

It's taken brains, rain, muscle and money, but the state of the Estuary may have improved since 1992, according to a report released on the subject this October. The report describes the current status and health of the Bay-Delta environment and summarizes recent changes in scientific understanding and management of the ecosystem—drawing on the findings of the October 1996 State of the Estuary Conference. The conference and State of the Estuary report (see Now in Print) are part of the S.F. Estuary Project's ongoing efforts to educate and involve the public in protecting and restoring the Bay-Delta system. The following is an excerpt from the report's executive summary.

At the most basic level, the Estuary's "health" comes down to the state of its waters, wetlands and wildlife. Comparing today's (1996-1997) state to yesterday's (1992), there's both good and bad news. On the good side, we have enhanced, restored or protected (through public purchase) substantial tracts of wetlands; cleaned up and improved conditions in numerous creeks and watersheds; and reduced selenium, copper and rice pesticide discharges to waterways. Populations of endangered California clapper rails and winter-run Chinook salmon seem to have stopped declining, and may even be slowly increasing. Fish in Bay creeks are maintaining healthy populations. Waterfowl and shorebirds continue to stopover in large numbers. Freshwater flows for environmental purposes have been easier to come by with the wet weather.

On the bad side, the vital phytoplankton that sustains invertebrates and juvenile fish is being consumed at alarming rates by the invading clam *Potamocorbula*. The rate of invasions by such foreign species is on the rise, as is their alteration of benthic communities and fish assemblages. Meanwhile Chinese mitten crabs are creeping toward the Delta, where their burrowing could undermine levees, and Atlantic zebra mussels, known to clog water intakes, have appeared at our borders. Species-wise, take limits of the endangered Delta smelt at the water project pumps have been exceeded several years running, harbor seal populations in the Bay have not increased since governmental protections as have coastal populations, and introduced predators such as red foxes and feral cats pose increasing threats to sensitive shorebirds. Pollution-wise, levels of many contaminants frequently exceed water and sediment quality guidelines, and long-banned PCBs and DDT persist in the environment. Indeed, PCBs, dioxin and mercury have accumulated in Bay fish to levels that pose a human health risk. Politics-wise, the water wars—complete with threats, lawsuits and posturing over who's

continued back page to



Playing God in the Delta

If you're trying to recreate nature in a watershed where mighty rivers have been dammed and diverted, vast tracts of wetlands diked and filled, and wide reaches of floodplain planted and paved, where do you start? CALFED hopes its long-awaited plan for restoring the ecological health of the Delta, released in draft form over the summer, will help to answer that question.

The three-volume *Ecosystem Restoration Program Plan* (ERPP) includes more than 700 actions ranging from emulating natural patterns of freshwater inflow to the Bay to expanding the Delta's floodplain area and restoring Central Valley stream channel meanders. Among its provisions, the plan calls for the acquisition of 400,000 acre feet per year of water for instream flows, and the conversion of up to 250,000 acres from agricultural land to habitat. The plan is expected to cost \$1.5 billion, and take 20 to 30 years to implement.

The plan breaks new ground, says CALFED's Dick Daniel, in that it "shifts the paradigm away from single-species restoration to the restoration of ecological processes at a landscape level." The plan identifies nine ecological processes for protection, enhancement and restoration including Central Valley stream flows and temperatures, natural sediment transport, floodplain processes and the Bay-Delta aquatic foodweb. "We want to reintroduce all the processes that contributed to the creation of the Delta

and let them help us to reconstruct it," says Daniel.

The majority of the plan's actions will occur in 14 ecological zones, each characterized by predominant habitat types and species, stretching from the North Bay-Delta to tributary watersheds of the Sacramento and San Joaquin Rivers below major dams and reservoirs. Secondly the plan addresses the upper watersheds and the near-shore ocean.



"We want to reintroduce all the processes that contributed to the creation of the Delta and let them help us to reconstruct it."

Daniel says the CALFED plan is far more ambitious than previous restoration efforts in that "a major objective is the recovery and eventual de-listing of endangered species dependent on the Delta, not just the protection of remaining populations." The plan identifies 26 individual species of fish, birds, mammals, reptiles and insects for recovery and also calls for sustaining healthy populations of other fish, invertebrates, waterfowl and upland game.

Although the plan outlines specific targets for ecosystem processes, habitats and species in each of the 14 ecological zones, its architects acknowledge that there is still much that is unknown about the ecological workings of the Bay-Delta ecosystem. For this reason, they say, the plan's "adaptive management" approach to implementation is its most important feature. Adaptive management is defined as the adjustment of restoration actions in response to new information gained as the program goes forward.

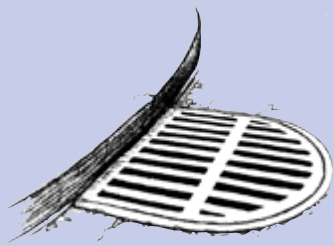
CALFED is the multi-agency program established by the 1994 Bay-Delta Accord to develop a long-term solution to the environmental, water quality and water supply problems of the Bay-Delta. The

continued page 8

BULLETINBOARD

TUNE-UP FOR THE BAY

"Fish can croak from secondhand smoke." No, that's not a headline from the latest ichthyological research into the effects of nicotine, it's a jingle from a new advertising campaign aimed at reducing pollution in the Bay. The "secondhand" smoke comes from cars, not cancer sticks, and the Bay Area Stormwater Management Agencies Association wants people to know that the gunk that spews from auto tailpipes eventually drifts down to the water. BASMAA's \$300,000, eight week campaign in running on local radio stations, urging people to tune their cars up and keep them running cleanly. Then hopefully it'll be "Bye bye black stuff, hello cleaner Bay." Contact: Sharon Gosselin (510)670-6547 o'b



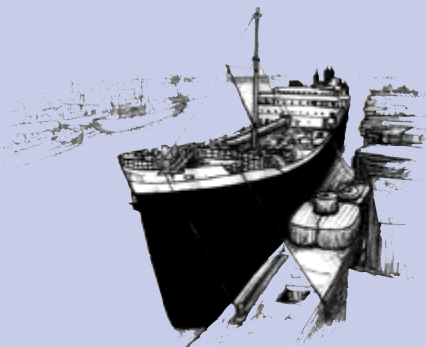
BREEDING DELTA SMELT

Scientists trying to create a supply of the super-sensitive Delta smelt for research found the effort initially difficult but technically feasible. To breed this threatened species, scientists had to mimic the conditions of its complex estuarine life cycle, in which adults live in brackish water and spawn in fresh water and where young go through a prolonged larval stage during which they return to brackish water and feed on microzooplankton. The project used two sites. Most broodstock were spawned and post-larvae reared to juveniles at the state water project fish facility, where the use of Delta water provides advantages of natural temperature fluctuation and a supply of natural zooplankton. Earlier developmental stages— egg incubation, hatching and rearing of larvae for 30 days— took place at U.C. Davis, aided by clean well-water and a temperature controlled recirculation system. Breeding began with the collection of immature smelt in the Delta in the fall, and the rearing of 498 brood fish at both sites in tanks over the winter. Natural spawning began in late March, and the

success rate at the state fish facility was much higher than in trials— 27,000 eggs were obtained compared to 5,000 in 1995. In June, eggs from the remaining ripe females at both sites were collected ("stripped") and fertilized in vitro. In the end, 40,500 eggs were collected, yielding 18,000 developing embryos and 10,700 hatched larvae. Most of these were transferred to glass aquaria for rearing in a temperature controlled water bath in which 80% of the water was changed daily and salinity was maintained at 5 ppt. Larvae were fed rotifers raised in monoculture on cultured algae. After 30 days, larvae were counted, measured and transferred to the state facility for further rearing. The mean survival rate from hatching to 30 days was 49%. Post larval smelt (age 30 days and length about 11 mm) are now being reared at the state facility in 120-liter flow-through circular tanks seeded with natural zooplankton and *artemia naupli*. In sum, the two most difficult challenges in Delta smelt culture remain the high sensitivity of mature adults to stress and the prolonged larval stage requiring live food. Contact: Joan Lindberg lindberg@jps.com (Excerpted from Summer 1997 IEP Newsletter). ARO

ALL'S NOT FAIR AT ARMY BASE

A proposal to hold an eight-month long world's fair at the decommissioned Oakland Army Base worries Port of Oakland officials. Backers say the base is ideal for their event, which they estimate will attract 23.5 million visitors in 2002. But the Port wants all 422 acres for new marine terminals. It also hopes to use dredge spoils to recreate wetlands in a Base inlet. The Port's John Glover recently told a city council committee that he as "very serious concerns" about the Expo, and the inlet's availability could "make or break" the Port's upcoming project to dredge a 50-foot-deep channel to accommodate ever bigger ships. Community groups have also requested



portions of the Base for their programs. o'b BUILDING ONE GRAND PLAN ON ANOTHER

CALFED need not reinvent every wheel, suggests a recent comparison between some of CALFED's water quality, water use, land use and research programs with the already approved and stakeholder vetted programs of the CCMP. The 26-page comparison between the CCMP (see cover) and CALFED's proposed programs was undertaken at the request of U.S. EPA Regional Director Felicia Marcus. EPA had been fielding requests from various interests demanding more of an interface between the still-evolving CALFED plans and the existing and hard-won CCMP, and it was time to get a better "handle" on their differences and similarities, according to EPA's Gail Louis. In the end, the comparison focused on four specific programs. "We zeroed in on areas we thought lacked detail and comprehensive planning, and suggested CALFED consider wholesale adoption of our actions," says CCMP Implementation Committee Chair Larry Kolb. Programs pertaining to fish, wetlands and wildlife were not compared due to the current evolving nature of CALFED's ecosystem restoration plan (see cover).

In terms of water quality, the comparison found that both the CCMP and CALFED recommend pollution prevention through source control, but means to accomplish the goal differ. The CCMP emphasizes regional, comprehensive planning for pollution prevention (i.e. a mass emissions strategy that develops waste load allocations) while CALFED targets selected pollutants and emphasizes improved discharge treatment. In terms of water use, both programs advocate water reclamation and recycling, support for BMPs for agricultural water management, and facilitation of voluntary water markets but the CCMP recommends improvements to the legal and regulatory framework and state groundwater management laws. In terms of land use, the CCMP suggests numerous changes to land use decisionmaking, and connects land use planning to watershed management and protection where CALFED does not. The comparison was shipped to CALFED this September in an effort "to focus our joint efforts on mutual goals," says Kolb. Contact: Marcia Brockbank (510)286-0780 ARO

LESSONS

RHETORIC AND REALITY: WORKING IT OUT AT THE LANDSCAPE LEVEL

Scientists trying to fill the gap between rhetoric and reality began critiquing the \$1.5 billion CALFED ecosystem restoration plan in mid-October, mirroring efforts by scientists around the country to grapple with the inherent difficulties—and opportunities—in taking on restoration at the landscape level.

Manipulating nature on a broad canvas is not new—but doing it to restore rather than alter natural processes is. The question that keeps coming up is whether it's even possible to restore an entire ecosystem. With a number of caveats, the answer seems to be, "yeah, more or less." But it may not be possible in every case. The obvious problems are political and economic. Often these are so glaring that they obscure the intriguing scientific issues. But large-scale ecosystem restoration is more than conflicts with developers, power companies or farmers. It is the indicator species for a revolution in scientific thinking, a way of looking at the world that emphasizes systems instead of single factors. In fact, the most common problem is that as these unprecedented efforts get underway, scientists and bureaucrats tend to fall back on a laboratory-style approach of isolating one factor, rather than looking at the system as a whole. Not only is this more familiar ground scientifically, but it is often politically expedient.

But chaos and complexity theory, which developed in the 1980s, indicates that living systems can't be chopped into parts; one simple action can produce a cascade of effects so variegated they're almost impossible to break down. To approach restoration—even simple restoration—it is almost certainly more productive to deal with processes rather than single factors, scientists now say.

It's a tough transition, says Bill Halvorsen of the National Park Service, who has shifted his work to landscape-level ecology over the past ten years.

"For the most part, I think that there's still an emphasis on, 'Let's go after one factor and try to get that one factor straightened out,'" says Halvorsen. "It might be something like an introduced species, and we're saying, let's go get that out of there. We can understand single

factor ecology rather than systems ecology. There's a lot of systems research, but not much implementation yet."

Scientists advising restoration projects around the country echo Halvorsen's criticism. But there are exceptions, projects that are ambitious enough to take on the interrelated elements that drive ecosystem processes. When the stars—and the federal funding—are in alignment, many scientists feel these projects have a chance. At the very least, they're confident that they're joining the right battle.

For instance, in the Everglades, work is already underway on a plan that scientists believe can result in the protection of a major portion of the ecosystem. CALFED's ecosystem restoration plan (see cover) may be even more ambitious. The \$1.5 billion plan, which attacks everything from timber practices to grasses, is regarded as part of a new generation of truly comprehensive efforts to reweave the fabric of nature—at least that part of it where the thread hasn't irremediably frayed. Clearly, the CALFED project was driven by competing demands for water, so the issue of flows looms large, but the scientific advisory panel that convened to assess the restoration blueprint in early October was impressed by its embrace of the Bay-Delta's complexity.

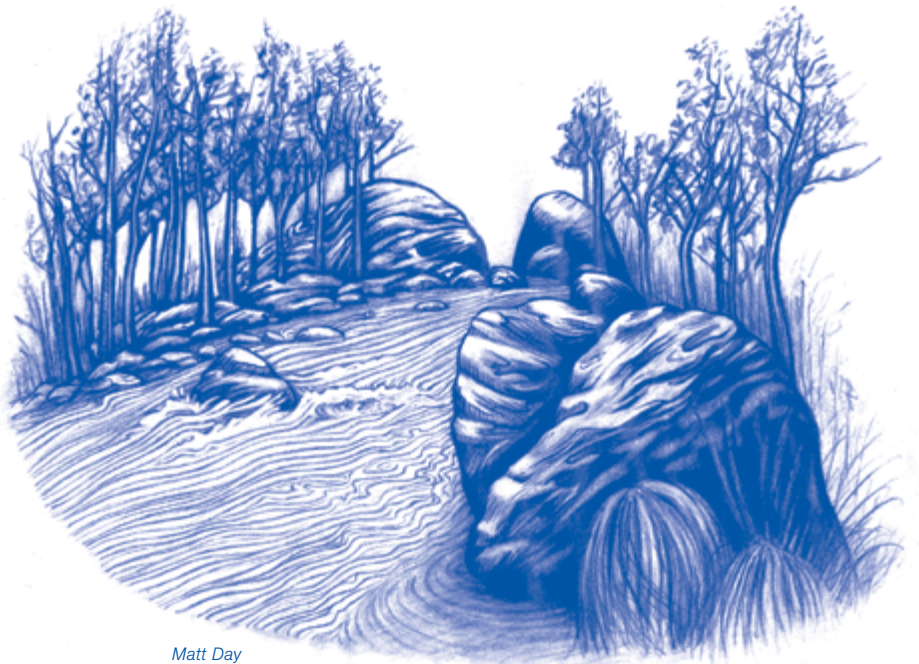
"They'd like to get away from single species or single factor science and try to approach this thing as an ecosystem," says Michael Barbour, a plant ecologist at U.C.

Davis. "This is enormously ambitious, probably the largest area to restore and rehabilitate, both geographically and economically."

Nevertheless, comments from Barbour and the other scientists on the CALFED advisory panel, which have not yet been formally released but were agreed upon in the October 8 meeting, reveal the tangled nature of the task. First, the scientists were disturbed at the proposal's confusion of the terms "restoration" and "rehabilitation." For instance, introduced species like striped bass are a major sportfishery in the Bay and Delta. The plan calls for enhancing these species, which doesn't qualify as restoration. Barbour and the others aren't necessarily telling officials it's a bad thing to pump up the striped bass, an effort that will help build support among sportsmen. But they are saying, let's make sure we recognize that this is rehabilitation, not restoration. Even if complete restoration—including extirpation of introduced species—were the goal, it wouldn't be possible, according to Dr. Jack McIntyre, another panel scientist and a salmonid expert from the Columbia River Basin who has worked extensively on watershed issues stretching from Oregon to Yellowstone to California.

"There's this document called the Delta-San Joaquin Atlas," says McIntyre. "It takes three and a half pages to list the exotic

continued page 6 "Lessons Learned"



Matt Day

HOUSEKEEPING

DERELICT BOAT REMOVAL

At high tide, you can barely see them. At low tide, they emerge from their muddy hideouts, ghosts of their former selves. But the derelict boats and old junks that have been clogging the sloughs and waterways of Redwood City have begun to disappear, thanks to the efforts of a grassroots team of citizens and agency officials known as "Operation Aqua Terra."

So far, approximately 30 abandoned sailboats, motor boats, barges and pieces of boats left to rot in the Bay's waters have been removed by Aqua Terra, with another 50 to go, says Louis Vella, co-founder of the task force. Aqua Terra convened a couple of years ago when the Redwood City Fire Department's Vella was approached by the Sheriff's Department about the derelict boats, which were creating navigational and other hazards in the waterways. Vella and others recruited support from the Port of Redwood City, the Redwood City Pride and Beautification Committee, the S.F. Bay Commission, the Coast Guard, the Don Edwards National Wildlife Refuge and other agencies.

"These waterways were like a lawless community," says Vella. "For years, any irresponsible person who had a boat that got old or dilapidated just left it there, sitting in the mud or water." With the help of the Bay Commission, Aqua Terra found a marine salvage company that had been fined for some illegal operations (but could not afford to pay), and had it remove 23 boats. A sunken barge was removed by its owner. Community clean-up days were organized and trash removed from nearby levees. "We're making the statement that this will no longer be tolerated," says Vella.

The Redwood City police recently acquired a new boat, donated by a Florida law enforcement agency, that will help Aqua Terra patrol the waterways, and a \$400,000 grant from the Integrated Waste Management Board will help fund future cleanup efforts. The group is also working to strengthen the port's existing mooring ordinance and to pass legislation authorizing stiffer fines for anyone abandoning a boat. "We have this valuable natural resource here that very few cities have," says Vella. "But it was becoming an eyesore and a navigational hazard. We had to ask ourselves, 'Is this what we want to greet our visitors with?' Contact: Louis Vella (650)780-7452 **LOV**

PARTICIPATION

BACKYARD WATER POLICY?

California's water policy debates should be accessible and relevant to more of the state's diverse society concludes a new report from the Pacific Institute. According to the report, *Our Water, Our Future: The Need for New Voices in California Water Policy* (see *Now in Print*), today's major water policy discussions represent the concerns of environmentalists, large agribusiness and urban water agencies, while leaving out the voices of low-income and minority communities.

"Public water agencies need to include the general public in their decision-making, not just the primary stakeholders," says Santos Gomez, co-author of the report. "While CALFED is going to great lengths to inform the public and increase public awareness of the need for a Bay-Delta solution, its public education campaign is largely designed to influence policy-makers rather than get real public feedback."

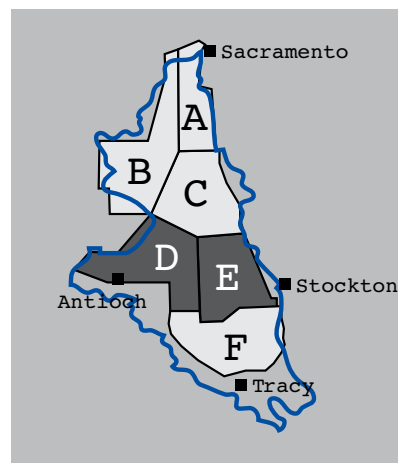
However, some who have worked in public involvement say bringing members of low-income and minority communities to the table is a challenge. "Involving these communities is very important but very difficult," says the S. F. Estuary Project's Marcia Brockbank. "We have tried to get minority representation on our committees, but have not been very successful."

This is not to say that many low-income communities are not intensely interested in water issues. According to Luke Cole of the Center on Race, Poverty and the Environment, poor, rural communities often have inadequate sewer systems and shallow wells that are susceptible to contamination. Cole cites several instances where poor communities have organized effectively to improve their water supply and quality.

"When we're talking about backyard issues you can get very good participation, but large-scale water policy is very remote and doesn't seem to have a direct effect on people's lives," says Brockbank. Torry Estrada of the Urban Habitat Program says that one obstacle to broader public involvement is that most community groups tend to focus on environmental issues such as neighborhood toxics sites that pose more immediate threats to communities. "The connection between water and community health issues really has not been made," he says.

The Pacific Institute's Gomez agrees. "Community leaders need to make the link between water and overall well-being," he says. "We need to engage community leadership in discussions on a regional or

DELTA SURVEY ZONES



statewide basis. We may also need to consider the establishment of a statewide environmental justice coalition that makes water policy a priority."

CALFED's Judy Kelly says she thinks the agency probably could do more to target community leaders. "As a public process, CALFED has an obligation to reach out to all communities," she says, noting CALFED's primary documents are being translated into Spanish. She adds, however, that the programmatic nature of CALFED makes it difficult to answer questions about the exact effects decisions will have on specific local communities.

The report also cites the structure of public meetings themselves as an obstacle to involvement. "There are questions about how open and accessible meetings really are," says the Sierra Club's Jenna Olsen, citing location, language, and the intimidation factor as possible barriers. "The format for public meetings makes people feel like they have to be an expert in order to speak," she says.

The report is light on concrete recommendations for increasing public involvement. Gomez says this is because he and his colleagues have not yet had an opportunity to learn from the communities in question what kinds of strategies would be most useful. This winter, the Pacific Institute will collaborate with the Environmental Water Caucus to hold a series of regional meetings in low income communities to raise awareness of CALFED, CVPIA and water issues in general, and try to answer these questions

The lack of low-income and minority involvement in the CALFED process may be symptomatic of a larger problem. "It's not fair to say that these communities are not interested in water issues because CALFED's not on their horizon," says Cole. "CALFED's not on anybody's horizon. There are only really a handful of people in the state who know anything about it." Contact: Santos Gomez (510)251-1600 **CH**

RECREATION

DELTA WATERS SUSTAIN BOATERS AND ANGLERS

Starlight and still waters attract not only lovers but anglers. A survey of anglers who frequent the channels and banks of the Delta's 700 miles of waterways found that 38% had fished at night. The newly released survey, prepared for the Delta Protection Commission and Department of Boating and Waterways by the California Department of Parks and Recreation, asked 10,000 registered boat owners and 10,000 licensed anglers what types of recreation they enjoyed where and when in the Delta. It also evaluated their satisfaction with marinas, parks, campgrounds and other facilities and identified changes in recreational activities over the last five years.

"One of the biggest changes is the advent of the personal watercraft," says the Commission's Margit Arambaru. According to the survey (see *Now in Print*):

- The two most common vessels owned used in the Delta were powerboats (69% of respondents) and personal watercraft (15%). The latter, better known by their brand names Jet Skis and Sea-Doos, are a fairly recent phenomena. Most of the powerboats range from 16-20 feet in length.
- Pump-out toilets were reported on 87% of houseboats, 68% of sailboats, and 15% of powerboats. Such toilets—pumped out into onshore sewage systems at marinas—help maintain water quality.
- Fishing proved the most popular activity from a boat (77%), with an average group size of 2.8 people participating in the activity for an average of 14 days per year. The second most popular activity was cruising (76%). Beyond boating and fishing, the most popular activities were sightseeing and viewing wildlife.
- Every year, Delta users engaged in a total of 7.1 million days or portions of days of boating. Most boating takes place on weekends between May and September.
- Most boating and fishing activities occurred in Zones D (west Delta—see map) and E (east Delta). Part of the reason for this is the number of marinas (52 in D and 17 in E), public boat launches (3 in D and 11 in E), fishing access points (16 in D) and recreation areas (Brannon Island in D), as well as Zone D's proximity to highways and populated areas. Zone D also proved the most popular location for



hunting on land, watching wildlife, picnicking, windsurfing, visiting historical sites and walking for pleasure.

- Over half the boaters felt that public restrooms, courtesy docks and shoreline areas accessible to the water were less than adequate, while launch ramps, fuel docks and marinas were adequate. Anglers agreed that public restrooms were in short supply, and felt that fishing piers and fish cleaning stations could be better and more plentiful.
- Boating groups spent an average of \$139 per trip inside the Delta on lodgings, refreshments, supplies and activities, and fishing groups \$95 per trip.
- Over 75% of both boaters and anglers observed law enforcement patrol boats while out on the Delta.
- Changes in recreational activities over the last five years were fairly minor. For boaters, boating and camping showed a slight decline, while windsurfing and bicycling showed a slight increase. For anglers, drops in participation were most precipitous for fishing, swimming and board sailing. Hunting had the biggest declines in both groups.

"The survey points out that our Commission needs to pay more attention to support facilities for recreation," says Arambaru. One way these may be provided is through \$1 million in Proposition 204 dollars in local government grants for recreational improvements to the Delta—applications due this December. "Hopefully, the grant applications will be reviewed by Parks and Rec. with the survey in mind," says Arambaru. Contact: Margit Arambaru (916)776-2290 ARO

YOUR LETTERS

DEAR ESTUARY,

The misleading format of the article "Herring Pickles" (June 1997) was most disturbing. The opening sentence blames the use of creosote piling for killing herring eggs in the Bay, implying it is a major cause of the population declines observed in recent years. It is not until one is well into the article that it is pointed out that the researchers, upon whose studies the article is based, concluded that creosote treated wood "...may be a much less significant factor in herring reproductive success than the salinity of Bay waters." As an organization dedicating to furthering good science and understanding the relationship between treated wood and the environment, we are dismayed by this attempt to place blame where it does not belong.

The intended purpose of piling, whether it be coated steel, concrete or one of several types of treated wood is not to provide spawning habitat. It should be no scientific revelation that creosote pilings are not an acceptable habitat for spawning herring. Creosote is a toxic substance impregnated into the wood to discourage marine borers and other organisms that would quickly destroy untreated wood. Properly treated wood lasts for decades, helping us to use forest resources sustainably. It should be pointed out that the use of creosote treated wood peaked in the 1940s, when herring and salmon populations were in much better condition and that the product's use has steadily decreased since—hardly a correlation in support of the theory that creosote is causal in the herring population problem. The tiny portion of the spawn lost to piling is inconsequential. If the editorial staff of *ESTUARY* is truly concerned about our herring resources, then it should focus attention on creating good eel grass and macro-algae habitat as well as on reducing Bay salinity to historic levels suitable for herring.

DENNIS HAYWARD
WESTERN WOOD PRESERVERS INSTITUTE

DEAR ESTUARY,

[Your article on Coneheaded Fish Screens (August 1997)] glaringly failed to identify Russell M. Berry, III, founder and principal of Intake Screens, Inc., as the inventor of the device. Mr. Berry has an application pending for issuance of a patent for the self-cleaning intake screen, and Intake Screens, Inc. is manufacturing and supplying these products to Mr. Borcalli's firm for use on the project described in your article.

TIMOTHY A. LUNDELL
REPRESENTING INTAKE SCREENS

Editor's Note: Berry acknowledges Borcalli's role in the conceptual design of the screen but wishes to clarify his own role as inventor and builder of the actual product.

LESSONS LEARNED CONTINUED

species of vertebrates and invertebrates in the Sacramento Delta. I had no idea there were this number of exotic critters. The fish list alone is nearly a page. They'll never get rid of them. The best they can hope for is to alter the ecosystem to the point where these fish don't do very well and it's more favorable for the natives."

McIntyre's comments show the kind of systemic approach that was urged by the panel. The second point they made was that the CALFED cooperators should simplify and focus the restoration effort. The development of conceptual models—which resemble flow charts—can help managers get the most bang for their buck. This is especially important in a plan as ambitious as CALFED's. "The system is complex," said Barbour, "but as people, there are only so many levers you can pull."

Third, the panel is pushing for independent scientific advisors to avoid conflicts of interest. "It's relied heavily on agency science," said Barbour. "It should not rely so heavily on agency and stakeholder input. We imagine scientific input might take the form of some sort of advisory body of scientists that would not meet occasionally, but would be available for continual consultation. The role of this body would be to facilitate the introduction of science to management."

Fourth, Barbour and the other scientists are urging CALFED to put in place a system for monitoring the accuracy of its conceptual models. This takes the restoration plan's adaptive management approach—the commonsense idea that you look at the effects of what you do as you go along and change the plan accordingly—one step further.

According to Barbour, officials were relieved that the science advisors didn't ask for detailed statistical models, which would have been far more labor-intensive. The reason for the emphasis on conceptual models, Barbour said, was to push the analysis toward an ecosystem approach rather than getting bogged down in small-scale number crunching.

If it weren't obvious already, the panel's call for establishing independent scientific oversight reveals the biggest barrier with large-scale ecosystem restoration—the fact that money and politics can paralyze the entire effort. That's exactly what's happened in the multi-state Columbia River Basin, according to McIntyre.

continued page 7

HABITAT

STRETCHING THE SHALLOWS

"Shallow water habitat" is the latest buzzword on the restoration scene, with CALFED (see cover) planning to create or restore approximately 20 miles of sloughs and 12,000 acres of shallow water in areas like the Delta, Suisun Bay, San Pablo Bay, the Napa River, Sonoma Creek, and the Petaluma River. Despite the big buzz on the shallows, however, scientists and planners still seem to be struggling to define and understand their role in the grand scheme of life in the Estuary.

"It's almost like a cult has developed around the idea of shallow water habitat," says the Department of Water Resources' Leo Winternitz, part of a new interagency team tracking shallow water habitat restoration. "Lots of questions and assumptions are being made. But I haven't seen any indication that just because you restore all this stuff everything will come back."

So what exactly is shallow water habitat? At the most basic level, it can be defined as water less than 2 meters (about six and a half feet). This is one reason not much is known about it, since most research vessels can't negotiate water less than 10 feet deep. Beyond the commonality of its depth, shallow water habitat can be tidal or non-tidal, perennial or seasonal, salty, fresh or brackish, or vegetated or non-vegetated. The term also refers to channels, sloughs, and dead-end sloughs. All shallow water habitat is assumed to be important for fish.

"During the last five years shallow water habitat has become a big issue, especially with regard to declining species," explains Winternitz. "In the '60s and '70s conditions were pretty good in the Delta. How much shallow water habitat has been lost since then? Not that much—the real losses occurred before the 1960s during the days of Delta reclamation."

Winternitz questions whether restoring shallow water habitat is a panacea to our endangered species problem. "Will we get our target species back or a greater abundance of introduced species? Striped bass like shallow water too. Some people want to swap existing wetlands for tidal shallow water habitat—wetland versus wetland. I don't know if that's good either," he says.

What biologists and ecologists do know is that, depending on their needs and

adaptations, many fish, birds, and other wildlife will use shallow water. BurRec's Larry Brown explains that species like splittail seem to require flooded river floodplains upstream of the Delta (such as the Yolo Bypass) for successful spawning, while Delta smelt use shallow water habitat lower in the Delta, such as Cache Slough, and splittail juveniles, tule perch, and prickly sculpin prefer dead-end sloughs—quiet backwaters thought to be particularly valuable for native fish.



Because they are both preferred by native fish and have been especially degraded in the estuarine system, dead-end sloughs may be one of the most important types of shallow water habitat to restore. But the name "dead-end slough" is misleading, explains UC Davis' Peter Moyle. "They are not at all 'dead'; they're full of life. Nor do most of them just end. They're called 'dead-end' because you can't go any further up them in a boat. But there are often streams flowing into them," he says. Moyle has sampled the sloughs in Suisun Marsh and found high concentrations of native fish in them, particularly younger, smaller fish. "They seem to prefer these areas because they're complex habitats with lots of cover (like tules and partly-fallen trees), and food concentrated there," he says.

A few sloughs, like Hog Slough in the Delta, do actually dead-end, Moyle says, but they are also very rich habitat for fish. Temperatures in these shallow sloughs tend to be warmer, which attracts species like large-mouth bass and sunfish.

Restoration of sloughs offer hope for native fish recovery because, as Brown puts it, "that's what used to be there." Shallow water habitat restoration is relatively new but not untried. Several Delta islands are now being flooded for this purpose. On the North Delta's 1200-acre Prospect Island, the January 1997 storms breached the Miner Slough levee in two locations, flooding the area. Project managers are now helping the site along by creating channels and internal islands. In the west and central Delta on Donlon and Venice Islands, shallows were created using dredge spoils to achieve the desired two meter depth. According to Winternitz, informal surveys show that fish and wildlife have begun using these areas and the new team will be watching closely for other progress.

Contact: Larry Brown (916)978-5043 or Leo Winternitz (916) 227-7548 [LOV](#)

HISTORY

BACK TO THE FUTURE

Back before high dams and long levees imprisoned and straightjacketed the rush of water from the mountains to the ocean, the Estuary functioned in an entirely different way. A soon-to-be released analysis of pre- and post-development conditions explores how the estuarine and watershed ecosystem has changed since the 1850s, and more specifically what its key natural characteristics were before humans put their stamp on the scene.

"Learning how the system functioned historically can help tell us what's necessary to restore, what we may only be able to rehabilitate, and what's been irretrievably lost," says Gary Bobker of the Bay Institute, which undertook the analysis with the Environmental Defense Fund. Their purpose was to provide CALFED with an ecosystem-based framework for prioritizing, integrating and evaluating its massive, multi-million dollar restoration plan (see cover). "This is nothing new, in terms of information on historical changes. What's new is that instead of looking at each cause and effect, we've tried to construct an integrated history, and discover how changes over time may have limited the ability of the system to sustain itself."

The biggest changes to the system took the form of "a one-two-punch," says Institute hydrologist Peter Vorster. The first punch wiped out a big chunk of fish and wildlife habitat. It occurred in the late 19th and early 20th century, when farmers and settlers drained ("reclaimed") Delta wetlands and river floodplains in order to put down roots — dramatically reducing the watery reach of the ecosystem and binding natural flows between unnatural levees. The second punch not only further confined the great rivers but also exported large amounts of water out of the system. Indeed since the 1920s, huge

flood control projects, water diversions and long distance aqueducts have cut off the rivers from their flood plains and rearranged the whole flow pattern of the ecosystem.

"The first punch occurred because the valley had too much water, and the second because there wasn't enough water elsewhere in California where the cities and farms developed," says Vorster. "The dams had the biggest impact in terms of alteration of the hydrograph because they dramatically reduced spring flows and increased some summer flows. Water now shoots down into the Bay much faster than it would have naturally. Some rivers now totally dry up at some times of the year. At the landscape scale, much of the underlying connectivity and geophysical support for essential structural characteristics and ecosystem processes has been disrupted."

The analysis goes on to link these changes to various responses in the ecosystem. For example, alteration of flooding, levee construction and land use changes almost totally eliminated the Delta's once dominant tule marshes. Similarly, the big dams cut off more than 90% of the historical spawning habitat of the system's once abundant salmon runs.

The analysis—due for release later this year—is just one piece in a three step effort to provide a firmer theoretical foundation for restoration planning, says Bobker. The first step was development of a set of indicators of ecosystem health—now being refined—the second, the historical analysis, and the third, a series of recommendations as to what extent key functions of the system can and should be restored.

The enviros would like to see a more intense focus on restoring the system's underlying physical processes and natural flow patterns. "We need to find the flows and the land for the rivers to flex their muscle," says Vorster.

They'd also like to see a series of habitat reserves throughout the ecosystem that are large enough to have diverse benefits and are carefully connected to other reserves so there are no "choke points" in the system, says Bobker, and so the "fish fry don't fry" on their way from one reserve to another, says Vorster.

"CALFED's current restoration targets are based on protecting the status quo," says the Defense Fund's Rod Fujita, "and many of the targets are disproportionately small compared to the extent of habitat degradation that occurred according to our analysis."

Contact: Rod Fujita (510)658-8008 [ARO](#)

LESSONS LEARNED CONTINUED

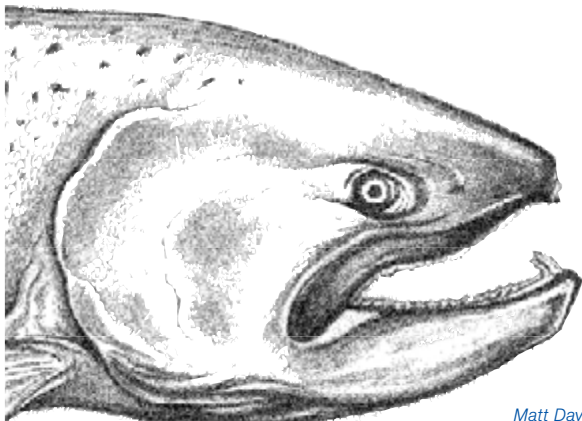
"The Northwest Power Planning Council started its restoration program in the early 1980s and it's spent \$3 billion," says McIntyre. "Right now we have more fish on the endangered species list than we did when they started. That doesn't seem to say too much about how well we're able to do this sort of thing."

Although environmentalists focus on the issue of dams on the Columbia, Rick Williams, a Boise, Idaho consultant who serves on the scientific review team for the Northwest Power Planning Council, says the watershed was degraded almost a century ago by logging. At this point, though, the dams that line up along the enormous river like freight cars are proving to be the last straw for many of the region's anadromous fish. All of Idaho's anadromous fish are either listed as endangered or proposed for endangered or threatened status. Spring and fall chinook are endangered, sockeye salmon exist in only one location supported by a captive broodstock, the bull trout has just been listed as endangered, the redband trout is proposed for listing, the coho salmon is extinct, and the steelhead is proposed for threatened status.

"The further upstream you go, the more endangered the stocks," says Williams, adding that fragmented jurisdiction is one of major impediments to meaningful restoration in the watershed. "Nobody's really in charge. There are a whole bunch of people who have various authorities and responsibilities, but no one governing unit that can say, 'The buck stops here,'" he says.

The problem is not just the morass of regulatory agencies—52 in all—that have some say over the Columbia River watershed. It is even more specific than the classic Western water rights tangle. On the Columbia, the political influence of power companies is as ubiquitous as the dams that line the waterway. Power companies also dominate the economics of the Columbia Basin restoration effort. Of the \$435 million annual restoration budget, half goes to the Bonneville Power Administration, which gets to charge for water that has been "lost" to fish restoration and is permitted to subtract loan payments for capital costs of dams. The result is that only \$100 to \$160 million is spent on restoration.

continued page 8



Matt Day

LESSONS LEARNED CONTINUED

Even this sum isn't always spent effectively, says Williams. In the Columbia Basin, fisheries managers, including state officials, actually decide on which project gets funding. The result of that setup is that often the status quo—which consists of an antiquated reliance on technological fixes, such as hatchery breeding—takes precedence over managing for biodiversity. "We all operate by consensus, so we can dwindle things down to the lowest common denominator," says Williams.

Nevertheless, Williams and his colleagues released a report in 1996 called *Upstream*, which recommended cutting in half the John Day Dam's reservoir—the longest on the river at 79 miles. There is only one dam separating the John Day from the Hanford Reservation. Ironically, the former plutonium processing plant contains the last freeflowing healthy chinook habitat.

"One of the points we try to make—and it sounds almost ludicrously commonsense—is that if you want to recover fish, you've got to give the fish more river," says Williams.

"We said we can improve salmon production a little bit by improving flows. But if people want a big gain, they had to be willing to talk about removing dams. Of course, everybody thought we were nuts. But now they're talking about it."

If the Columbia Basin restoration effort hasn't yet cracked the economic system that keeps the river down, the Everglades could be considered the counter-argument, indicating that ecosystem restoration on a large scale may indeed be possible. It's probably no coincidence that the problem in the Everglades is too much water, a concept that seems almost surreal to anyone who's worked on water problems in the arid American West.

The abundance of water causes its own problems in the Everglades—notably flood control releases during unusual storm events that interfere with bird nesting and breeding—but they may not be as intractable as those caused by aridity in the hardscrabble West. What also works in favor of the Everglades is the fact that so much of the ecosystem—1,507,850 acres—is a national park and the park is 90% wilder-

continued page 9

CALFED PLAN CONTINUED

public comment period for the draft ecosystem plan was scheduled to end on October 14. The final plan will be included in the draft Environmental Impact Statement for CALFED's Preferred Alternative, which is scheduled to be released for public review later this winter.

SITTING IN JUDGEMENT

Among the stakeholders in the CALFED process, reaction to the plan has been predictably mixed. "It's the best game in town," says Friends of the Estuary's Elizabeth Patterson, adding that she thinks the plan's greatest strengths lie in its ecosystem-wide approach. "The plan is trying to restore function to rivers and the Estuary while looking at water quality in a watershed context. It also includes some immediate restoration plans that are consistent with the CCMP," she says. The CCMP is the *Comprehensive Conservation and Management Plan* for the Bay and Delta approved by government leaders and diverse interests in 1993.

One of the best things about the plan is that much of its \$1.5 billion price tag has already been funded, according to Greg Zlotnick, who has been close to the CALFED process and now serves on the Board of Directors of the Santa Clara Valley Water District. Proposition 204, approved by voters last fall, designated \$390 million for plan implementation, and on September 30 Congress approved \$85 million in federal matching funds for fiscal year 1998. In addition, says Zlotnick, Category 3 funds established under the Bay-Delta Accord "provide funding for the early implementation of projects consistent with the ERPP."

Not everyone is impressed with the plan. One widespread criticism is that despite its large geographic scope, the plan shortchanges the Central and South Bay. "It's an incomplete document in that it is supposed to be an ecosystem-wide plan and it goes to the headwaters but not the bottom waters," says the Audubon Society's Arthur Feinstein.

Despite his general enthusiasm for the plan, Zlotnick agrees. "We believe that if a species is of concern in the North Bay and Delta, then it is in the South Bay as well. Also, if the South Bay ecosystem is strong enough that we don't have to put additional water into it, that will help to reduce stress on the Delta. Finally, we put in restoration money and we'd like to see some of that come back to work for

fish here too" (Santa Clara was the only Northern California district to make a second contribution to Category 3).

"Our mission is to restore the ecological health of the Delta," explains Daniel. "We just did not find a nexus between the biological and physical process of the South Bay and the Delta. But if we do find one, we are certainly open to expanding the focus area."

Many environmentalists believe that even within its focus area, the plan doesn't go far enough. "This is not as massive a step as it's being bandied about," says Feinstein. "The restoration in the plan is a drop in the bucket compared to what we've lost. For example, the plan promises 150,000 acres of wetland restoration in the Central Valley, but compare that to the 6 million acres that we've lost. To say that this restores the ecosystem is a gross exaggeration."

The Bay Institute's Gary Bobker agrees. "The riparian habitat and wetland acreages fall short of large-scale restoration numbers, although they are certainly not trivial" he says. "In terms of what we've identified as potential restoration areas, the numbers are small."

Others think the numbers are too big. "These recommendations would have a dramatic effect on agriculture in the Delta," says Margit Aramburu of the Delta Protection Commission. "They would convert a minimum of 110,000 to 140,000 acres of agricultural land to habitat, and we think this could have very detrimental socio-economic effects on the Delta and surroundings." Her Commission feels that the recommendations may even violate CALFED's principle of not displacing impacts.

Some are also concerned that the plan doesn't include enough species. For example, "They've left out the San Pablo Bay song sparrow and the saltmarsh yellow throat, and there aren't enough plants," says Audubon's Barbara Salzman.

"There are many more species that it would have been nice to include," admits CALFED's Terry Mills, a major architect of the plan. "The species we selected had to be manifest as problems in the Delta." Mills acknowledges that the plan is weak on plants and plant communities, but says new sections on plants will be included in a later draft.

Other plan critics object



Matt Day

fundamentally to its species recovery goals, according to CALFED's Daniel. "Some water managers on streams where we may want to repatriate steelhead are not happy with the plan," he says. "They'd just as soon not bring the fish back, because whenever you have endangered species present you have regulatory headaches."

Others would like to see regulation beefed up, especially with regard to land use. "Land use in the watershed will determine the success of the restoration plan. It should address the land use action plans in the CCMP, such as requiring CEQA to specifically assess the effects of new development on the Estuary and requiring that city and county general plans be consistent with the CALFED solution," says Elizabeth Patterson. "It's politically difficult but CALFED is the best window of opportunity we have had for getting at these issues."

Greg Zlotnick says these criticisms are misplaced. "There are interests who are looking to use CALFED to get at overall water use in California, but that is a separate issue from ecosystem restoration. Growth management is not what this program was designed to deal with," he says.

PARTING THE WATERS

Daniel says he expects the most controversy over the plan's proposals for instream flow volumes. The 400,000 acre feet per year of water the plan calls for would be acquired through a combination of water management, purchase from

willing sellers and new water supplies (such as conjunctive use or recycled water), rather than through the time-consuming, expensive and often contentious regulatory process. Daniel says CALFED has already received criticism from those who believe the plan calls for too much water.

Part of the problem is that there is very little reliable science on how much instream flow is needed for healthy anadromous fish populations. "We have made the assumption that fish evolved to take advantage of natural patterns of flow events and we want to mimic those patterns," says Daniel. The plan calls for providing high flows during the spring and the first significant rain event of the fall. "The question is, how much water do we need to do that?" he says.

Although they think the plan's approach is basically sound, several people say they would like the plan to increase baseline as well as peak flows. "If we are going to expand marshes in Suisun Bay, for instance, we are going to have to supply them with the necessary fresh water," says Bobker.

Pete Rhoads of the Metropolitan Water District questions the plan's emphasis on instream flows for fish restoration. "Restoring flows won't restore salmon and steelhead," he says "Native fish need many different types of habitat, from stream spawning to estuarine rearing habitat. We see a lot of recommendations for flows, but we don't see enough of the diverse habitat restoration that's needed."

"If we removed stressors associated with tributary barriers and gave fish access to

LESSONS LEARNED CONTINUED

ness. In the case of the Everglades, a series of lawsuits also resulted in the political will to solve the problems caused by agriculture and development that were affecting the park.

Because of the relationship between the land north of the Everglades and the park, it was impossible to begin to solve the park's problems without looking beyond any single factor to problems of flood control, land use, and water quality. Almost \$200 million in federal funds is being used to purchase land that is mostly in floodplains. A large program is underway to design systems using natural wetlands as stormwater treatment, according to Tom Armentano, chief of the biology resources branch of the South Florida Natural Resources Center of Everglades National Park.

While clearly it doesn't always work to throw money at a problem, restoration of Long Island Sound, which was one of the first estuary projects, is clearly hampered by lack of funding. With a budget of only \$15 million since 1985, the estuary restoration project hasn't made it far past the research stage and is almost exclusively reliant on state and county funds for its work. While Clinton and Dole competed to see who could come up with more money for the Everglades in the last presidential election, the Long Island Sound, with its varied array of environments, from urban to rural marine, languished. The Chesapeake Bay, another early estuary recovery project, also seems to have suffered by being set up before some of the more progressive mechanisms of ecosystem restoration were in place. Outside scientists have criticized the Chesapeake project for failing to take on land-use issues and focusing too exclusively on water quality.

Political problems associated with restoration often eclipse scientific issues, but it sometimes appears that these two arenas are as closely related as the systems and processes of the ecosystem itself. Environmental restoration in the latter half of the twentieth century must take into account chaos and complexity, a way of understanding the world that is not confined to science. Chaos and complexity theory actually evolved out of the science of ecology. But as the ideas surrounding chaos and complexity evolved in the 1980s, restoration ecologists were faced

continued page 10



Matt Day

continued page 10

LESSONS LEARNED CONTINUED

with some disturbing problems. If there is no steady state—no baseline for nature—then what benchmark should restorationists aim for? Complexity theory tells us there are patterns in nature that are recognizable—at least using high-powered computers—but so complex that they baffle most traditional Cartesian scientific thinking. The political problems inherent in this uncertainty are obvious; people who favor business as usual have a good sound bite argument against doing anything.

But if these conundrums are approached with intellectual integrity, one is led to the conclusion that the chance to incorporate chaos and complexity into ecosystem restoration is drawing many of the country's top scientists to ecosystem restoration. Researchers now have a chance to restore processes rather than build a museum, to foster cycles of birth and death instead of working as a taxidermist.

In political terms, large-scale ecosystem restoration is a quiet revolution. For years, environmentalists and scientists have fantasized about a "Habitat Protection Act" as a more intellectually grounded basis for conservation efforts than the Endangered Species Act. Today, nobody believes that such an act would pass Congress. But the shift in emphasis from single species to habitat conservation is occurring in the natural course of things. Certainly, there are disadvantages to change occurring this way. It is scattershot; estuaries are getting more attention than deserts, farmland and prairie are still basically ignored. And change occurs slowly; the United States is still cut up on man-made instead of biological lines, with planning done by cities and counties while problems increasingly occur on the watershed level. Certainly managing with chaos and complexity theory in mind requires more tolerance of uncertainty by citizens. But at least there seems to be agreement in the scientific community that, as CALFED advisor Dr. Paul Angermeir said to the American Fisheries Society last August, "It takes a landscape to recover a species." [sz](#)

CALFED PLAN CONTINUED

upstream habitat we might not need to implement all of the natural processes targets the plan is suggesting," says Serge Birk of the Central Valley Project Water Association. "There are immediate opportunities to remove stressors on fish, and these should be prioritized."

Lack of prioritization also bothers Doug Latimer of the Mill Creek Conservancy. "Without assigning priorities, the document implicitly gives the same weight to minor riparian problems in relatively pristine areas and the huge problems caused by pumping and diversions in the mainstream Sacramento River and the Delta," he says. "Mill Creek could still support many thousands of anadromous fish if they never had to leave. Sure there are little things we could do to marginally help them, but they won't do any good if the downstream problems are not addressed. We need to make sure that we spend time and money where they can do the most good."

Rhoads also says that the plan does not delve deep enough into the impact of harvesting and hatchery fish on native fish. "Many of us feel that the salmon can't recover without addressing the harvest issues. We've had years where 65-70% of the total fish population was harvested, and weak native stock are harvested at the same rate as hatchery fish." Daniel notes that the plan includes California's first effort to assess the impact of hatcheries on native fish. "We will look at the whole range of issues associated with hatcheries, including competition, genetics, disease, and whether or not hatcheries are actually producing the mitigation they were intended to provide."

Both Birk and Rhoads advocate caution regarding the plan to mimic natural flow patterns in light of the massive alteration of the Central Valley's ecosystem over the past century. Rhodes points to the winter-run salmon that now spawn in the upper reaches of the Sacramento River. "They spawn there because of the cold water that's released out of Shasta Dam. If we use water from above the dam for additional flows, we don't know what effect that may have on the small remaining population of winter-run salmon." Birk adds that historically, the salmon would have been above the dam. "The mimicry of natural processes needs to be integrated with the life stages of the fish, and that's hard to do when the remnants of the population are not where they used to be," he says.

Because of the scientific uncertainties surrounding many of the plan's provisions,

Daniel and Mills emphasize the plan's adaptive management approach, which includes phased implementation, ecosystem monitoring and focused research. The approach is put forth in Volume 3 of the ERPP, which Daniel emphasizes is a working draft. Nevertheless, some people are uncomfortable with the questions it leaves unanswered.

"Everybody has a different idea of what adaptive management means," says Rhodes. "The ERPP has started a dialogue, but there needs to be more. We need to reach consensus on an approach that makes sense."

Several critics say that they are uneasy about the adaptive management approach because the plan does not spell out its overall restoration objectives clearly enough, making it difficult to evaluate the success of restoration actions. "CALFED's mission is to restore ecological health, but they have not clearly defined what ecological health is," says Bobker. "What is the standard against which we are measuring restoration activities? This question is very important from a planning perspective. CALFED needs to do more work to define its objectives, and when it does that, some components of the plan will change."

Birk agrees. "We should have some specific objectives for restoration and we should have some degree of certainty that if we take certain actions we're going to reach our objectives."

Bobker also sees a conflict between the idea of adaptive management, which is based on the idea of uncertainty, and the desire of water users and land owners to be protected from any surprises. How this conflict is resolved will largely depend on the mechanisms the CALFED Assurances Group is identifying to ensure that the Preferred Alternative is implemented as agreed. Possibilities include legislation, contracts and the establishment of new institutions to implement the program. Bobker thinks the key to achieving successful adaptive management while insulating water users from surprises is to have clearly defined objectives and enough dedicated resources—in terms of land, water and money—to "completely achieve the restoration agenda, plus respond to the unexpected."

Contact: CALFED (916) 657-2666 [ch](#)

PLACES TO GO
& THINGS TO DO

WORKSHOPS & SEMINARS

NOV 18 SAT
8TH ANNUAL EDUCATOR'S CONFERENCE
 Topics include "Wildlife and Wetlands, Making Connections," "Monitoring Our Creeks for the Future," "Marine Mammals in Our Watershed" and a Discovery Voy.
Sponsor: Aquatic Institute
Location: Various Bay Area locations
 (510) 231-9566

NOV 3 MON THRU THU
CONFERENCE: EFFECTS OF OIL ON WILDLIFE
Sponsors: Cal Fish & Game and U.C. Davis Wildlife Health Center
Location: Monterey
 (916) 752-3809
 ndottum@ucdavis.com

NOV 5 WED THRU FRI
FACILITATING AND MEDIATING EFFECTIVE ENVIRONMENTAL AGREEMENTS
 Professional development course will track the steps in a structured negotiation process. Participants will have opportunities to work as facilitators and mediators in simulated negotiations.
Sponsor: CONCUR
Location: Kerr Campus, U.C. Berkeley
 (510) 649-8008

NOV 14 FRI
S.F. BAY DECISIONMAKERS CONFERENCE
 Panel topics include the Maritime Industry in Transition and Wetland Mitigation Banking.
Location: Palace Hotel, San Francisco
Sponsor: Bay Planning Coalition
 8:30 AM--2:30 PM
 (415) 397-2293

NOV 14 FRI • SAT
CONFERENCE: PUTTING OUR COMMUNITIES BACK ON THEIR FEET
 Conference focuses on how communities can become more livable, with healthy environments, economies and residents.
Sponsor: Local Government Commission
Location: Los Angeles (916) 448-1198

NOV 19 WED THRU FRI
21 ACWA 1997 FALL CONFERENCE
 "Sealing the Deal on the Big Issues." Topics will cover a wide range of issues of interest to the water community, including legislation and policy developments at the federal and state levels.
Sponsor: Assoc. of Cal. Water Agencies
Location: Long Beach
 (916) 441-4545



MEETINGS & HEARINGS

NOV 7 FRI
CCMP IMPLEMENTATION COMMITTEE MEETING
Sponsor: San Francisco Estuary Project
Location: Regional Water Quality Control Board, Oakland
 10:00 AM-12:30 PM
 (510) 286-0780

NOV 4 TUE • THUR • WED
6 MEETINGS ON CALFED PLAN
 Public meetings in preparation for the release of the CALFED Bay-Delta Program draft programmatic *Environmental Impact Report/ Environmental Impact Statement*. The meetings will feature an open-house session during which Program staff will be available to answer questions and provide information to those in attendance. A formal presentation will provide a general overview and update of the Program's progress as well as an opportunity for the public to comment on issues they think are important.

NOV 3 WED • THUR
4
Sponsor: CALFED
Locations: Walnut Grove, San Francisco, Fresno, Santa Barbara, Los Angeles, San Diego
 (916) 657-2666



HANDS ON

NOV 6 THUR
EROSION CONTROL WORKSHOP
 On-site demonstrations of erosion control techniques for construction projects.
Sponsor: San Francisco Estuary Project, Regional Board, others.
Location: Martinez
 9:00 AM-3:00 PM
 (510) 286-0780

NOV 6 THUR
PHOTO EXHIBIT RECEPTION
 A month-long exhibit of aerial photographs of San Francisco Bay wetlands by photographer Herb Lingl opens.
Sponsor: Bay Commission
Location: Bay Commission, San Francisco
 5 PM-7 PM
 (415) 557-8784

NOV 6 THUR • FRI
7 GIS TOOLS AND SOLUTIONS CAN THEY WORK FOR MY ORGANIZATION?
 Course provides a basic understanding of GIS tools and their use in planning, analysis and decisionmaking by local, federal and state governments.
Sponsor: UC Extension
Location: 150 Fourth Street, Suite 675
 (510) 643-7143

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 Canadian Institute of Treated Wood
 (613) 737-4337

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 Pacific Institute and EDGE: the Alliance of Ethnic and Environmental Organizations
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San Francisco Bay Area Stormwater Runoff Monitoring Data Analysis 1988-1995, Final Report
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State of the Estuary Report, 1992--1997: Vital Statistics, New Science, Environmental Management
 SF Estuary Project
 Copies available in November from (510) 286-0460

The Sacramento-San Joaquin Delta Recreation Survey, August 1997
 Prepared by California State Parks for the Delta Protection Commission and the California Department of Boating and Waterways
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STATE OF ESTUARY CONTINUED

get and who's to give up water— continue to simmer behind the seemingly calm and cooperative fronts of CALFED and the CVPIA.

Beyond the resources themselves, the state of the Estuary can also be measured in terms of well-intentioned effort, which has certainly increased since the early 1990s. A host of earnest, public-private and government programs have been launched, and some implemented, that reflect the public's commitment to environmental health— one to develop a long-term management strategy for Bay dredged material (LTMS), another to double anadromous fish populations and improve water conservation and environmental conditions in the area served by the Central Valley Project (CVPIA), others to balance water use and supply conflicts (Bay-Delta Accord & CALFED), and others to better monitor estuarine pollution levels (RMP) and map Bay wetlands (San Francisco Bay Area Wetlands Ecosystem Goals Project). Recent years have also seen a wave a new projects and programs

tackling some of the Estuary's thornier pollution problems— stormwater runoff from cities, farms and construction sites, metal leaks from abandoned mines, air and road dust from vehicles. And restoration of habitat has never been so well-funded.

These programs— if fully implemented— may go a long way toward addressing the five critical Bay-Delta management issues identified by the Estuary Project in the late 1980s— the decline of biological resources, the diversion and alteration of freshwater flows, increased dredging and pollution, and intensified land use— another measure of the state of the Estuary. Of the five, only the land use issue remains unaddressed on a large scale.

Finally, the state of the Estuary may also be measured in terms of understanding the nature and value of the ecosystem. Many more people— scientists, educators, citizens and resource managers — are involved in researching and monitoring estuarine conditions and health than in the 1980s. The large environmental planning projects described above have expanded the dollars and time committed to getting

good science to back up management decisions. In addition, there's been a recent push to better map and document the Bay's remaining wetlands and marsh life using GIS technology and to offer at-your-fingertips electronic access to data on real-time estuarine conditions— from where the endangered fish are swimming to flow and salinity levels. There's also been a blossoming of community and school-based programs that use citizens and students to collect stormwater and creek data for municipalities. Despite this swell of data and knowledge, our understanding of how the estuarine system works and responds to management changes is still far from complete.

All these measures of the state of the Estuary fall short of offering a consistent, meaningful, long-term standard of the Estuary's health. In the meantime, however, the new report and the three conferences and previous report on the subject offer useful snapshots of the state of the Estuary over the last decade.

ARO

YOUR INDEPENDENT SOURCE FOR BAY-DELTA NEWS & VIEWS



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