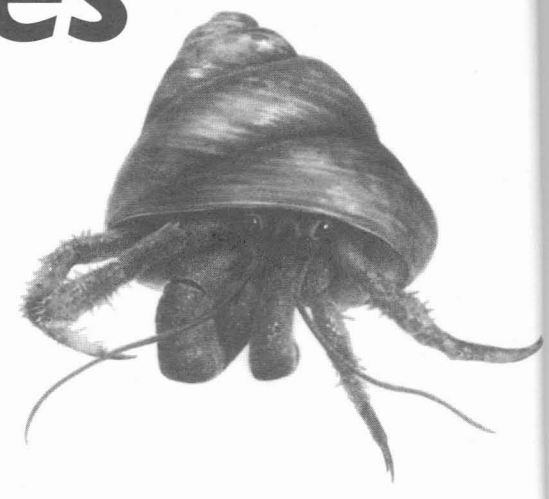
Dr. Peter J. Rubec is a fisheries scientist for Texas Parks and Wildlife Department and president of IMA-USA. For more information, write to IMA-USA, 201 W. Stassney, Suite 408, Austin, TX 78745-3156. In Canada, Ocean Voice International is at 2883 Otterson Dr., Ottawa, Ontario, K1V 7B2.



Fishing with nets.

BETWEEN *the Tides*

ANN CAUDLE



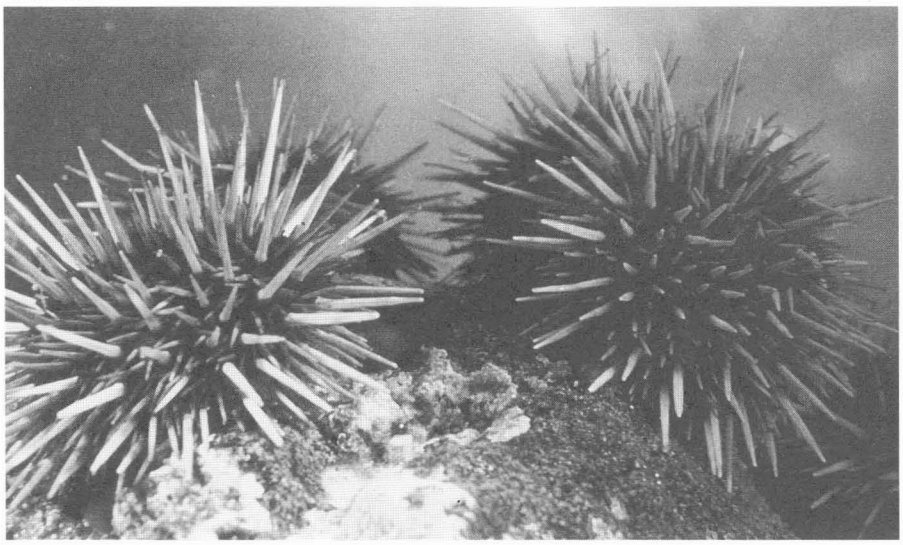
Hermit crab.

TEACHERS MAPPING FIELD TRIPS to the shore—as well as parents, other adults, and children at junior high reading level—will find a wealth of intriguing information about "the teeming stripes of life" between the tides in this well-written and illustrated small book. *Seashore Life on Rocky Coasts,* by Judith Connor, senior research associate at the Monterey Bay Aquarium Research Institute, is the latest in the aquarium's excellent natural history series. It guides the reader through communities "that are only slowly revealed as the tide eases out," and explains tides and other phenomena in clear, direct language. It also offers tidbits that will capture the attention of anyone, at any age. Here's a sample, courtesy of the Monterey Bay Aquarium:

A Prickly Situation

Pink and purple spiny sea urchins (*Strongylocentrotus* spp.) live wedged between rocks in the tide pool. Holding on with hundreds of tube feet, the urchins resist the water's surge. Each wave brings them bits of food that they can catch and eat. Their lower tube feet grip the rock, while their upper ones grab at drifting seaweeds. One urchin catches a loose flap of kelp and transfers it, tube foot to tube foot, to the mouth hidden on its undersides against the rock.

DAVID WROBEL



Sea urchins.

Single Parenthood

Proliferating anemones (*Epiactis prolifera*) in the low tide zone flaunt a rich, if revolutionary, sex life. The small and younger anemones are females. As they grow in size, they grow male organs too. In a proliferating population, the oldest, largest members are hermaphrodites—both males and female at the same time.

Older anemones set their own style of reproduction. One may use its own sperm to fertilize its eggs; another may use sperm from some other individual. The inbreeding anemone that provides both eggs and sperm ends up as both mother and father to its brood.

Tide Pool Thieves

Dozens of hermit crabs (*Pagurus* spp.) roam the tide pool, wearing the old shells of dead turban snails. The crabs won't wrestle shells from living turban snails, but they'll fight each other for a proper-sized shell found vacant.

The hermit crabs scramble on the anemone, immune to its stinging tentacles. Besides the armor offered by their borrowed shells, the crabs wear another line of defense. They steal bits of slime from the anemone and rub it on themselves. This slimy shield offers protection from the anemone's stings.

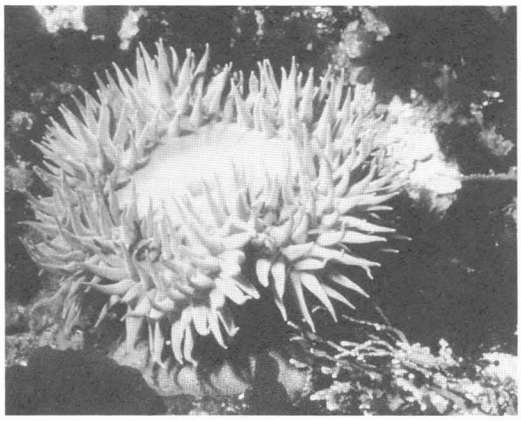
A Scavenger's Picnic

A kelp fly alights on a sunny rock. With a lunge, the [shore] crab [*Pachygrapsus crassipes*] grabs the fly and pops it in its mouth. The quick meal and hasty movement attracts the attention of other creatures; hungry gulls (*Larus* spp.) spy the crab. In a flash, a gull swoops in and nabs the crab, catching it by one leg. Bird and crab struggle, locked in a momentary battle.

The skirmish ends abruptly when the crab casts off its shackled leg and dives into a crevice . . . Slowly inching its way down the angled crevice to a tide pool lined with seaweeds, it seeks a haven from the birds while it grows a replacement leg. ■

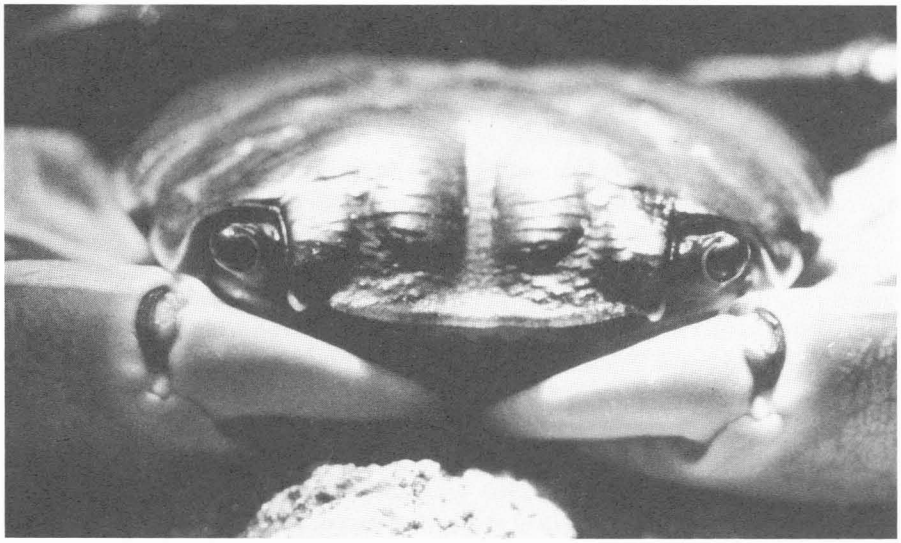
This 64-page book has over 90 photos, with index, and sells for $9.95. It is available at book stores throughout the state. Or one may order it directly by calling the Monterey Bay Aquarium Gift & Bookstore at (408) 648-4848.

STEVEN K. WEBSTER



Sea anenome.

TUPPER ANSEL BLAKE



Shore crab.

NOW AVAILABLE

California's Living Marine Resources and Their Utilization, *edited by William S. Leet, Christopher M. Dewees, and Charles W. Haugen. California Sea Grant, Davis, CA: 1992, $15.00, 257 pp*

Looking for a general reference guide to California's fisheries? You're in luck. California Sea Grant recently published *California's Living Marine Resources and Their Utilization*, a long overdue revision of a 1971 work of the same name published by the California Department of Fish and Game. The new book documents enormous changes in the state's fishing industry and provides a wealth of information on all major commercial species.

One of the most obvious changes is the decline in fisheries landings, which peaked in 1976 at 900.97 million pounds, but declined to 371.5 million pounds by 1991. This decline is in part due to the fact that tropical tunas, which once dominated landings, are seldom caught for canning in California today since the industry has moved to the eastern Pacific. A red sea urchin fishery started in 1972 and is now the state's leading fishery in dollar value, with virtually the entire harvest exported to Japan. Significant fisheries developed for widow rockfish, hake, and herring. And specialized new fisheries and aquaculture enterprises have begun.

Perhaps the reason it took so long to revise this book is that it is quite thorough. Chapter headings include marine plant resources, crustaceans, mollusks, other invertebrates, fish resources (with ten subchapters), aquaculture, underutilized species, marine recreational fishing, marine mammals, marine birds, and the economic utilization of ocean resources. An appendix gives the yearly landings in pounds for various species as far back as 1916. The index helps you locate individual species.

Among more than 200 authors and reviewers are leading experts from public agencies, universities, and private industry. Each chapter was peer reviewed. At the end of each section is the author's name and affiliation as well as a list of references for those seeking more information. Good quality black and white photos, bar charts, and graphs are sprinkled throughout. For a mere $15.00, you can't go wrong on this one.

To order, send $15.00 (includes tax and postage) to Sea Grant Extension Program, Dept. of Wildlife and Fisheries Biology, University of California, Davis, CA 95616-8751. Checks should be made payable to UC Regents.

Coastal Natural Hazards: Science, Engineering, and Public Policy, *edited by James W. Good, and Sandra S. Ridlington. Oregon Sea Grant, Oregon State University, Corvallis, OR: 1992, $15.00, 161 pp*

Coastal Natural Hazards: Science, Engineering, and Public Policy, a collection of the principal papers delivered at a conference of the same name held in October 1991 in Corvallis, Oregon, is designed to be a primer on the subject of coastal natural hazards for newcomers, whether they are local officials, property owners, realtors, or coastal visitors. For the most part, the papers are written in nontechnical language, with ample illustrations to help the reader understand such topics as the effects of an El Niño on beach erosion, planning and engineering approaches to hazard mitigation on the West Coast, successes and failures of public policy on development in hazardous areas, as well as earthquakes, and control of sea cliff erosion. (It includes some great pictures of expensive houses teetering on the edge.) References are at the end of each chapter. To order send $15.00 (includes tax and postage) to Oregon Sea Grant, Oregon State University, Administrative Services A402, Corvallis, OR 97331-2134.

Saving Point Reyes Seashore: An Oral History of Citizen Action in Conservation, *Regional Oral History Office of University of California, Berkeley*

The seven oral history interviews in this 390-page volume document the extraordinarily successful Save Our Seashore campaign of 1969-70, without which Point Reyes as we know it today would not exist. The book also constitutes a case study in citizen action for the protection of the environment. It is available for study at the Bancroft Library; University of California, Los Angeles; Marin County Library; the Point Reyes National Seashore; and other libraries. To order, send check for $83, plus $4.00 for shipping, to Friends of the Bancroft Library, Regional Oral History Office, 486 Library, U.C. Berkeley, Berkeley, CA 94720. Phone: (510) 642-3795. Allow three months for delivery.

Catalog of California State Funding Sources, *by Vera Nicholas. California State Library Foundation, Sacramento, CA: 1993, $35.00, 400 pp*

The fifth edition of the *Catalog of California State Funding Sources* contains information on more than 300 funding programs offered by state agencies to local governments, special districts, colleges and universities, and nonprofit or community-based organizations. Each entry details the purpose of the funding, type of assistance (grants, loans, subventions, technical assistance, and range of funding), who may apply, gives deadlines, and whom to contact. This $8\frac{1}{2}$ x 11-inch book is easy to read and use—it includes a complete table of contents and an index. To order, mail $35.00, plus $2.50 for shipping, and $2.88 for tax to California State Library Foundation, 1225 8th St., Suite 345, Sacramento, CA 95814.

Managing Wastewater in Coastal Urban Areas, by the National Research Council, National Academy Press, Washington, DC: 1993, $49.95, 350 pp

This report focuses on issues raised by sewage authorities seeking waivers from national minimum standards for treatment of wastes disposed into coastal waters. It recommends a policy of coordinated planning to manage all coastal water quality problems, from sewage to storm runoff.

Though compiled by a committee of the National Research Council, *Managing Wastewater in Coastal Urban Areas* is mainly a lengthy policy discussion. It provides relatively few data or analyses on many important topics for California's coastal waters, such as toxic and persistent pollutants, pollution prevention, or water conservation and reclamation. It does contain some interesting data and analyses on certain sewage treatment technologies, nutrients, and pathogens in its appendices, as well as some interesting statistics if the reader is willing to dig for them in its 350 pages.

Unfortunately, important perspectives, questions, and analyses are missing from the report's policy discussions. It recommends more flexibility in addressing exemptions from "secondary" sewage treatment requirements but does not analyze the differences between southern California, where so much money was spent seeking such exemptions, and the San Francisco Bay Area, where cities have already proved they are able to afford secondary and even tertiary treatment. It recommends coordination to address all significant sources of pollution in a watershed but does not discuss existing laws requiring "waste load allocations" for this same purpose, nor why they are so routinely ignored that one recent waste load allocation was said to be the first for a toxic element in any U.S. estuary. It endorses pollution prevention but does not analyze any industrial processes that produce less waste. It endorses economic incentives, but does not discuss investments in industrial pollution prevention despite the successful precedent of sewage treatment grant programs. It emphasizes runoff pollution problems but does not analyze the root cause of most toxics in urban runoff—automobile-dependent urban transportation systems.

For people with a great interest in secondary sewage treatment policy, this report provides some detailed perspectives about how to—in its words—"protect the environment while using it for waste disposal." I had hoped for a clearer expression of the difficulty of predicting ecological damage, a perspective that strives to prevent this damage, and more analysis of solutions that conserve water and prevent pollutants from entering wastewater and storm runoff.

To order, send a check for $49.95 plus $4.00 for shipping to National Academy Press, 2101 Constitution Ave., N.W., Box 285, Washington, DC, 20055, or call 1 (800) 624-6242. ■

Reviewed by Greg Karras, a biologist and director of the Clean Bays and Coastal Waters Program, Citizens for a Better Environment. He has been engaged in technical research and advocacy on pollution prevention and toxics for ten years.

RICHARD AVERITT

A volunteer with the BayKeeper probes an outfall on San Francisco Bay

Available from the Conservancy

- ***A Pocket Guide to California's Public Piers*** provides maps, directions, and descriptions of the public piers on California's coast and bays. This 30-page brochure is available at no charge from the State Coastal Conservancy, 1330 Broadway, Suite 1100, Oakland, CA 94612. Please send a self-addressed envelope with $0.52 in postage per copy.

- ***A Guide to State and Federal Funding for Resource Enhancement and Land Conservation*** is designed to help state agencies and nonprofit groups find public funds for their projects. For a free copy, write to the Conservancy at the above address.

HEAVY METAL

THE CITY OF SAN JOSE will invest $2 million to help local businesses recycle their water and reclaim heavy metals, and an additional $375,000 to launch a Pollution Prevention Center, in an agreement that settled a suit by Citizens for a Better Environment and the CLEAN South Bay coalition. The out-of-court settlement, announced June 30, is designed to keep heavy metals from flowing into the shallow southern reaches of San Francisco Bay. The San Francisco Regional Water Quality Control Board agreed to grant the city five years to implement the program before requiring it to comply fully with state and federal water quality standards for wastewater discharge. The city of Santa Clara is also party to the agreement.

THOMAS RUDE

In the suit, the plaintiffs alleged that the San Jose/Santa Clara Water Pollution Control Plan violated its discharge permit 700 times during a two-year period, from May 1991 to date, by permitting heavy metals to pass through its outfall pipe into San Francisco Bay. The plant is not equipped to remove copper, nickel, cadmium, and other metals used in the manufacture of circuit boards for computers and other local industries. The metals have entered the food chain to the extent that the state has advised pregnant women and children not to consume fish or ducks from the south bay. The pollution is also threatening the reproductive capacity of the endangered California clapper rail and led to the crash of the south bay's shrimp fishery. Elevated levels of copper have been found in the blood of bay harbor seals. Most of the heavy metal discharges originate with small businesses that lack capital to invest in recovery equipment, according to Denny Larson, spokesman for Citizens for a Better Environment. "They were

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Public Access Wins in Court

THE CALIFORNIA SUPREME COURT had good news this spring for private property owners who permit public recreational use of their lands, and for advocates of greater public access. In *Ornelas v. Randolph*[1] a rule of law that may have inhibited public use of private lands was clarified to provide greater protection of landowners from liability to those who may be injured on their properties.

The case broadened the application of California's "recreational use" statute, Civil Code Section 846, with respect to the type of property affected. Enacted by the legislature in 1963 to encourage private landowners to allow the general public to use their lands for recreation, Section 846 provides those owners with immunity from potential liability to recreational users except under certain conditions: there is no immunity (1) if the landowner willfully or maliciously fails to guard or warn potential users about dangerous conditions on the land; (2) if permission to enter the property is granted for consideration; or (3) where the injured party is expressly invited, rather than merely permitted, to enter the property. In keeping with the legislative intent, the immunity applies only where the injured party entered the property for a recreational purpose—it would not prevent a liability claim brought against a landowner by, say, a contractor, employee, or invited guest who is injured on the property.

While the language of the statute seems fairly clear, courts have applied additional limits to its application by holding repeatedly that the land in question must be "suitable" for recreational use. Most notably, they have been unwilling to grant immunity against injuries that occur on construction sites. The *Ornelas* case was brought on behalf of an eight-year-old child injured when playing around farm equipment and, following the construction cases, the lower court declined to grant immunity. This time, though, the State Supreme Court firmly decided that no such exception exists. The statute does not distinguish between developed and undeveloped property or between urban and rural land, and there is no requirement that the site be in a natural condition. What matters is the *use* actually made by the person entering: if it is for a recreational purpose (and the statute otherwise applies), the owner is immune from liability regardless of the condition of the site.

Of course, one feels badly for the injured child in this case. Unlike the children with whom he had entered the property, he wasn't playing on farm equipment but sitting nearby playing with a hand-held toy, when a metal pipe dislodged and fell on him. His mother had warned him not to play on the farmer's property, and per-

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1. A good source of information about Civil Code §846 is the Bay Area Ridge Trail Council's booklet "California's Recreational Use Statute and Landowner Liability." A new edition, revised in light of *Ornelas v. Randolph*, is expected to be available later this year ($2.75 including postage). Write to the Council at 311 California Street, Suite 300, San Francisco, CA 94104. Or call (415) 391-0697.

HEAVY METAL, continued

flushing their raw materials down the drain," he said. (This is legal under the terms of their discharge permits.) The new city program will provide loans to such firms to install source reduction and reclamation equipment.

A few companies have already invested in the new technology on their own initiative. Acteron Corp. of Redwood City, an electroplating company, has been recycling its process water and practicing other source reduction methods. Pat Burt, president of Acteron, estimates that savings in his water and sewer bill amount to $20,000 a year.

The new Pollution Prevention Institute will work on eliminating nonindustrial sources of heavy metal pollution. It will seek to have the sale of copper root killers banned from gardening centers, will work to replace corroding copper pipes, and will try to persuade San Jose not to use copper pesticides to rid its drinking water of algae. Meanwhile, the Regional Water Quality Control Board, and the city of San Jose will develop new restrictions on toxic sewer dumping. ■—RM

ACCESS, continued

haps he'd merely tagged along. Certainly this wasn't an appropriate place for children to play. But should the landowner therefore pay for the child's injuries? The court pointed out that application of the statute to open lands but not to those on which the owner has erected barricades or other impediments to trespass would unjustly penalize those who make efforts to safeguard their properties and public users from harm.

This decision should be helpful both to private landowners and to public access proponents by eliminating uncertainties about whether any particular property is or is not suitable for recreation. Owners need not fear liability to recreational users of arguably "unsuitable" lands, and may thus be more receptive to public access that the users themselves find desirable and appropriate. ■

—*Marcia Grimm*

The author is chief counsel for the State Coastal Conservancy.

BIRDS WITHOUT BOUNDARIES

Editor:
Thank you for mentioning the Western Hemisphere Shorebird Reserve Network (WHSRN) in your Winter/Spring edition of *Coast & Ocean*. I found the articles on the Pacific Flyway very interesting and well written. WHSRN, which now operates as an international program of Wetlands for the Americas, is still very active throughout the Western Hemisphere, working to identify major staging sites for migratory shorebirds and bringing them into an international network. Six major shorebird staging areas of the Pacific Flyway are currently members of the Network: Marismas Nacionales and Estero Rio Colorado in Mexico; Mono Lake, the Grasslands, and San Francisco Bay in California; and the Copper River Delta in Alaska. Several other areas have expressed interest in joining the network, including the Bay of Panama in Panama; Grays Harbor, Willapa, and Puget Sound Estuary in Washington; the Fraser River Delta in British Columbia; and the Yukon River Delta, Izembek Lagoon, Stikine River Delta, and Montague Island in Alaska.

To date, 21 sites in seven countries have joined the Network, protecting an estimated 30 million shorebirds and over 4 million acres of wetlands. Membership is based on biological criteria and the voluntary nomination of landowners/managing agencies. The international recognition received by these sites helps them to obtain support for conservation activities. WHSRN provides scientific, management, and other forms of technical assistance to the sites. WHSRN has also been successful in helping catalyze more than $10 million in support for sites in the United States and is currently helping secure substantial funding for several sites in Latin America.

Wetlands for the Americas, in addition to its wetland projects in South America, cooperates with the North American Waterfowl Management Plan as a major nongame partner, distributing the WA-authored *Shorebird Management Manual* and providing training to wetland managers on management of wetland areas for shorebirds and a diversity of other wetland species. The organizations that you listed as forming Wetlands for the Americas all have representatives on the WA council, but are only a few of the organizations represented.

Julie M. Sibbing
WHSRN Program Manager,
Manomet, Massachusetts

MODERATION FURTHERS

Editor:
I disagree with letter writer Gordon LaBedz's characterization of your Fall 1992 discussion of cattle grazing as "flippant." The article was quite thoughtful in pointing out that grazing is the best agricultural use of some land. It is Dr. LaBedz and other anti-cattle polemicists who are flippant about grazing. It may well be true that Americans eat too much fat, but it does not follow that all grazing is hazardous to our health and should be eliminated. Low-fat dairy products are an excellent source of dietary calcium for those who don't like the taste of kale and other leafy dark green vegetables.

He's also being flippant when he talks of manure in our streams, rivers, and coastal waters. Here in Marin County the Regional Water Quality Control Board has been very diligent in regulating dairy waste runoff. If his local water quality control board is not, he should look there for better enforcement of laws already on the books.

Yes, our health would probably improve if Americans ate more plants and less flesh. But no, there is no good reason not to eat dairy products or wear wool. I think *Coast & Ocean* made the point well that there are some areas that can be grazed and provide food and clothing, but cannot be tilled without environmental damage. The anti-cattle folks would be much more believable if they would

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concede that point, use their good arguments to educate the public about the dangers of eating too much meat, and focus on environmental problems of feed lot operations instead of open range grazing.

Sarah Cameron
Inverness

EVERY WETLAND COUNTS

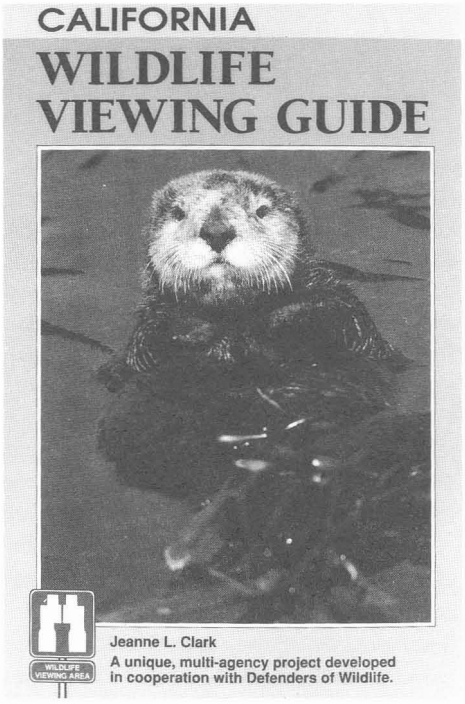
Editor:
Thank you for the outstanding issue on the Pacific Flyway. California's wetlands are critical for the long-term protection of the migratory waterfowl and shorebirds that are part of our heritage, and your coverage will help us to inform citizens and decision-makers about these interrelated natural values.

I would like to amplify the point made in the Winter/Spring 1993 issue that all of California's coastal and interior wetlands are equally essential for maintaining the biological system that includes the waterbirds and shorebirds. On the coast, in particular, we cannot treat one wetland complex as more important than another. The San Francisco Bay-Point Reyes-Delta complex provides habitat for more waterbirds at one time than do other wetland complexes, but it is important for readers to grasp that by the time those birds reach the central part of California they have already spent days or weeks in other wetland complexes farther north (or south, for the spring migration). The Humboldt Bay-Eel River delta complex (with instantaneous counts exceeding 100,000 shorebirds), Morro Bay, Orange County wetlands like Newport Bay, the Baja lagoons, and other coastal wetlands are no less important than San Francisco Bay in maintaining this interdependent biological system. The Pacific Coast and Central Valley Habitat Joint Ventures exist to secure long-term protection for wetlands and the wildlife that requires them. Unfortunately, the Joint Ventures do not cover all of California's wetlands of significance, and they require the commitment of interested citizens throughout the state to make sure that there will be wetlands for the waterfowl and shorebirds to return to in the future. I encourage *Coast & Ocean* readers to find out what they can do to secure protection for wetlands that are important to them and to this biological system.

Chad Roberts
Chairman, California Steering Committee, Pacific Coast Joint Venture

WATCHABLE WILDLIFE

Editor:
Rudolf Becking's comments on the *California Wildlife Viewing Guide* (Winter/Spring 1993) were for the most part very generous and helped underscore some of the guide's unique features. As he is a retired professor of natural resources, I can understand Dr. Becking's convictions regarding the wise use of natural resources and their cultural values, destructive land use practices, and other topical management issues. As an author who has specialized in writing about wildlife and management issues for more than a dozen years, I share his interest and concern.



However, the California guide is part of a national series of state-by-state guides, each with the same highly formatted structure—down to word counts for each section on a page. The subjects Dr. Becking mentioned were not overlooked: The national content guidelines and format rules do not allow for any lengthy treatment of these interrelated issues. Even so, several of his concerns were briefly mentioned in the front of the book and in text accompanying the illustrations.

More than a dozen federal, state, and private organizations supported the development of this viewing guide, and our prime goal was to make wildlife viewing easy: to take the mystery out of viewing wildlife by telling where to go, how to get there, what species to watch for, where to find them, and the best seasons for viewing. This, plus a photo, is a huge amount of information to pack into each page. The singular focus and the format rules did not allow space to cover broader conservation issues.

I'd like to mention an important aspect of the California Watchable Wildlife Project that was not noted in Dr. Becking's review: The federal Highway Administration has adopted a brown sign with white binoculars on it as a national wildlife viewing symbol. These signs will be placed on highways, city streets, and back country roads to direct people to each of the 150 California sites described in the guide, as well as sites in other states. Also, some of the proceeds from guide sales go directly toward other Watchable Wildlife Projects.

Jeanne Clark
Author and Project Manager, California Watchable Wildlife Project

MONARCH MEETING

Editor:
Thank you for your comprehensive, balanced, and up-to-date article on the monarch butterfly in California. *Coast & Ocean* readers may be interested in learning more about this special natural phenomenon. A northern California group will begin meeting in late summer to share current information, develop monitoring plans for each cluster site, discuss recovery plans, and continue public education on the monarch butterfly's winter homes in California. To receive meeting information, send your name and address to Mia Monroe, Muir Woods National Monument, Mill Valley, CA 94941.

Mia Monroe
Park Ranger, Muir Woods National Monument

Congratulations to Jim Nardi, of Mill Valley, who reported spotting an Atlantic green crab off Tiburon, in Richardson Bay, and thus earned a free subscription to *Coast & Ocean*. The crabs have been found in the southernmost reaches of San Francisco Bay north through San Pablo Bay. They have also been sighted in Bodega Harbor, according to Andrew Cohen of the Energy and Resources Group, University of California, Berkeley.

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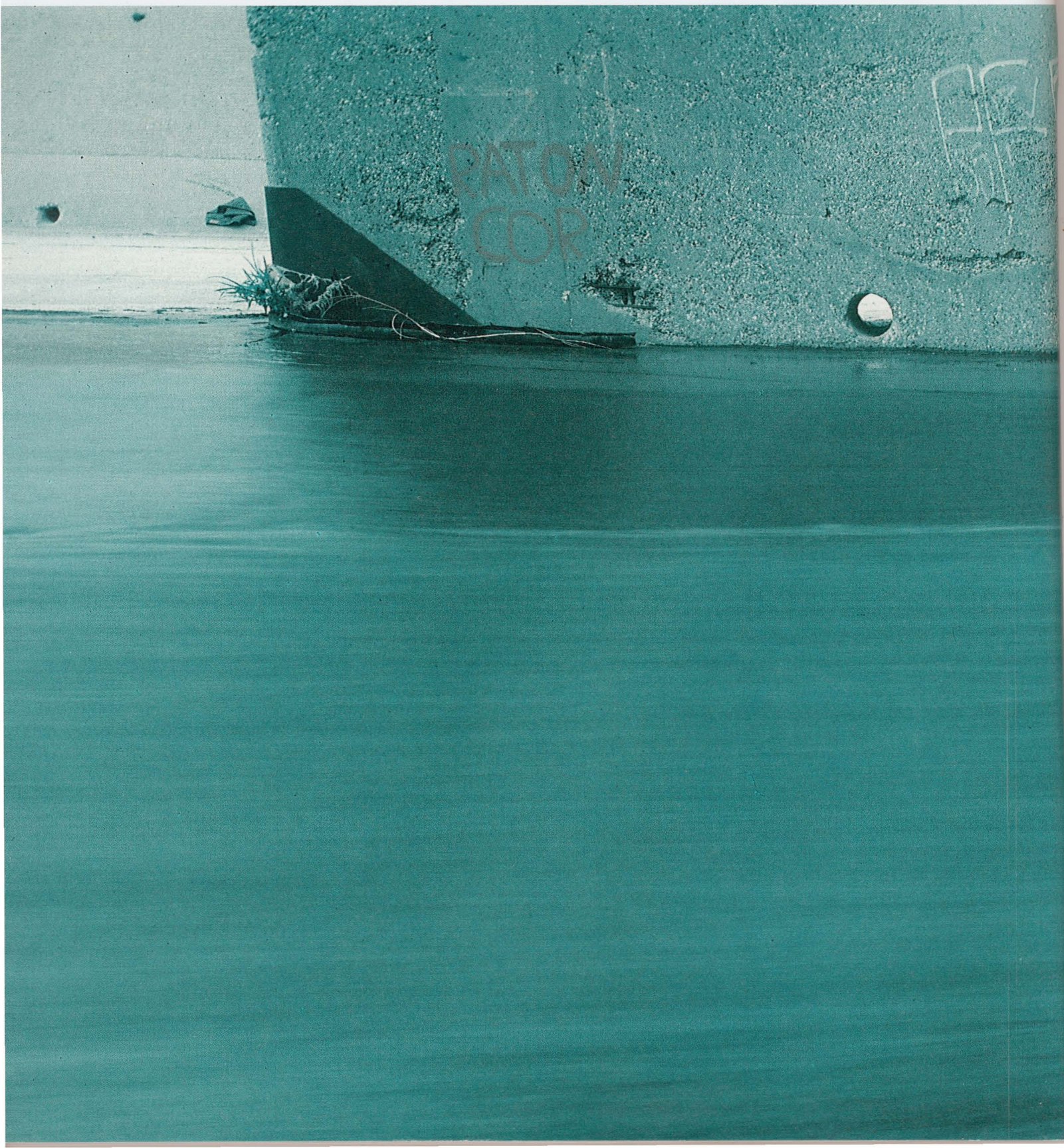
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