



**NOCTURNAL ENGINEERS**

A century ago, wildlife officials proclaimed that the Delta's beavers had been trapped to extinction. Most farmers responded with a cry of "Good riddance!" Charismatic as they are from a distance, beavers can be a major nuisance: they weaken levees, in which they love to build their lodges, cut down trees, and (being obsessive dam builders) attempt to inhibit the source flow of any water that makes a sound, including irrigation and drainage canals.

But the pronouncement was premature: beaver numbers were on the rise again by the 1920s. Today, there are probably more than 27,000 of the long-toothed critters in the Delta, according to Bill Grenfell, a retired Fish & Game biologist, once responsible for monitoring trapping in the state. That's the highest concentration in California and probably the highest ever in the Delta, which provides abundant human-made beaver habitat, with no natural beaver predators.

These furry engineers try hard. Their dens take a lot of work to build and maintain, but gusto is one thing they have more than enough of. "If your average Joe Blow worked as hard as a beaver, you could fire half your crew," says Nick Catrina, a professional trapper. "There are farmers on some of the islands who have guys working all day long taking apart the dams the beavers just come and build again each night."

Beaver dens range from the size of a wheelbarrow to a pickup truck. The bigger ones can cause levee failure, a serious matter in the Delta where flooding is a constant and—as islands continue to subside—growing threat. The cumulative weakening of Delta levees could make a difference one day if an earthquake shakes the levee system hard enough to cause a chain reaction of failures, according to Kent Nelson with the Department of Water Resources.

When observed during the day, Delta beavers belie their midnight industriousness. Propelled by large scaly feet with webbed toes, and steered by a rudder-like tail, they cause almost no disturbance in the water. Unless, that is, they are frightened, in which case they smack a loud warning "Pop!" with their tails and vanish underwater, where they can remain for 10 minutes without taking a breath. **GS**



**Mendota Maelstrom**

The three-decades-long battle between farmers and enviros over how to keep selenium out of water delivery canals, rivers, and wildlife refuges in the San Joaquin basin has a new focal point. Deep in the valley, where the San Joaquin River bends to flow north to the Delta, sits a large reservoir/water-transfer structure called the Mendota Pool. The pool is fed by the south-flowing Delta Mendota Canal, as well as by groundwater that farmers pump into the pool in exchange for surface water they acquire for irrigation. Water from the pool is sent back northward via the Main Canal to feed farms, duck clubs, wetlands, and thousands of acres of wildlife refuges in the Grasslands Water District; some of this water spills over into the San Joaquin River, which already carries a heavy burden of pollutants.

Recent samples taken in the pool by the Central Valley Regional Water Quality Control Board show selenium concentrations above the two pbb standards established by Fish & Wildlife to protect wildlife. Enviros and resource managers worry that if the something isn't done about the selenium in the pool, and if flows aren't restored to the upper San Joaquin River, another Kesterson-type crisis could happen, on an even bigger scale. "Selenium accumulates in mud, in quiet water areas like the Mendota Pool, where it is recycled and recycled again. That is what happened with DDT," warns Felix Smith, a former Fish & Wildlife biologist, now with Save the American River Association. "This area, from the Mendota Pool to the Delta, could turn into the largest toxic waste site in the state."

Selenium is an element that leaches from irrigated San Joaquin Valley soils. In high enough concentrations, it can bioaccumulate in the food web and cause the kinds of wildlife deformities seen at Kesterson and in Tulare Basin evaporation ponds, both end-points for irrigation drainage water.

Last June, Fish & Wildlife sent a letter to the State Water Resources Control Board asking that the Delta-Mendota Canal, the Main Canal, and the Mendota Pool be added to the state's Clean Water Act Section 303(d) list of impaired water bodies. In February 2003, the State Board added the Mendota Pool to the list, after seven out of 26 samples revealed selenium concentrations of over two ppb. Now that the pool has been listed, says the Central Valley Regional Board's Joe Karkoski, the Regional Board will work with stakeholders to establish a total maximum daily load (TMDL) if the problem is not otherwise addressed. Karkoski thinks the TMDL process will call more attention to the problem. "We'll be working with the Bureau of Reclamation and dischargers into the pool outside of the TMDL process too," says Karkoski. "We'll see if there

**"Until you restore clean water flows from the upper river and do some serious land retirement on the west side, you're just rearranging deck chairs on the Titanic."**

are some things we can do either in lieu of the TMDL, or in addition to it." Enviros think the Main Canal and Delta-Mendota Canal should also be added to the list of impaired water bodies (although the Regional Board recommended the Delta-Mendota Canal for listing, the State Board declined to add it).

Resource managers at the Grasslands Water District and enviros can't forget the indelible images of deformed birds at Kesterson and in the Tulare Basin. Those

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## BULLETIN BOARD

**THE ALAMEDA WHIPSNAKE LOST THE LATEST ROUND IN THE LEGAL RING** after the Homebuilders Association, the California Chamber of Commerce, and the California Alliance for Jobs won their lawsuit against U.S. Fish & Wildlife, claiming that the agency had not adequately defined the area to be included in its critical habitat designation for the whipsnake or considered the economic impacts of the designation. In 2000, Fish & Wildlife designated more than 400,000 acres of land in Alameda and Contra Costa counties as critical habitat for the snake.

**STOCK PONDS PROVIDE HABITAT FOR THE STOCKY, SMALL-EYED CALIFORNIA TIGER SALAMANDER**, according to a Fish & Wildlife proposal to exempt ranchers from provisions of the Endangered Species Act. Of 1.1 million acres throughout the state proposed as designated habitat for the salamander, about half are privately owned, offering resource managers an opportunity

to partner with ranchers in protecting both the ranchers' way of life and the species, according to Fish & Wildlife. But the agency's proposal to reclassify the Santa Barbara and Sonoma salamander populations from endangered to threatened has raised the hackles of enviros, who say the proposal is illegal, and that the salamander populations are on the verge of extinction.

**CAL FISH & GAME WILL RECOMMEND TO THE STATE FISH AND GAME COMMISSION** this month that the 2002-2003 herring fishery in the Bay be closed, or reduced with a shorter season, despite good numbers in the Bay last year. Biologists are concerned because the population has decreased over the past 10 years and hasn't bounced back after the last El Niño, says Fish & Game's Becky Ota. Fewer older fish have been counted during surveys and in catches, and spawn deposition survey results have also been low, says Ota, who adds that roe from herring are exported to Japan, and a closure or reduced season could affect lots of livelihoods. Two more hearings will take place, in June and August, before the Commission makes a decision.

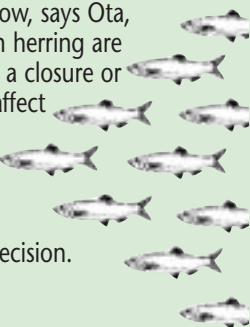
**THE SACRAMENTO MUNICIPAL UTILITY DISTRICT IS THE FIRST UTILITY** district to drop its lawsuit over flows in the Trinity River (see "Chaos at the Confluence," December 2002 ESTUARY). Twelve environmental groups petitioned the utility district to drop its suit, citing its legal position as inconsistent with its mission to meet electricity needs in an environmentally responsible manner. Westlands Water District and the Northern California Power Agency—which includes such cities and agencies as Palo Alto, Santa Clara, Alameda, the Port of Oakland, and BART—plan to press forward.

**FOR WESTERN WATER WATCHERS, THERE ARE FEW SURPRISES IN WATER 2025**, a new report by the Department of the Interior intended to prevent further crises and conflict over water in California. The report warns that the Sacramento-San Joaquin Delta is "highly likely" to experience conflict over water needs in the future. The report's solutions include developing water transfer markets, using water more efficiently, developing desalination and other technologies, and improving cooperation among government agencies. See [www.doi.gov/water2025/ppt.html](http://www.doi.gov/water2025/ppt.html).

**POACHING PROBABLY HASN'T HELPED** white sturgeon numbers, say Cal Fish & Game biologists, who tracked a mother and son caviar-collecting team for two years, videotaping the duo selling the fish and their eggs for money. White sturgeon have declined over the past six years from an estimated 147,000 to 70,000 fish. Sports fishers are currently allowed to catch one of the huge—up to 1,500 pounds—fish per day, but no commercial sale is allowed.

**ADULT MALE FISH LOSE ABOUT 50 PERCENT OF THEIR FERTILITY** when exposed to short-term and low concentrations of ethynylestradiol, a synthetic estrogen found in oral contraceptives that finds its way into waterways, according to a new study that appeared in the June issue of *Environmental Toxicology and Chemistry*. Earlier research had shown that high concentrations of estrogen could turn juvenile male fish into female fish, but the new study shows that adults too, are affected, if they are exposed during a critical sexual maturation stage before they spawn. [Inquiry@pnl.gov](mailto:Inquiry@pnl.gov)

**SAN FRANCISCO MAY HARNESS THE ENERGY** of the 400 billion gallons of water that flow through the mouth of San Francisco Bay every day, depending on how well a \$2 million pilot project turns out. The study will test technology developed by Hydro Venture (a London firm with a S.F. office), in which the tidal energy coming through the mouth of the Bay beneath the Golden Gate would be channeled through an underwater concrete passageway. Long, passive "fins" inside the passageway would funnel the current as it ebbs and flows, creating suction. That suction would, in turn, pull air from pipes connected to turbines on shore, causing them to turn and create electricity. The pilot project has been unanimously approved by the city's board of supervisors, as part of San Francisco's goal of developing non-polluting energy, which also includes solar and wind-powered projects. The city is looking for another \$2 million to pay for environmental impact studies on how the passageway would affect fish and tidal flows.



## ENVIRONMENT

### FALLOWING MAY FOIL FLOCKS

The scientific community is divided over whether a one-year deal to fallow 40,000 acres of rice fields in the Sacramento Valley will have an impact on birds that use the fields as wintering grounds. But most scientists say they are worried that if rice farmers continue to funnel water to Los Angeles, wildlife will suffer.

"Any project that would dry up rice fields is always a bit concerning to wildlife folks," says Cal Fish & Game's Dave Smith. "It's the one type of cropland that provides good habitat."

As many as 300,000 birds winter in the Central Valley, one of the most important feeding grounds in the Pacific Flyway that stretches from the Arctic to South America. Fields planted with rice play a major role on the Flyway by substituting for some of the wetlands that once offered birds food and shelter, particularly in the winter. Flooded rice fields now make up more than half the remaining wetlands in the Central Valley. Sacramento Valley rice farmers flood 300,000-350,000 acres each year, providing habitat for everything from white-faced ibises to giant garter snakes. More than 60 species of birds have been identified in rice fields.

By contrast, there are only 200,000 acres of what land managers call "natural, managed" wetlands, mostly in wildlife refuges and parks. These nearly natural fields provide richer and more varied habitat for birds, but tend to be managed for the benefit of hunters. That means flooding for waterfowl—species like ducks and geese—that thrive in deeper water than shorebirds.

According to University of Connecticut's Chris Elphick, the shallower rice fields are particularly important for shorebirds like dunlins, dowitchers, and yellowlegs, and also for wading birds like great blue herons, great egrets, snowy egrets, and white-faced ibises. In the winter, as many as half the shorebirds migrating through Central California use the rice fields.

Elphick says this year's reduction in habitat may be offset by the fact that about 100,000 acres of wetlands have been restored in the Central Valley over the last decade. But is

concerned that shorebird numbers in general are declining, so any reduction in habitat could hurt.

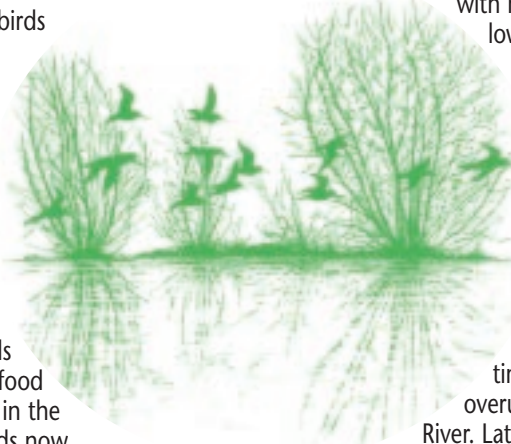
Ducks Unlimited's Mark Petrie says this year's relatively high rainfall is likely to produce more waterfowl, which will in turn need habitat this winter. "This is not a good winter to be losing 40,000 acres of winter-flooded rice," he says.

Both Petrie and Elphick say their greatest concern is that MWD will come back to the rice farmers year after year. According to Smith, such discussions are already underway. "The best solution is for water buyers to set some money aside to compensate landowners so they can idle fields but also establish some good habitat on the land, with native grasses and shallow water," he says.

Under an agreement negotiated by the Clinton administration, MWD had to show progress on finding alternative sources of water to prove that it would be able to meet a 2016 deadline for cutting back on its historic overuse of the Colorado River. Late last year, MWD failed to convince officials at the Imperial Valley Irrigation District to sell their water so federal requirements could be met. Federal officials cracked down, cutting off more than 600,000 acre-feet of Colorado River water—the amount by which the state has traditionally exceeded its legal allotment of 4.4 million acre feet. State officials are now hustling to come up with a compromise that will satisfy federal requirements.

Adan Ortega, vice president for external affairs at MWD, says this year's transfers were beneficial to fish by keeping water in the Delta at key migration times. Ortega says MWD would consider environmental mitigation for future transfers. "Our position has been that we support that when there are transfers, the beneficiaries—that means us—ought to pay reasonable mitigation costs, including assessed environmental impacts."

According to Ortega, MWD is compensating for the loss of Colorado River water with increased storage and conservation. But that didn't stop the district from purchasing more than 150,000 acre-feet—47 billion gallons of water—from 11 Sacramento Valley irrigation districts earlier this year. Furthermore, only 120,000 acre-feet will actually be transferred.



## SPECIES SPOT



### RECLUSE RAILS

The endangered California clapper rail and black rail get all the press. But the Bay's tidal marshes are also winter quarters for the sora and Virginia rails, more abundant but (like all rails) extremely secretive. In recent years, some fortunate birders have spotted a fifth species, even more cryptic and elusive. Unobserved for almost a century, wintering yellow rails are showing up again in places like Palo Alto Baylands and the Suisun marshes.

The nocturnal, sparrow-sized yellow rail is almost impossible to detect when not calling; photographer William Burt calls it "a miracle of stealth and secrecy." Rather than flying from danger, yellows crouch and scurry away through concealing vegetation. Only extreme tides force them into the open, where they may fall victim to herons and other predators.

For reluctant fliers, yellow rails wintering here have come a long way. They haven't been confirmed nesting in California for at least 50 years; one former locale is now a reservoir. In fact, yellows were considered extirpated west of the Rockies until a remnant population was discovered in Oregon's Klamath Basin in 1982. Ken Popper, who has studied those rails since 1995, estimates 200-300 breeding pairs at known sites. Although none of the rails he's banded have been recovered on their wintering grounds, Popper believes the birds sighted in the Bay Area are migrants from Oregon. He says yellow rails heard calling in Northern California last year during the breeding season may have been refugees from the Klamath region's drought.

Virginia rails, like scaled-down clappers, and soras, with black masks and yellow chicken-like bills, may breed along the upper reaches of the Petaluma and Napa rivers. Soras, unlike Virginias, are declining nationwide. But local Audubon Christmas Bird Counts show stable wintering populations for both species. Benicia, which includes the the fresher marshes that these rails prefer, has the highest numbers, tallying 462 Virginias in 1995. Although triple digits are unusual, birders elsewhere around the Bay can expect at least a few Virginia and sora sightings during winter high tides, even if they never encounter a yellow rail.

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JE



# TRANSFERS

## MISSING PIECE OF H<sub>2</sub>O MATH

Sacramento Valley farmers could transfer as much as 136,124 acre-feet of water to the Metropolitan Water District this year while fallowing 40,000 acres of rice-growing land as part of water transfer deals MWD made to compensate for the loss of Colorado River water. This exchange of irrigation water for payment—\$13.6 million in total should MWD ask for all the water—relies on a state water accounting system that is supposed to safeguard against injury to downstream users. Yet the system leaves some water unaccounted for.

What remains unknown is the amount of "return flow"—that portion of diverted surface water that is neither consumed by crops through irrigation nor absorbed by the soil that flows back into a river. Return flows are important in determining whether one water user is—through a change in water use—

hurting another, downstream user, who counts on a certain amount of water being available to them. In the case of Sacramento Valley rice farmers, the change in use stems from their fallowing land and transferring the water they won't be using for irrigation to another user, the MWD.

The estimate of transferable water is based on a calculation of the evapotranspiration of applied water (ETAW)—a number that represents a portion of the water metabolized by each acre of a crop plant and the water evaporated from the soil. ETAW—calculated as an average for each crop plant—takes into account varying water needs among crops (rice needs more water than, say, safflower), the changing water needs of a crop over a year, and the "thirstiness" of the area in which a crop is grown (for example, the ETAW for cotton grown in the Sacramento Valley will be different than that for cotton grown in the Imperial Valley).

Water officials rely on past years' data on crop rotation, idling, and production to

determine the amount of acreage planted by a farmer. This number is multiplied by the percent to be fallowed, and the resulting number of acres is then multiplied by a crop's ETAW to arrive at the amount of water available for transfer. Typically, though, water districts don't measure return flow, says Jerry Johns of the Department of Water Resources.

"From a water transfer standpoint, we don't need to know the return flows since we are providing an estimate of transferable water based on reductions in [water used by crop plants and] based on temporary changes in land use," explains Johns. "This is a water-district-by-water-district determination."

But faced with a future of less Colorado River water flowing into its reservoirs and fields, the Golden State has to get better at accounting for every drop of water used, says Elise Holland of the Trust for Public Land. Holland, who is developing a "how to" guide on purchasing water for environmental purposes, says measuring return flows is important for many reasons, improving efficiency and conservation. "Farmers are being asked to reach new efficiencies in water use, and that raises the question of who gets to control the water that's saved," notes Holland.

CALFED's Environmental Water Account is currently used to ease the impacts of demand, drought, and other strains on the water supply by allowing fisheries agencies to call for reductions in pumping by the State Water Project and the Central Valley Project at times when certain fish are in danger (CALFED is the state-federal partnership working to balance competing demands for the state's water). In return for reductions in pumping, the water account buys water from willing sellers or diverts surplus water when safe for fish to store, transfer, or release it to compensate cities and farms.

Holland believes that including return flows in accounting for how much water is used and transferred is an important issue that CALFED should tackle for the good of the environmental water programs. "How are we going to assure land owners or agencies that water is going to be available if we aren't measuring [everything]?" she wonders.

For Johns, ETAW has proven sufficient in preventing injury to downstream users over the years. "From a water transfer standpoint we don't need to know the return flows since we are providing an estimate of transferable water based on temporary changes in land use," he says.

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# HISTORY LESSON

## LAKE'S LEGACY

Driving by Kettleman City on I-5, you might find it hard to believe that a shallow lake once covered up to 750 square miles of what is now "the largest agribusiness chessboard on earth," according to William Preston, geography professor at California Polytechnic State University, San Luis Obispo, and author of *Vanishing Landscapes/Land and Life in the Tulare Lake Basin*, who spoke at a U.C. Berkeley Water Resources Center Archives talk in May. At times, according to Preston, the lake even overflowed into the San Joaquin River, possibly coinciding with the river's salmon and steelhead runs, and producing an "uncommon assemblage of biological richness." Preston described the lake as a "virtual aquarium," a rich ecosystem of tules, clams, terrapin, mussels, sculpin, Sacramento squawfish, thicktail chub, all kinds of waterfowl, and mammals like beaver, mink, otters, deer, elk, and rabbits.

By the 1940s, the lake had shriveled to a ghost of its former self, as the rivers that fed it—the Kaweah, Kings, Tule, and others—were diverted for agriculture. Today the lakebed is planted with crops like cotton, alfalfa, and safflower. But the lakebed still floods in rainy years—it did so as recently as the winter of 1997, and in 1983, when 83,000 acres were inundated. Floods, land subsidence, air pollution, soil salinization,



toxic evaporation ponds—which can cause wildlife deformities—and the inequitable juxtaposition of some of the richest agricultural land worked by the poorest

laborers are all problems that need to be examined, said Preston.

One possible solution Preston presented is a demonstration project implemented by Westlake Farms on the western edge of the old lakebed. Westlake has restored two areas to a semblance of the wetlands that once thrived along the lake, with the goal of turning 15,000 acres over to the state and federal governments as habitat. Though some may not like the idea of taxpayers purchasing land that has received crop and water subsidies for years, Preston, who grew up in the area, sees hope in this idea. "One way or another the lake is coming back," he predicts, a phenomenon that will be accelerated by global climate change. "Tulare Lake will re-emerge and throw off its human constraints," predicts Preston. "Do we want to jump on the opportunity to restore this landscape or not?"

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**LOV**

# POLLUTION

## SWAPPING PESTICIDE PROBLEMS

Things looked brighter for aquatic life in creeks and streams when U.S. EPA announced three years ago that it would phase out most urban uses of diazinon and chlorpyrifos. This meant that over the next few years, these chemicals would fade from the storm drains. But a recently published study on the effects of their substitutes in urban creeks and streams brings bad news: the pesticides replacing diazinon and chlorpyrifos pose new pollution hazards and are highly toxic to aquatic organisms and fish. "I'm very concerned that we're trading one set of problems for another set of pesticide problems," explains TDC Environmental's Kelly Moran, the study's lead researcher.

Moran identified several new chemicals replacing diazinon and chlorpyrifos: imidacloprid, the first of a relatively new type of pesticide derived from nicotine; organophosphates, like malathion, which are in the same chemical family as diazinon and chlorpyrifos; carbamates like carbaryl; and pyrethroids. Little is yet known about the full toxic effects of imidacloprid, although Moran's study suggests it is toxic to aquatic crustaceans. As for organophosphates and carbamates, malathion and carbaryl are currently under EPA's review, and Moran believes the agency may eventually phase out most urban uses of these pesticides. But what concerns Moran most are pyrethroids, the family of chemicals that resemble the natural insecticide pyrethrin, which is produced by chrysanthemums.

Pyrethroids are more toxic to aquatic species than pyrethrins and organophosphates and may decompose slowly enough in sediments that residuals can remain for years and accumulate over time as the use of pyrethroids increases—all the more worrisome considering that pyrethroids are gaining currency in the market faster than other pesticides. "These are probably making up the majority of the diazinon substitutes in California," notes Moran.

In California and other places where urban creeks are cooler during rains and other runoff events, pyrethroids pose a special problem. They become more toxic to their targets at lower temperatures. Even at sub-lethal concentrations, pyrethroids cause fish to swim erratically, change their schooling activity, and even swim at the water's surface. Other aquatic organisms like daphnids (water fleas) experience lower rates of food filtration and reduced reproduction, and Moran is concerned that pyrethroids and the substances they decompose into may be endocrine disruptors. More testing will need to

be done, says Moran, especially as pyrethroids proliferate in the marketplace.

Testing pyrethroids presents another problem. Currently, there are no test methods available to independent labs that allow them to analyze low levels of pyrethroids—levels below those known to harm an organism but that are still of concern, explains pollution prevention consultant Bart Brandenburg with Our Water, Our World. EPA does not require pesticide makers to develop such tests and this, says Brandenburg, is a missing safeguard in the system, as the TDC report highlights.

"You shouldn't be able to sell [a pesticide] to the public unless tests are available to assess impact," says Brandenburg, a peer reviewer on the report.



Another problem is that there is no program in place for measuring pesticides in Bay Area creeks and streams. The S.F. Regional Board along with the Clean Estuary Partnership and the S.F. Estuary Institute, in establishing a strategy for tracking all urban pesticides, is contemplating how such monitoring should be done, but the monitoring itself shouldn't be the ultimate goal, says the Board's Tom Mumley.

"The reason we found diazinon in creeks is because large amounts were being sold and people were using way too much of it," notes Mumley.

Replacements like pyrethroids are being used in urban areas to ward off pests around office buildings, homes, and other places surrounded by concrete foundations and walkways, where pesticides are applied every month or so and sprinkler systems wash the chemicals into storm drains. "The answer is to not let them get into the creek in the first place," says Mumley.

Measuring chemicals in runoff near homes and offices—where Mumley estimates pesticides are 10 to 100 times more concentrated and therefore easier to measure—is one way to begin to address the problem. Another is to educate the public and professionals about less toxic ways to combat pests. This is the goal of Our Water, Our World, a program founded by Brandenburg and supported by Mumley and others, that educates retailers and consumers about integrated pest management, a system that promotes the least toxic methods for thwarting pests. If there is an underlying message of the TDC report, Moran notes, "It's that it is exceptionally important to get off the pesticide treadmill."

Contact: Kelly Moran (650) 627-8690; Tom Mumley (510) 622-2395; Insecticide Market Trends and Potential Water Quality Implications, is available at [www.tdcenvironmental.com/finalreport.pdf](http://www.tdcenvironmental.com/finalreport.pdf) **KC**

## HANDSON



### FLOATING CLASSROOM

How do you ensure that the next generation of Bay Area residents will care enough to protect S.F. Bay? You start when they're in grade school, according to managers of Project Transquest, an educational program run by the Bay Model Association that takes local students out on the water to learn firsthand just what makes the Bay worth protecting.

About 250 students from the fourth grade on up through high school have participated in the program since it began two years ago. Participants start their adventure with interactive activities at the Bay Model, learning about pollution, invasive species, and other Bay-related topics, then head out for a three-hour adventure on one of the Angel Island Ferry boats, specially outfitted as a research vessel. Rotating among several research stations, students trawl for Bay fish, dredge for crabs and clams, collect plankton, and use an onboard microscope to see organisms up close.

"They get very excited about handling these creatures—baby crabs, shrimp, plants—things they don't normally see," says program director Andy Peri. "They're also awakened to the fact that there's a lot of life in the Bay, whereas when you look at the surface of the water, you see birds and that's about it. There's life from the first millimeter of the water on the surface all the way down to the bottom mud."

Students learn how human activity has changed the Bay, and how recycling, reduced pesticide and herbicide use, and organic farming help minimize the negative impacts.

Teachers especially appreciate that their students get direct experience with ecology, says Peri. "Some of the underserved populations from Marin City, who we've worked with a lot in this program, have never been out on the Bay, even though they live right next to it."

Eventually, the Bay Model hopes to expand the program from seven to 50 trips a year, says Peri, depending on the success of fundraising efforts.

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**MENDOTA - CONTINUED**

folks are concerned that the same thing could happen at the Grasslands National Wildlife Refuge, which is in part fed by the Main Canal (which is in turn fed in part by the pool). Says Grasslands Water District's Don Marciochi, "We are worried that the selenium will accumulate and become a problem." Marciochi says that things have improved dramatically since Kesterson—and credits various agricultural districts with spending lots of time and money to remove their drainage water from the Grassland system via the Grasslands Bypass—but says there is still a problem, albeit not of the same magnitude as Kesterson (where ppb of selenium were in the hundreds per billion).

BurRec's Mike Delamore says the bypass has successfully segregated high selenium drainage flows from the channels that supply the wetlands and is gradually reducing selenium delivered to the San Joaquin River. As a result, BurRec can focus on selenium levels in the 2-5 ppb range, as opposed to the 350 ppb delivered to Kesterson or the 60-80 ppb previously conveyed in the wetland channels, says Delamore. He also points out that last year, BurRec established a daily monitoring program for the Delta-Mendota Canal, the pool, and the Main Canal, but admits that no one knows for sure where all the selenium is coming from. "We are working with the Regional Board to identify and understand the sources of these residual selenium levels," says Delamore.

But monitoring and establishing TMDLs aren't going to solve the problem, according to enviros. Says Smith, "I don't buy into maximum daily loads. I don't think you can put a safe limit on selenium because it bioaccumulates to such an extent." Smith says that the concentrations of selenium being found in the pool and canals are high enough to cause bird deformities, and that deformed young have been found every year studies were performed.

Smith is also concerned about selenium loads in the San Joaquin River. He says selenium in the bodies of fish from Mud Slough and the river has increased, as it has in fish in the greater Grasslands area, even after ag drainage water was rerouted around the Grasslands. He likens the river's assimilative capacity to an overworked pack animal. "You can give it a reasonable amount of work to do and time to rest, or you can kill it. You're asking a river to pack that load 24 hours a day, 7 days a week, 365 days a year. Add to that the other stuff

you're putting into the river, and it's not going to be fit as fish habitat, wildlife habitat, or anything."

But the river is unlikely to get better anytime soon. With the recent collapse of settlement negotiations between the Friant Water Users Association and the Natural Resources Defense Council (NRDC) and other environmental groups over the river's flows, restoring water to the upper San Joaquin isn't looking promising. The groups are back in court, and NRDC's Jared Huffman says selenium and flow problems need to be looked at as part of the bigger (problematic) picture. "When you think of problems like water quality in the Bay-Delta, where 22 million people get their drinking water, and ag discharge waivers—this web of seemingly intractable problems—I find it really strange that people rarely mention the loss of the entire upper San Joaquin River," says Huffman. "An argument can be made that until you restore clean water flows from the upper river and do some serious land retirement on the west side, you're just rearranging deck chairs on the Titanic."

Smith agrees with Huffman, and adds that while Delta standards can be met in most cases with outflow from the Sacramento River, if fisheries are ever to return, the Delta also needs flows from the San Joaquin, the Tuolumne, and the Stanislaus rivers.

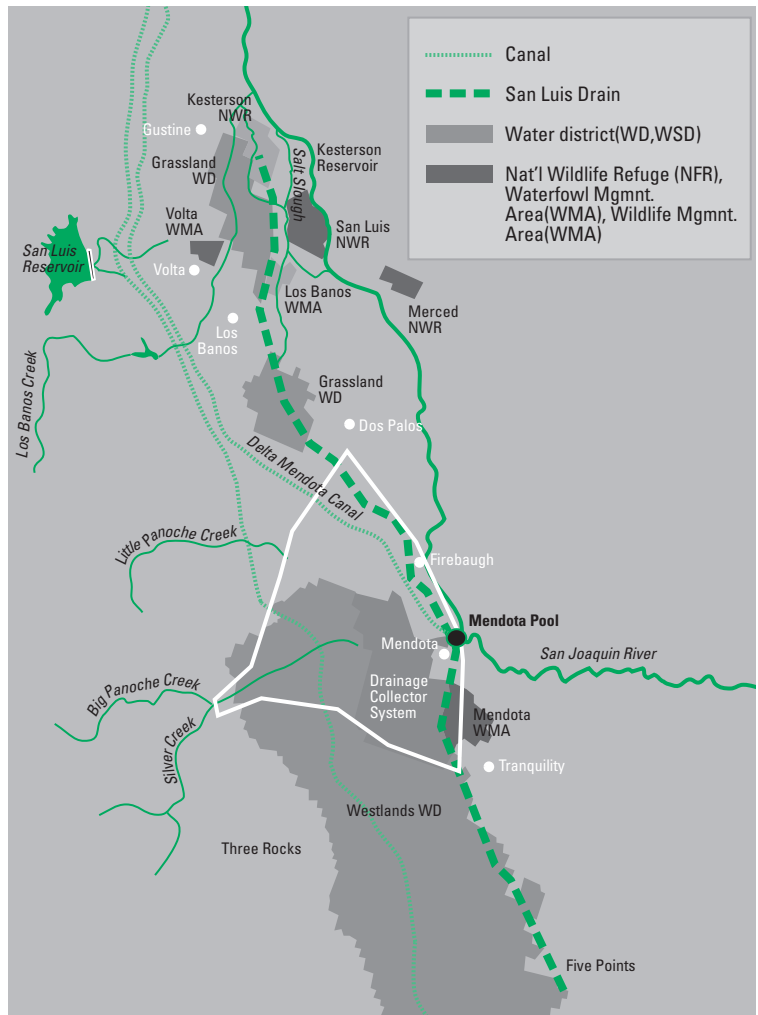
Had settlement negotiations not fallen apart, says Huffman, restoration would have offered substantial water quality benefits throughout the system. But Huffman emphasizes that to fix the selenium problem, the drainage issues must be resolved, and he doesn't think BurRec's proposal to create more evaporation ponds is the solution. The idea behind evaporation ponds is that the salts in the drainage water precipitate out. But, as shown at Kesterson and in

Tulare Basin evaporation ponds, the selenium stays behind, contaminating the food web and causing deformities in the critters than ingest it. "When I think of evaporation ponds, I think of Kesterson," says Huffman.

BurRec, for its part, says it has few choices. As part of a court order, it released a report in December containing options for dealing with the drainage problem. Although no final preferred alternative has been chosen, disposing of the selenium-laden drainage water in the Delta or Pacific Ocean is unlikely, says Delamore. In addition to identifying some 42,000-45,000 selenium-laden acres for land retirement, BurRec has proposed building 5,000 acres of new evaporation ponds as part of its in-valley solution, along with 3,200 to 6,400 acres of mitigation ponds. BurRec's final EIS is due in June 2005.

Contact: Joe Karkoski (916)255-3368; Felix Smith febesmith@juno.com; Jared Huffman (415)777-0220; Mike Delamore (559)487-5039 **LOV**

**SAN JOAQUIN DRAINAGE AREA**



# PLACES TO GO & THINGS TO DO



## WORKSHOPS & SEMINARS

JULY  
WEDS & THUR  
30  
31

### COMMUNITY CULTURE & THE ENVIRONMENT WORKSHOP

**TOPIC:** Two-day workshop designed to help participants develop and create community-centered and long-term initiatives. The South Bay salt pond restoration planning process will be used as a case study.

**LOCATION:** S.F. Bay Commission

**SPONSORS:** S.F. Joint Venture, S.F. Estuary Project, U.S. EPA, and U.S. Fish & Wildlife

**CONTACT:** Caroline Warner (415)883-3854; cwarner@sfbayjv.org

AUG  
FRI  
1

### COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN WORKSHOP

**TOPIC:** Review efforts to protect and restore the S.F. Estuary, measure the effectiveness of participants in carrying out the CCMP, and re-evaluate CCMP priorities. Celebrate the tenth anniversary of the CCMP's adoption at a reception.

**LOCATION:** MetroCenter Auditorium, Oakland

**SPONSOR:** S.F. Estuary Project

**CONTACT:** Marcia Brockbank (510)622-2325; mlb@rb2.swrcb.ca.gov

AUG  
WEDS  
13

### WETLANDS REGULATION & MITIGATION

**TOPIC:** Overview of federal and state laws and regulations that protect wetlands and other water bodies, with special emphasis on section 404 of the Clean Water Act.

**LOCATION:** U.C. Davis

**SPONSOR:** U.C. Davis Extension

**CONTACT:** (800)752-0881



## HANDS ON

JULY

SUNDAYS  
6  
13  
20  
27

### SEA SERIES: SCIENCE, ENVIRONMENT, ART

**TOPIC:** Drop in for a hands-on demonstration of an amazingly detailed and functioning South Bay watershed diorama. Learn what a watershed is and see how human actions affect the effort to maintain healthy South Bay habitats.

**SPONSOR:** U.S. Fish & Wildlife

**LOCATION:** Don Edwards S.F. Bay National Wildlife Refuge, Alviso

**CONTACT:** (408)262-5513

JULY

SAT  
5

### TWILIGHT MARSH WALK

**TOPIC:** Take an easy stroll along the Tidelands Trail at twilight and observe the beginning of nature's night shift. Not suitable for young children. Reservations required.

**SPONSOR:** U.S. Fish & Wildlife

**LOCATION:** Don Edwards S.F. Bay National Wildlife Refuge, Fremont

**CONTACT:** (510)792-0222

JULY

SUN  
6

### SALT MARSH HISTORIES

**TOPIC:** Go on an easy hike and learn about human activity from the late 1800s up to the present. During the walk, "meet" three unique friends from salt marsh history. Geared for adults.

**SPONSOR:** U.S. Fish & Wildlife

**LOCATION:** Don Edwards S.F. Bay National Wildlife Refuge, Alviso

**CONTACT:** (408)262-5513

JULY

FRI  
11

### MARSH BABIES

**TOPIC:** This stroller-friendly walk will allow participants to enjoy one of the busiest seasons at the Refuge. Bring your baby along to touch, listen, smell, and maybe even taste the marsh. Geared for ages 2 and under.

**SPONSOR:** U.S. Fish & Wildlife

**LOCATION:** Don Edwards S.F. Bay National Wildlife Refuge, Alviso

**CONTACT:** (408)262-5513

## NOW IN PRINT & ONLINE

*Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Orchard Pesticide Runoff and Diazinon Runoff into the Sacramento and Feather Rivers [Draft]. May 2003.*

California Environmental Protection Agency and the Regional Water Quality Control Board, Central Valley Region.  
[www.swrcb.ca.gov/rwqcb5/programs/tmdl/sac\\_feather\\_diaz/BPA\\_Sac\\_Diaz\\_pub.pdf](http://www.swrcb.ca.gov/rwqcb5/programs/tmdl/sac_feather_diaz/BPA_Sac_Diaz_pub.pdf)

*America's Most Endangered Rivers of 2003. April 2003.*

American Rivers. [www.americanrivers.org/mostendangered/2003report.htm](http://www.americanrivers.org/mostendangered/2003report.htm)

*America's Living Oceans: Charting a Course for Sea Change. June 2003.*

Pew Oceans Commission. [www.pewoceans.org](http://www.pewoceans.org)

*Bay Area Wetland Project Tracker, San Francisco Estuary Institute*

[www.wetlandtracker.org](http://www.wetlandtracker.org)

*Bel Marin Keys Unit V Expansion of the Hamilton Army Airfield Wetlands Restoration Project—Final Supplemental Environmental Impact Report/ Environmental Impact Statement. April 2003.*

U.S. Army Corps of Engineers, San Francisco District, in collaboration with the California State Coastal Conservancy and the San Francisco Bay Conservation and Development Commission.  
[www.coastalconservancy.ca.gov/belmarin](http://www.coastalconservancy.ca.gov/belmarin)

*California's Groundwater Update 2003 [Draft]. April 2003.*

Department of Water Resources.  
[www.waterplan.water.ca.gov/groundwater/updates.htm](http://www.waterplan.water.ca.gov/groundwater/updates.htm)

*Community Culture and the Environment: A Guide to Understanding a Sense of Place. Winter 2003.*

U.S. Environmental Protection Agency.  
(800)490-9198.  
<http://yosemite.epa.gov/ncepihom/nsCatalog.nsf/EPA Title/>

*Creating an Oasis with Greywater: Your Complete Guide to Choosing, Building, and Using Greywater Systems, Revised and Expanded Fourth Edition.*

Art Ludwig. 2002. Poor Richard's Press.

*Layperson's Guide to Water Conservation. March 2003.*

Water Education Foundation. (916)444-6240.  
[www.watereducation.org](http://www.watereducation.org)

*Layperson's Guide to the Central Valley Project. March 2003.*

Water Education Foundation. (916)444-6240.  
[www.watereducation.org](http://www.watereducation.org)

*A Practical Guidebook to the Identification and Control of Invasive Aquatic and Wetland Plants in the San Francisco Bay-Delta Region. By Michael May, Cristina Grosso, and Josh Collins. April 2003.*

San Francisco Estuary Institute.  
[www.sfei.org/nis/](http://www.sfei.org/nis/)

*The Pulse of the Estuary: Monitoring and Managing Contamination in the San Francisco Estuary. 2003. San Francisco Estuary Institute.*

[www.sfei.org/rmp/pulse/pulse2003.pdf](http://www.sfei.org/rmp/pulse/pulse2003.pdf)

## OUTSTANDING CCMP PROJECTS ?

Nominations are sought for outstanding projects that implement one or more actions in the Comprehensive Conservation and Management Plan (CCMP), a blueprint for restoring and maintaining the chemical, physical, and biological integrity of the Bay and Delta. The CCMP contains 145 recommended actions in nine program areas: 1) aquatic resources; 2) wildlife; 3) wetlands; 4) water use; 5) pollution prevention and reduction; 6) waterway modification; 7) land use; 8) public involvement and education; and 9) research and monitoring. Deadline: Thursday, July 31, 5:00 p.m. Contact Friends of the S.F. Estuary, (510)622-2337.

## CALL FOR POSTERS

### 6TH BIENNIAL STATE OF THE ESTUARY CONFERENCE

Abstracts for posters addressing California's changing water picture, habitat restoration and species studies, and estuarine water quality are welcome. Abstracts should be no more than one page (single-spaced in 12-point type) in length and should include an evaluation of findings and how they relate to the state of the Estuary. Abstracts due July 31, 2003.

Contact Cindy Brown [cbrown@usgs.gov](mailto:cbrown@usgs.gov) or see [www.abag.ca.gov/abag/events/estuary\\_state/pubs/CallforPosters.pdf](http://www.abag.ca.gov/abag/events/estuary_state/pubs/CallforPosters.pdf)

**ENVIRONMENT CONTINUED**

Even if the state manages to convince federal regulators to turn the Colorado tap back on, Southern California will still face a 2016 deadline for cutting back on its use of the Colorado River. With Southern California's human population expected to double in the next few decades, wildlife biologists are worried. "The looming battle will be securing water for wetlands that already exist," says Petrie.

Meanwhile, in the Sacramento Valley, resistance from farmers may scotch future deals. Don Bransford, a farmer in the Glenn-Colusa irrigation district, refused to follow his fields this year despite low commodity prices. Like many of his colleagues, Bransford is concerned about the loss of his way of life. He also is an avid birder whose conversation is peppered with the names of avian species. "In January, the rice fields white with snow geese," Bransford says. "My wife teases me about it. I'm kind of in awe of it."

Contact: ChrisElphick@uconnvm.uconn.edu (860)486-4547; Mark Petri (916)852-2000; Adan Ortega (213)445-9645 **SZ**

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ESTUARY is a bimonthly publication dedicated to providing an independent news source on Bay-Delta water issues, estuarine restoration efforts and implementation of the S.F. Estuary Project's *Comprehensive Conservation and Management Plan* (CCMP). It seeks to represent the many voices and viewpoints that contributed to the CCMP's development. ESTUARY is funded by individual and organizational subscriptions and by grants from diverse state and federal government agencies and local interest groups. Administrative services are provided by the S.F. Estuary Project and Friends of the S.F. Estuary, a nonprofit corporation. Views expressed may not necessarily reflect those of staff, advisors or committee members.

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