

## CRAB CONNIPTIONS

Thousands of hairy-clawed crabs native to Chinese waters brought critical Delta fish salvage facilities to a halt this past summer, sending engineers and biologists on a frantic search for ways to separate the crabs from the fish, and to prevent future shut downs and impacts on endangered species.

Ordinarily, the state and federal fish salvage facilities in the Delta act as giant screens that capture fish to prevent them from becoming trapped and killed in the downstream water export pumps. If the salvage facilities are not operating, water cannot legally be exported. But this summer, so many crabs piled up on the trash rack at the Bureau of Reclamation's Tracy facility that flows backed up and threatened to collapse the structure. "The crabs were clogging everything up. Nothing was functioning," says U.S. Fish & Wildlife's Kim Webb, one member of an interagency group studying the crabs.

Up to 20,000 crabs ended up in fish holding tanks at the state and federal facilities each day during the crab crisis — a big jump up from the dozen or so seen just a few years ago. The mittened monsters from another continent—probably brought to California via a suitcase by someone with a taste for delicate crabmeat—have clearly spread throughout the Delta and Sacramento and San Joaquin River systems. With each female mitten crab producing between 250,000 and one million eggs, downstream areas are becoming overcrowded, and the crabs have begun moving farther and farther upstream, says Webb.

The crabs hang out in upstream fresh waters until they begin to reach sexual maturity. They then head downstream for the Delta to spawn in saltier water between late August and mid-October, where in 1998 many were pulled into the fish facilities.

Salvage operators first tried to control the crabs in the holding tanks, where huge cylindrical strainers are lifted in the center of the tanks, allowing fish to flow back into the "loadout buckets." But this fall, masses of crabs either blocked the openings between the screens and buckets, leaving fish high and dry in the bottom of the salvage tanks as all the water rushed out, or — worse yet — ended up in the buckets with the fish.

To separate the crabs from the fish, operators at the Tracy facility studied the crabs' behavior and decided to force them to scuttle up the sides of the tanks by manipulating the water speed. "When they put the intake valves up really high, the crabs would start to climb the tank sides, but in such a confined space the high flows weren't necessarily good for the fish," says Webb. Still, compared to being bruised, bumped or clawed, not to mention poked by the sharp spines of the crabs, higher flows seemed the better option for the fish.

*continued page 5*



## Revenge of the Forgotten River

Thirty-five years ago, the residents of Trinity County, in the remote northwestern part of California, would have had little interest in State Water Board hearings on Bay-Delta water rights. After all, the Trinity River is a major tributary of the Klamath River, and nature never intended its waters to come anywhere near the Bay and Delta. But that was before federal water engineers dammed the Trinity, drilled a tunnel through the Coast Range and began diverting more than three quarters of the river's flow to the Central Valley Project (CVP).

Now, Trinity County is trying to get some of that water back, and to remind decision-makers that they should consider the Trinity's needs as they plan for protection and restoration of the Bay Delta. "We call the Trinity the forgotten river," says Tom Stokely of the Trinity County Planning Department. "No one even puts us on the map when it comes to water issues." The county is proposing an approach to flow restoration on the Trinity that could radically alter water rights in the Central Valley.

The U.S. Fish & Wildlife Service and the Hoopa Indian Tribe — which has federally protected rights to the river's diversion-devastated fisheries — are completing a 12-year flow evaluation of the Trinity, mandated by Congress in 1984 (and already several years late). The evaluation is expected to recommend that diversions from the Trinity to the Sacramento-San Joaquin Valley be reduced by an average of 255,000 acre-feet

per year to restore the fisheries. The Secretary of the Interior is expected to make a final decision on the flow restorations in late 1999.

Advocates for the Trinity say the State Board — and to some extent CALFED — are ignoring the potential effects of increased Trinity River flows on Central Valley Project operations, and they worry that this failure may affect the restoration plan. "The Trinity is going to get water back," says Byron Leydecker of Friends of the Trinity. "Not to plan for that is an outrage."

The Trinity's defenders don't just want their water back: they want it to come from a specific place. The county claims that damming the Trinity allowed the CVP to expand its "place of use" to irrigate the selenium-laden soils of the Westlands Water District, and helped damage the Bay-Delta ecosystem by creating toxic agricultural runoff. "The water that created the Kesterson disaster was Trinity water," says Stokely, referring to the infamous 1983 discovery of selenium-deformed birds at a Merced County wildlife refuge. The county has asked the State Board to declare that continued

water deliveries to Westlands constitute a wasteful and unreasonable use of water in violation of the state constitution, and to remove from the CVP service area all lands with selenium concentration greater than 0.36 micrograms per gram — about half of the 600,000 acres within Westlands.

Attorneys for Westlands say Trinity's position is misinformed. "When the San Luis Drain was closed, Westlands terminated drainage service to landowners within the district," says Thomas Birmingham. "There is no discharge of agricultural drainage outside Westlands' service area."

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### TRINITY RIVER DIVERSION



## HELP



## PROGRESS ON CCMP PRIORITIES?

When scientists, decision-makers, environmental advocates and concerned citizens gather at the third State of the Estuary conference in March (see Calendar), a big question will be "How are we doing in implementing the S.F. Estuary Project's 1993 *Comprehensive Conservation and Management Plan*?" To answer that, Estuary's editors need your help preparing a new *CCMP Workbook* evaluating progress made on the following 10 priority actions identified in a 1996 workshop:

1. Expand, restore and protect Bay-Delta wetlands. Acquire more wetlands; restore non-wetland areas to wetlands or riparian habitat; complete a comprehensive regional wetlands management plan; and enhance the biodiversity within wetlands.
2. Integrate and improve regulatory, planning, management and scientific monitoring programs. Promote multi-agency regulatory requirements and monitoring protocols to expedite implementation of ecosystem planning; address multi-media and local/regional relationships; reduce analysis paralysis; and secure additional funding.
3. Create economic incentives that encourage local government to implement measures to enhance the Estuary. Make federal and state funds available for local watershed planning and other programs that protect the Estuary; identify financial barriers to and propose alternative funding arrangements for environmentally sensitive land use.
4. Improve the management and control of urban runoff. Increase long-term education programs on pollution prevention and extend stormwater programs; develop mass-emissions strategies to reduce both point and nonpoint source pollution; reduce pollutant loadings from transportation.
5. Prepare and implement watershed management plans throughout the Estuary. Include watershed management in Local General Plans; develop a manual of how to integrate local stormwater, watershed, wetland protection and other CCMP consistent planning initiatives; and educate the public about the connections between land use, transportation and water quality.
6. Reduce and control exotic species introductions and spread in the Estuary. In addition, educate the public about exotic species impacts on the Estuary.
7. Build awareness about CCMP implementation.

8. Increase public awareness about the Estuary's natural resources and the need to protect them. In particular, develop grassroots outreach and school-based education programs.
9. Implement the Regional Monitoring Program and integrate the results of scientific monitoring into management and regulatory actions. Build on the 1993 regional monitoring strategy and expand program to address all five key CCMP issues (dredging, pollution, biological resources, land use and freshwater diversion); update monitoring strategy for

urban runoff (including air deposition); develop study sites where hydrology, contaminants and biological components are all monitored.

10. Work with federal and state agencies to include CCMP recommendations in other planning and restoration efforts and funding decisions.

If you know of any policies, programs or activities relating to any of these priorities and adopted or implemented since 1996, please contact Cariad Hayes at (510)547-1168, (510)547-6287 (fax) or [cariad@dnai.com](mailto:cariad@dnai.com).

## BULLETIN BOARD

**WETLANDS CAN CONVERT TOXIC SELENIUM** into a harmless gas, according to U.C. Berkeley biologist Norman Terry. Terry — who previously discovered the selenium-fighting properties of broccoli — says the amount of selenium volatilized depends on the mix of plants in the wetland, with cattail and widgeon grass appearing especially effective. Studies are continuing, says Terry. Contact Norman Terry: (510)642-3510

**CATTLE GRAZING DOESN'T IMPACT STREAMS** according to research released earlier this year by U.C. Berkeley's Barbara Allen-Diaz. Her ongoing study of nine springs in three oak woodland watersheds near Marysville compared three different treatments — no grazing, light grazing and moderate grazing — and found no significant differences in vegetation cover, creek channel morphology or water quality (overgrazing, of course, can have significant impacts). "We've learned that springs are very resilient systems," says Allen-Diaz. Contact: Sheila Barry (925)371-0154 ext.41

**SMALL FILLS PERMIT** procedures keep changing. The Army Corps' controversial nationwide permit 26—which currently exempts wetland fills of up to three acres from most reporting and application requirements—will expire on September 15, 1999 under a recently proposed schedule for new and revised permits. The new proposals modify previously proposed changes to the Nationwide General Permit Program—which governs small maintenance or construction projects considered to have relatively minor impact on wetlands—and are "much more restrictive," according to the State Board's Marla Lafer. Among other changes, the proposal would exclude nationwides in designated critical resource waters or impaired water bodies. Lafer says it is not yet clear how the proposed changes will be implemented. Contact: Marla Lafer (916)657-0926

**REGULATORS REASSESSED POLLUTION LEVELS** in the Bay-Delta region this summer and made some changes to their biennial water quality assessments. The assessments — required under the Clean Water Act and updated every other year by the regional water quality boards and the U.S. EPA — contain a detailed "303(d)" list of impaired water bodies and their pollutants. In terms of major changes to their 1998 assessment, the S.F. Board added exotic species and PCBs to the list of Bay-wide pollutants, and got more detailed about metal problems in certain areas; the Central Valley Board added the pesticides diazinon and chlorpyrifos in Sacramento and Stockton urban creeks to the list and delisted rice pesticides in the Sacramento River. U.S. EPA has in turn proposed several additions to the lists, as shown in the table below. Once listed, the law requires responsible agencies to set total maximum daily loads (TMDLs) for each pollutant in each water body, which includes developing management measures to reduce them. The boards must respond to EPA's proposals this December.

For more details see:

[www.epa.gov/region09/water/tmdl/calist/list.html](http://www.epa.gov/region09/water/tmdl/calist/list.html)

## EPA'S PROPOSED 303(d) ADDITIONS

Water Body	Pollutant	Priority Ranking
SAN FRANCISCO BAY	dioxin-like compounds	high
	DDT	low
	dieldrin	low
	chlordan	low
LAKE MERRITT	dissolved oxygen	low
	floating matter	low
SAN FRANCISCO URBAN CREEKS (35)	diazinon	low
STOCKTON DEEP WATER CHANNEL	dioxins	medium
	PCBs	medium

## WATERSHED

### NAPA WINES ABOUT VINES



Besides fine wine and food, the Napa Valley's greatest draw may be its vistas of terraced vineyards and forested hills. But the tranquillity these vistas promise is largely an illusion: the valley's hillsides have become ground zero in a fight that is not just pitting environmentalists against agriculture but also grape grower against grape grower.

Property values in the valley are skyrocketing, with prices of \$60,000 an acre or more for prime land now common. "Everybody seems to want a Tuscan villa with a vineyard," says Napa Resource Conservation District volunteer Chip Bouril. Environmentalists say the hunger for land is threatening habitat for endangered species, such as spotted owls and steelhead trout, and increasing pressure on the Napa River, already included on the 303(d) list of impaired water bodies due to sediment (see page 2). Responding to the entreaties of concerned citizens — and, some say, to the specter of new state and federal regulation — the Napa Planning Commission approved an amendment to the county's General Plan this September that could lay the groundwork for new restrictions on farming, timber harvesting and development. The Napa County Board of Supervisors is scheduled to vote on the proposal in December.

Napa County already has one of the strictest erosion control ordinances in the country, although until recently enforcement has been lax, say area growers on both sides of the amendment issue. The county is now focusing on enforcement, an effort Jim Lincoln of the Farm Bureau believes is behind the amendment. "This is just being done to add language to the General Plan to validate the existing ordinance," he says. The Farm Bureau supports the amendment — to the chagrin of many area growers, who have formed their own association, Farmers for Napa Valley, to fight the proposal.

Resource managers say that as stringent as the existing hillside ordinance is, it may not be enough to protect the Napa River because converting forest to vineyard alters the hydrology of the watershed. "The runoff coefficient — the percentage of rainfall that immediately runs off the land into rivers and streams — increases as more land is cleared," says Bouril. The higher volume of water can cause stream banks to fail, in turn contributing sediment to waterways.

Some fear that too much extra runoff might threaten the innovative flood control plan approved by county voters last spring. Under the plan, many levees and dams that have failed to contain the Napa River so often in recent years will be torn out, and the river permitted to revert to its natural state. However, the plan rests on the assumption that the river's flows will not exceed historic highs by much.

Chris Malan of Concerned Citizens for Napa Hillides says her group will use the language in the amendment to seek zoning changes designating hillside land as protected watershed and requiring buffer zones between vineyards and riparian corridors. Nevertheless, the Farm Bureau's Lincoln says he doesn't expect the amendment to lead to any new "onerous or unworkable ordinances."

Opponents of the amendment fear new regulations that they say would unfairly penalize responsible growers. "Most of us have been doing all the right things to protect the hillsides, but there have been a few bad eggs who have caused serious problems," says Richard Camera of the Hess Collection winery. "Now all we hear about are the bad farmers, and we're talking about additional restrictions and another layer of bureaucracy. We just need to enforce the laws we have."

Stuart Smith of Smith-Madrone Winery suggests that the amendment may be misdirected. "Urban development causes much more runoff than vineyards; maybe we should be looking at that," he says. Both Smith and Camera note that less than 1% of the land in Napa County is even suitable for hillside vineyards. "There is a question of scale here that has to be addressed," says Camera.

Debate over the proposed amendment is fueled by a dearth of data on the river and its tributary streams. A citizen group is working with the Resource Conservation District to gather basic water quality and flow data, but so far there isn't enough information to draw concrete conclusions about the health of the watershed. "The less data there are the more polar the argument becomes," observes Bouril.

Opponents of the amendment say they hope the county will defer action until it receives a report from the Watershed Task Force now being convened by the RCD to assemble and analyze what data there are on the river, timber harvests, vineyard conversion and other watershed issues. "To adopt this amendment now is putting the cart before the horse," says Smith. "We need to be guided by science and fact, not emotion."

Contact: Chris Malan (707)255-7434 or  
Stuart Smith (707)963 2283 CH

## WATERMARKET

### FRESNO FARMS TO WATER TRACY HOMES?

A transfer of 3,000 acre-feet of agricultural water from a farm in Fresno County to a planned housing development in Tracy, 80 miles to the north, shouldn't have any negative impacts, according to a controversial environmental study released by the Bureau of Reclamation this November.

The water transfer is the brainchild of the Stockton-based developer the Grupe Company, which wants to build 5,500 suburban homes in the hills west of Tracy near the Altamont Pass. But the site — a 6,000-acre former sheep and cattle ranch — doesn't have any water. To get water, Grupe bought the small 800-acre Widren Water District outside Firebaugh. Grupe is now asking BurRec to allow the company to "wheel" the agricultural water allotment — which means the company could take water out of the Delta Mendota Canal in Tracy, instead of in Fresno County.

The Tracy City Council approved the project in early 1998 and was then sued, along with the developer, by Alameda County, the City of Livermore, and the Sierra Club. Fresno County supervisors — who oppose the transfer of water out of their county — filed a second lawsuit against the project. In a recent letter, the county described the environmental assessment as a "whitewash... a monumental exercise in glossing over and then dismissing the existence of impacts..."

Although farmers often sell small amounts of water between themselves, individual Farm Bureau organizations in Fresno and Madera counties have adopted strict policies that oppose "out-of-area" transfer of agricultural water to urban uses. The California Farm Bureau Federation, as well as the Sierra Club, and the Stockton-based Land Utilization Alliance, have all criticized the environmental assessment for ignoring impacts such as increased groundwater pumping in Fresno County.

If the Widren water transfer is approved by the Bureau, farmers are fearful that developers will scour the San Joaquin Valley looking for other irrigation districts to buy, with the intent of stripping the water rights to feed thirsty subdivisions in places like Livermore, Tracy, Manteca, and Modesto. Farmers might then be forced to pump groundwater to grow crops or allow prime farmland will go fallow. EP

## SCIENCE

## DATA REGULATES REGULATORS



When local regulators ponder giving the go-ahead to an oil refinery wanting to discharge effluent into the Bay or a developer carving out a new shoreline park, they often consult the RMP. What the RMP — the six-year old Regional Monitoring Program that regularly collects data on contaminants and water quality at 22 stations around the Bay — tells them is how local conditions may or may not bear on the project.

"It gives us information about pollutant concentrations in different compartments of the Bay, so we know our boundary conditions and background levels," says the S.F. Regional Water Quality Board's Kim Taylor. Knowing what's already in the aquatic environment — the "background" — is key to setting appropriate targets for reducing pollutants.

Over the years, the Board has clearly looked to the RMP — one of the first methodologically consistent, long-term data sets on current Bay conditions — for a reality check on their objectives for water quality, discharges and sediment disposal. "The RMP tells us our current mercury objective is violated every time the winds and tides kick up, so we know something is wrong with that objective, that we have to change it to something more meaningful," says Taylor. RMP data has also highlighted cases where water quality standards are too far above or below background levels in the Bay.

How the Regional Board uses the RMP's information has always been a big question for the 68 federal, state and local agencies and businesses that sponsor the program to the tune of \$2.9 million a year. Its most recent and prominent use, says Taylor, is in the Board's work to produce the biennial water quality assessment for the Bay region. The assessment, required by the Clean Water

Act, identifies waters in which beneficial uses (recreation, shipping, drinking etc.) are impaired by pollution, and lists specific pollutants requiring action. In conducting the assessment, the Board examined the RMP data on conditions and contaminants in the water column, sediments and bivalves to see, according to Taylor, if water quality standards are being met. "It plays a fairly central role as either a deciding factor in the weight of evidence or as a clear cut indicator that something is or isn't a problem," she says.

Indeed when the Board sent its draft assessment up to the regulatory ladder to U.S. EPA and to interested parties for review, the resulting comments led the Board back to the RMP. BayKeeper, for example, wanted Pacheco and Coyote Creeks, and the Napa and Petaluma Rivers, to be added to the list of impaired water bodies because of contamination found at nearby RMP monitoring stations. "I used the RMP data to see if there was merit to their comments," says the Board's Lila Tang. "Our conclusion was that those stations were more in the tidal zone, and thus did not really represent conditions in the rivers themselves."

The Board also consults the RMP on a project-specific level. When Cattelus applied for a permit to excavate and fill a 50-foot buffer zone for the Eastshore Park, Board staff used ambient contaminant concentrations in sediment identified in the RMP to specify clean fill levels. When the Army needed direction on how much to clean up a salt marsh at the Hamilton airfield, the Board instructed it to use data from nearby RMP stations for comparison. When a PG&E employee alleged that his supervisors had been directing him to siphon off PCB-laden oil from natural gas lines into Santa Clara County creeks for 28 years, the Board used RMP data to advise PG&E on how to check up on itself. The company wanted to investigate whether there had been any environmental impacts from the alleged blow offs, and submitted a plan for sampling water and sediments in the creeks to the Board. From the RMP, the Board could tell that the PCB detection limits PG&E planned to use were much too high compared to background levels in the area. Previous PCB research conducted by RMP participant Walter Jarman had also identified a unique PCB source — with a fingerprint visible only using by certain testing techniques — plaguing the South Bay. "With ten years of RMP data right on the shelf, I could tell PG&E right off the top of my head how far to drop the detection limit and what analytical technology to use," says the Board's Khalil Abu-Saba.

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## THE MONITOR

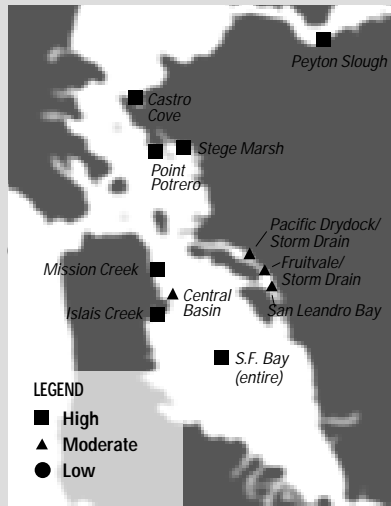
## CLEAN UP CRAWLS AHEAD

Clean-up plans for the seven worst toxic hot spots in San Francisco Bay were released for a 30-day public review this December. "These plans are pretty generic," says Karen Taberski of the S.F. Regional Water Quality Board, which developed the plans to meet requirements of the state's Bay Protection and Toxic Clean Up Program. "They basically lay out the process by which clean up should take place." The process is already in motion for the top-ranked sites (see map): the Board used its current regulatory authority to ask responsible parties to define the aerial extent of the contamination, ascertain appropriate clean-up methods and submit feasibility studies to the Board.

The Peyton Slough site — located in an old copper smelting area and harboring the highest copper and zinc levels in the Bay Protection Program database statewide — is already a few steps ahead of the game, says Taberski. Efforts already underway to restore the adjacent Shell Marsh (where oil spilled in 1988) and reduce flooding along Highway 680 include dredging of Peyton Slough — paving the way for removal and capping of offending sediments.

Another site, the Bay itself — listed because eating its PCB and mercury laced fish is dangerous to human health — obviously has no single responsible party. Here the Board's plan is more fleshed out and includes clean up

## BAY TOXIC HOT SPOTS RANKING



Almaden Mine (a mercury source) and Point Potrero (a PCB and mercury source), as well as investigations into other sources watershedwide, regional restrictions on further inputs to the Bay's total mercury load, and public education about fish consumption and pollution prevention. Approval of the Board's plans is expected by this February, after which they go to the Sacramento for inclusion in statewide plans. Contact: Karen Taberski (510)622-2424 (for technical information on site testing and ranking see *Now in Print*) ARO



## RESTORATION

### TITANIC PAPERWORK

California water experts are doing their best to guide the Titanic-sized CALFED around the icebergs and dead-end sloughs and into the deepest and greenest possible port. Three newly released reports attempt to inform the process by which CALFED — the four-year-old state-federal effort to the balance the water needs of humans, fish and wildlife in the Delta — decides which parts of the ecosystem to throw a life preserver.

"All interests agree on the need to restore ecosystem functions and bring species back from the brink of extinction," says U.C. Berkeley hydrologist Dr. Matt Kondolf, a contributor to one of the reports. "The questions now are how does the ecosystem really work and how can we prioritize what we should be doing?"

According to The Bay Institute's *Sierra to the Sea* report, the best place to find some of these answers is in history. The July 1998 report strips away the fetters of human intervention — the dams and levees and reservoirs — and reveals the natural undisturbed watershed as a mosaic of five separate aquatic ecosystems, including upland and lowland river flood plains, the Delta, the Bay and the nearshore ocean.

According to the report, "Freshwater marshes [once] stretched from Willows to Bakersfield in a continuous swath of green, nestled in river bottoms, the Sacramento Valley flood basin and the Delta... Vast riparian forests teeming with wildlife inhabited natural levees along every stream channel in the Central Valley, stretching like a green ribbon for miles... Permanent marshes, choked with tules, dotted with lakes, and crisscrossed with sloughs, nestled between riparian forests and oak woodlands, savannas and vernal pools, [covering] the plains as far as the eye could see... Naturally meandering rivers [flowed into the Delta]... a vast sea-level swamp composed of huge tracts of intertidal wetlands transected by a complex network of waterways...."

The report goes on to document two centuries of human interventions — among them farming, mining, flood control, water redistribution and the harvest of plants and animals — whose combined effects on system ecology have been "staggering."

"It's depressing how much acreage we've transformed," says the Institute's Peter Vorster, a co-author of the report. "So it's imperative we preserve every last historic shred of the ecosystem."

Report authors point out that early natural conditions and processes shaped the life requirements of many of the native species that are now the focus of recovery and restoration plans, and that careful consideration of pre-disturbance conditions provides the necessary "baseline" for any such efforts.

While restoration planning should be firmly based in historic natural processes, it must also use the current maze of dams, canals and reservoirs to mimic them, according to the second new report. *An Environmentally Optimal Alternative for the Bay-Delta*, produced by the Natural Heritage Institute this October, tackles current problems, politics, finance, land use and water exports in an attempt to push its own view of the Delta's environmental best shot.

This shot, according to the report, should begin with short-term, low-conflict actions, such as restoring West Delta islands to elevations at or near sea level to improve ecosystem values and water quality. In the longer term, report authors suggest an emphasis on, among other things, local control over restoration, and on selecting restoration projects that address critical knowledge gaps; prevent urbanization, fragmentation, exotic species invasions and other irreversible changes to the Delta ecology; yield the greatest benefits per unit of investment at the lowest-risk; and are the most self-sustaining.

To support these restoration efforts, report authors endorse some major reforms to the water-supply system, including building a small peripheral canal, removing key dams, rewatering the San Joaquin River, placing environmental rather than water project managers in charge of pumping and exports, and maximizing water markets, conservation and groundwater storage.

Deciding which among the myriad possible system changes and restoration projects will breathe the most life into the ecosystem's fish, plants and animals is the purview of the third report, *The Strategic Plan for Ecosystem Restoration*. This report responds to stakeholders and a science review panel's opinions that the restoration program produced by CALFED last year is a menu of actions not a plan, and that some scientifically sound process is needed to figure out what to do first and how to make the most of it. Without such a strategy, deciding how to spend the big restoration bankroll now available "would simply be left to business and politics as usual, with the money probably divided up among various constituencies," according to Kondolf.

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Sacramento River, 1852 by C. Ringgold, reprinted from *Sierra*

## CRABS CONTINUED

The next salvage step loads the bucketed fish onto tank trucks, which transport them far downstream of the pumps and salvage facilities for release. But this summer, when salvage operators tried to flow the fish from the buckets into the truck tanks, crabs again blocked openings. Both fish and crabs had to be pushed through the holes onto the trucks, which ended up killing many of both, says BurRec's Scott Siegfried. When it came time to release the fish into the Delta through the 12-inch hoses on the backs of the tank truck, crabs got in the way yet again. Salvage operators resorted to making more frequent hauls to release sites and netting fish from crab-laden buckets.

Finally, operators took to trying to catch the crabs in the channels (called "secondaries") that initially convey the fish into the salvage system. "The crabs are easier to remove there because they are confined and concentrated in an open rectangular channel. The holding tanks are round and difficult to work in," explains Siegfried.

All told, crab-control efforts included traps, pumps, and a "traveling" screen positioned across the channel. Of all of the methods, only the traveling screen was at all successful, says Siegfried, since it stopped many of the crabs and but allowed most of the fish to swim through the mesh.

Biologists in Germany, where the mitten crab was very numerous in the 1930s, developed their own control methods. According to the Department of Fish & Game's Kathy Hieb, they trapped juveniles migrating upstream by placing baskets on the upstream sides of dams to collect climbing crabs as they fell from the dam tops. On steeper dams, they built tile-lined trenches along river banks to catch crabs trying to go around.

Similar trapping efforts at the Delta fish salvage facilities may have failed for several reasons, says Siegfried. Crustacean invaders at large in the massive Delta can easily miss the crabpots and traps; outmigrating crabs eat very little, and may thus not be interested in trap bait; or flows in front of the salvage facilities may be too high for successful trapping.

One bright spot in the crab gloom and doom is that endangered salmon runs usually don't arrive at salvage facilities until

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## CRABS CONTINUED

Thanksgiving. By mid-November this year, mitten crab numbers had tapered off to only 1,000 per day. Biologists say that by spring, most of the adult crabs will have died, and juveniles will be migrating upstream. While a few could end up at the salvage facilities with spring fish, biologists are not anticipating the same kind of mayhem. No one is breathing easy, however. "Next year, in late summer and autumn, we expect to collect millions or tens of millions of crabs," says Siegfried. "Those numbers would overwhelm the control efforts we carried out this year."

In an attempt to stay one step ahead of the crabs, BurRec's Technical Services division in Denver is testing new traveling screens for the conveyance channels. Using a model, as well as actual test crabs, BurRec is trying to perfect the screens in time for next year's onslaught. In the meantime, an interagency project team has been proposed for mitten crabs, and a workshop for all interested parties will be held next March, where a comprehensive mitten crab management plan may be born. "There's really no way to gauge what the crabs will do next year," says Webb. "Endangered species runs shouldn't overlap with the crabs, but it all depends on rainflows, water temperatures and other natural conditions. We have to hope that doesn't happen. In the meantime, we're all just trying to cooperate on solutions."

Despite these reassurances, a few winter-run and steelhead were found at the state fish facility as late as mid-October. What implications would an increased "take" of endangered fish have for pumping and salvage operations? According to Fish & Game's Deborah McKee, "The whole process depends on being able to do a meaningful subsample of fish coming into the salvage tanks. Take limits are based on accurate counts of fish coming through the facilities and the survival of salvaged fish. But instead of counting fish, we're counting mitten crabs. We may need a whole new way of monitoring fish survival in the Delta if the salvage facilities cannot function." Contact: Kim Webb (209)946-6400 LOV

## PAPERWORK CONTINUED

Kondolf was one of six respected scientists who teamed up to conceive and write the strategic plan, which defines those elusive but hip-sounding terms "ecosystem-based planning and adaptive management," describes opportunities and constraints within the Bay-Delta watershed, presents goals and quantifiable restoration objectives, discusses the use of conceptual models, and lays out a strategy for regulatory compliance.

"Ecosystem management is a pretty new idea. No one really knows how to do it," says another of the six scientists, the University of British Columbia's Michael Healey, who has studied Washington's Columbia and Mississippi's Kissimmee river projects and participated in similar-scale projects in Canada. "It's also a big departure from the traditional way of doing things, and there's a lot of institutional resistance. The groundwork to overcome this has been laid more solidly here than in any other process I'm aware of."

One of Healey's contributions to the strategic plan was to champion the often unpopular (in terms of public investment) activity of experimentation. According to the plan itself, "Uncertainty is tackled head on... The power of the scientific method is used in designing restoration actions as experiments to determine the effectiveness of new forms of management, just as, in medicine, new therapies are tested in scientifically based clinical trials."

The strategic plan also highlights 12 overall "opportunities" for restoration (and 17 others specific to rivers and the Delta). It identifies invasive species, for example, as the single most likely impediment to achieving a healthier ecosystem and thus worthy targets for "robust" control efforts. It points out that the chronic exposure of Delta organisms to contaminants may get in the way of long-term restoration, and makes addressing such problems a specific ecosystem restoration goal. It acknowledges uncertainties about the assumption that lack of physical habitat limits certain fish populations and suggests large scale pilot projects to test this assumption. And recognizing

that dynamic river channels, free to overflow into floodplains and migrate within a meander zone, provide the best riverine habitats, the plan makes it a priority to identify which parts of the system still have (or can have) adequate flows to inundate flood plains and sufficient energy to erode and deposit.

"We focused on ways to let nature, and natural physical processes within the watershed, do the restoration work," says Kondolf.

The plan also lists some interesting selection criteria for restoration projects. These emphasize projects that will yield the greatest absolute benefits for native species, provide the most useful information about system dynamics, offer results within a short time frame, be the most self-sustaining in the long-term, and be complementary with other projects.

"The strategy tells us how to use applied science to pick priority actions and pick them sequentially, so the first wave supports the second," says Jones & Stokes' Steve Chainey, who managed the strategic plan project. "It puts flesh on the concept of adaptive management, making it real and tangible rather than a nameplate or cliché."

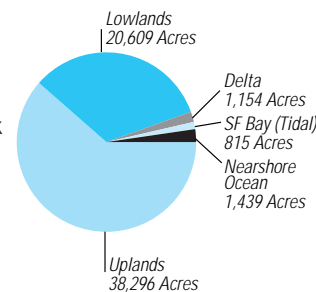
CALFED needs this decision-making framework to have credibility."

The independently produced strategic plan is now undergoing review by the various CALFED agencies. When CALFED releases its own version later this year, it will be interesting to see how much of the original strategic plan remains intact, says Chainey. In the meantime, the *Sierra to the Sea* report has been heralded by the U.S. EPA as noteworthy in the care with which it documents the natural system's capabilities before and during intensive development, and the Heritage Institute report has been the subject of several newspaper editorials on how to rebuild California's water system.

"We may not fully appreciate what it might take to make all this work," sums up Kondolf. "But there are many opportunities and correctable inefficiencies out there. It's not a question of either we give up the fish or starve in the dark."

Contact: CALFED (916)654-4841, NHI (415)288-0550 or TBI (415)721-7680 ARO

## THE FIVE ECOLOGICAL REGIONS OF THE BAY-DELTA WATERSHED



Source: *Sierra to the Sea*, Appendix A  
(See report's legends text for excellent acreage data on aquatic habitats, past and present.)

PLACES TO GO  
& THINGS TO DO

## WORKSHOPS &amp; SEMINARS

**JAN 13**  
WEDS

**CEQA UPDATE**  
Topic: Steps in the Environmental Impact Report process; how to apply the California Environmental Quality Act (CEQA) in special situations; new legislation.  
Cost: \$215  
Sponsor: UC Davis University Extension  
Location: Davis 8 AM-4 PM  
(800) 752-0881

**JAN 14**  
THURS

**CLEAN WATER 404 UPDATE**  
Topic: Army Corps of Engineers Nationwide Permitting (NWP) Program. Get the latest information from the Corps and other state and federal agencies regarding all NWP activities, including replacement of Nationwide Permit 26.  
Cost: \$215  
Sponsor: UC Davis University Extension  
Location: Davis  
8 AM-4 PM  
(800) 752-0881

**FEB 5**  
FRI

**CCMP PROGRESS WORKSHOP**  
Topic: Facilitated workshop to: evaluate progress in implementing the 1993 *Comprehensive Conservation and Management Plan* (CCMP), especially the top 10 priority actions identified in 1996 (see p.2); to re-evaluate these priorities and if necessary set new ones; and to examine the effectiveness of the CCMP implementation structure  
Sponsor: SF Estuary Project  
Location: MetroCenter, Oakland  
10 AM-3 PM  
(510) 622-2325

**FEB 23**  
TUES THRU

**FEB 26**  
FRI

**MAR 3**  
WEDS THRU

**MAR 5**  
FRI

**CEQA WORKSHOPS**  
Topic: California Environmental Quality Act.  
Sponsor: Association of Environmental Professionals  
Location: Various  
8 AM-3 PM  
(916) 737-2371

**MAR 3**  
WEDS

**ENVIRONMENTAL COMPLIANCE WORKSHOP**  
Topic: Coordinating environmental permitting and consultation requirements for projects subject to the California Environmental Quality Act and the National Environmental Policy Act.  
Cost: \$215  
Sponsor: UC Davis University Extension  
Location: Davis 8 AM-4 PM  
(800) 752-0881

**MAR 17**  
WEDS - FRI

**MAR 19**  
THRU

**4TH BIENNIAL STATE OF THE ESTUARY CONFERENCE**  
Topic: The Rehabilitation of the Estuary and its Watersheds. Presentation topics include The Changing Watershed; Major Stressors: Implications for Species Decline and Recovery; Recovery of Species and Their Habitats; Rehabilitation of the Estuary; Management Dilemmas; Institutional Opportunities; Where Do We Go From Here?.

Sponsors: SF Estuary Project, SF Estuary Institute, San Francisco Bay Regional Water Quality Control Board, Friends of the SF Estuary, U.S. Geological Survey  
Location: St. Mary's Conference Center, San Francisco  
Cost: \$40-\$175  
(510) 622-2465

**MAR 29**  
MON

**CALIF. WATERSHEDS: PROTECTING WATER QUALITY & AQUATIC HABITAT**  
Sponsor: UC Davis University Extension  
Cost: \$165  
Location: Sacramento Hilton 8:30am-5pm  
(800)752-0881

**FEB 18**  
THUR THRU SAT

**FEB 21**  
THRU SAT

**17TH ANNUAL SALMONID RESTORATION CONFERENCE**  
Topics: Workshops on flood damage in urban creeks; cooperative programs with ranchers, farmers, and citizen groups; practical tools etc. Conference sessions on stream restoration, TMDLs, southern steelhead, local economies and restoration permitting.  
Sponsor: Salmonid Restoration Fed.  
Cost: \$45-\$100  
Location: Brookdale Lodge, Brookdale  
(707)444-8903



## HANDS ON

**JAN 22**  
FRI THRU

**JAN 24**  
THRU

**3RD ANNUAL SAN FRANCISCO BAY FLYWAY FESTIVAL**  
Topic: Celebrate the importance of the North Bay to migratory shorebirds and waterfowl of the Pacific Flyway.  
Sponsor: SF Bay National Wildlife Refuge  
Location: Mare Island  
(707) 562-BIRD

**FEB 19**  
FRI THRU SUN

**FEB 21**  
THRU SUN

**19TH ANNUAL RIVERS FESTIVAL**  
Topic: Fighting for Rivers: Dam Fighting in the 21st Century. Conservation and recreation workshops, kids' activities, and exhibits on whitewater products and conservation activities.  
Sponsor: Friends of the River  
Location: Fort Mason Center, San Francisco  
(916) 442-3155  
www.friendsoftheriver.com

NOW IN PRINT  
& ONLINE

*Battling the Inland Sea: Floods, Public Policy and the Sacramento Valley*  
Robert Kelley, University of Calif. Press

*Chairman's Interim Report of the Senate Select Committee on the CALFED Water Program*  
Senator Maurice Johannessen  
Copies from (916) 445-3353

*The Economic Impact of Recreation in the Delta*  
George Goldman  
Copies from (916)776-2290 or www.delta.ca.gov

*Evaluation and Use of Sediment Reference Sites and Toxicity Tests in San Francisco Bay*  
John Hunt et. al., State Water Resources Control Board, April 1998  
Copies from (916) 657-1247

*MTBE: A New Threat to California's Drinking Water Association of California Water Agencies*  
www.acwanet.com

*Preserving Our Heritage, Securing Our Future: A Report to the Citizens of the Nation*  
Association of National Estuary Programs  
Copies from (202) 554-6288

*Report of the Agricultural Task Force for Resource Conservation and Economic Growth in the Central Valley*  
California Farm Bureau Federation  
Copies from (916) 561-5677

*Sediment Quality and Biological Effects in S.F. Bay*  
John Hunt et. al., State Water Resources Control Board, August 1998  
(916) 657-1247

## YOUR LETTERS

## DEAR ESTUARY,

*I am writing to set the record straight. Recent news reports have chronicled the year-long campaign by one activist to close Cargill's salt-making operations in exchange for the San Francisco Bay International Airport's proposed new runway. We thought the scheme was far too ludicrous to be believed, but now we hear rumors are circulating that we have a secret agreement with the airport along these lines. This is false.*

*To "pay" for a loss of less than one-tenth of 1 percent of open water, the airport is expected to toss Cargill Salt out and convert 29,000 acres of salt ponds and industrial properties to marsh. That's a ratio of nearly 75 to 1--absurdly out of balance for a project that stands to benefit the entire region. Clearly, this is not about offsetting the as-yet-unknown impacts of a new runway; it's a cynical land grab. Our sustainable industry has successfully harvested sea salt from San Francisco Bay for nearly 150 years, and we intend to continue.*

CATHERINE HAY  
GENERAL MANAGER  
CARGILL SALT

**RMP CONTINUED**

Another example of recent RMP roles in decision-making concerns Chevron's application for a NPDES (discharge) permit. Chevron has a deepwater outfall and facilities that do a good job of diffusing and mixing its effluent with receiving waters. As a result, the oil company qualifies for a 10:1 dilution credit in which pollutants in its effluent can basically be ten times more concentrated than that of a company discharging to shallow waters with no turbulence or mixing. "I reviewed RMP data upstream, downstream and close to the point of discharge to get a feel for the existing quality of Chevron's receiving waters and to evaluate the level of the dilution credit. It helped me make a best professional judgment that we can defend," says the Board's Keyvan Moghbel.

Taylor adds that RMP information provides "added value" to some of the Board's more detailed research studies on sediment transport, hydrodynamics and how pollutants move through the system. Contaminants such as mercury, PCBs and dioxin have been moving up the food chain into fish, according to recent Board studies, leading to

a state health advisory on fish consumption. The RMP is now following up with further fish testing and consumption studies necessary for state health and environmental agencies to fine tune the advisory.

"The RMP is invaluable in terms of feedback on our policies," concludes Taylor. Contact: Kim Taylor (510)622-2426 ARO

**TRINITY CONTINUED**

An Interior Department solicitor sided with the water district in moving to exclude the county's testimony and evidence from the State Board hearings. "We're not siding with Westlands as a matter of policy," says Interior's Alf Brandt, "Our concern was that Trinity was stating as fact their interpretation of the law, particularly area-of-origin laws." Brandt also questions the Trinity representatives' expertise on matters relating to Westlands drainage. "They've never even been to Westlands," he says.

Stokely believes Interior's position reflects bias. "When Interior's solicitor goes to these hearings, he's supposed to represent fish and wildlife and Indian tribal interests as well as

the Bureau of Reclamation," says Stokely, "but it's apparent to us that he's in fact only representing the Bureau." On the issue of testimony, Trinity, Interior and Westlands reached an agreement whereby all of Trinity's documentary evidence went into the hearing record, although oral and written opinions were excluded.

Trinity does have some influential allies. "The Trinity basin's needs must be met before you export water," says Dante Nomellini, an attorney for the Central Delta Water Agency. "And it's certainly unreasonable to take water out of the Trinity, send it down the west side of the Valley and use it to degrade the quality of the San Joaquin."

The State Board water rights hearings will continue into early 1999 and litigation is likely to follow any decision. Nevertheless, says Stokely, "At least Trinity County has earned a seat at the table with other California water interests." Contact Tom Stokely (530)628-5949 CH

YOUR INDEPENDENT SOURCE FOR BAY-DELTA NEWS &amp; VIEWS



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