

THREE FIRSTS FOR SELENIUM CONTROL

Late this July the Central Valley Regional Board voted to adopt what may be the first waste discharge permit in the nation that actually requires farmers to meet an effluent limit, say environmentalists.

This waste discharge requirement applies to farmers and drainage districts in the 97,000-acre Grassland basin, who have been plagued with no outlet for their selenium-laden agricultural drainage water since the mid 1990's, when U.S. Fish & Wildlife began to enforce a 2 ppb selenium standard for area sloughs serving both drainers and wetland refuges.

The new requirement is the outcome of a two-year-old pilot project in which the federal government, with environmental support, allowed farmers to reopen a 28-mile section of the San Luis Drain (closed since 1983 due to its role in selenium-linked duck deformities at Kesterson) known as the Grasslands Bypass Channel if they met certain conditions, including limits on their selenium loads. The bypass project also helped reroute drainage water away from area wetlands. Basin drainers and farmers generally succeeded in meeting the load limits, using a variety of on-farm best management practices (BMPs) and economic incentives. Another condition of the pilot project was that the Board formalize the process by adopting waste discharge requirements within two years, which it has just done.

"It's good news for the environment because we know the amount of selenium flowing into the San Joaquin river will continue to be cut, and good news for farmers because they're being allowed to control the way they meet the limits," says the Environmental Defense Fund's Terry Young. "Nobody's giving them instructions and telling them how to farm."

How farmers are achieving reductions may also involve several firsts. One first is the recent formalization, with the help of a U.S. EPA grant, of a selenium load trading program among the seven water and drainage districts in Grasslands Basin, in which one district having a problem meeting its regionally allotted load in one month can trade with another that doesn't have a problem. Each district plants crops which mature in different seasons and thus need to discharge their irrigation water at different times of year. So this April, for example, the Charleston Drainage District used some of the Panoche District's allotted load and plans to pay the latter back this September. "The trading program provides us with the flexibility to maximize each other's resources and operate the basin as a whole," says Panoche's Dennis Falaschi.

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Biologically Fit by 2100 ?

Rather than leave the fate of the Bay's wetter wildlands and wildlife to whim, 100 scientists and resource experts have mapped out their best biological hopes for the year 2100 in a report released this June. Many are celebrating the arrival of sorely-needed scientific guidance for the surge of environmental restoration projects now underway. But others are wary of its implications in terms of loss of land and livelihood and its sky-is-the-limit approach to goal setting for our future Bayscape.

According to the information-jammed, 190-page *Draft San Francisco Estuary Baylands Ecosystem Goals* report, the Bay lost 82% of its tidal wetlands, 69% of its riparian forest and 42% of its tidal flats in the last two centuries, with a corresponding 1480% gain in salt ponds, 2663% gain in lagoons and 406,329% gain in Bay fill.

To recover some of these losses, the Goals map out three alternate visions for the year 2100 in which long lost tidal marshes grow from today's 34,000 acres up to 103,000 acres, with compensating drops in salt production ponds, grazed farmland and marsh managed for waterfowl. (Three visions were developed to show that habitats can be arrayed in more than one way and in different amounts to achieve the same general goals.) In addition to an overall vision, the Goals suggest 124 specific restoration actions, list numerous design considerations for would-be restorers, and preview potential implementation concerns.

"It's great that the Goals looked at our future in such a visionary fashion," says the

Audubon Society's Arthur Feinstein. "The Bay Area needs an ambitious restoration program, bits and pieces might keep a few endangered critters going but they won't recreate a functioning ecosystem."

"No one else has yet been able to get so many scientists to look at the problems of the Bay ecosystem as a group and issue joint recommendations," says well-known University of California ecologist Luna Leopold. "The community and CALFED had better pay attention."

The Goals' primary thrust is to strive for connected patches of 2000+ acres of tidal marsh centered around endangered plant

"Bits and pieces of habitat might keep a few endangered critters going but they won't recreate a functioning ecosystem."

and animal populations and emphasized along the Bay edge and mouths of streams to maximize benefits for fish. Other aims are to create large complexes of managed saline ponds located near important shorebird foraging areas, to emphasize the natural transitions from mudflat through tidal marsh to upland so that actual functioning mosaics of habitats come back to life, and to avoid perpetuating the piecemeal pockets and isolated strips of habitat restored today.

"When we diked the Bay earlier this century, we took all the

diversity out and got uniform mud and homogenized upper marsh throughout the system," says U.S. Fish & Wildlife's Peter Baye, one of the participating scientists. The Goals aim to recreate some of the now missing links, to go beyond the two-dimensional pickleweed plains — many dislocated from the rest of the ecosystem — now being created by many small levee-breaching projects and to add what Baye calls "mature middle marshes and high marsh edges that can't be made to order."

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SELENIUM CONTINUED

"This may be the first time a trading program has been attempted among nonpoint sources of pollution," adds Susan Austin, a lawyer recently hired to direct the basin's economic incentives programs. "It clearly gets good results with less hardship on those being regulated."



Another first may be Panoche's new \$5.6 million, high-tech, computer-monitored recirculation system. The system plumbs the area with the worst selenium and salt problems and reroutes the most concentrated drainage water back through the system. About 24 acre feet of the really salty stuff is then blended with freshwater every day during peak irrigation periods and reused on crops. "It keeps 80% of Panoche's 50% share of the basin's total selenium load out of the river," says Falaschi.

Other salt and selenium-reducing tools used by basin drainers include leasing land to grow salt-tolerant crops, investing in more efficient irrigation systems and placing permanent sprinklers along dirt roadways to apply drainage water for dust control. "We wouldn't have made these investments if the bypass project hadn't forced us into a regulatory process, and given us the certainty of a drainage outlet," says Falaschi. "It's been very costly, but we haven't reached a point yet where we can't continue to farm."

The newly adopted waste discharge requirements come up for renewal in three years, at which time Terry Young would like the Central Valley Board to take the next logical regulatory step and amend its Basin Plan to include a selenium TMDL (total maximum daily allowable load, as defined in the Clean Water Act) for the San Joaquin River. Young says despite demonstrated reductions in selenium loads during wet years (when flood conditions make limiting discharges much harder), water quality standards are still being violated. "A TMDL is designed to match up allowable discharge with the standards to gradually bring the river into compliance," she says. "The exciting part is that we already have proven techniques in place that work." Contact: Rudy Schnagl (916)255-3000 ARO

POLLUTION

SLOW DOWN ON QUICKSILVER

Mercury creeping up the Bay food chain from fish to herons to seals has the S.F. Regional Water Quality Control Board ready to say "enough is enough." Their response was to propose, in draft form this June, a total maximum acceptable daily load for the Bay, which applies to all sources.

Mercury levels as high as 0.9 ppm (parts per million) have been found in local sharks and 0.3 ppm in striped bass (compared to an average of 0.1 ppm for fish from all U.S. waters); studies have also found the metal in night herons, clapper rails and harbor seals. In the Bay, this diffuse and changeable metal — also known as quicksilver — crops up in both water and sediments and comes from diverse sources, among them runoff from abandoned mercury mines, wastewater and industrial discharges, and deposition from air pollution.

The proposed total load — "TMDL" — is a watershed-based approach to clean up required under the Clean Water Act to help the Bay comply with federal standards, says the Board's Kim Taylor. It looks at all sources of mercury and tries to limit the total amount entering the Bay by proposing target effluent concentrations and an offset program (a hybrid between a mitigation bank and a tradable loads program) for dischargers that would help pay for remediation of the largest sources of mercury — abandoned mines. Mercury entering the Bay from abandoned mines in the Sacramento River watershed is "one or two orders of magnitude higher" than all other inputs combined, says Taylor.

Clean up of some abandoned mines, such as New Almaden in the South Bay (a Superfund site) has already begun. Clean up of another problem area far upstream from the Bay — the mine-riddled Sacramento River watershed — is much more daunting. When mercury from mine tailings in this watershed runs off into rivers and creeks in the rainy season, it adheres to riverbanks and beds, and in high flows becomes re-suspended and flushed into the Bay. In the rainy winter of 1997, the U.S. Geological Survey measured mercury flowing into the Bay from the Sacramento River and Yolo Bypass at levels as high as 32 kg/day. (For comparison, a dry season loading would average around 0.2 kg/day.) High levels in Yolo County's Cache Creek (which flows into the Bypass) prompted the Central Valley Regional Board to list the creek in its proposed regional toxic hot spot clean up plan, out of concern about potential bioaccumulation in the new Yolo Wildlife Refuge.

Further downstream, many of the hot spots in San Francisco Bay mud (such as Point Potrero in Richmond) are vestiges of old industrial activities, says Taylor, adding that over time much of the mercury will be buried in the Bay's deepest sediments. Still, because of constant new inputs, currents that stir up sediment layers, and activities like dredging, she explains, "we've got a problem with our mercury water quality objective every time the wind kicks up."

The real problem is that re-suspended inorganic mercury (from mine runoff) can be transformed into methyl mercury — the form taken up by fish and other organisms. "The biggest unanswered question for us in controlling potential inputs is what are we doing that increases the rate of methyl mercury formation and uptake in the food chain?" says Taylor. "Everything from dredging to creating new wetlands stirs up the deeper layers. And you're adding bacteria which transform it into organic forms."

Even though inputs from Bay dischargers may be small compared to abandoned mine runoff, they're not off the hook since the mercury they discharge is dissolved mercury — which more easily becomes methyl mercury. So what will the TMDL mean for dischargers? One option is to change effluent limits for deep- and shallow-water dischargers to make them equal (deep-water dischargers currently get a 10:1 dilution credit) while making limits more stringent overall. The Board is proposing long-term averages of between .02 and .05 ppb; current limits are .025 and .012 ppb.

Chuck Batts, of the Bay Area Dischargers Association, says the TMDL seems like a viable long-term strategy, but that "the devil's going to be in the details." He thinks bigger questions are going to be "how to deal with the sediment re-suspension problem and runoff from mercury mines." Environmentalists could not be reached for comment.

With the TMDL, says Taylor, the Board wants to make sure effluent limits reflect "state-of-the-art pollution prevention programs and plant operations, and long-term variability in loading." After the draft TMDL public comment period expires on September 1, the details, including how an offset program will work, will be hammered out in a pilot study. Offsets could be defined, for example, in dischargers' NPDES permits, according to Taylor. The challenge will be putting all the information together and making a program that makes sense, admits Taylor. "Our goal is to control all controllable sources." Contact: Kim Taylor (510)622-2426 or Joe Domagalski, USGS (916)278-3077 LOV

CALFED

BRASS TACKS AT LAST?

The decision on CALFED's preferred alternative seems to be coming down to two very specific things: bromide and fish. Water suppliers want to make sure their source water from the Delta is as free of bromide as possible, especially in the face of mounting research about associated health risks and tough new drinking water regulations. And resource agencies want to make sure that the salmon, steelhead, striped bass and smelt battling a system short on water and habitat and rife with obstacles and hazards finally end up on the road to recovery.

"These are the two things that may have the most impact on our conveyance choices," says CALFED's Rick Woodard, referring to his agency's three recently-released alternatives for how to re-engineer the Delta's rivers and pumps to better convey water for the benefit of both cities and farms and the ecosystem and its endangered species.

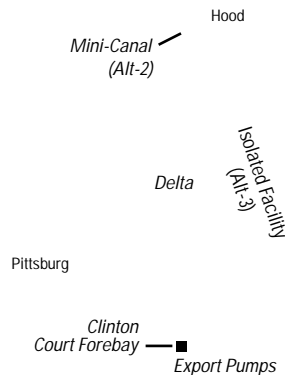
"CALFED will be made or broken on the issue of diversion effects on fish," says U.S. Fish & Wildlife's Mike Thabault. "It's time to move from avoiding jeopardy to recovery."

CALFED's three alternatives share a common program of ecosystem restoration, water conservation and the like but differ in terms of their "conveyance" approach. The first would basically maintain the status quo, the second would enlarge a key channel feeding the pumps and build a mini-canal to improve "through Delta" water movement, and the third "dual system" would add a new canal from Hood to the South Delta pumps, bypassing the Delta (see map). This canal is also known as the "isolated facility" or "PC" (though smaller in size and capacity than the peripheral canal rejected by voters in 1982). The isolated facility would allow a portion of the flow, as necessary to protect fish or drinking water quality, to be isolated from the Delta, with the remainder being pumped from within the Delta as it is today.

Though scientists and engineers think the Delta bypass canal might be the best for reducing bromide (because it moves the point of diversion further upstream away from bromide-bearing seawater) and protecting fish (because it gives water managers more pumping flexibility and recreates natural flow patterns), some stakeholders and citizens disagree. Many are saying CALFED's got to prove that a less invasive approach won't work first.

So CALFED is now toying with a new "phased" approach beginning with the

CALFED CONVEYANCE OPTIONS



common programs and moving into "through-Delta" improvements, then monitoring the heck out of the whole effort for seven years to see if works (see page 8). If it doesn't, then everyone seems to be expecting a contingency plan involving the dual conveyance system.

That leaves us with a current CALFED energy rush — led by several swat teams of

scientists, stakeholders and agency staff — directed at putting more meat on actions proposed to address bromide and fish. The fish team began by exploring which life stages of which species would be most affected by a change in the point of diversion under each of the alternatives, and is also assessing how much of a role diversion mortality may play in controlling population abundance as compared to other stressors such as inadequate habitat. Diversions impact fish in several ways, most directly by killing them when they get sucked into pumps and intakes, and less directly by affecting flows, disturbing migration, decreasing biomass and promoting predation on endangered species.

At first glance, an isolated facility seems to provide the most benefit for the most species, especially San Joaquin salmon and young Delta smelt. This is mostly because "the South Delta is such a death trap," says team member Elise Holland of The Bay Institute. With an isolated facility, water managers get a second set of pumps in a different location and can switch

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BURNING ISSUE

UNSURE ON ASSURANCES

CALFED is expected — and devoutly hoped — to nurse the battered Bay-Delta ecosystem back to health. But what if some or all of the hundreds of actions in its *Ecosystem Restoration Program Plan* (ERPP) — ranging from restoring Central Valley streams to eradicating invasive species in the Delta — don't work? Many stakeholders are reluctant to sign off on any CALFED solution that doesn't provide a satisfactory answer to this question, one of several make-or-break issues the state-federal program is still grappling with as it steams toward the release of a revised draft EIS/EIR late this year.

"Ask any interest group whether they think their major concerns have been taken care of," challenges B.J. Miller. "This issue is the key to the success of CALFED, but there has been essentially no progress at all on addressing the fundamental political fears and desires of any interest group." Water exporters, for example, want assurance that if they give up water and provide funding to implement the ERPP, they will not have to give up more money or water ten years from now if the environment is not recovering or new species are listed under the Endangered Species Act. Environmentalists, on the other hand, want to make sure that they have the tools they need, including additional water

and funding if necessary, to ensure environmental recovery.

A CALFED work group has been trying to develop the "assurances" that will answer these questions for two years, but many participants have been frustrated by slow progress and some now say the issue may be the biggest stumbling block the program has faced yet.

Part of the problem seems to be a fundamental disagreement over what the term "assurances" means. CALFED's Mike Heaton describes assurances as "the tools, mechanisms and processes that will be integrated into the plan to reassure people that the program will be implemented as proposed, as well as things that will prevent or mitigate adverse impacts that might come out of the implementation program." These tools might include new legislation, regulations, contracts or physical solutions, he says.

Heaton and other CALFED consultants say that to some extent the assurances are embodied in the program's implementation plan, which makes actions in one program area contingent upon actions or conditions in other areas. "The approach is to tie each program to the others, and tie benefits together so that everybody has an incentive to make the program work," says Mary Scoonover, legal counsel to CALFED.

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ASSURANCES CONTINUED

Not good enough, say some work group participants. "CALFED seems to have defined assurances as process and implementation," says Cynthia Koehler of Save The Bay and the Environmental Water Caucus. "An implementation plan is not an assurance." Clearly identifying sources of water and money for the ERPP would be a good start on real assurances, says Koehler. The EWC is also calling for an assurances package that includes measurable performance standards for the ERPP with legal mandates to achieve them, controls on water project operations, and other mechanisms. "For the ecosystem piece of this at least, assurances boils down to the simple question of how do you make sure that the goal of ecosystem restoration is achieved?" says Koehler, adding that CALFED's response to EWC's proposal was "six pages of pure fluff."

CALFED's position, says Heaton, is that "we can assure that things get done, but we can't assure that these things will actually produce the results that we all want." Nevertheless, he says, there is widespread, though not universal, agreement on some assurances issues, such as the need to protect upstream water rights and to assure that revenue streams for the program do not rely on the highly politicized federal appropriations process.

In addition, say Heaton and others, there is growing consensus around the need for a new institutional entity to manage the ERPP, and possibly the CALFED program as a whole. "You're going to have all this money to spend and some definite goals to accomplish — the logical thing is to pull this effort together under one umbrella," says Miller, adding that the new entity would probably be governed by representatives of various stakeholder groups, as well as the CALFED agencies. Questions remain, however, on virtually every aspect of the concept, including how much authority the entity would have and how big a budget it would need.

Despite the many issues still to be resolved, Heaton and Scoonover say that a "package" of assurances will be included in the revised EIS/EIR released later this year. And in the meantime, says Scoonover, "there will be a bigger emphasis on assurances over the next six months than any other program element." Contact Mike Heaton (916)657-2666; or Cynthia Koehler (510)452-9261 CH

PEOPLE

ROGENE REYNOLDS
ACTIVIST IN SPIKE OF HERSELF

To hear Rogene Reynolds tell it, all she wants to do is "raise my kids, play with my grandchildren and watch the world go by," but the world just won't let her. For the past two decades the Delta real estate agent has again and again found herself leading the charge to protect Delta farmland and water from the incursions and insults of urban interests. These days it's the specter of the peripheral canal, summoned from the grave by CALFED, that's driving her towards the battlements.

"She's a lightning rod," says the Delta Protection Commission's Margit Aramburu, who says Reynolds has an extraordinary ability to mobilize people around issues.

Although "raised to pay attention," Reynolds says she was fairly apolitical until she joined the 1970s grassroots effort to persuade Governor Brown to veto the Senate bill authorizing the canal. She helped gather signatures and joined a delegation — "busloads of people" — that went to Sacramento hoping to meet with Brown. When he refused, Reynolds staged a one-woman sit-in in his office that lasted well into the night. When Brown signed the bill, Reynolds helped launch the referendum that ultimately defeated the canal plan.

Reynolds' activism is fueled by a fierce commitment to the agricultural community where she has spent most of her life. Reynolds, 49, was born and raised on Roberts Island, where her great grandparents settled and began farming in the 1880s. She married young and moved away, but returned to the Island 10 years ago with her second husband, Bill. The island, one of the largest of the Delta islands, is still exclusively agricultural, due to zoning provisions designed to discourage subdivisions.

After the PC victory, Reynolds says she backed away from politics for some time. "I got too involved," she says of her first brush with activism. "I sacrificed my family's time and I damn near ruined my marriage. It was worth it in the sense that it had to be done but looking back, I really got too carried away."

But politics kept coming to her. First the city of Lathrop tried to acquire 2,500 acres of Roberts Island for sewage treatment, then the Bay Area Water Recycling Program developed a plan to irrigate the area with treated waste water. "It's always the same issue: because we're open space we're a dumping ground," says Reynolds. She took the lead in fighting both plans, and in both cases her opponents backed off.

Reynolds, a Republican, says she sees only a small conflict between her political beliefs and her real estate career. Although she doesn't care for the growth patterns in the Stockton area, which she expects will eventually cover a lot of farmland, and would hesitate to "do business with a developer," she says she's a realist. "People have to live somewhere, and it's my job to sell it to them. But I do wish they'd build *up* more, and not put people on the best land."

Between battles, Reynolds has directed some of her prodigious energy to spearheading a drive to restore the historic Roberts Island Farm Center, raising more than \$60,000 from local sources. "When a cause appears, she's right there in the forefront," says Farm Center president Mike Robinson, who has known Reynolds since childhood.

Reynolds hadn't paid much attention to CALFED until the program's draft EIS/EIR was released last spring. "It was a shock," says Reynolds, who went to bed crying after reading the document and it wasn't just the canal that upset her. "The whole thing was such a slam on farming, which is my heritage" she says, citing CALFED's land retirement plans. Although she supports the basic idea behind CALFED — that is, trying to balance competing water needs in the face of a growing population — she has a real problem with plans to move water from one basin to another for the benefit of urban areas. "Ultimately, we're going to need it, either for our own environment, our own farming or our own growth," she says. "Once water is gone to the cities, it isn't going to come back."

For the moment, Reynolds is taking a cautious wait-and-see approach with CALFED. "There are extremely powerful interests pushing for the new canal," she says. "They're not going to go away, not that easy. They may try a different tack, but if they don't get it now they'll be back again in 20 years." But in all likelihood, so will Reynolds. "They'll build this ditch over my dead body," she says. CH

"I can
rabble rouse
pretty well"

PROPERTY

NEW REFUGE TO THE NORTH ?

A bottleneck in the Yolo Bypass may soon be eliminated as part of the new North Delta Wildlife Refuge proposed by five federal and state agencies. The refuge, to be managed by U.S. Fish & Wildlife, would link the three main islands in the Bypass — Liberty Island (the bottleneck), Prospect Island, and the Little Holland Tract, in a 7,800-acre expanse of open water, seasonal wetlands and slow-moving sloughs. Although the refuge was originally slated to be part of the Stone Lakes National Wildlife Refuge (to the northeast), Fish & Wildlife's DC office decided the project was substantial enough to become the fifth federal refuge established in the Bay-Delta Estuary.

By removing Liberty's levees, the project's proponents say, high flows will pass through the Bypass more smoothly. "Right now it acts like a cork, backing up Sacramento River flows and damaging levees on other islands," says Geneal Chima, who represents the Liberty Island seller. Restoring Liberty Island as a tidal wetland would benefit Delta smelt, Sacramento splittail, winter run Chinook, and various species of waterfowl, says Fish & Wildlife's John Castellano, while the endangered Swainson's hawk and giant garter snake would benefit from adjoining uplands, which would remain seasonally dry. Fish & Wildlife also plans to create riparian zones to host neotropical migrant songbirds.

To address the fear expressed by some farmers during the March 4 public hearing that waterfowl will be attracted to their crops when Liberty becomes a refuge, parts of Liberty may also be planted with "wildlife-friendly" crops such as millet, corn, or wheat. In the meantime, Prospect and Little Holland have been undergoing a form of "natural" restoration over the past 10 years, after being flooded from repeated levee failures.

With all the controversy over converting ag land to habitat, Fish & Wildlife was surprised when the owner of Liberty Island approached them two years ago offering to sell. They were even more surprised when other landowners asked why they were stopping with Liberty, says Castellano. Fish & Wildlife is considering changing the scope of the refuge proposal to include not only the three islands within the Bypass (the core of the refuge), but also much of the area between Rio Vista and the bottom of the Yolo Basin Wildlife Area.

Margit Aramburu of the Delta Protection Commission says the Yolo Bypass islands,

traditionally farmed in row crops, may be more suitable than others for conversion to refuges because they are subject to flood easements: unlike some Delta islands, these islands are intentionally flooded if necessary when flows are too high in the Sacramento River and Bypass. For that reason, no one is allowed to live or build structures on them. "But," Aramburu adds, "I think it's vitally important we have a management plan, that we'll know exactly what the refuge will look like. The feds bought Prospect in '94, but to date, we haven't seen a budget, staff or program for managing it."

The second public meeting was held in a workshop format on July 28, and Fish & Wildlife will now complete a draft environmental assessment that incorporates com-

ments from the meetings and proposed alternative refuge boundaries. A final decision will be published in January 1999, after additional public input. Contact: John Castellano (916) 979-2085 LOV

HARDSCIENCE

NO GOLDEN STATE FOR ZEBRA MUSSEL ?

The infamous zebra mussel — crustacean purveyor of wrack, ruin and general clogging to Great Lakes plumbing and power plant cooling systems — might find California much less hospitable, according to a recent study. Only 44% of 160 sites on rivers, canals, lakes and reservoirs statewide offer the right conditions for colonization by this striped-shelled European terror.

According to the S.F. Estuary Institute study, zebra mussels require an environment that is rich in calcium, fresh to mildly brackish, warm-to-cool and alkaline, with plenty of hard substrates and low enough flow speeds to allow young to settle and adhere. Researchers Andy Cohen and Anna Weinstein screened the sites for five important environmental variables (salinity, dissolved calcium, pH, temperature and dissolved oxygen) and ranked 54% as having no or low potential for colonization, 2% as moderate and 44% as high. Among the most inviting spots were coastal watersheds, the west side of the Sacramento Valley, the lower San Joaquin River and the southern Delta, not to mention critical water conveyance facilities such as the Delta Mendota Canal; the California, South Bay, Los Angeles and Colorado River aqueducts; the All American Canal; and their associated reservoirs.

Researchers were surprised, however, by how many waterways and waterworks would fail to prove cozy mussel motels. "Zebra mussels exploded so fast in the Great Lakes that everyone got the impression they could live anywhere," says Weinstein. But zebra mussels might have a hard time getting to California, let alone surviving here. The upper Sacramento River system, for example, doesn't

have enough calcium to keep the mussel happy — zebra mussels need more calcium, about 15-30 ppm, than any other freshwater bivalve to maintain their shells. San Francisco Bay, for another example, is too much of a constant mix of fresh and salty. Researchers have never found zebra mussels abundant where salinities fluctuate above 2 parts per thousand (in the Bay-Delta's case, this would roughly be downstream of Antioch).

With no watery superhighway to travel, the worrisome mussel may also find it not so easy to reach the Golden State from the Great Lakes or the Oklahoma River 2,000 miles away (the nearest infested area). There's not a lot of trailered boat traffic — one major pathway of introduction — between Lake Michigan and the S.F. Bay-Delta watershed, and even if there was, most mussels along for the ride would be dead and dried out upon arrival (as were those found recently by California border guards). "An invasion is not inevitable," says Weinstein, "but we need to be vigilant."

Vigilance, at the moment, means educating border inspectors and passing out boater leaflets, as well as a state-federal task force aimed at stopping the spread on the west slope of the Rockies at the 100th meridian. Another step might be to identify invasion hot spots, so they can be the focus of boater education, monitoring and advance planning for containment and eradication. Such hot spots are likely to be "popular recreational reservoirs with lots of interstate boat traffic, where hospitable conditions combine with lots of opportunities for introduction," says Weinstein. For more mussel information see *Now in Print*. Contact: Anna Weinstein (510)231-9539 ARO

WATERSHED

BEFRIENDING SAUSAL CREEK

"Planting things is easy," says Sam Cohen of Friends of Sausal Creek, as he waters a baby redwood. "Taking care of them the first year or two is the hard part."



Cohen was talking about the tree, planted last winter, but he might have been referring to any start-up volunteer group. Cohen says that having a variety of tasks available helps keep people interested.

That's one reason the two-year-old Friends of Sausal Creek group has succeeded. Along the creek itself — which runs from the Oakland Hills, through a deep canyon into heavily-used Dimond Park, then roughly parallels busy Fruitvale Avenue before flowing into the Bay — the group has ripped out exotic plants, especially Algerian ivy and blackberry, replacing them with species indigenous to the creek watershed. They've also created a sunny hillside garden filled with California natives generally available in gardening shops, so people can get ideas for their own backyards. In addition, a separate team is repairing a trail that runs through the canyon, and another monitors water quality and riparian wildlife.

The Friends organization was founded in 1996 — after locals began attending watershed awareness meetings organized by the Aquatic Outreach Institute — and continues to grow with logistical help from the Institute and funding from Alameda County. It's one of 30 community-based creek and watershed and restoration groups now thriving in the Bay region. Workdays draw 20-30 people, and the group gets help from city crews and youth groups. "It takes an incredible number of people to fix something once it's been messed up," Cohen says.

The creek's largely urban setting has its advantages and disadvantages, says member Michael Thilgen. Local kids hung a rope swing over the creek and trampled the ivy underfoot, saving the Friends from having to clear it, he recalls. But they've also skidded down freshly planted hillsides and engaged in outright vandalism.

And sometimes nature does its own restoration. Thilgen points to a brightly blooming scarlet monkey flower — winter floods carried its seeds downstream, he explains. "That's the real force we're working with." Contact: Anne Hayes (510)231-9566 O'B

GOALS CONTINUED

"Folks have been doing all these restoration projects and ignoring everything around them," says Wes Maffei of the Napa County Mosquito Abatement District, one of the participating resource managers. "Some appear not to have considered components such as plant communities, invertebrates, species assemblages and effects on adjacent lands. In other instances one or a few species were the driving force rather than a complete ecosystem view, which is what the Goals attempt to do."

"The Goals provide restoration objectives for the Bay that are comprehensive in terms of all the biological issues," says Cal Fish & Game's Carl Wilcox, also on the resource managers team. "If we reach this level of restoration it will mean recovery for a lot of species at risk."

Indeed, Goals authors hope that resource agencies and would-be restorers will use the new document to help pick and build the best projects for the most species, so they don't get into conflicts such as the one over Sonoma Baylands. In 1994, state and federal fish and game agencies found themselves fighting over the Sonoma project, according to Wilcox, because they had no shared scientific basis for deciding the relative benefits of existing seasonal wetlands on the site versus the tidal marsh to be restored. "We had competing wildlife interests," he says.

Such stalemates fueled a fire for the development of a Goals-type document first laid in the S.F. Estuary Project's 1993 *Comprehensive Conservation and Management Plan* for the Bay and Delta (CCMP). The CCMP called for development of a regional wetlands management plan based in part on the habitat needs of plant and animal communities. Assessing those needs was the purpose of the Goals.

Some of these needs are very specific, as exemplified in the 124 specific actions suggested in the report. These include, for example, enhancing the mixed hardwood forest on Deer Island; reducing wave action at a Corte Madera marsh seal pupping site; expanding a freshwater marsh near S.F. Airport for the benefit of endangered garter snakes and red-legged frogs; building shorebird roosting sites in the Emeryville Crescent; cleaning up possible contaminants on Richmond's shores; and creating shallow pannes for snowy plovers to nest in near Old Alameda Creek.

To delve a little more deeply into the actions list, plants, for example, would

benefit from the development of more complex marsh habitats as most of the "floristic diversity" occurs in high marsh and upland transition zones, according to Fish & Wildlife's Baye, who made a point of linking the Goals with his agency's forthcoming recovery plan for tidal marsh species. The Goals also suggest reintroducing the now locally extinct California sea blite and near-extinct salt marsh owl's clover. The blite is specific to sandy salt marshes, where waves break against the marsh edge — conditions that are extremely rare in a shoreline ringed with dikes and concrete.

Displacement of native plants by invaders from other coasts, such as Atlantic "smooth" cordgrass, was a controversial topic for the Goals' plant team. "We feel these are four alarm fires," says Baye, citing the invading cordgrass' ability to act as "a tremendous geomorphic agent" (by increasing siltation) and to do genetic damage by hybridizing with the natives. In terms of the Goals, the plant team felt strongly that if the outcome of a tidal marsh restoration project was just going to be invasion of solid stands of exotics, then it should be done elsewhere until infestations are controlled, says Baye. Though some consideration for these issues appears in the Goals, Baye doesn't think they took the need for eradication seriously enough. "We need an all-out war. If there's no regionwide strategy, they will just reinvade — today's piecemeal approach is like spraying a garden hose on a forest fire," he says.

Fish proved a much cooler topic in the Goals process. "With all the small plants and invertebrates found in mudflats, shallows and tidal marshes, you have the beginnings of a food chain that is much more productive than open water," says Bob Tasto of Cal Fish & Game — another participating scientist. "Fish forage and sometimes breed in these areas at high tide, and juveniles often use them to hide from predators." The most obvious fisheries benefit of the Goals may come from any restoration of large areas of tidal marsh in Suisun Bay, where endangered Delta smelt and Chinook salmon smolts could hang out. The Goals also seek to increase the Estuary's stock of eelgrass, a shallow water plant favored by herring and smelt and by hungry California least terns diving for food.

Even insects make a buzz in the Goals, albeit a small one. Spiders, mites and flies all play a role in the wetland food chain, says Maffei, as do small invertebrates like fairy shrimp. "We have to be careful about how we change habitat, or we could lose an

important food item for birds like a brine fly or a beetle, or a wasp that pollinates wetland plants. The Goals open the door to these considerations for the first time."

Some Goals participants used to their own niches seemed uncomfortable with the leap they were asked to make between science and vision, and between the best for one species and the best for all. Some mentioned that they'd liked to have had more time for rigorous integration between the different focus teams on fish, birds, insects and the like, while others were frustrated by how long the Goals process took and left the table part way through. More formal peer review and some actual in-the-field research to back up the Goals are also on the wish list. "We were basically pulling together everything we knew and giving our best professional judgment," says Fish & Wildlife's Baye.

Addressing such feedback from both participants and the public is one of the aims of the second draft scheduled to emerge later this year (comments due on this first draft September 1). Anyone wishing to do their homework will find hundreds of ideas and technical tips in both the body of the report, and those dead set on deep background will get a mindfull in the Goals' appendices and accompanying species reports on fish, plants, birds and invertebrates.

Goals workshops held around the Bay this July drew a total of 160 people. Many attendees commended the Goals as a concerted effort on the part of well-intentioned scientists and resource managers to tangle with some really tough issues. Others were not so enthusiastic.

In the South Bay, Cargill Salt expressed shock at a vision that deletes commercial

saltmaking from the picture by the year 2100. "The Goals fail to recognize the plain fact that we are going to continue our legitimate and environmentally beneficial business of harvesting salt in perpetuity," says Jill Singleton of Cargill, which sent representatives to all four workshops to repeat the same message: we're here to stay so don't count on our salt ponds for restoration. "Government science should deal with reality, not fantasy."

North Bay farmers were also shocked by the Goals' year 2100 zero acreage of farmed or grazed bayland, but, unlike Cargill, seem willing to talk turkey. "I had to scrape some of our farmers off the ceiling at that workshop," says the North Bay Alliance's Jim Haire, a farmer. "But once they realized this was a scientific wish, not a regulatory action, they calmed down." Haire says North Bay farmers recognize the scarcity and unique ecological value of their lands and only want to get a fair price for it.

At the Suisun Bay workshop, duck club owners and hunters arrived in force, worried that conversion of managed to tidal marsh proposed in the Goals meant their lands would be condemned by big government. "Losing 20,000 acres in the Suisun marsh is a tremendous hit," says the California Water Association's Bill Gaines. "The only place we support conversion is in some of the wetlands around the periphery, which levee breaches year after year make too expensive to maintain for ducks." Suisun Resource Conservation District biologist Steve Chappell — also a Goals participant — felt that waterfowl suffered in the Goals in the rush to create new habitat for endangered fish, mice and rails. "We'd be eliminating wetlands currently productive for waterfowl, shorebirds and resident wildlife for benefits on the 30-50 year horizon," he says.

At the Central Bay workshop, environmentalists commended the Goals as an invaluable aid to advocacy organizations and government agencies working to restore the ecosystem but had concerns about the Goals' entirely voluntary approach. "There may be a role for regulatory incentives or direct regulation should voluntary approaches fail to meet these critical ecological objectives," says Save the Bay's Will Burns.

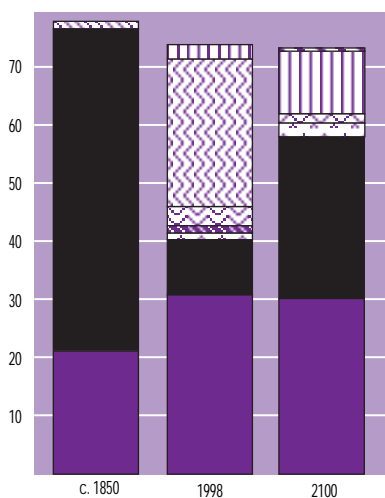
Goals developers say they expected such comments, as their focus was biology first and reality later. "Now we need to put the Goals through social, political, economic and legal filters so that what comes out is implementable according to all the measures of society today," says U.S. EPA's Paul Jones.

Clearly finding baylands to restore — if landowners are unwilling to sell — may be a major filtering mechanism. "You can only cut the pie up in so many ways if the only pieces left are diked private lands," says Chappell. "If the Goals are used as outlined, as a long-term goal as landowners become willing, then it's a good process, but if they take on a life of their own and get misused to regulate and condemn private lands then there's a problem. We're afraid Fish & Wildlife might use them to implement its tidal marsh recovery plan."

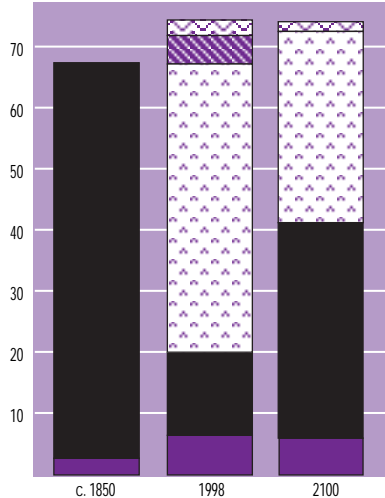
South Bay goals may have to be rethought, says Fish & Game's Wilcox, in favor of working with Cargill to make their existing system as wildlife-friendly as possible while developing a strategy for acquiring any ponds that become surplus for restoration. In the North Bay, economic incentives might spur farmers to keep water on their land a little longer every winter for

continued page 8

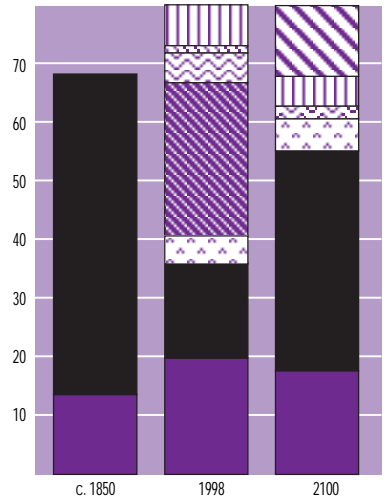
SOUTH BAY ACREAGE GOALS IN ACRES x1000



SUISUN BAY ACREAGE GOALS IN ACRES x1000



NORTH BAY ACREAGE GOALS IN ACRES x1000



Graphs represent only one of the Goals' three alternate visions for 2100. Central Bay omitted due to lack of space.

LEGEND

- Seasonal Ponds
- Saline Ponds
- Salt Ponds
- Diked Baylands
- Farmed Baylands
- Managed Marsh
- Other Baylands
- Tidal Marsh

GOALS CONTINUED

the benefit of seasonal avian visitors. "If all the oat-hay farmers on the North rim allowed just 10% of their land to pond up every year, we'd be miles ahead of where we are today in terms of benefits," says Wilcox.

Another major filter is obviously economic. Federal and state resource managers have a long history of being strapped for operations and management dollars, leaving them ill-equipped to care for or optimize vast new tracts of wetlands, let alone monitor them for problems or progress. "Without the money it's a fool's game to try and restore all this stuff," says EPA's Jones.

But most of these issues — many of which are acknowledged in the fine print of the Goals document — fall on the implementation side of the equation, supposedly the next step after the Goals are finalized. Going through a reality check would be part of any process for developing a regional wetlands protection and management plan, as called for in the CCMP. The U.S. EPA and the S.F. Regional Water Quality Control Board are already trying to work out how to facilitate such a planning process. The Board's Peggy Olofson envisions beginning with an evaluation of the Goals in light of existing wetland policies and plans (such as the CCMP, the Regional Board's Basin Plan, the S.F. Bay Commission's Bay Plan and Suisun Marsh plan), and then defining a table of contents for a regional wetlands management plan. Efforts would then zero in on working with local interests on subregional issues, on improving the regulatory process for restoration, on evaluating the feasibility of the various projects listed in the goals, and on developing a monitoring program for existing wetland rehab projects. With a most-feasible projects list in hand, legislation and funds to pursue them could be sought, says Olofson.

Some early implementation work is already being done by the S.F. Joint Venture, which brokers public-private land acquisitions for wetland protection and restoration. According to Nancy Shafer, the Venture has begun evaluating the Goals, identifying the most feasible projects, developing a voluntary implementation strategy, and projecting costs for acquisition and maintenance.

In the meantime, several agencies have already identified conflicts with some of their policies, such as the Goals' recommendation that clean dredged material only be employed to help restore wetlands "when its use will result in an essential ecological restoration

benefit that cannot be achieved better through natural means." Several local agencies have policies promoting the beneficial use of dredged material whenever possible — largely to reduce environmental problems associated with its disposal in the Bay itself. Another potential conflict might be between Goals recommendations on keeping people away from sensitive wetlands and state policies promoting public access to the Bayshore.

While such issues percolate through any implementation phase that emerges, the Goals will clearly not sit on the shelf. Wilcox says Cal Fish & Game has already used the Goals to target the best existing projects on

the table, such as one in American Canyon that would link up existing wetlands and create contiguous tidal marsh for seven miles inland from the Highway 37 bridge on the Napa River. And the Joint Venture's Nancy Shafer is delighted to have a biological foundation to point to when making a case for restoration. "If a property rights group asks me why we need this or that project or so many acres for wetlands, I can point to Goals and say see how it helps all these species. It helps me articulate the why," she says. Contact: Peggy Olofson (510)622-2402

ARO

THE MONITOR

KEEPING TABS ON CALFED

"Eyes and ears" on the multi-million dollar effort to improve the Delta's water supply, fish and wildlife are the goal of one of the most sweeping environmental monitoring programs ever proposed. With a \$1.8 million grant awarded this April, scientists and stakeholders recently began mapping out a 30-year Comprehensive Monitoring, Assessment and Research Program aimed at evaluating CALFED's successes and failures — with a first draft due this autumn.

"In order to manage adaptively, CALFED's approach from day one, you have to know what the results of your actions are," says the new program's manager Leo Winternitz of the Department of Water Resources. "Monitoring and research are the only way to do that, and it ain't easy or cheap. It takes equipment, takes boats, takes people, takes planning..."

"What's most appealing is the opportunity to focus from the outset on what people actually need to know, so the science doesn't just end up on the shelf," says the U.S. Geological Survey's Larry Smith.

The fledgling effort's workplan, posted on the Web, includes inventorying all current monitoring programs in the Central Valley watershed, identifying gaps and overlaps, and developing a mutually compatible data management process, common monitoring protocols, feedback loops and an umbrella institution to coordinate the whole shebang.

Can all this really be planned by October, with CALFED burn-out rampant among stakeholders, agency staffers and scientists

alike? Winternitz is wearily optimistic. "We'll be happy if we identify what needs to be done and why in terms of CALFED's common programs, and to some extent when and where, but the who and how will have to come later," he says, laughing and likening the task to parting the waters of the Red Sea.

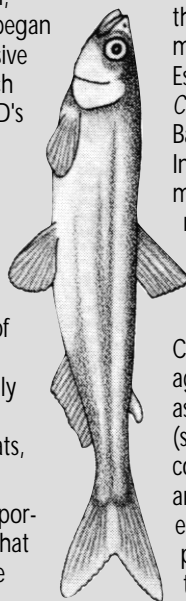
What excites Margaret Johnston most is the close resemblance of the program to the kind of coordinated, regionwide monitoring strategy proposed in the S.F. Estuary Project's 1993 *Comprehensive Conservation and Management Plan* for the Bay and Delta. Johnston's S.F. Estuary Institute now coordinates Bay-centric monitoring. "The effort to tie Bay to Delta monitoring has been pretty bottom-up until CALFED," she says.

Scientists like Johnson, and many environmentalists, have long harped on CALFED to set detailed restoration goals against which researchers can monitor, such as those newly released for Bay wetlands (see cover). Such goals, and an explicit conceptual model of how the Estuary works and what stresses it, will provide an essential reference for the new monitoring program, according to Winternitz. Once the system is in place, Smith hopes to make the data collected accessible to all via the Internet. "A lot of controversies arise because of the absence of hard information," he says.

With new watching and listening posts on every shore and in every den, the information flood could be daunting. "Hopefully the eyes will be able to see straight and the ears will be able to hear well," says Winternitz.

Contact: Leo Winternitz (916)227-7548 or view the workplan on-line at <http://lep.water.ca.gov/cmarp/>

ARO



FISH & BROMIDES CONTINUED

back and forth to avoid hurting the fish depending on where they are in the system. "It's the San Joaquin salmon, who get pulled down Old River directly into the pumps, that really tipped the scales toward the PC, but the uncertainties about impacts are many and the double hits north and south are a real problem," says Holland.

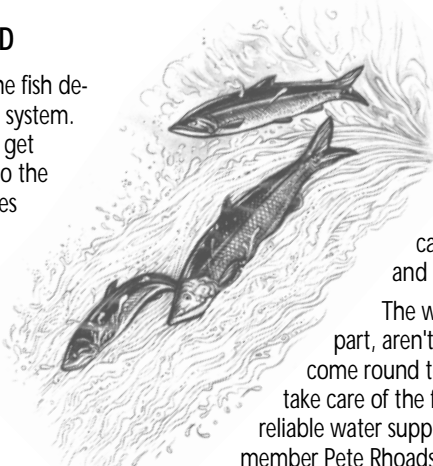
The double hits problem, shared by both alternative 2 and to a lesser extent 3, is that with a new screen at the Hood intake, some of the non-resident fish in the system may now have to negotiate screens both at Hood and in the South Delta. And while screens are well-intended, the technology is far from perfect. "We still can't screen out eggs and larvae," says Holland.

Also weighing in on the diversion-effects equation are all the other bits of the PC-package. According to Fish & Wildlife's Thabault, this package includes a bunch of very stringent operational constraints matched to fish migratory movements and hydrological conditions, plus habitat reconstruction, water quality improvements to the San Joaquin in terms of salts and selenium loads, and capacity constraints on exports. "Because it does the most to mimic the natural flow of water from east to west, from the rivers to the sea, it's still the best for fish," he says.

But with the PC likely to be relegated to contingency status, the team is now working to make the "through-Delta" alternative, which ranked worst for fish in a preliminary report, as good as it can get in terms of species recovery. The problem here lies with the new mini-canal, according to CALFED's Ron Ott. "If we put a substantial amount of Sacramento River water through the canal into the Mokelumne, salmon runs cued to sense Sacramento River water may end up the canal," he says. Fish in the canal could then get stuck behind new pumps below the Hood fish screen, requiring new fish bypass or salvage (trucking) facilities — another death trap for many fish. For these and other reasons, many biologists are skeptical that any through-Delta approach can work for fish.

Such concerns will have to be addressed in awfully short-order. By the end of August, the fish team must complete a sound through-Delta alternative, by September a contingency plan detailing the most fish-friendly PC, and by October a phased approach integrating both with water supply concerns.

"We need to start by optimizing operation of the existing Delta system, which is flawed, and make some small structural changes everyone



Matt Day

can agree on," says Holland. The harder part will be attempting to build in some level of operational equity for the fish in a system that more often caters to the needs of farms and cities, she says.

The water suppliers, for their part, aren't squawking yet. Most have come round to the idea that unless they take care of the fish, they can't count on a reliable water supply, according to fish team member Pete Rhoads of Los Angeles' Metropolitan Water District. "But there's still considerable uncertainty over the effect of the pumps, versus toxics, versus exotic organisms," he says. Uncertain or not, all are now being asked to give it their best guess this fall. "CALFED's backed us into a corner," says Holland. "They're asking us when and how is the lowest impact, and the answer is never."

Moving on to the bromide problems, the isolated facility could be the best alternative but there's a catch. It might or might not be able to be built in time to help water suppliers meet any of the new drinking water standards lurking on the doorstep of the new century.

By way of background, bromide is a natural substance that derives from seawater and occurs in the Delta at levels six times the national average for source water, largely because California is the only place in the country that takes drinking water from an estuary. Bromide troubles water suppliers because when water containing it undergoes ozonation to remove disease-causing microbes, it forms a carcinogenic byproduct called bromate. "Bromate is ozone's Achilles' heel," says Buck.

Since the 1980s, water suppliers have invested heavily in ozone treatment to replace chlorine which, when used for drinking water treatment, can produce a better-known and much-longer regulated class of harmful disinfection byproducts known as trihalomethanes, or THMs. The quality of the Delta source water also plays a role here, as THMs form when water containing organic carbon from plant material (common in the region's peat soils) is disinfected with chlorine. The additional presence of bromide can create bromated-forms of THMs. While THMs have long been suspected carcinogens, studies released this spring also suggest a link with miscarriages.

This November, U.S. EPA plans to reduce the allowable level of THMs in drinking water from 100 parts per billion to 80 ppb and set a standard of 10 ppb for bromate. Even lower "placeholder" levels have already been published for implementation as early as 2002. Though local officials think these tougher standards are

HOW SEE IT

FINANCING THE FIX

DAVID YARDAS ENVIRONMENTAL DEFENSE FUND

"Among the most critical unanswered questions in the discussion of the CALFED Bay-Delta program is who, in the end, will be asked to pay for what. The stakes are enormous — the total bill could well exceed \$20 billion over the next 20-30 years.

"According to the *Phase II Report*, 'sharing the costs of the Solution based on the benefits being created is the cornerstone principle of the CALFED Financial Strategy.' While my organization [EDF] supports the basic notion that those who would benefit from any newly-developed facilities should pay the 'true costs' thereof, the benefits-based approach described in the Phase II Report ignores at least one critically important issue: how we got here in the first place. By assuming that 'costs will be paid for by the beneficiaries of the actions, as opposed to seeking payment from those who, over time, were responsible for causing the problems being experienced,' CALFED is doing its best to ignore more than 100 years of environmentally-damaging water development activities — much of it taxpayer funded — the adverse results of which necessitated CALFED's programmatic efforts.

"Taken literally, the benefits-based approach so-defined would preclude any assessment of (1) historic investments and subsidies in existing water development, (2) prior unmet environmental mitigation obligations, (3) the true prior and ongoing costs of diversions, depletions, exports, impoundments, and pollution from facilities, and (4) the related ecosystem costs of any new water development.

"The above approach assumes, in effect, that the 'water playing field' is somehow level. This ignores the fact that half of all Bay-Delta inflows (more than 70 percent in drier years) are already extracted from the ecosystem every year. It would also require the public to pay for any and all ecosystem benefits — including repairs for the damage already done. And it would preclude adopting even modest fees to pay for use of the public's water, to begin to 'internalize' long-ignored environmental costs, and to assist in implementing CALFED's efforts to restore ecosystem health — the best, and perhaps only,

YOUR LETTERS

STRIPED BASS

Dear Estuary,

I take great exception to your December 1997 article on striped bass population decline excerpted from an article written by Bill Bennett of U.C. Davis (IEP News, Autumn 1997).

According to the article, Mr. Bennett suggests that the decline of the striped bass population in the Estuary was due to global warming rather than low freshwater flows and high exports from the state and federal water project pumps. Mr. Bennett suggests that the warmer ocean temperatures stimulated an outmigration of striped bass from the Estuary to the ocean.

Mr. Bennett apparently believes the stripers just disappear into the ocean, never to return to the Delta. There is no mention of the fact that striped bass are an anadromous fish and as such will seek out the fresh water of the Delta to spawn as they have for the last 125 years. This drive in anadromous fish to propagate and preserve the species supersedes all other drives. It is far fetched to believe that salmon could suddenly give up this primary survival trait simply because of an inconsistent El Niño event over the last 20 years.

More importantly, Mr. Bennett ignores the overwhelming preponderance of data from the Interagency Ecological Program (a cooperative study program consisting of biologists, hydrologists and engineers largely from state and federal resource agencies). I refer Mr. Bennett to the 1987 IEP Technical Report No. 20 documenting the decimation of the striped bass population due to the state and Central Valley water project pumps, and depicting a minimum loss of 793 million striped bass eggs and larvae from the pumps for the year 1985 alone. Another table, submitted for the 1992 State Water Rights Proceedings, estimates the loss of striped bass (1"-6" in length) from 1957 through 1989 to be in excess of one billion fish due to the water projects.

To ignore this documentation from so many expert scientists is to ignore reality. It is intuitively obvious to even the most causal observer the main reason for the decline of the fishery.

As a final note, it was not surprising to learn that Mr. Bennett's study to deflect the focus of attention from the pumps was funded by the water contractors vis-a-vis the Bureau of Reclamation.

Larry Stenger

Cal Fish & Game Striped Bass Advisory Board
U.S.F.W. Striped Bass Technical Team
California Striped Bass Association
United Anglers of California
S.F. Estuary Project

FISH & BROMIDES CONTINUED

unlikely to fly, Byron Buck of the California Urban Water Agencies isn't too optimistic. "I can't think of any examples in regulatory history where EPA has relaxed health standards, and backing off placeholder numbers, hard fought for by the environmental community, would certainly be perceived as a relaxation," he says.

Water purveyors have two choices for reducing bromide and disinfection byproducts: get better source water or invest in new and more complex treatment processes (see CUWA report *Now in Print*). Some suppliers, like the Contra Costa Water District (which has one of the most seawater-influenced intakes), have already successfully dealt with the first round of regulations by developing a diverse array of filtration and treatment options that they can use in different combinations as needed.

But this treatment technology isn't feasible yet on a scale necessary to get a big water supplier like Los Angeles' Metropolitan Water District ("Met") into compliance, according to Buck. "The bottom line is that it's less costly to build a new facility to get better source water," he says. If suppliers wanted to add a new technology such as "membrane filtration" to comply with tougher standards on the horizon, Buck calculates that costs would run \$140-250 per acre-foot as opposed to \$30-\$125 for the isolated facility.

CALFED's through-Delta alternative could reduce bromide by about 25% (using the mini-canal to shunt a bunch of spanking-clean fresh water downstream) and dual-system by about 60% (by skimming off water before it reaches the seawater-tinged Delta). Just how accurate these calculations are likely to turn out, and their significance in light of the latest health effects research, treatment technologies and regulations, is the task before yet another CALFED panel of outside experts set up to meet this September.

But no matter what the experts say, "The utilities can't count on any of the alternatives to help them comply," according to U.S. EPA's Bruce Macler. "There won't be any 10-year grace period for Met. The state will enforce and the public won't allow any delay, when it comes to their health." But Buck believes that the feds will have to consider the difficulties in developing any new compliance timelines.

For their part, environmentalists note that seawater intrusion is not the only potential source of bromide to drinking water supplies — which are often a

combination of waters from multiple sources and reservoirs run through numerous canals, all places where they might pick up bromide, pathogens, organics and other water-quality compromising substances. "Bromide is getting into the plumbing system in places all along the California Aqueduct, not just the Delta," says the Tuolumne River Trust's Tim Ramirez. "Drinking water quality is better evaluated when it reaches the door of the treatment facility, not up at the source."

So what can CALFED do right away, in terms of core actions, that can yield benefits regardless of the alternatives? This is the question now being answered by CALFED's existing water quality SWAT team of stakeholders and advisors, of which Macler is a part.

"In many cases, the real problem isn't bromide, it's algae," says Macler. Algal growth spurred by excessive nutrients flowing into source water from feedlots and fertilizer use puts utilities in a bad bind. "You can't chlorinate algae, or you get bad tasting water," he says. And you can't use ozone treatment because it produces bromate.

One thing Macler's group thinks CALFED and water suppliers should do is watershed management activities around drinking water intakes. A few obvious examples, says Macler, would be to: reroute an agricultural drain which has long fed unwanted nutrients into the water above the Rock Slough intake; replace wooden cow bridges over the South Bay aqueduct with metal ones (cow pats fall through the wooden slats); work with farmers around Discovery Bay on how and when to drain fields; and even to restrict swimming in reservoirs. "These kinds of corrections are pretty proactive and doable with small dollars — the bang for the buck compared to treatment is astonishing," says Macler. "We need to try these core actions before we reroute the Delta."

But Buck is skeptical that there are any other significant sources of bromide than seawater. "These actions will at best give you some localized improvement in organic carbon contamination, but do nothing for bromide. You can't deal with the bromide issue with watershed management, it's a non-sequitur," he says. He also points out that the science on the impacts of disinfection byproducts is still in its infancy, and relates only to a third of the potentially harmful treatment byproducts in our water. "There may be more serious health problems coming down the line that will force an isolated facility," he says.

continued back page

PLACES TO GO & THINGS TO DO



WORKSHOPS & SEMINARS

SEPT
WEDS - FRI
9
THRU
11

SEPT
WEDS - FRI
18
24
25
30

WATER QUALITY PROTECTION WORKSHOPS

Topic: Construction Site Planning and Management
Sponsor: S.F. Estuary Project
Location: San Jose, Pleasanton, Sonoma
9:00 AM—4:00 PM
(510) 286-0924

SEPT
WED - FRI
16
THRU
18

WATER MANAGERS' WORKSHOP

Topics: Proposition 218; LAFCO update; board-manager relations.
Sponsor: ACWA
(916) 441-4545

OCT
SAT
10

KIDS IN MARSHES

Topics: Marsh habitats, pollution prevention, water quality monitoring, marsh animals. Open to K-12 educators working in Alameda County.
Sponsor: Aquatic Outreach Institute
Location: S.F. Bay National Wildlife Refuge, Fremont
9:00 AM—4:30 PM
(510) 231-5784

OCT
TUES - THURS
20
THRU
29

SHORT COURSE: RIVER RESTORATION AND NATURAL CHANNEL DESIGN

Sponsor: Wildland Hydrology
Location: Pagosa Springs, CO
(970) 264-7120



MEETINGS & HEARINGS

SEPT
THUR
10

BAY-DELTA ADVISORY COMMITTEE

Topic: Alternative Proposals for CALFED Ecosystem Restoration Program in the Delta
Sponsor: CALFED
(916) 657-2666

SEPT
FRI
11

CCMP IMPLEMENTATION COMMITTEE

Topics: Ecosystem Goals Project; diazinon
Sponsor: S.F. Estuary Project
Location: Vacaville
10:00 AM—12:30 PM
(510) 286-0460

SEPT
MON - THURS
21
THRU
24

SIXTH NATIONAL NONPOINT SOURCE MONITORING WORKSHOP

Sponsor: Iowa Department of Natural Resources
Location: Cedar Rapids, Iowa
(319) 335-2575



HANDS ON

SEPT
SAT - SUN
12
13

AMERICAN RIVER FESTIVAL

Sponsor: American River Conservancy
Location: Placerville
(530) 621-1224

SEPT
SUN
20

14TH ANNUAL CALIFORNIA COASTAL CLEANUP DAY

Topic: "Shore Could Use Your Help." Help clean up the beaches, rivers and creeks around the San Francisco Bay and Delta.
Sponsor: Coastal Conservancy
Location: Various
(800) COAST-4U.

SEPT
SUN
20

SACRAMENTO RIVER CLEAN-UP AND BARBEQUE

Sponsor: Upper Sacramento River Exchange
Location: Dunsmuir
(530) 926-1546

SEPT
WEDS - FRI
23
THRU
25

EASTERN SIERRA WATERSHEDS TOUR

Topic: Tour begins in Reno and travels along Lake Tahoe, the Mono Basin and the Owens Valley.
Sponsor: Water Education Foundation
(916) 444-6240

OCT
SATURDAYS
17
24
NOV
SATURDAYS
7
14

EDUCATORS' CONFERENCE

Topic: Teaching About Creeks, Wetlands and Watersheds. Consists of field trips covering topics such as water quality monitoring, native plant propagation and wetland habitat restoration. Pre-registration required.
Sponsor: Aquatic Outreach Institute
Cost: \$25.00 per trip
Location: Various
(510) 231-9547

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ESTUARY HAS MOVED!

The offices of the San Francisco Regional Water Quality Control Board and the San Francisco Estuary Project have moved to
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FINANCING CONTINUED

assurance of long-term water supply reliability.

"To its credit, the Phase II Report identifies as outstanding 'whether or not any adjustment for past impacts is appropriate prior to using the benefits [based] approach.' To this end, a draft CALFED document currently under discussion in the BDAC Finance Workgroup (*Beneficiaries Pay: Implications for Cost Allocation*) holds promise. While the Implications draft continues to discount the need for an accurate and detailed financial baseline analysis, it proposes instead a forward looking alternative that would include, among other key elements: (1) a surcharge on all water users in the Bay-Delta system to assist in funding the CALFED common programs; (2) clarification that the users of [storage and conveyance] facilities must pay the full cost of [any such] facilities; (3) assurance that any share of new facilities that might be dedicated to ecosystem purposes will be treated as a mitigation cost for ongoing water development impacts (i.e., paid for by the direct beneficiaries and not by the public at large); and (4) assurance that, if public funds are provided for facility planning purposes, they will be cost

shared up front, with the balance to be repaid by contractors should facilities be constructed.

"Though the Implications draft needs work, it is an important step in the right direction. Unfortunately, the principal public discourse on these issues of late has been shaped not so much by CALFED's work, but by Governor Wilson's efforts to secure hundreds of millions in taxpayer funds for water development projects and activities through a prospective 1998 state water bond, the 1998-99 state budget, and in proposed companion federal legislation. The asserted justification for such funds — which of course cannot be justified using any version of the beneficiaries pay concept — is that the ecosystem received its share of funds through state Proposition 204 (and companion federal legislation), so now, the past aside, it's the water users' turn once again.

"This is precisely why a rigorous baseline assessment is needed. By our estimates, for example, the ecosystem funds provided to date amount to less than two percent of the historic construction investment (measured in current-year dollars) in the CVP and SWP alone. Whatever it does, CALFED must reject the temptation to sweep the past under the rug."

FISH & BROMIDES CONTINUED

Whatever the perspective, the isolated facility seems to be the runner-up. So for now, CALFED's alternatives seem to be heading back down that old familiar road: pollution prevention in the watersheds and operational optimization at the pumps. It's a straight road, but it's also had no enforcement teeth to date, and no track record of large scale success. Key will be whether forthcoming monitoring of fish recovery actually results in course changes and adaptive actions, or just sits around in the hard drives of scientists. Also key will be assurances on how any new facilities may be operated (see p.3) and how tough the feds — both U.S. EPA on drinking water and U.S. Fish & Wildlife and the National Marine Fisheries Service on endangered species — decide to get when they see CALFED's future path.

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