

## HOT CLUE OR RED HERRING?

With Delta smelt numbers at an all-time low, the furious scramble to identify the cause of their decline continues. One recent theory is that pesticides may be poisoning the smelt's food web. Concerns about water quality in the Delta are nothing new. The Department of Fish and Game's Perry Herrgesell says USGS has found evidence in years past that dormant sprays applied to nut crops in the valley are washed off into the Delta, causing toxicity to aquatic critters. But more recently, says Herrgesell, on four separate occasions this spring, water samples turned up toxic to *Hyalalella azteca*, a tiny amphipod, that while not eaten by the purse-lipped smelt, represents the primary consumer part of the food web that smelt do eat.

UC Davis' Inge Werner, who examined the samples, explains that three of them—taken from the southern end of the Sacramento River Deep Water Channel on February 1 and the Sacramento River near Rio Vista on February 28 and April 11—killed 23-37% of the exposed *Hyalalella* in 10-day tests. According to Werner, when the synergist piperonyl butoxide (PBO) was added, two of the samples' toxicity decreased, indicating that organophosphate insecticides might be the culprits. On the other hand, she adds, the PBO slightly increased the toxicity of a water sample taken from the Sacramento River across from Sherman Lake on March 29, indicating that pyrethroids might be a problem in that sample.

"None of these particular cases would have killed smelt directly, adults or juveniles," says Herrgesell. "But they could have affected their food organisms." During the same time that the samples were being taken, juvenile smelt had spawned and were moving toward the zone of influence at the pumps. "When we saw them for the first time, the numbers of juvenile smelt were 90% lower than the previous year. So something really happened this spring. Is it toxics? We don't know, but there is circumstantial evidence of toxicity to test organisms during the time young fish were being produced and moving through the system."

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## TO PIPE OR NOT TO PIPE

There's a reason an idea like the peripheral canal keeps resurfacing in discussions about what to do about the mounting problems in the Delta, and Wim Kimmerer thinks he knows why.

The various demands on the Delta for urban and agricultural use—and the fact that it's also habitat for fish and other aquatic organisms—are constantly conflicting. "And so, in a way, separating water from fish is one solution," says Kimmerer of the Romberg Tiburon Center.

Separating water from fish in this context means diverting water from the Sacramento River to a separate channel to pump it south, leaving the actual Delta to the fish. This idea had great currency in the 1980s, particularly within agencies like the California Department of Fish and Game—until opposition from enviros killed it.

Nonetheless, the peripheral canal is gaining popularity once again at a time when the Delta smelt population is plummeting, and development in suburbs and exurbs is expanding, placing more demands on an overtaxed Delta. The favorable reception the canal has received baffles the California Sport Fishing Protection Alliance's Bill Jennings. "I'm just fascinated at the avalanche of endorsements for a peripheral canal, the billions committed, and no one knows what it is," says Jennings. "It's like saying, 'Buy my car, but you can't see it.'"

Jennings is skeptical that the project will help solve the problems in the Delta. "Every other project on the Delta has promised

**"We need more water. We need to build more storage, and we have to build conveyance, the canal, and all of those kinds of things."**

—Governor Arnold Schwarzenegger's taped remarks reported in the Sacramento Bee, June 15, 2007

benign or beneficial effects, but they've only exacerbated existing conditions," he says.

Says Kimmerer, "Building a peripheral canal will get DWR off the hook, but whether it will solve any problems to do with fish is an open question."

Kimmerer posed that question in a 1993 opinion piece he wrote for a DWR newsletter. Back then, he asserted that we just didn't know enough about the Delta to accept or reject the construction of the separate channel. He outlined the key areas that needed study—how would the hydrodynamics of the Delta and the abundance of various estuarine species be affected by

the changes in temperature and flow that would occur with the diversion of river water to a separate canal?

And how have we done in improving our knowledge in these areas since 1993? That's a mixed bag, notes Kimmerer. He gives high marks to research done under the CALFED Science Program, particularly the particle tracking models that have enabled researchers to learn where various fish go in the Delta and to understand other aspects of their behaviors, including spawning. In addition, research done on the environmental water accounts has helped scientists understand the impacts of pumping on various species. But we also should understand, for instance, what happens when large amounts of salt water come into the Delta. "We didn't learn nearly as much as we could have from the

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## HOT CLUE OR RED HERRING? CONTINUED

Yet another troubling incident, says Herrgesell, occurred in May when over 100 juvenile Chinook salmon tagged with sonar were discovered in the Stockton ship channel near a sewage outfall pipe.

The EPA's Bruce Herbold doesn't buy the contaminants theory—yet. "This is grasping at straws in my estimation. Yes, we saw some toxicity; yes, it's an issue of concern; yes, we need to pursue, but was it toxic to the fish? Probably not."

The Central Valley Regional Board's Karen Larsen says her agency doesn't have the data to judge whether or not contaminants were a problem for smelt. But, she adds, "I think it was of great interest that we did see toxicity during the time smelt spawned this year." Larsen says her agency is redesigning the toxicity piece of the POD studies to hone in on what the greatest effects are and which chemicals are causing toxic impacts. "From there we have the opportunity to assert our regulatory authority to do any number of things—303(d) listings and development of a TMDL for a certain contaminant, for example." Larsen says that more immediately, the Regional Board plans to send a letter to all dischargers under their jurisdiction notifying them of the problem. The Board is also examining the Stockton sewage outfall issue more closely. So far, says Larsen, "We haven't found any smoking guns."

While they are concerned about contaminants, The Bay Institute's Tina Swanson and the California Sport Fishing Protection Alliance's Billing Jennings both say contaminants need to be looked at as one possible cause of the smelt decline, not as the sole cause. "The pumps are clearly the 900-lb. gorilla in the room," says Jennings. Says Swanson, "The rapidly accumulating science we have is consistently telling us that degraded habitat conditions, high densities of harmful invasive species, direct mortality, and low fish populations are the result of multiple inter-related factors. We are going to have to address them all."

Herbold says more studies on contaminants need to be done—and they are underway, as part of the Pelagic Organism Decline studies. The National Center for Ecological Analysis and Synthesis is partnering with the Interagency Ecological Program to address the potential role of contaminants in the entire pelagic organism decline (Delta smelt, young striped bass, longfin smelt, and threadfin shad).

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## PEOPLE

## BAY BALANCER

In her alter ego as a belly dancer, Beth Huning finds that a strong sense of balance is critical. The same is true of working with over 120 businesses, non-profits, regulatory agencies, scientists, and others to acquire and restore wetlands and waterways around the Bay, says Huning, now in her fifth year as coordinator of the S.F. Bay Joint Venture. "Designing the mix of habitats that will benefit endangered species without sacrificing other species is also a balancing act," she points out.

The decade-old group's focal areas include the North, Central, and South Bay, as well as the Delta within Contra Costa County, upland areas of Suisun Marsh, and the parts of San Mateo, San Francisco, Marin, and Sonoma counties that touch on the Bay or are connected to it by a water body. While the Joint Venture's primary purpose is acquiring and restoring wetlands, says Huning, it also provides a point of coordination for some of the scientific evaluation needed to make sure that restoration goals are being met.

Huning says the job's biggest challenge is—not surprisingly—finding new sources of funding for acquisition and restoration. "We have close to \$400 million in projects ready to go over the next three to five years." Her biggest surprise on the job has been the level of success the group has attained. "When I worked at Audubon, we were tackling all of these projects that were depleting habitat. Now I'm being contacted all the time by landowners looking to sell, realizing that there are alternatives to selling to developers. That's a real turnaround since my days at Audubon and when the Habitat Goals project was first being put together. We were fighting development after development, one loss after another. But there's been a real reversal." Yet Huning is far from complacent. Dealing with sea level rise and its potential impacts on restoration projects is an immediate hurdle resource managers must face.

Prior to her work as coordinator, Huning worked for National Audubon, directing the Richardson Bay Audubon Center, and with Bay chapters on wetlands issues and projects. Like many enviros, her passion for saving habitat stemmed from a love of birds and wildlife. She grew up in southern California, in condor country. "I was used to seeing them



on a fairly regular basis—we had a lot of what are now listed species sitting on our front lawn. I saw what was happening to creatures that were common at one time, and wanted to do more to help them."

Her Audubon days have paid off at the Joint

Venture, where she acted as chair of the management board prior to becoming coordinator, and helped put together its organizational structure and the cooperative agreement among the partners. Says Ducks Unlimited's Fritz Reid, "Because she had worked with so many of the partners [at Audubon], Beth brought the ability to understand the different skill sets that each organization has...she builds partnerships with what seem like 'odd pairings,' but that deliver key products. She also has the ability to motivate folks when the task seems unattainable."

Before working for Audubon, Huning was a naturalist with the National Park Service in Yosemite, managing their environmental education programs. But she had always volunteered for Audubon, including while teaching elementary school just out of college, where she got her undergraduate degree in Geography. When she had almost completed a master's degree in science education, she landed her job with Audubon and decided to focus on that.

Her geographer's tendency to see the big picture and how multifaceted issues interrelate undoubtedly come into play in her current position. Says Citizens' Committee to Complete the Refuge's Art Feinstein, "When Beth took over the Joint Venture it was a collaboration of organizations that had goals but didn't really know how to proceed. Beth gave it direction and energy and cohesion. She turned goals into process and results. She's hired great staff. She has been diplomatic when the competing interests of the collaboration required it, allowing the Joint Venture to move forward on projects and issues rather than bogging down in debates. I've simply been wowed by her effectiveness."

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*Illustration by Lisa Krieshok*

## OUTREACH

### A SHORE VOICE

A long neglected corner of San Francisco Bay, the North Richmond shoreline, has many hidden assets: the Bay's largest expanse of eelgrass, habitat for tidal-marsh specialists like the endangered California clapper rail, and some increasingly vocal human advocates. Involving local communities in restoring and protecting these resources is the goal of the recently launched North Richmond Shoreline Academy, a project of the Natural Heritage Institute (NHI), Community Health Initiative, Golden Gate Audubon Society, Parchester Village Neighborhood Council, Urban Creeks Council, and West County Toxics Coalition, funded by the CALFED Watershed Program.

NHI's Rich Walking hopes the Academy will "generate interest, excitement, and activity around the shoreline." He points out that some neighbors have had little access to the Bay: "If you go to Parchester Village, the kids are out there playing on the shoreline all the time. But in North Richmond, Chevron is between them and the shoreline." He also sees the Academy as a way of channeling restoration funds—including fees and penalties originating in Richmond—into local projects.

Most of the partners have deep roots here, having collaborated on plans for the Rheem Creek watershed and Breuner Marsh and the new documentary *A Promised Land*. Golden Gate

Audubon, new to the mix, will organize a citizen-science survey of the shoreline's birdlife. Local volunteers will be trained to conduct the year-round census at three marsh locations; other participants are welcome.

Walking describes another Academy venture, oyster restoration at Point Pinole, as "an opportunity to get people out, get their hands and feet wet, and have them learn what's growing here." Tours are planned—one for the Spanish-speaking community—so residents and experts can share knowledge of shoreline habitats. One tour may be by boat. "This is for the community," he emphasizes, "trying to find out how they use the shoreline, what they value about it." As with Rheem Creek, the tours will lead to a visioning process.

Academy partners are involving all age groups. In May, Verde Elementary School third- and fourth-graders and high school students from Youthbuild and other after school programs met at the Wildcat Creek Staging Area for a bird walk and other activities.

In the long run, what happens to the North Richmond shoreline will depend largely on the eminent domain battle over Breuner Marsh between the East Bay Regional Parks District and the developer who owns the land. Walking said community representatives previously rejected a development plan that lacked tidal-marsh mitigation, and insist on a voice in any restoration project.

CONTACT: Rich Walking, [rpw@n-h-i.org](mailto:rpw@n-h-i.org) JE



Golden Gate Audubon's Bob Lewis gives some young birders a few tips.

## SCIENCE SPOT

### NIGHT SHIFT

Once agricultural runoff has delivered selenium into Bay/Delta waters, how does the toxic element enter the estuarine food web? Aquatic animals don't acquire selenium directly from the water, but from the organisms they eat. Phytoplankton—algae and other small photosynthesizers—are well known as selenium concentrators. But it appears bacteria also play a major role, in a process not dependent on sunlight.

Studies several years ago at the Delta's Mildred Island, an area near the Lower Jones Tract flooded since 1983, focused on the relationship of light to selenium uptake. Stephen Baines and Nicholas Fisher of Stony Brook University in New York joined researchers from Old Dominion University in Virginia and USGS in the CALFED-funded project.

Baines, Fisher, and colleagues found that 42 to 56% of the selenium uptake at two Mildred Island sites occurred at night. Adding daytime uptake in waters below the reach of sunlight brought this "dark uptake" to 75 to 85%, most of it attributable to bacteria. "It was a surprise that so much of the selenium was taken up by bacteria," says Fisher. The bacteria had higher selenium to carbon uptake ratios than the phytoplankton, implying different selenium exposures for consumers of phytoplankton and bacteria.

What eats the bacteria? That varies with location in the Estuary. Bacteria are a significant resource, accounting for 29% of primary production at both Mildred Island and Frank's Tract, another flooded island. At Mildred Island, microscopic protozoans—ciliates, flagellates, and others—are the principal consumers. They in turn are food for larger organisms including filter-feeding bivalves. Bivalves—like the invasive overbite clam *Corbula amurensis*, a selenium accumulator—may also ingest bacteria directly. It's possible that bacteria are most important to the food web in deep channels where turbidity is high and light low.

Although Mildred Island, a hotspot for phytoplankton productivity, isn't representative of all Delta ecosystems, the results of the study there should inform decision-making on the role of the flooded tracts in the future Delta. "There are big issues with these flooded islands—whether there should be more of them," Baines says, "and countervailing arguments involving contaminants."

CONTACT: [sbaines@ms.cc.sunysb.edu](mailto:sbaines@ms.cc.sunysb.edu); [nfisher@notes.cc.sunysb.edu](mailto:nfisher@notes.cc.sunysb.edu) JE

## WATER QUALITY

### BRINE LINE

Over the past two decades, as Oakland's canning plants gave way to cafes and condos, the East Bay Municipal Utility District found that only about half of its Oakland wastewater plant's capacity—for treating 170 million gallons per day—was being utilized. At the same time, Central Valley food processors were looking for places to dispose of their waste effluent, which is very salty, not good for Delta waterways, and expensive and difficult for smaller municipal treatment plants to remove. When EBMUD proposed that they truck their waste from the valley, a partnership was born.

"The problem is, you really don't treat salt, the most you can do is move it around and change its form. You always end up with a chunk of salt that goes to the landfill or ocean," says the Central Valley Regional Board's Ken Landau. Once widely used, on-site evaporation ponds high in salt can contaminate groundwater. Landau says the EBMUD program is a good solution for plants that aren't too far away and have limited amounts of waste. For other food processors, trucking their waste to Oakland is expensive (not to mention the CO<sub>2</sub> emissions from the trucks), and better solutions probably exist. In Madera, for example, Oberti Olives found a way to recycle 100% of its wastewater using reverse osmosis membrane filtration; the costs were defrayed through various grants.

"We're strongly encouraging facilities to do that kind of thing, but some industries have to add a lot of salt—cheese manufacturers, for example—and can't really re-use it." Landau also mentions the second benefit of EBMUD's program—it also takes "FOG"gy discharges—fat, oil, and grease—the "kind of stuff you wouldn't put down your kitchen sink."

Is all of this salty wastewater safe for the Bay? "We don't want to cause problems in the Bay—but sometimes the wastes that are major problems for disposal in the Central Valley are not a problem if discharging to the ocean or Bay," says Landau, adding that the S.F. Bay Regional Board was consulted before the program began. The S.F. Bay Regional Board's Lila Tang says EBMUD's discharge is still fresh relative to the Bay, and meets water quality standards.

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## RESTORATION

### SALT POND SHAKEDOWN

The cloud of California gulls above Pond A16 in the Don Edwards San Francisco Bay National Wildlife Refuge was not a good omen.

A16 was one of the former Cargill salt ponds reconnected with the Bay under the Initial Stewardship Plan (ISP) for the South Bay Salt Pond Restoration Project. Nine days earlier, on August 1, 2005, U.S. Fish and Wildlife Service personnel had closed the pond's levee gates to prevent water low in dissolved oxygen (DO) from discharging into Artesian Slough out of concern for impacts to aquatic life. "[Closing the gates] was a big mistake," recalls Fish and Wildlife's Eric Mruz.

When refuge staff reached the pond, they found gulls gorging on the small dead fish—probably jacksnelt or topsmelt—littering the shore. DO levels had fallen to less than 1 milligram per liter, well below the Basin Plan standard of 5 mg/L and the 3.3 mg/L trigger point for corrective action. Stressed by low oxygen levels, the fish had crowded into near-surface waters where they were vulnerable to waiting gulls. The gulls also wiped out that year's Forster's tern chicks on the pond's interior islands. After discussion with the S.F. Regional Water Quality Control Board, A16's intake gates were opened wide to bring oxygenated slough water back into the pond.

Although apparently a one-time occurrence, the A16 fish kill illustrates a persistent dilemma for salt pond restorationists: the tension between managing to meet water quality standards and managing for wildlife values. Civil engineer Steve Moore, formerly with the Regional Board, where he helped design the discharge permit for the ISP ponds, is concerned about the interaction between low DO, stress on fish, and the increased use of the ponds by water birds: "The abundance and diversity of bird use has exploded. But that may indicate an unsustainable system." And he's also concerned that the project, following the line of least resistance, is grandfathering in the ponds in their present configuration.

Moore points out that the ponds in the refuge, and those the California Department of Fish and Game manages as the Eden Landing Ecological Reserve near Hayward, worked fine as salt accumulators: "A shallow broad pond is a good design for making salt." But water in a shallow pond warms in summer, and sunlight penetrates the whole water column—conditions favoring exponential algae growth. After algae blooms and dies off, microbial decomposers use up the pond's oxygen.

"Dissolved oxygen is the master variable of water quality with respect to supporting aquatic life," says Moore. "And it doesn't take much to



deplete oxygen to levels of concern. You're operating in a narrow range." Although tidal-margin organisms in the Bay have evolved to cope with low DO levels, their exposure is brief, during low tides—not days at a stretch as in A16.

Moore is concerned not just about acute stress episodes ("There have probably been fish kills we don't know about—the gulls get them faster than we can spot them") but also about chronic effects. Long periods of low DO, Moore says, have been shown to adversely affect growth, reproduction, and behavior in fish. A few species, like the long-jawed mudsucker, can handle low-DO environments; others, including steelhead, are much more sensitive.

Moore isn't alone in his misgivings. "Are the high bird counts due to increased reproduction by opening the ponds or to fish species being stressed and thus easier prey?" asks the Regional Board's Bruce Wolfe. "Are we setting up an attractive nuisance? The jury is still out."

It's hard to get a handle on what's happening with the fish in the ISP ponds. USGS surveyed fish species composition until last year, but neither it nor any other agency is looking at the effects of low oxygen stress on the fish. USGS' Michael Saiki says the fish species that successfully colonize the ponds are more tolerant of suboptimum conditions.

The waterbird data is equivocal. USGS' Nicole Athearn monitors bird populations as well as DO levels. She has seen increases in fish-eating birds—pelicans, cormorants, terns, grebes—using the ponds as salinity decreased, but points out that they represent only a small fraction of birds observed; 1% in winter, 3% in summer. (That's not considering the California gulls, whose numbers began to burgeon long before the ISP.) About 70% of the piscivores were resting on the ponds, the islands, and the surrounding levees, not actively feeding.

The most visible trends since the ponds were breached have been much greater use by dabbling ducks (responding to lower salinity) and shorebirds (responding to exposed mudflats). Countering that, use of the ponds by wintering



Pond A19's levee is breached. Photo by Beth Huning.

eared grebes, which feed on saline-specialist brine shrimp and brine flies, has declined; some may have shifted to the high-salinity ponds still owned by Cargill.

Whatever the links may be, everyone recognizes low DO as a problem. "While we thought salinity was going to be a big issue, we were surprised by DO," says Wolfe. Wolfe, Moore, and the Coastal Conservancy's Steve Ritchie all laud the wildlife agencies for grappling with it, despite limited funds for adaptive management.

The two wildlife agencies face somewhat different challenges: the Alviso ponds managed by Fish and Wildlife are more subsided than Fish and Game's Eden Landing ponds. Fish and Wildlife has learned from the A16 episode: "We no longer close discharge points at all." The federal agency has tried a variety of fixes, recognizing that every pond is different. A3W, a pond with out-of-control algae, has submerged borrow pits (the source of the dirt that made the levees) along its edges. Installing baffles blocked the low-oxygen water in the pits. Solar aerators were tried in A7, without much effect. A14 was a chronic problem pond with "extremely low DO levels that did not respond to any actions taken thus far," Fish and Wildlife concluded in its Annual Self-monitoring Report for 2006. Early this year the narrow channel connecting A14 with Coyote Creek was widened to improve flow-through.

Mruz says most of the Alviso ponds have been converted to muted tidal (with both intake and discharge gates fully open) or partially muted tidal (with the intake gate partly closed), which seems to have helped. But that approach didn't work for A16, operated briefly as a muted tidal pond in May 2006 before fish stress was detected and the experiment discontinued.

At Eden Landing, according to the Regional Board's Robert Schlipf, "management requires the art of looking at tide levels," fine-tuning the discharge gates. "Low DO is just a fact of life in managed ponds in summer," says Fish and Game's Carl Wilcox. "We haven't changed the

gates so much as how we operate." Last year, low-DO conditions were recorded throughout the monitoring season, not just in summer. Although ponds may be shut down during the lowest tides, no fish kills have been reported. Fish and Game resorted to pumping for a week in 2006, but that's prohibitively expensive.

Fish and Game's John Krause describes a new practice his agency implemented this year: moving water from low-DO ponds into seasonal ponds, and replacing it with intake from the sloughs during high tides. "It's been somewhat effective," he judges. The state agency has also allowed one of its low-DO ponds, B6A, to draw down during the summer to become nesting habitat for the federally threatened western snowy plover.

Overall, the DO picture is improving, although still not meeting the Basin Plan standard. Athearn reports an increase of 1.2 mg/L in the ISP ponds since 2004. She's not convinced that oxygen levels in the discharge sloughs are worse than in other South Bay sloughs: "We have measured low DO in a nearby slough that is not connected to any ponds. More investigation is needed to determine 'normal' DO levels in the South Bay during summer." Although he feels the 5 mg/L Basin Plan standard may be too conservative for South Bay tidal habitats, Moore says the DO swings in the ISP ponds are more dramatic than anything recorded in the tidal sloughs.

It appears that Phase 1 of the project, slated for 2008, will go further toward addressing Moore's concerns. Although changes in pond configurations and levee structures were off the table during the ISP, Ritchie says Phase 1 will include experiments to reduce the residence time of water in the managed ponds: "One thing we're considering is finding ways to fill in the borrow ditches." According to Mruz, Alviso's troubled A16 will be broken up into 3 or 4 cells with small interior levees. Similar treatment is planned for one of the Ravenswood ponds, also managed by FWS but not included in the ISP.

Phase 1 aims to incorporate lessons learned from the ISP. "The ISP had the idea we would tolerate some stress to the system as we transition from salt-making to restoration," says Moore. A recently approved US Army Corps of Engineers Bay-wide study of sediment transport should inform the process.

"The whole pond restoration process is going to take upwards of 50 years," warns Wolfe. "We're looking at all the indicators of pond performance we need to evaluate: mercury methylation, fish and bird populations, DO. The goal is still to have 90% tidal marsh, 10% managed ponds. We may have to stop and say that the goal is not achievable without further adaptive management."

CONTACT: s.moore@nute-engr.com;  
BWolfe@waterboards.ca.gov; sritchie@scc.ca.gov JE



## BIRDWATCH

### BIRDIR BAY

These are grim times for North American birds. National Audubon reports that 20 common species have declined by 8.2 to 5.4%, including some Bay regulars: northern pintail, greater scaup, loggerhead shrike, lark sparrow. Not all the news is bad, though. Independent researcher William Bousman reports in the journal *Western Birds* that, contrary to expectations, the 9 Bay Area counties have actually seen an increase in avian diversity over the last 80 years.

Bousman's starting point was the benchmark 1927 study by Joseph Grinnell and Margaret Wythe, *Directory to the Bird-life of the San Francisco Bay Region*, listing 159 breeding species; his research added 13 more. County-level breeding bird atlases and other records yielded documentation of nesting by 215 species in the years since 1927. While some were one-off efforts by strays and two (mute swan, wild turkey) resulted from introductions, 17 represented natural range expansions.

The Estuary has been transformed since the '20s. Conversion of salt marsh to salt-evaporation ponds provided habitat for new species of colonial waterbirds: California gull, least and Forster's terns, black skimmer. Other trends included reservoir construction, maturation of second-growth forest, urban plantings, and preservation of open space, favoring a diverse set of species: common merganser, northern mockingbird, red-breasted nuthatch, hooded oriole.

Some birds rebounded from over-exploitation. The snowy egret, decimated by the early 20th century plume trade, made a dramatic comeback. Wood ducks, extirpated in the Bay Area by 1927, are common again. Only four 1927 breeders are gone: fulvous whistling-duck, lesser nighthawk, yellow-billed cuckoo, and willow flycatcher—the last two victims of habitat loss, aggravated in the flycatcher's case by cowbird brood parasitism.

Bousman didn't examine population size trends, only breeding records. But his compilation provides a counterpoint to the prevailing sense of doom. He suggests that 1927—just after the era of plume and market hunting and the logging of the coastal forests—may have been a low point, when it was reasonable to conclude that species diversity would continue to fall due to habitat loss. "The unhappy future projected by Grinnell and Wythe has not come to pass," writes Bousman—"at least not yet."

CONTACT: William Bousman,  
barlowi@earthlink.net JE

## STORMWATER

## SOUTH BAY STALLS RUNOFF

If you want to know what one of the biggest contaminants in the Estuary is, the San Francisco Watershed Council says look no farther than your yard or driveway.

Rain washing over roofs, parking lots, and sidewalks, as well as sidewalk "cleaning" hose-downs or street-side car washes, gathers oil, antifreeze, metals, and other pollutants and deposits this toxic concoction in storm drains, creeks, and ultimately the Estuary.

This landscape's-eye view has been on display through tours and the council's web site as part of two demonstration stormwater projects the council recently completed. In one project in Palo Alto's downtown, workers replaced a traditional concrete driveway with what's called the "Hollywood model"—one with ruts fashioned from dirt or bricks to soak up more rainfall. The council also installed a rain garden, replacing less-permeable clay soil with sandy loam to improve infiltration.

The idea for the projects—funded through a \$220,000 grant from the State Water Resources Control Board—was to show how modest changes to landscaping could reduce the amount of runoff, says the council's Katie Pilat.

Working with the grant, the council could engage in "what-if" scenarios and try different techniques and materials. Some were costlier than others. For instance, using unit pavers—concrete bricks that fit together but leave space for an absorbent material—to rebuild part of a patio cost nearly \$20,000.

But Pilat says simply capitalizing on the layout of a house or apartment complex can sometimes do the job more efficiently and cheaply. For example, digging a trench out front of the house at the base of the driveway and filling it with gravel and sand probably would have done the same job that repaving the driveway did, notes Pilat.

In a second project, 5,500 square feet of a one-acre asphalt parking lot in Menlo Park was replaced with permeable concrete. In an additional 1,400

## PLANNING

## FUTURE FOCUS

BCDC's Will Travis thinks the restoration community has done a good job of acquiring and restoring wetlands around the Bay. "The battle to save the Bay is over," he declares, with the caveat that you don't abolish the police force (BCDC) that "keeps the peace." The new challenge, he says, is to "save the Bay Area from the Bay," meaning that as the climate changes and sea and the Bay levels rise, carefully restored marshes and wetlands could be wiped out or inundated. "Instead of bemoaning that fact, we need to get out in front of that change and be waiting for it. We need to look at opportunities to acquire vast areas and plan them so that as sea level rises, wetlands can migrate outward and upward so we still have an estuarine system."

There are other things that can be done to lessen the impact of sea—and Bay—level rise, says Travis, especially tackling greenhouse gases. "About 45-48% of the greenhouse gas emissions [in the Bay Area] come from the tailpipes of autos and light trucks," says Travis. "The biggest chunk of greenhouse gas emissions are coming out of cars, and the Bay Area Air Quality Management District (BAAQMD) has no authority over them because they're mobile emissions." The state's efforts to regulate tailpipe emissions have been hampered by lawsuits from automobile manufacturers (and possibly politics). "We thought, 'is there another way of getting at this?'" says Travis. One idea is a current effort by the Joint Policy Committee—BCDC, ABAG, the Metropolitan Transportation Commission (MTC), and the BAAQMD—to think in a more integrated way and to focus on where new development should go and where open space should be preserved.

FOCUS—"Focusing Our Vision"—builds on the regional smart growth strategy of 2002, a well intended effort that "didn't go anywhere," says Travis and MTC's James Corless. "Our own self critique was that it was a pretty fuzzy

vision," says Corless. "We did great outreach and engaged a ton of people, but the local governments felt left out." In the FOCUS effort, local governments nominate "priority areas" in their jurisdictions where future development can build upon existing transit centers and where open space should be preserved. Says Corless, "We've known for a while now that a lot of smart growth efforts are being led bottom up through communities and local cities. As regional agencies, we've been grappling with a strategy for promoting smart growth and directing population growth toward existing areas. What we realized is that we need to stitch together all these different local efforts that have taken off in the last five years."

Corless cites downtown Hayward as a good example of a FOCUS prototype. There, the city has built up around an existing BART station after re-connecting the town with the station by replacing a BART parking lot with a new city hall, housing, and shops, and rebuilding an existing BART garage in a more appropriate spot. "They still have a ways to go, a few vacant shops," says Corless. "But they've revitalized their downtown." A survey found that 45% of the people living downtown used public transit, compared to the Bay Area regional average of 12%. "The point is that these folks are still driving, but they own fewer cars and are driving less," says Corless.

The criteria for "priority places" are simple, says Corless. "You have to be in an existing developed area, be planning for more development and housing, and be near a transit service that runs at pretty high frequency."

Once the JPC reviews all of the nominations—as of July, they had received 40—it will present the "winners" to the state, as the Bay Area's new regional strategy, to try to tap into last November's bond dollars for planning, capital, and infrastructure grants to implement the new plans. It will also tap into the regional transportation plan that MTC oversees, says Corless. "There are lots of little pots of money for incentives, bits given out here and there, but we want to try to get some synergies going to coordinate them. The idea is to focus our efforts, not sprinkle stuff around everywhere, but to make a difference."

One worry is that since more dollars will go toward heavily used transit systems, the lesser-used systems might be dissatisfied. "It's going to be quite a push for MTC to stick to this strategy," says Travis. "But it won't be a sit-on-the-shelf plan if MTC really ties its transportation plan dollars to reducing greenhouse gases and vehicle miles traveled."

CONTACT: Will Travis [travis@bcdc.ca.gov](mailto:travis@bcdc.ca.gov); James Corless [jcorless@mtc.ca.gov](mailto:jcorless@mtc.ca.gov) **LOV**



An old-fashioned driveway (a pilot project in the South Bay) allows more runoff to percolate (see sidebar).

# PLACES TO GO & THINGS TO DO



## EVENTS

OCT

3

WEDNESDAY

### BAY INSTITUTE ANNUAL FALL GALA

**TOPIC:** Celebrating H2O: Headwaters to Ocean  
**LOCATION:** San Francisco  
**SPONSOR:** The Bay Institute  
Kristen Addicks,  
(415)506-0150, ext. 24  
<http://www.bay.org/main.htm>



## CONFERENCES

SEPT

2-6

SUN.-THURS

### 2007 ANNUAL MEETING

**TOPIC:** Thinking downstream and downcurrent  
**LOCATION:** San Francisco  
**SPONSOR:** American Fisheries Society  
[www.fisheries.org/](http://www.fisheries.org/)

SEPT

4-7

TUES.-FRI

### 2007 ANNUAL CONFERENCE

**TOPIC:** Collaborative approaches to integrated floodplain management  
**LOCATION:** Lake Tahoe  
**SPONSOR:** Floodplain Management Association  
Iovanka Todt  
(619)204-4380

## REQUEST FOR PROPOSALS

### DEADLINE: AUGUST 31, 2007

The National Center for Ecological Analysis and Synthesis and the Interagency Ecological Program seek proposals for a working group to address the potential role of contaminants in the decline of pelagic organisms in the upper San Francisco Estuary.

Submit proposals electronically no later than 5 p.m. Pacific Daylight Time.

For more information, visit <http://www.nceas.ucsb.edu> or contact Erica Fleishman, [fleishman@nceas.ucsb.edu](mailto:fleishman@nceas.ucsb.edu).



## HANDS ON

AUG

11

SATURDAY

### STEWARDSHIP AND RESTORATION WORK DAYS

**TOPIC:** Help maintain a restoration project on San Pablo Creek.  
**LOCATION:** El Sobrante  
**SPONSOR:** SPAWNERS;  
[www.spawners.org](http://www.spawners.org)  
(510) 665-3538;  
[Juliana@thewatershedproject.org](mailto:Juliana@thewatershedproject.org)

SEPT

8

SATURDAY

OCT

13

SATURDAY



Illustration by Lisa Krieshok

### HOT CLUE OR RED HERRING? CONTINUED

Consultant Susan Anderson is developing bio-marker guidelines for Estuary fish that will allow scientists to look at the fish and “have the fish tell you what the problems are,” says Herbold. Whether or not contaminants are the cause, there is a bigger problem, he warns. “This spring’s decline points to the fact that we don’t know where the fish are when there are so few of them. We can’t tell from our sampling that any spawned. We thought all spawning took place in the Cache Slough area, and maybe some in the central and south Delta, but we never saw any.” The bottom line, says Herbold, is that we don’t have enough fish to draw any conclusions.

**CONTACT:** [pherrgesell@dfg.ca.gov](mailto:pherrgesell@dfg.ca.gov);  
[herbold.bruce@epa.gov](mailto:herbold.bruce@epa.gov); [iwerner@ucdavis.edu](mailto:iwerner@ucdavis.edu)  
LOV

### BRINE LINE CONTINUED

EBMUD estimates that over 35 million pounds of salts from approximately 100 Central Valley dischargers were diverted from Delta waterways in 2006. “We could still treat another city the size of Oakland,” says EBMUD’s Ben Horenstein. Tang says she hopes some of that excess capacity can eventually be used to treat urban runoff.

**CONTACT:** [bhorenst@ebmud.com](mailto:bhorenst@ebmud.com)  
[klandau@waterboards.ca.gov](mailto:klandau@waterboards.ca.gov) LOV

## NOW IN PRINT & ONLINE

*Country in the City: The Greening of the San Francisco Bay Area.* Richard Walker. May 2007. University of Washington Press. <http://www.washington.edu/uwpress/search/books/WALCOC.html>

*Down the Drain: Sources of hormone-disrupting chemicals in the San Francisco Bay.* July 2007. Environmental Working Group. East Bay Municipal Utilities District. <http://www.ewg.org/node/22004>

## SAVE THE DATE!

### 8TH BIENNIAL STATE OF THE ESTUARY CONFERENCE 2007

October 16, 17, and 18, 2007

Scottish Rite Center

1547 Lakeside Drive Drive, Oakland

short walk from public transit!

<http://sfep.abag.ca.gov/soe/>

(510) 622-2398

### SOUTH BAY STALLS RUNOFF CONTINUED

square-foot section, workers replaced pavement with landscaped biofilters, permeable concrete blocks that resemble Rice Crispy Treats. Both materials are stable enough to support delivery trucks and, if installed correctly, can last as long as a normal concrete lot, says Pilat, only that they absorb much more water—about 3 to 5 gallons per square foot per second. “That’s way more rainfall than we will ever have,” she says.

Pilat says the Council has received a number of calls about the demonstration projects—follow-ups from its web site and tours that were also covered by the grant. But she’d like to do more outreach, and so she’s seeking more funding. And she has more up her sleeve, particularly in light of global warming, which is predicted to dump more rain on the Bay Area. Pilat wants to test techniques to help city residents harvest rainwater.

“By being more strategic in how we build and landscape, we can have many ways to get lots of runoff reduction—and more local water supplies—for very little money,” says Pilat.

<http://www.sanfranciscuito.org/runoff/demo/index.htm>.

**CONTACT:** Katie Pilat (650)961-1035, ext.305; [katie@sanfranciscuito.org](mailto:katie@sanfranciscuito.org) KC



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Editorial Office: PO Box 791  
Oakland, CA 94604  
lowensvi@sbcglobal.net

## Estuary Web site at

[www.estuarynewsletter.com](http://www.estuarynewsletter.com)

To subscribe to/questions about ESTUARY:  
(510)622-2499

## STAFF

Managing Editor: Lisa Owens Viani

Associate Editor: Kristi Coale

Page Design: Bobbi Sloan

Contributing Writers: Joe Eaton

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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## TO PIPE OR NOT TO PIPE, CONTINUED

Jones Tract [breach] about how salinity moves in or what would happen if the Delta took a large slug of salt," says Kimmerer.

One reason the peripheral canal is getting a new vetting is because a form of it was recommended in a February report from the Public Policy Institute of California (PPIC). This paper gave a sobering assessment on the efforts to manage the Delta thus far and suggested a sort of "Peripheral Canal Plus" as part of a piecemeal solution to rethink the Delta. The canal would start near Hood on the Sacramento River and run south along the Delta's eastern edge, sending exports to Clifton Court Forebay. It would meet with Central Valley Project and State Water Project intakes. The "plus" part involves special operations, investments, and activities for environmental and other in-Delta land and water uses. This proposal from the PPIC paper is part of recent legislation drafted by Assemblyman Joe

Semitian that is working its way through Sacramento. Another reason a peripheral canal is gaining currency is because there is little consensus on how to manage the Delta for environmental purposes, says U.C. Davis' Jay Lund, one of the contributing researchers to the PPIC report. "We have become too entangled in water supply issues," says Lund.

The emphasis on water supply has obscured other factors affecting the decline of Delta smelt. Kimmerer says invasive species have played a huge role in altering the Delta. For instance, when the overbite clam (*Corbula amurensis*) was introduced to the Delta in 1987, it took over the food supply for bass and smelt. And while smelt numbers didn't exactly plummet at the time, the introduction of Brazilian waterweed really changed their habitat.

Kimmerer says the weed, which the Delta is choked with, has made the water much clearer by trapping sediment. So the amount of habitat for smelt has declined over the past two decades.

"These things [overbite clam and Brazilian waterweed] have been the one-two punch in the system and its altered habitat and there's no going back," he says.

In the meantime, the specter of a new canal, which some insiders claim is a "done deal," continues to loom. Kimmerer says we've done the research to show why we don't want the canal. The next step, he says, would be "look at different scenarios in the Delta if a canal were built."

This assessment is key because, Kimmerer notes, there's too much history of going blindly into engineering solutions, only to create new problems or worsen existing ones. One example in his mind was the Tehama spawning channel built at the Red Bluff diversion dam. It was a project that cost millions of dollars. "And maybe one salmon spawned in there. The fish just said, 'Unh, unh,'" Kimmerer says.

Jennings adds that no one has considered the impacts of a peripheral canal on water quality. "What happens when we divert fresh water around the Delta? We turn it into a brackish sea," he says, predicting that more salt and more toxins will flow in.

"The peripheral canal is on course for a head-on collision with the Clean Water Act," he says.

CONTACT: Wim Kimmerer (415)435-7143;  
Bill Jennings (209)464-5067 **KC**



Ideas, questions, feedback?

Send to [lowensvi@sbcglobal.net](mailto:lowensvi@sbcglobal.net)