

## GREENS BENIGN?

Grass is always greener—a lot greener—on a golf course, much to the delight of golfers. But the unnatural color vexes environmentalists, who are all too aware of how it got that way—from the herbicides, pesticides, and fertilizers pumped onto the courses annually. After wondering for years about golf courses' impacts on stormwater runoff and surface water quality, the Contra Costa County Clean Water Program staff decided to stop speculating about the impacts and start studying them, says the Program's Jamison Crosby.

Over two years, researchers collected more than 1,000 water samples, upstream and downstream of six golf courses that had creeks running through or near them. They compared how the samples affected two sentinel species—algae and water fleas. Samples from the courses that use traditional fertilizers were compared with samples from the courses that use organic ones.

"The results show we don't have the problem with golf courses that we thought we did and that organic fertilizers are not dramatically better than traditional," says Crosby. "Algae growth declined by 2% downstream of the organically fertilized courses and increased by 8% downstream of the traditionally fertilized courses. None of the water samples harmed the water fleas."

Mike Blankinship, Blankinship and Associates, who managed the study, says, "These results are credible because the study design was scientifically robust. However, more extensive sampling might have added power to the statistical tests." Lisa Anich, with Friends of Mount Diablo Creek, notes that only two of the six sites had year round creek flows, and that few samples were taken when the creeks were running low and runoff from the golf courses would make up a greater portion of the flows.

One universal finding was that on courses where vegetated buffers separate manicured

*continued page 8*

## INSIDE

CLIMATE CHANGE .....1,4

BULLETIN BOARD .....2

STEWARDSHIP  
Groundswell .....3

CALFED CONFERENCE CLIPS  
Hot items from the science  
conference  
.....2,3,4,5

Places to Go, Things to Do  
In Print & On Line .....7



## CLIMATE CHANGE SWAMPS PLANNERS

Global warming could—and should, say some—change the way California's coastal and river-based communities make land use decisions. Trouble is, very few are getting that message, says Susanne Moser with the National Center for Atmospheric Research.

The effects of global warming will force communities "to think about and rethink our most deeply-held values, including the Holy Grail of property rights," says Moser. But in a survey of coastal land managers, Moser found that very few communities have done anything to date to plan for increased sea and river levels resulting from rising temperatures.

Moser says the underlying task for communities will be to figure out tough management questions. But the harder task will be to ask difficult questions. "How much of a right do you have to protect your piece of land—and to do with that land what's inscribed in the Constitution if doing so has a negative impact on the environment and the community around you," she asks. "Climate change is pushing us to look at these tough questions."

Questions such as this one are at the heart of a land use/development case that must now go through an appeals process before the Delta Protection Commission. At issue is whether Yolo County's Board of Supervisors can turn floodplain land along the Sacramento River—once home to a sugar beet mill—into a housing development behind a levee that state and federal officials have identified as damaged. The Natural Resources Defense Council says the project violates the Delta Protection Act, and it's suing to stop the development. The 1992 Act staked out a "primary zone" in the Delta that was intended to protect farmland and wildlife habitat and to minimize urbanization that might put residents in the path of a flood. The Commission, which was also established in the Act, is to protect the primary zone from intrusion by nonagricultural uses, including housing developments.

Yolo County supervisors disagree. They say the Act, hammered out in 1992, did not define

the land in question as being in the primary zone. And, they say, their general plan—which predated the 1992 Act—included development of the Sugar Mill site. Nonetheless, the Commission—for only the second time in its 14-year history—has halted the project pending review.

The lawsuit by NRDC is its second global warming-related suit aimed at government officials. Earlier this year, the organization sued the state Reclamation Board for approving permits allowing levee modifications in advance of a housing development in the Delta's Stewart Tract. In the suit, NRDC and other plaintiffs charge the RecBoard, a state flood-control agency, with violating environmental law by not taking into account the ways in which sea level rise could affect the levees. Linda Fiack, executive director of the Delta Protection Commission, says the Sugar Mill project has been through the first phase of the review process, in which the Commission decided whether the case met three criteria: Was it located in the primary zone; was it considered development; and were the issues in the case grounds for an appeal? The next phase of the appeal process will be to determine whether the plan to build 100-plus houses is consistent with the Land Use and Resource Management Plan for the Primary Zone of the Delta. That question will be taken up at the Commission's next meeting on January 25, 2007.

While Fiack could not comment directly on the case, she did reference the Plan's establishment of the primary zone. The Sugar Mill appeal cites inconsistencies with several policies in that plan. On July 27, the Commission adopted a Strategic Plan for 2006-2011 that cites the consideration of environmental influences—including rising sea and river levels—as a threat to the protection and preservation of the Delta.

The effects of global warming will be felt statewide, not just in the Delta. According to the U.S. Environmental Protection Agency, the 10 warmest years of the 20th Century happened in

*continued page 4*

## CALFED Conference Clip

## MERCURY MENACE

Restoring San Francisco Bay's tidal wetlands, for all its environmental benefits, has one potential downside. The inorganic mercury in marsh sediments, legacy of historic mining, can be converted into methylmercury by bacterial activity in the new wetlands. Transport of this more dangerous form, a developmental neurotoxin, has sobering implications for estuarine food webs.

At the October conference, Brian Bergamaschi and Jacob Fleck of USGS discussed the difficulties of measuring mercury fluxes at Browns Island, a probable methylation hotspot. They reported a tight relationship between methylmercury production and dissolved organic carbon, likely from the soil.

Lisamarie Windham-Myers of USGS asked whether plants mattered in the methylation process. Her findings show that areas with plants had greater methylation rates than revegetated plots in the high marsh. Mark Marvin-Dipasquale of USGS found that methylmercury production levels are particularly elevated in the high marsh, where wetting and drying cycles promote the methylation process.

Peter Green of UC Davis presented his findings on mercury concentrations in dominant marsh plants: salt grass, cordgrass, pickleweed. At Stege Marsh in the East Bay, pickleweed showed highest levels in summer, and higher concentrations in tips than in shoots. Green suggested that more mercury may be entering the Bay via plants than through winter rains.

Isa Woo of USGS traced methylmercury bioaccumulation pathways through marsh invertebrates to black rails, high marsh specialists, in the Petaluma River marshes, which have the Bay's highest methylation rate. She collected herbivorous snails and planthoppers, detritus-feeding amphipods, and predatory beetles and spiders, and obtained blood and feather samples from resident rails.

Although beetles and spiders, the black rail's primary prey, showed higher mercury levels than other invertebrates, levels in the rails were relatively low. However, Danika Tsao-Melcer of UC Davis and USGS found that feather concentrations were within the range known to cause reproductive effects in other birds. Though sediment mercury concentrations were higher in interior marshes compared to channel edges, no edge-interior differences were observed for invertebrates. "We're not seeing acute effects from the sediment into the biota," Woo concluded. "Is there a disconnect from sediment levels to invertebrates, or are we missing something?"

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## BULLETIN BOARD

## BLACKLOCK BREACHED

On a quiet October morning, bulldozers scooped a final bucket of mud from a Suisun Marsh levee, and Little Honker Bay began flowing onto the former Blacklock Ranch. The 65-foot wide breach will allow water and sediment to help transform the ponds and seasonal wetlands on the site to tidal wetlands over the next several years. The project is funded by the CALFED Ecosystem Restoration Project and the Suisun Marsh Preservation Agreement. DWR bought the property in 2003 and developed a restoration plan with SMPA partners (see PLANNING, "Marsh on the Move," ESTUARY, April 2006).

## STOCKTON ON THE HOT SEAT

Stockton's privatization of its water and wastewater operations is illegal, according to San Joaquin County Superior Court Judge Elizabeth Humphreys, who ordered the city to retake control of its facilities within six months. Enviro had sued, claiming that the \$600 million contract between the city and OMI-Thames allowed construction projects that could damage the environment to go forward without environmental review; they also alleged that the water conglomerate did not properly maintain infrastructure, resulting in sewage spills and water quality violations. The 2003 contract was signed just 13 days before voters would have gone to the polls to require a public vote on the deal.

## FLEXIBLE SALMON

When water begins flowing back into the parched San Joaquin River, and spring-run Chinook once again maneuver through its pools and riffles, the fish will likely be declared an "experimental population," in order to reassure private landowners along the river that their land will not suddenly be designated critical habitat. The salmon would join the "experimental" ranks of the California condor, Yellowstone area gray wolf, and Florida whooping crane. With an experimental designation for the fish, fishing, boating, farming, water supply, and hydroelectric projects would not be liable for accidental "take."



## ROOM FOR RIVER

In Yuba County, the Bear River is free to meander after a two-mile "setback" levee replaced an older, more confining levee. A 300-acre walnut orchard was removed to give the river more room, with property owners compensated at around \$50,000 an acre. While flood experts are lauding the setback levee, some enviros are unhappy with the way it was funded: in part by a \$29,345 fee on new homes built before the levee was in place.

## PPCP PROGRESS AND PROBLEMS

PPCPs—pharmaceuticals and personal care products—are one of the least understood but most ubiquitous pollutants in the country's waterways, including the Estuary (see

"Pandora's Cauldron," ESTUARY, October 2004 and "Five Steps Forward," April 2006). San

Mateo County is the latest to tackle the problem, with three police departments accepting unwanted or expired prescription drugs in mailbox-style drop boxes. Last May, the Santa Clara Basin Watershed Management Emerging Contaminants Working Group and the Bay Area Pollution Prevention Group (BAPPG), held a pharmaceutical take-back day, collecting 3,600 pounds of unwanted medications that might otherwise have been flushed to the Bay. The city of Palo Alto's Karin North says that while the event was very successful, collection events are labor-intensive and expensive. She hopes a mail-back program can be implemented in the future. "Over 10 percent of our waste stream is made up of controlled substances," says North. "Yet pharmacies can't take [them] back." North continues to work with the DEA on the issue. "At some point, we have to come up with a better solution."

One new worry is that pharmaceuticals and other contaminants—including household disinfectants, fragrances, caffeine, and antidepressants—have now been found in the terrestrial food web. In a recent USGS study, tissue concentrations of these compounds ranged from 100s to 1,000s of micrograms per kilogram in earthworms collected from fields where biosolids had been applied.



## STEWARDSHIP

### GROUNDSWELL

Most private property owners aren't fond of outside agencies telling them what to do, and the farmers and ranchers in the lower Mokelumne River watershed are no exception. "There was only one time when I was really nervous," recalls EBMUD

biologist Kent Reeves, who has spent the past decade trying to "maintain and enhance the riparian ecosystem" of the lower river—a mandate that arose out of a joint settlement agreement EBMUD entered into as a result of a FERC relicensing process in the late 1990s. "We were out driving around in a pickup truck, and the rancher I was with started venting about the Endangered Species Act. I thought, 'nobody knows I'm out here; it'll be months before they find my body.'"

But Reeves was able to connect with the rancher; he had been raised on a ranch in the San Joaquin Valley himself and is still more comfortable in cowboy boots than high-tech hiking shoes. He began going door to door to urge landowners to partner with him conducting wildlife surveys, writing grants, and building a watershed stewardship group. Says San Joaquin County RCD's John Brodie, "In a watershed like the Mokelumne, where 95% of the land is in private ownership—if you're going to get any conservation done and habitat restored, if you're going to get good things happening, it's going to have to be with the help of private landowners." What Reeves found as he walked the watershed was that many of the landowners were already engaged in conservation and restoration work.



One year old cottonwoods on Lange's floodplain property.

"Cooperative conservation" may be the latest buzzword, but for many of the landowners on the lower Mokelumne River, it's old news, the way they've always been doing things. Twelve years ago, with \$40,000 from his own pocket, fourth-generation farmer Brad Lange restored a quarter mile of tributary Gill Creek. Today, that site grows thick with native oaks, buckeyes, and cottonwoods. Fourteen wood duck boxes line

the stretch of river adjoining Lange's land; 76 barn owl boxes installed in the vineyards are part of his IPM program. Two years ago, with help from a CALFED grant, Lange took seven acres of vineyard—land that had been planted generations ago in the floodplain—out of production; today those acres glisten with willows and quail brush instead of grape vines. Economically, it's a loss to not produce grapes there any longer, says Lange. "But it was time for

us to do it." (Lange's restoration projects and farming operations were featured at a White House conference on cooperation conservation in 2005 in St. Louis.) Nearby, John Ledbetter of Vino Farms used his own money to hire River Partners to design a restoration project for the stretch of river on his farm. In 2000, Vino Farms received an IPM Innovators award from the Department of Pesticide Regulation, for reducing insecticide use by 67% and fungicide use by 10%.

With help from a CALFED grant, Lange, Reeves, Cliff Ohmart of the Lodi Woodbridge Winegrape Commission, and others were able to build on these efforts. They formed the lower Mokelumne River watershed stewardship steering committee, pulling in many more landowner stakeholders, and members from the Farm Bureau to the Sierra Club; they held workshops on water quality and BMPs, and published a watershed stewardship plan and a handbook for urban/suburban property owners on reducing runoff. The driver for the stewardship plan was in part the farmers' desire to do the right thing, says Brodie, who, in addition to his RCD job, now works part-time as watershed coordinator, and in part their desire to be one step ahead of any new regulations coming down the pipe. In fact, they had already come up with a self-monitoring program more stringent than the one that eventually came out from the Central Valley Regional Water Quality Control Board, says Brodie. He recalls Ledbetter standing up at a meeting and declaring that "we have to do more than just the minimum to get by; let's do whatever we need to do [to help the river], and do it right."

**"Let's do whatever we need to do [to help the river], and do it right."**

## CALFED Conference Clip

### PONDERING PYRETHROIDS

Pyrethroids—synthetic insecticides modeled on pyrethrins that occur naturally in plants—were touted as safer alternatives to organophosphate pesticides like diazinon. But they've emerged as contaminants of environmental concern in their own right. John Oram of the San Francisco Estuary Institute noted that pyrethroid use in the Central Valley had tripled in the last decade, with 178,000 pounds used in 2003. Different types have different uses: esfenvalerate and permethrin for orchards and row crops, cypermethrin and bifenthrin for urban structural and landscape treatment. Beginning in 2001, urban use exceeded agricultural use.

Oram said 1/10th of a percent of the mass of pyrethroids applied is potentially washed off and available for transport into aquatic environments. At this rate, Central Valley use could deposit pyrethroids in Suisun Bay at concentrations of 1 to 2 nanograms per gram—enough to harm invertebrates like the crustacean *Hyalella azteca*. But concentrations in the Bay and Delta haven't been measured, making it difficult to evaluate the risk to fish.

Inge Werner of UC Davis detailed how these potent neurotoxins could harm fish. Esfenvalerate reached acute toxicity in fish at 70 parts per trillion, and killed fish larvae exposed to stormwater runoff from a Central Valley prune orchard. Smaller concentrations can have sublethal effects on behavior, increase susceptibility to disease and predators, and affect reproduction. Pyrethroids present at only 4 parts per trillion were found to impair the olfactory function of Atlantic salmon. When juvenile Chinook salmon were exposed to normally nonlethal concentrations of esfenvalerate plus a virus common in hatcheries, the double whammy killed 70% of the fish within 6 days.

According to UC Berkeley's Donald P. Weston, pyrethroids differ from most chemicals in being more toxic at colder temperatures. Experiments with *H. azteca* showed toxicity to be about three times greater at 13° C (55° F) than at 23° C (73° F). "We are underestimating the potential impact by basing risk assessment on standard toxicity tests at warmer temperatures," Weston warned.

"The more we look, the more we find," said Werner. "We should really try to keep pyrethroids out of surface water. We can confine this if we do the right thing. Much more public outreach and education is needed." **JE**

## CALFED Conference Clip



## UDDERLY TOXIC

Human hormones—estrogens, androgens, progestins—in urban wastewater have been shown to cause reproductive abnormalities and immune-function compromise in fish. But they're not the only culprits. Edward Kolodziej of UC Berkeley reported that cattle grazing and dairy farming may have similar impacts on water quality. Although steroid hormone production by cows can exceed human production by 10- or 100-fold, there isn't much data on the environmental consequences.

Kolodziej measured steroid concentrations at over 25 sites in small watersheds where cattle grazing is the predominant land use: Marin and Sonoma County coastal watersheds and the Dry Creek watershed in Stanislaus County. Some results were as high as or higher than those from urban wastewater effluent. At the coastal sites, he found low concentrations in dry-season samples, but a spike in November and December after the first major winter rains. This "first flush" produced levels known to potentially cause endocrine disruption in aquatic organisms. The highest concentrations detected occurred at the same time coho salmon return to these coastal streams to spawn. Dry Creek didn't show this pattern, but did have highest concentrations in intensively grazed headwater regions.

In smaller, low-flow headwater streams, even a few cows can have a major impact. For small agricultural watersheds, waste from only three to six cows could raise hormone concentrations to a level of concern. "These are all endogenous compounds produced and excreted naturally, not from pharmaceuticals," Kolodziej clarified. Future research may determine how long concentrations remain elevated, whether native fish show signs of endocrine disruption, and what land management practices could abate the problem.

Factor in the chemical load of the average dairy cow, and the picture becomes even more ominous. Poster presenters Naoko Watanabe of UC Davis and colleagues investigated the use of hormones, antibiotics, and other chemicals on Central Valley dairy farms, and have begun to analyze their water quality impact. Although the hormone intake of dairy cows was small compared with natural estrogen output, Watanabe's group found significant amounts of antibiotics given to weaned heifers to prevent disease and to lactating cows to increase milk production. JE

## CLIMATE CHANGE, CONTINUED

the last 15 years. Scientists report that they've seen global sea level rise 4 to 10 inches during the past century. And scientists who have studied the Sierra snow pack say they've already seen less snow as a fraction of the state's total precipitation over the last 50 years.

Less snow pack means less water available to flow down from the Sierra in July, August, and September when the weather is typically drier and more water is needed in rivers for fish as well as people. A reduced snow pack is also a challenge for those managing the state's water supply because they will have—overall—less water to divide among agricultural, urban, and environmental uses. That's because there doesn't yet exist a way—mostly through dams—to capture in January and February increased precipitation that falls as rain instead of snow, which melts later in the year. Scientists estimate that by 2070, there will be between 30% and 60% loss of the Sierra snow pack, and 6 to 14 inches of sea level rise.

Whatever is to happen—and the degree to which it will happen—means that planning today to take these changes into account is important, says Moser. Along with Amy Luers of the Union of Concerned Scientists, Moser developed a framework for evaluating California resource managers' preparedness for climate change impacts. She then tested it in a survey sent out to 300 such managers and asked them questions like how and whether they are taking sea level rise into consideration in their planning and what barriers may exist to such planning.

"It was very revealing ... actually, very little has happened to date," Moser notes.

The barriers Moser found were that many managers were paralyzed by a lack of staffing and federal and state resources, or that they

believe they do not have a legal mandate to plan for climate change. Moser says many resource managers don't feel public pressure to do this sort of planning and so are consumed in their day-to-day tasks—for which they may also be understaffed and underfunded.

Moser says her goals for spreading the word about the results of her survey are to move people a little farther along in planning for climate change. She understands local managers are up against some big forces: California derives billions of dollars in development, taxes, and recreation from its coastal areas. She's heartened to see that state legislators and agencies are receiving her message at

some level and are willing to put some money in the budget for local communities to do their planning.

Having a plan in place to accommodate rising waters is key. Moser notes that the one thing everyone wanted the day after Hurricane Katrina was to return to normal. And normal, she says, was the way things were before the hurricane struck. "It's not, 'Sure, let's give up this piece of land that we had before and move inland.'"

Moser says the hard things managers will have to do include considering moving coastal communities and roads inland. Plans like these have to be on the manager's desk the morning after the flood takes place or they are unlikely to be implemented. "To wait for the crisis to begin thinking of adaptation options may be too late," warns Moser.

The one thing that would go a long way toward helping communities in the wake of global warming impacts would be to carefully examine future development plans. "Don't make decisions now that create legacies of problems in the future," Moser says. CONTACT: Susan Moser (303)497-8132; Linda Fiack (916)776-2292 KC

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**"It was very revealing ... actually, very little has happened to date ..."**

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## CALFED Conference Clip

### POD CONTINUES TO CONFOUND

No other topic under discussion at the fourth biennial CALFED Science Conference fit its "Making Sense of Complexity" theme quite as well as the Pelagic Organism Decline. From members of the interagency POD Working Group and from independent researchers, conference attendees heard new data, new theories, and new questions on both long-term and short-term trends. "We have some answers, but not the ones you want," observed Chuck Armor of the California Department of Fish and Game.

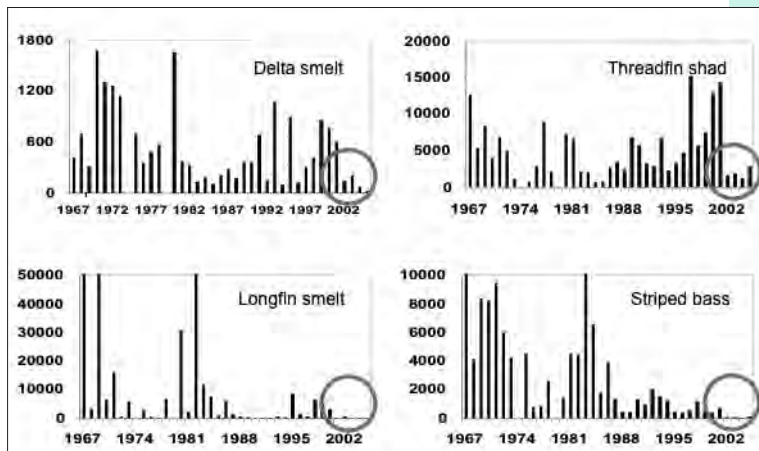
The Pelagic Organisms of concern are four species of estuarine fish: the endemic and threatened Delta smelt (*Hypomesus transpacificus*); the naturalized striped bass (*Morone saxatilis*), an important sport fish; the native longfin smelt (*Spirinchus thaleichthys*); and the introduced threadfin shad (*Dorosoma petenense*). Their life histories and ecological niches differ; Delta smelt are an essentially annual species, striped bass are longer-lived. The bass and the two smelt species had experienced long-term declines. But all four showed a precipitous drop in abundance around 2002; and instead of rebounding in subsequent high-flow years, numbers stayed low. "We had good water years, but the fish stopped responding," said Ted Sommer of the California Department of Water Resources. This summer and fall's surveys, according to Randy Baxter of DFG, show striped bass at a record low and little change in Delta smelt abundance. Longfin smelt, with a substantial increase in 2006, provided the only bright spot.

To unravel this mystery, POD researchers have looked at many data sources: on food availability, disease, contaminants, toxic algae, predation, salinity, freshwater flows, and entrainment (direct losses to water project operations). Bruce Herbold of the EPA repeated his favorite simile, the "Murder on the Orient Express" scenario in which all the suspects are guilty. "But we've made progress, limiting the possibilities to a smaller number of suspects," he adds.

Wim Kimmerer and his students at San Francisco State University's Romberg Tiburon Center have approached the POD decline by examining the estuarine food web: phytoplankton and bacteria at the base, secondary consumers like copepods, and organisms like the overbite clam (*Corbula amurensis*) that compete

for food resources. One working hypothesis is that fish numbers are limited by food availability in a "trophic squeeze."

The copepod story alone is complicated by boom-and-bust cycles of introduced species, with *Pseudodiaptomus forbesi* supplanting *Eurytemora affinis* around 1988, and the subsequent increase of a third species, *Limnithona tetraspina*. *E. affinis* and *P. forbesi* are eaten by the POD fish species; the much smaller *L. tetraspina* is not. Larval *P. forbesi* are also consumed by the filter-feeding overbite clam, whose numbers track changes in the Estuary's salinity. In addition, *P. forbesi*, a selective feeder on diatoms and other algae, has suffered from long-term declines in phytoplankton productivity, especially in Suisun Bay. "Everybody is food limited," says Kimmerer.



B. J. Miller, a consultant to the San Luis & Delta-Mendota Water Authority, made the strongest claim for food limitation as the driver of the fish decline, at least for Delta smelt: "Adult smelt decline is caused by decline in prey in summer in the core habitat area and downstream of the Confluence." He argued that summer co-occurrence of the smelt and its prey is a better predictor of fall smelt abundance than either water exports or salvage at the pumps. However, "*P. forbesi* was up in 2005 but Delta smelt was way down," Miller concedes. "We can't explain that."

The Contra Costa Water District's Marianne Guerin presented her analysis (see "Delta Murder Mystery," ESTUARY, August 2006), linking fall salinity to Delta smelt abundance. She hypothesizes that seasonal salinity increases support overbite clam recruitment and disruption of the food web. This would impact the fish at a critical time for gonad development. Others have speculated about seasonal food limitation as a key stressor for the smelt. But Swee Joo Teh

## CALFED Conference Clip

### RIPIARIAN RESEARCH

Riparian restoration in the Central Valley was the theme of several presentations: conceptual models, hands-on techniques, measurements of success.

John Stella of UC Berkeley discussed his model for pioneer riparian tree recruitment—the process by which willows and cottonwoods become established. The challenge: "How do we restore a disturbance-dependent community in a disturbance-altered ecosystem?" Measuring riverbank hydrology, seed release timing, and seedling water stress thresholds at Tuolumne River sites, Stella found the synchrony of seed release with spring snowmelt flow to be a key factor. His results can help time flow releases to maximize tree establishment at the lowest water cost.

Recalling experiences at the San Joaquin River National Wildlife Refuge, River Partners' Tom Griggs described how decommissioned Army Corps of Engineers levees were replanted to provide flood refugia for the federally endangered riparian brush rabbit. The levees constitute 90% of the refuge's high ground. Griggs said his group learned the hard way this spring which plants can survive prolonged flooding: Oregon ash, black willow, and button-bush did best.

Some farmers have been concerned that restored riparian adjoining farmland may harbor unwanted neighbors: small mammal pests like voles, gophers, and ground squirrels. According to Gregory Golet of The Nature Conservancy, such

problems are short-lived. Twelve Sacramento River sites were sampled, using visual surveys, live traps, and analysis of barn owl pellets. Golet said gopher and vole populations appear to decline as restoration sites mature. One worrisome finding: invasive black rats—predators on cup-nesting birds and roosting bats—were most common in older sites and remnant habitats.

Healthy riparian forests support an abundance of birds: 161 species at Yolo Bypass riparian sites, 67 nesting. According to Chrissy Howell of PRBO Conservation Science, birds can be excellent indicators of habitat restoration design and success. The return of rare species like the least Bell's vireo is important, but studying a group of riparian bird focal species, including common birds like the spotted towhee, helps habitat managers know which plants and other features birds need to survive. She said focal species diversity doubled at the San Joaquin River refuge after restoration. JE

DWR

## HANDSON

## TRASH TALLY

A toy gorilla clad in a sequined dress singing Spanish, a first edition of *Sheep Management and Disease* with a 1951 *San Francisco Examiner* editorial tucked inside, and cigarettes and cigarette butts—lots of them—were among the haul from this year's September Coastal Cleanup Day. The event netted 770,918 pounds of trash and 103,153 pounds of recyclables, says the Commission's Eben Schwartz, with 2,123 miles of shoreline cleaned by 50,208 volunteers. Although the final analysis of this year's debris won't be available until the spring, Schwartz says he expects the results to be typical of last year's.

## TOP TEN FOUND ITEMS (2005)

ITEM	NO. OF ITEMS	% OF TRASH
Cigarettes/cigarette filters	258,075	37.3
Food wrappers and containers	98,895	14.3
Caps/lids	61,117	8.8
Cups, plates, forks, knives, spoons	40,215	5.8
Straws/stirrers	28,159	4.1
Bags	26,119	3.8
Beverage bottles (glass)	24,377	3.5
Beverage bottles (plastic, two liters or less)	18,741	2.7
Beverage cans	15,842	2.3
Cigar tips	14,309	2.1
<b>TOTAL</b>	<b>585,849</b>	<b>84.8</b>

What can be done about the trash problem, especially with plastics accumulating in the ocean (see "Plastic Plague," *ESTUARY*, April 2003)? Schwartz directs people to [www.plasticdebris.org](http://www.plasticdebris.org), which contains a California Action Plan for trash, adding that the Commission also sponsors an Adopt-a-Beach program year-round. "The key at the end of the day, though," he says, "is going to be source reduction." Picking up trash on the streets when you see it helps, but "the best thing to do is not create so much trash in the first place. Buy products with less or no packaging, recycle, and compost everything you can." Even that isn't enough, he suggests. "Always be aware of the amount of trash you are creating through your day. You may not mishandle that trash, but it might get lost somewhere along the way, and we all become responsible, ultimately, for the garbage that ends up in our ocean, Bay, and coasts."

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## POD CONTINUES TO CONFOUND, CONTINUED

of UC Davis countered that 89% of the adult Delta smelt he collected last year had food in their bellies: "The health of Delta smelt is not affected by food limitation or disease." Although the picture varied regionally, with more liver lesions in Suisun Bay, Teh reported relatively little evidence of disease, internal parasites, or liver and gonad abnormalities from his Delta smelt studies. In contrast, UC Davis' David Ostrach found a high incidence of disease and parasites in striped bass collected in July 2005. His data also point to immune system compromises induced by contaminants.

Along with bottom-up pressure on POD species from food web constraints, top-down pressure from losses to water project operations emerged as a key theme. Gonzalo Castillo of the US Fish & Wildlife Service addressed State Water Project and Central Valley Project exports and salvage, noting that Delta smelt abundance indices had declined after high salvage years and that the pre-adult abundance index was negatively related to the previous winter's exports. He added that the smelt's spawning migration upstream coincides with South Delta exports. Michael Chotkowski of the US Bureau of Reclamation reported that increased exports in October through December were associated with decreased fall abundance of Delta smelt in the following year, although the effect was statistically minor. DWR's Lenny Grimaldo discussed how the daily behavior cycle of young striped bass may increase that species' vulnerability to entrainment. They're more active at night, when most of the salvage at the pumps occurs. And the POD period saw higher increases in pumping at night, when it's less expensive, than during the daytime.

DWR's Matt Nobriga pulled several strands together, noting that environmental quality—measured by salinity and clarity—has declined for Delta smelt, striped bass, and threadfin shad since the 1960s. He pointed to fall salinity encroachment, resulting from increased exports, as the driver for reduced habitat area, increased grazing by the overbite clam, and increased entrainment of adult and larval fish ("If you move the salt up closer to the pumps, you move the fish up.") Nobriga pointed out that salinity intrusion used to be natural in the Estuary in the fall, "but the system had become artificial by the time we started monitoring."

But what's happening in summer and fall may not be the whole story, according to William Bennett of UC Davis' Center for Watershed Sciences and Bodega Marine Laboratory. He suggested that the Delta smelt, at least, is experiencing a decline in reproductive potential. Although most live only a year, some female

Delta smelt survive into their second year. Such females tend to be larger, produce more and larger eggs, and spawn earlier. "The trawls had ripe females in January and February, but we don't see babies until May," says Bennett. The fate of early-hatching larvae is unknown, but Bennett suspects they're being lost to water operations. "When fisheries remove the larger and older fish, a higher proportion of individuals becomes weaker and dumber over time," he adds. Exports in March and April may be taking the fittest larval

**"When fisheries remove the larger and older fish, a higher proportion of individuals becomes weaker and dumber over time."**

smelt: "It's not the amount of larvae you take—it's which ones. It could be that the interaction of springtime losses with a summertime bottleneck regulates annual population abundance."

"Patterns that drive long term trends may have reached a turning point in the last four years—or there may be something new," Herbold sums up. The research effort is far from finished. "There are holes we need to address," says Armor. "Changes in hydrology, climate effects, and longer-term trends." Next year, the POD group plans to take a closer look at top-down stressors like salvage and predation. In addition to continuous briefings for agency directors, the group is aiming for a synthesis report by late 2007. Armor says the team hasn't been making recommendations: "We have all we can do trying to understand the science."

CONTACT: Chuck Armor, [carmor@dfg.ca.gov](mailto:carmor@dfg.ca.gov); Ted Sommer, [tsommer@water.ca.gov](mailto:tsommer@water.ca.gov); Randy Baxter, [rbaxter@dfg.ca.gov](mailto:rbaxter@dfg.ca.gov); Bruce Herbold, [herbold.bruce@epa.gov](mailto:herbold.bruce@epa.gov); Wim Kimmerer, [kimmerer@sfsu.edu](mailto:kimmerer@sfsu.edu); Marianne Guerin, [mguerin@ccwater.com](mailto:mguerin@ccwater.com); Sweet Joo Teh, [sjteh@ucdavis.edu](mailto:sjteh@ucdavis.edu); David Ostrach, [djostrach@ucdavis.edu](mailto:djostrach@ucdavis.edu); Gonzalo Castillo, [gonzalo\\_castillo@fws.gov](mailto:gonzalo_castillo@fws.gov); Michael Chotkowski, [mchotkowski@mp.usbr.gov](mailto:mchotkowski@mp.usbr.gov); Lenny Grimaldo, [lgrimald@water.ca.gov](mailto:lgrimald@water.ca.gov); Matt Nobriga, [mnobriga@water.ca.gov](mailto:mnobriga@water.ca.gov); William Bennett, [wabennett@ucdavis.edu](mailto:wabennett@ucdavis.edu). **JE**

# PLACES TO GO & THINGS TO DO



## MEETINGS

JAN  
24  
WEDNESDAY  
9:00 AM-  
NOON

### STREAM & WETLANDS PROTECTION

**TOPIC:** Stakeholder meeting to discuss scope of proposed Stream and Wetlands System Protection Policy.  
**LOCATION:** 1515 Clay Street, Room 1, Oakland, CA  
**SPONSOR:** S.F. Regional Water Quality Control Board (510) 622-2308



## FUNDING OPPORTUNITY

**DEADLINE: JANUARY 5, 2007**

The State Water Resources Control Board is making available about \$21 million dollars in grant funding for small community wastewater projects under its Small Community Wastewater Grant Program.

Eligible small communities include towns, cities, sewer districts, Indian tribes, and/or other public bodies with populations of 20,000 persons or less and with an annual Median Household Income of \$37,994 or less.

The community must have jurisdiction over the disposal of sewage and be subject to permitting by a Regional Water Board. To be considered, a community must be placed on the statewide Competitive Project List.

Prospective applicants must first contact their local Regional Water Board Grant Coordinator (list of these at: [http://www.waterboards.ca.gov/cwphome/scwg/grant\\_coordinators.html](http://www.waterboards.ca.gov/cwphome/scwg/grant_coordinators.html).) and submit a complete Initial Scope of Work Form (found on the internet at: [http://www.waterboards.ca.gov/cwphome/scwg/docs/12\\_app\\_h\\_initial\\_scope\\_of\\_work\\_form.doc](http://www.waterboards.ca.gov/cwphome/scwg/docs/12_app_h_initial_scope_of_work_form.doc).) The SCWG Program Guidelines can be found at: <http://www.waterboards.ca.gov/cwphome/scwg/index.html>.

For more information, please contact Dave Kirn, Program Manager, [dkirn@waterboards.ca.gov](mailto:dkirn@waterboards.ca.gov), (916) 341-5720 or Kyle Wooldridge, Project Manager, [kwoldridge@waterboards.ca.gov](mailto:kwoldridge@waterboards.ca.gov), (916) 341-5744.



## HANDS ON

DEC  
23  
SATURDAY  
9:00 AM

### BIRD WALK (1)

**TOPIC:** Lake Merritt bird identification  
**LOCATION:** Nature Center, Perkins & Bellevue, Oakland  
**SPONSOR:** Golden Gate Audubon [Travishails@yahoo.com](mailto:Travishails@yahoo.com)

DEC  
27  
WEDNESDAY  
9:30 AM-  
NOON

### BIRD WALK (2)

**TOPIC:** Lake Merritt and Lakeside Park bird identification  
**LOCATION:** Nature Center, Perkins & Bellevue, Oakland,  
**SPONSOR:** Golden Gate Audubon [Hilary@powersedit.com](mailto:Hilary@powersedit.com)

JAN  
20  
SATURDAY  
8:00 AM-  
NOON

### HELP MONITOR SAUSAL CREEK

**TOPIC:** Bird monitoring  
**LOCATION:** Sausal Creek, Sequoia Arena, Joaquin Miller Park (510) 531-3887

JAN  
21  
SUNDAY

**TOPIC:** Aquatic insect sampling  
**LOCATION:** Sausal Creek  
**SPONSOR:** Friends of Sausal Creek (510) 527-2507 (insect monitoring) and (510) 219-8036 (water quality)

## WANTED: EXECUTIVE DIRECTOR

for the Urban Creeks Council of California. The ideal candidate will be an enthusiastic leader with a strong background in fundraising, financial organization, personnel management, and organizational growth. They will also have experience managing a small, independent organization and a track record developing collaborative working relationships with community groups, environmental organizations, and governments. A commitment to and knowledge of creek restoration and related fields is preferred. Salary is commensurate with experience and includes benefits, generous vacation, and congenial workplace in a building located on Strawberry Creek Park, site of one of the first daylighting projects. To apply send cover letter, including salary requirements, and resume to: [afateman@gmail.com](mailto:afateman@gmail.com). No calls or faxes, please.

For more information on UCC and/or a full job description visit [www.urbancreeks.org](http://www.urbancreeks.org).

## NOW IN PRINT & ONLINE

*Delta Risk Management Strategy – Initial Technical Framework Papers. September 2006.*  
California Department of Water Resources.  
<http://www.drms.water.ca.gov/ITFP/>.

*Golf Course Study, Final Phase II Report. September 2006*  
Contra Costa Clean Water Program and City of Pittsburg  
Blankinship & Associates (530) 757-0941  
[http://www.cccleanwater.org/resources/surveys\\_studies/special\\_studies.php](http://www.cccleanwater.org/resources/surveys_studies/special_studies.php)

*Pocket Guide to Creek Birds of California 2006.*  
California Partners in Flight and PRBO Conservation Science. (415) 868-0655

*Suisun Marsh Brochure. November 2006.*  
Suisun Marsh Charter agencies.  
[www.delta.dfg.ca.gov/suisunmarsh/charter](http://www.delta.dfg.ca.gov/suisunmarsh/charter)  
or [carolyn\\_fassler@fws.gov](mailto:carolyn_fassler@fws.gov)

*Summary of Project Scope for proposed Stream and Wetlands System Protection Policy*  
San Francisco Regional Water Quality Control Board  
<http://www.waterboards.ca.gov/sanfranciscobay/streamandwetlands.htm>. (510) 622-2308

## MARK YOUR CALENDAR!

### CCMP UPDATE: IMPLEMENTATION COMMITTEE MEETINGS

**FRIDAY, FEBRUARY 2, 2007**

**9:30 AM TO 1:30 PM**

**TOPIC:** Approval of the final Water Use program area update recommendations; consideration of Aquatic Resources and Wildlife program areas update recommendations

**LOCATION:** 1515 Clay Street, Room 4, 2nd Floor Oakland, CA (City Center BART stop)

**FRIDAY, MARCH 2, 2007**

**9:30 AM TO 1:30 PM**

**TOPIC:** First presentation of Pollution Prevention and Wetlands groups

**LOCATION:** 1515 Clay Street., Oakland, CA

*If you have any questions about the CCMP Update process or the Implementation Committee please contact Marcia Brockbank (510-622-2325 or [m Brockbank@waterboards.ca.gov](mailto:m Brockbank@waterboards.ca.gov)).*

**GROUNDSWELL, CONTINUED**

In June, a Safe Harbor Agreement encompassing the entire 80-square-mile watershed was drawn up; the agreement allows landowners to enhance habitat on their property and yet not be subject to stringent federal regulations if endangered species like the valley elderberry longhorn beetle take up residence ("which we all hope they do," says Lange, who was the first to sign on). "Lange's idea was that maybe if we had enough elderberry bushes planted, if we could get everyone along the river to plant them, maybe the beetle wouldn't be an endangered species any more," says Brodie. Yet even Lange had reservations about the regulatory agencies' mindset over the safe harbor agreement at first. "It was a real hurdle for them to make an agreement that is farmer-friendly. They came into the process telling us what they

would need from us. I said, 'you're working with a volunteer. You won't plant anything on my property unless I have something that is truly a cooperative agreement. You can have 50 elderberries or you can have none.'"

Lange, whose children are now actively involved in the family business, stresses that the real motivator for his work isn't regulatory—or wanting to set an example. "Twenty years ago, we had the kids out on Sunday afternoons identifying oak trees, putting up owl boxes, bluebird boxes. It's us; it's who we are; it's what we've done all along."

CONTACT: Brad Lange (209)339-4055;  
Kent Reeves (209)365-1096;  
John Brodie (209)327-2823 **LOV**

**GREENS BENIGN CONTINUED**

turf from the creeks, there is less algal growth in the streams. The Contra Costa RCD's Jessica Hamburger wants to encourage golf courses to use buffers, both to improve water quality and provide riparian habitat for wildlife.

CONTACT: Mike Blankinship,  
blankinship@envtox.com; Jamison Crosby,  
jcros@pw.cccounty.us

SEE:  
[http://www.ccleanwater.org/resources/surveys\\_studies/special\\_studies.php](http://www.ccleanwater.org/resources/surveys_studies/special_studies.php) **SPW**



## Story ideas or scoops? Send to [lowensvi@earthlink.net](mailto:lowensvi@earthlink.net)

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