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ESTUARY

## POD: NEW CLUES, SLIPPERY SMELT

The results of last fall's Midwater Trawl Survey (MWT) are hot off the presses, with mixed messages about the Pelagic Organism Decline (POD) in the Estuary. Winter and spring freshwater outflows were high in 2006, raising expectations of a good reproductive season for the fish species of concern. Longfin smelt did seem to respond to winter flows, with their highest abundance index (1,949) since 2000. But the threatened Delta smelt made its second-lowest showing with an index of 41, topping only 2005's 26. The index for young-of-the-year striped bass more than doubled, from 121 to 363, but was still below historic levels. Threadfin shad abundance was slightly lower than in 2005, also well down from pre-decline indices.

Randy Baxter of the California Department of Fish and Game says the non-response of the shad was no surprise: "They like warm water for spawning, and since high flows result in cooler temperatures, there may be subtle negative effects." Longfin smelt spawn earlier, and seem to do best when winter flows transport their buoyant larvae downstream into San Pablo Bay. As for striped bass, says Baxter, "We were hoping to do better than that. I'm reluctant to say it was a big turnaround."

The big story may be the smelt that got away. Special sampling in September showed that almost all the Delta smelt were slipping through a test net with half-inch mesh, identical to that used in the MWT. "There are probably more fish out there than our numbers represent," adds Baxter. "How many more is anybody's guess." DFG researchers plan to evaluate their sampling gear and develop auxiliary sampling techniques that will let them quantify what they're missing.

Baxter sees a relationship between Delta smelt size and changes in the upper Estuary's food web: after the invasion of the

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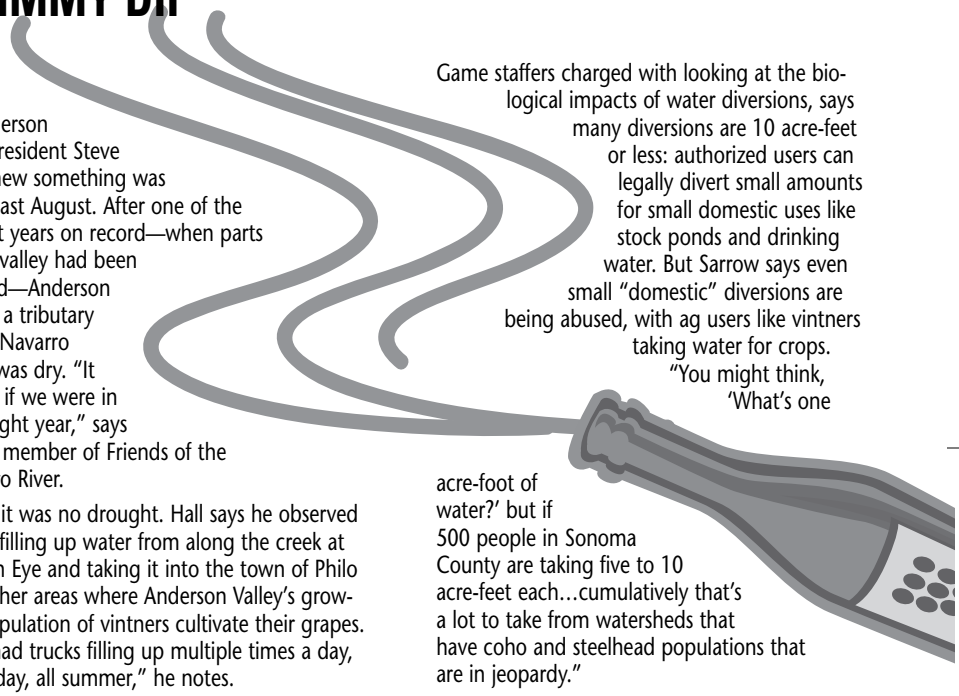
## INSIDE



# SKIMMY DIP



Anderson Valley resident Steve Hall knew something was amiss last August. After one of the rainiest years on record—when parts of the valley had been flooded—Anderson Creek, a tributary of the Navarro River, was dry. "It was as if we were in a drought year," says Hall, a member of Friends of the Navarro River.

But it was no drought. Hall says he observed trucks filling up water from along the creek at Golden Eye and taking it into the town of Philo and other areas where Anderson Valley's growing population of vintners cultivate their grapes. "You had trucks filling up multiple times a day, every day, all summer," he notes.

Whether it is done by truck, pump, a trench dug into the side of a creek, or a make-shift dam of dirt piled into a creek bed, water users are dipping into creeks and streams—without permits—to take more than their share. And it's coming at a cost: lower flows mean less sediment and water for fish and other aquatic life.

The main culprits, according to the State Water Resources Control Board, which regulates water rights and diversion permits, are agricultural users, frustrated by having to wait five and sometimes more than 10 years for a permit. Hall and other residents in Anderson Valley, along with their counterparts in Sonoma and Napa Valleys, narrow the culpable to a specific group of ag users—vintners. State officials concur.

"Wherever vineyards are being developed—Mendocino, Sonoma, Napa, Solano—that's where we're seeing lower flows," says Jeremy Sarrow of the California Department of Fish and Game.

These unauthorized diversions come in many shapes and sizes. Sarrow, one of several Cal Fish & Game staffers charged with looking at the biological impacts of water diversions, says many diversions are 10 acre-feet or less: authorized users can legally divert small amounts for small domestic uses like stock ponds and drinking water. But Sarrow says even small "domestic" diversions are being abused, with ag users like vintners taking water for crops. "You might think, 'What's one acre-foot of water?' but if 500 people in Sonoma County are taking five to 10 acre-feet each…cumulatively that's a lot to take from watersheds that have coho and steelhead populations that are in jeopardy."

The practice of unauthorized diversions—particularly in the wine country—is widespread, says Brian Johnson of Trout Unlimited, because the permitting process for smaller diversions makes it hard to regulate who gets to dip into the river and when. "The culture in this part of the world has been that people build first and then ask permission later," explains Johnson.

That culture has only grown as the State Board has become buried in a backlog of about 500 applications for water permits and roughly the same number of petitions to change water right conditions. "The Division of Water Rights has about 20 technical staff working on these 1,000 actions," the State Board's Liz Kanter explains in an email.

And that's just the queue for water rights and permit changes. Kanter says the State Board acts on unauthorized diversions only after someone files a complaint. Estimates of the number of complaints range from a few hundred to nearly 1,000. And the staffing for investigating these

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**NEW CLUES,** CONTINUED

overbite clam, the average size of smelt in the MWT declined.

Growth rates may be changing as well. "The way they're growing now, they're not getting up to size," Baxter says. The fish may be taking longer to reach the growth threshold for gonadal development, which would delay spawning, which would result in smaller juvenile fish during the survey period.

Although other researchers have made the connection between food availability and the decline of the Delta smelt, new complexities are emerging. The U.S. EPA's Bruce Herbold says POD biologists are excited about the ideas Bill Bennett of UC Davis presented at last fall's CALFED science conference: "What's new is the idea that the selective harvest of adults—losses due to exports at times when the best adults are trying to spawn—results in less healthy progeny. Lots of people have looked at just the summer, but it may not be so much that food resources are limited then as that the fish may not be as capable of harvesting the resources that are there." Herbold says "real mind shifts are going on" as researchers focus on the health and fecundity of early adult smelt.

CONTACT: Randy Baxter, rbaxter@delta.dfg.ca.gov; Bruce Herbold, Herbold.Bruce@epamai.epa.gov. JE

# PEOPLE

## WIZARD WINTERNITZ

It's not hard to see which of Leo Winternitz' New Year's resolutions—fix the Delta; fly-fish every river in the world—will be more fun. As deputy director of strategic planning at CALFED since October 2006, Winternitz has found himself in the thick of some of the state's most critical water issues, tasked with concluding "stage 1" of CALFED—examining what worked and what didn't during the first seven years, in relation to the four major goals of water supply reliability, water quality, ecosystem restoration, and levees—and then making recommendations for "stage 2." A major piece of stage 2 is the Delta Vision process, the end result of which is to be a strategy for "managing the Delta as a sustainable ecosystem that continues to support the environmental and economic functions critical to the people of California," as directed by an executive order from Governor Schwarzenegger in 2006.

If anyone can pull a hornet's nest of contradictory interests together, it's Winternitz, says California Urban Water Agencies' Steve McAuley, who, while working for DWR, lured him from the agency's water quality branch to working as his executive assistant, a job in which Winternitz implemented key environmental policies and programs, including the Environmental Water Account. Says McAuley, "Leo's job is one of the toughest jobs I've seen in 35 years in this business. How well [the Delta Vision process] succeeds will not be limited by his talents; it will live or die on the issues." CALFED's Joe Grindstaff is confident he's hired the best person for thejob. "Leo is willing to take on tough issues. He has a reputation for fairness with everyone who has worked with him in the past. He has a proven ability to work with many varied stakeholders to arrive at a solution."

His track record includes five years as the executive director of the Sacramento Water Forum, where he brought together water purveyors, environmental and public interest organizations, state and federal regulatory agencies, and farmers and agricultural groups to negotiate a groundbreaking regional water supply and environmental protection agreement for the American River. Says McAuley, "Leo understands human dynamics, what makes people tick. He puts himself in others' shoes—how do environmentalists, taxpayers, politicians see things? This [CALFED] job is going to take someone like Leo who sees the big picture and can see it from all sides."

Says Winternitz, "The biggest challenges are going to be coming to a decision about the facilities we currently have in the Delta that are important to the state's economy and the Delta as an ecological resource. The system envisioned by Governor Pat Brown was never completed. So we have this system we've been working with since the late 1960s that has proved troublesome." Since that time, says Winternitz, we've tried to manage it adaptively, mitigating for impacts associated with the state and federal water projects. "But whenever we try and adapt to do things better, there are inadvertent impacts, and a lot of that is associated with the geographic location of the facilities." So the big decision that needs to be made, says Winternitz, is whether to continue with the existing infrastructure or identify alternatives. "It takes a long time to get to a solution. The longer we hold off, the greater the chance for a catastrophe to happen. If we believe that there is a POD and that sea levels are rising, that we are losing snow pack—if that's where we're heading, let's stop and reflect.'"

Winternitz is optimistic that the stakeholders in the Vision process—and CALFED staff—will come up with a sustainable solution for the Delta. "It's a matter of being able to address all the different interests," he says. " We've done it before; all the people here are bright and care passionately about the common resource. No one is drawing hard lines in the sand."

One thing he learned during his tenure with the water forum is that solutions have to be all-inclusive. "The state coming in with an iron hand is not going to work. When we got to implementing the water forum agreement, we discovered things we hadn't thought out; there were changed conditions. We had to keep coming back and meeting and resolving how the agreement related to what was happening today. The best way is to have the parties come together to work to find their common interests, and then get their decisions blessed by the state."

Winternitz says that although Delta issues are broader than those he tangled with on the American River, the principles are pretty much the same. He sees his role, in part, as enabling the discussion. "I want to make this place an objective, friendly place for people to come together and discuss interesting and contentious issues." And once he's figured out how to solve what many see as the Delta "mission impossible?" On to fly-fishing his next river. LOV

# SCIENCE

## MARSH-MERCURY MINGLE

The restoration of San Francisco Bay's tidal wetlands is a complicated business, with possible unintended consequences. The production of methyl mercury—the most toxic form of the element, composed of a methyl group ($CH_3$-) bonded to a single mercury atom—appears higher in vegetated wetlands. What if creating more tidal marsh introduces more methyl mercury into the Estuary and its food web? But ongoing research may show how to reduce that risk—and even turn new wetlands into methyl mercury sinks rather than sources. Not all wetlands, it seems, have the same production potential. In what Mark Marvin-Di Pasquale of the US Geological Survey calls the "Goldilocks effect," conditions have to be 'just right."

Marvin-Di Pasquale has been trying to sort out the factors governing methyl mercury production in different wetland environments, ranging from the Cosumnes River and its freshwater floodplain to the Petaluma River saltmarshes. The picture that emerges is complex. Methylation, he explains, results from the activity of sulfate-reducing and iron-reducing bacteria in wetland sediments. It's also governed by the pool of reactive inorganic mercury available to the microbes, much of which is chemically bound to soil particles or tied up in compounds like cinnabar. In the highly oxidized surface sediment of salt marshes, the reactive mercury pool is comparatively larger. Sulfate-reducing bacterial activity leads to more reducing conditions, which binds mercury and shrinks the reactive pool.

The bacteria go dormant when soil dries out, and flooding jumpstarts their activity. This is where the "Goldilocks effect" comes in, says Marvin-Di Pasquale: "In recently flooded environments things are 'just right' for methyl mercury production." Both seasonal and tidal cycles could promote the process: "It takes both the activity of the microbes and the right pool size of reactive mercury. Areas wetted and dried repeatedly optimize both. They're good zones for making methyl mercury because things are being reset constantly." On the other hand, permanently flooded environments with constant bacterial activity tend to have limited reactive mercury pools.

Adding marsh plants to the mix expands the soil zone where methylation takes place. Visualize a soil sandwich: the top slice with little sulfate- or iron-reducing bacterial activity; the bottom with little available reactive mercury; the filling where the transition from oxic to anoxic conditions allows an optimum balance of the two. By pumping oxygen into the soil, plant roots enlarge that optimum zone. But it works

*Illustration by Hiroko Kusuda*

differently with different plant species. Pickleweed, with short, fibrous, hair-covered roots, seems to be a promoter. "We tend to see that pickleweed marshes have higher activity and higher methyl mercury concentrations," says Marvin-Di Pasquale, who cautions that most of the data so far has come from pickleweed marshes; little is known about the effect of other plants. And methyl mercury produced in those marshes would not necessarily enter the estuarine food web: "In many of these saltmarsh settings, the net movement of water is down into the groundwater, not out into the Bay." Also, below a certain soil depth, any methyl mercury produced won't be churned to the surface by burrowing organisms, according to Marvin-DiPasquale.

The South Bay salt ponds are a question mark, only beginning to be studied. Marvin-Di Pasquale suspects they may be low zones for methyl mercury production, with highly sulfitic sediment and a limited reactive mercury pool. Because they were impounded before most of the mercury entered the Bay, "these ponds might be cleaner than Alviso Slough or South San Francisco Bay."

A strong proponent of restoration, Marvin-Di Pasquale hopes concern about methyl mercury doesn't get in the way. "When we have a better handle on the interaction of controlling factors," he says, "we may be able to make recommendations on what sort of habitat minimizes production of methyl mercury."

At Moss Landing Marine Laboratory, Mark Stephenson has also been thinking along those lines. His presentation at the CALFED science conference showed that tidal wetlands may either export methyl mercury or import it. In preliminary research in Suisun Bay in 2004, he found methyl mercury production varying with hydrological regime. Stephenson hypothesizes that the net import of methyl mercury measured at the mouth of Suisun Slough reflects high levels

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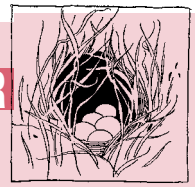
# THE MONITOR



## NEST PESTS

Mercury in the estuarine food web affects different bird species in different ways, according to researchers who have been looking at birds that share the same habitat in San Francisco Bay but vary in foraging strategies.

US Fish & Wildlife biologist Collin Eagles-Smith and colleagues report that methylated mercury concentrations in liver tissue are higher in fish-eating Forster's terns and Caspian terns than in black-necked stilts, American avocets, or surf scoters. Stilts outscore avocets in both liver and blood mercury concentrations. Although both feed primarily on small crustaceans and insects, the differences may reflect choices in foraging sites.

In a blood mercury study, led by Josh Ackerman of the US Geological Survey, researchers found that 17% of the pre-breeding adult stilts sampled at high risk for reproductive impairment, but none of the avocets. In breeding season, blood and liver mercury concentrations increased significantly in avocets, stilts, and Forster's terns, with avocets showing the smallest increases. Up to 58% of breeding Forster's terns in the south Bay were found to be at high risk for reproductive impairment.

Additional studies led by Ackerman looked at total mercury in young stilts and Forster's terns at different developmental stages. In both species, blood mercury declined as the chicks matured and deposited mercury into growing feathers, and increased just before and after fledging as feather production slowed down. USGS' Kevin Kenow found a similar pattern in common loon chicks in Wisconsin.

For terns, stilts, and avocets, birds sampled in the south Bay were most contaminated by methyl mercury, although levels were also high in north Bay birds. Surf scoters, though, showed highest concentrations in Suisun Bay.

Mercury isn't the only contaminant waterbirds have to deal with. Selenium, like mercury, has been associated with embryonic death and deformities in birds. Gary Heinz of USGS found that the two act synergistically: a double whammy of mercury and selenium had a worse effect on mallard embryos than either did on its own. Heinz is also assessing the sensitivity of other waterbird species to mercury injected into their eggs.

CONTACT: Collin Eagles-Smith, collin_eagles-smith@fws.gov; Josh Ackerman, jackerman@usgs.gov; Gary Heinz, gary_heinz@usgs.gov. JE

## BULLETINBOARD

### BUFFER SETBACK?

Many California farmers have been trying to restore wildlife habitat by planting hedgerows, and riparian buffers along streams, and even creating wetlands. But after spinach from the Central Valley was tainted with *E. coli* this summer, food processors are increasing their efforts to get farmers to grow more antiseptically, on the theory that animal waste contaminated the crops: this despite a UC Santa Cruz analysis of the *E. coli* in the spinach concluding that that strain (0157:H7) is rare in wild birds and mammals, and is found in the digestive tracts of grain-fed cattle.

A related problem is that some processors require farmers to use poisoned bait if they are planting wildlife habitat, in order to control rodents, a practice abhorred by groups like the Hungry Owl Project. "Bait should never be used, as secondary poisoning of wildlife may occur," says the Hungry Owl Project's Maggie Rufo. Some growers think the controversy over "clean" farming will blow over, especially since buffers and hedgerows are needed to improve water quality. In Salinas, the Community Alliance with Family Farmers has no plans to stop growing habitat: they have over 40 hedgerow projects scheduled for the next two years.

In the meantime, the U.S. EPA has proposed making three of the nine rodenticides currently on the market available only to certified pesticide applicators, with the remaining rodenticides available over the counter in tamper-resistant bait stations. Rufo would like to see all rodenticides banned, however.

"Integrated pest management is the best option, including tolerance and attractants for beneficial predators such as hawks and owls."

### TAKING BACK THE SHORELINE

The North Richmond Shoreline Open Space Alliance has its own ideas for what they would like to see happen along the stretch of Bay between Point Pinole and the Richmond Potero (aka Potrero San Pablo)—but it isn't the condos, ports, or casinos proposed by developers and the city. At a January meeting, the NRSOSA group sponsored a meeting to present its ideas to the community, city officials, and

## POLITICS

### GREENBACKS FOR WATER WORRIES

As 2007 begins, water issues are in the spotlight again, with re-elected Governor Arnold Schwarzenegger offering up his plan for how to meet the state's water needs, and the controversy over how to clean up the San Luis Drain continuing to play out behind the scenes in Washington, D.C.

California voters were in a generous mood last November, approving $10 billion in bonds for levees and coastal cleanup. Measure 1E, which earned 64 percent of the vote, will provide $4.1 billion to shore up the Delta's levee system. That money comes not a moment too soon as engineers try to plug some 71 deeply eroded spots.

The $5.4 billion Proposition 84 bond gives the state roughly $800 million to repair levees. State officials estimate that restoring the Delta's levee system will cost as much as $14 billion. The rest of Prop 84 will go toward cleaning up the state's coastal and inland waters and protecting natural resources.

These bond measures were put on the ballot by Governor Schwarzenegger and the Legislature as part of their bipartisan work on environmental issues, which included a bill to cap greenhouse gas emissions. Now that Governor Schwarzenegger has taken the oath of office a second time, he's revealed another part of his environmental plan—how to make the most of California's thinly-stretched water supply.

One fact that has emerged from the state's studies on global warming is that the Sierra snow pack is getting smaller. That means that water supply systems that have always relied on snow melt flowing down our rivers in the summer will likely now depend on precipitation that falls as rain in the winter. The trick will be making adjustments to capture this water.

Against that backdrop, in his State of the State address, Governor Schwarzenegger called for another $4 billion to $5 billion to build two new dams, Temperance Flat Reservoir near Friant Dam and Sites Reservoir in Colusa County. That plan is certain to change the dynamic between the Republican Governor and the Democratic-controlled legislature. Last year, the Governor and the Legislature worked closely together on the greenhouse gas emissions bill, a move that was not received enthusiastically by legislative Republicans. The dam proposals give Republicans some ground on which to support the Governor. Potential roadblocks for the dams are the price tag and who—voters, water/irrigation boards, or some combination of the two—will pay for construction.

While storage and levees occupy Sacramento, farther to the south, the selenium disposal debate—what to do about the San Luis Drain—is heating up again. A January 18 story in the *San Francisco Chronicle* cited a federal government memo indicating that the U.S. Bureau of Reclamation is backing off of its recently announced preferred alternative for dealing with the selenium-laced wastewater in favor of a costlier plan.

Last year, BurRec issued a draft of the alternatives for disposing of the drainage that results from irrigating parts of the western San Joaquin Valley, including land that is part of the Westlands Water District. Westlands owns much of the land in this area—roughly 600,000 acres. Under the preferred alternative, BurRec would have paid farmers to permanently retire about 308,000 acres of farmland. This would not entirely eliminate selenium-laced waste, but it would take out of production most of the selenium-laden land. A system of evaporation ponds would still be needed to collect the water. The cost to build the ponds plus the compensation to the farmers is estimated at more than $300 million. It would cost another $900 million to retire the land.

According to the memo obtained by the *Chronicle,* BurRec currently supports an even more expensive plan—one that could cost between $2 billion and $3 billion over a 50-year period. This plan would build more evaporation ponds to capture the selenium wastewater, purchase reverse osmosis water-treatment technology to help remove selenium from the water, and would retire only 194,000 acres of cropland. In the meantime, BurRec has reported finding selenium-contaminated bird eggs from a grasslands area treatment project.

One major difference between the time the draft report on the San Luis Drain was first released and now: With the Democratic Congress in place, Congresswoman Grace Napolitano is set to chair the House Subcommittee on Water and Power. She is on record as having several differences with BurRec and has indicated that hearings on the San Luis Drain might be in the offing. BurRec is expected to announce its policy with respect to the San Luis Drain sometime this month. KC

# CLIMATE

## FISH FRET

Polar bears desperately seeking icebergs, songbirds nesting early, and butterflies migrating in odd seasons are the usual scenes associated with climate changes and wildlife. But in California, where climate change is predicted to have a big impact on rivers and streams, wildlife with fins could be just as—or more—affected than those with feathers and fur. Of particular concern are salmon and steelhead, since wild populations are already at risk. "The first thing to remember is that California is at the southern end of the range for all anadromous species," says UC Davis' Peter Moyle. "If the climate is getting warmer, suitable conditions will move farther north. So there will be more stress on the southernmost populations."

The catalog of climate change-related insults to fish includes the possibility of smaller streams drying up during droughts, more frequent "extreme" discharges in heavier storms, in which redds in some streams could be scoured and destroyed, changes in the timing of peak discharges (needed for smolt migration) and in sedimentation rates, warmer weather delaying spawning, and possible advantages to predators from warmer waters.

Salmonids move downstream when alien predators (such as largemouth bass) are least active, says Moyle. "But the window of time when they can avoid predators will become narrower if the water gets warmer. Most predators have relatively low metabolic rates when the water is cold. When it heats up they become more active."

Both Moyle and the Department of Fish and Game's Dennis McEwan are most concerned about Central Valley spring-run Chinook. "Their whole evolution is keyed toward coming up the rivers in the spring on high flows generated by snow melt. If that changes, they're going to find themselves in a world of hurt." Adds Moyle, "Temperatures are already at the upper end of the range for these fish in some tribs like Butte Creek. A degree or two could make that habitat largely unsuitable."

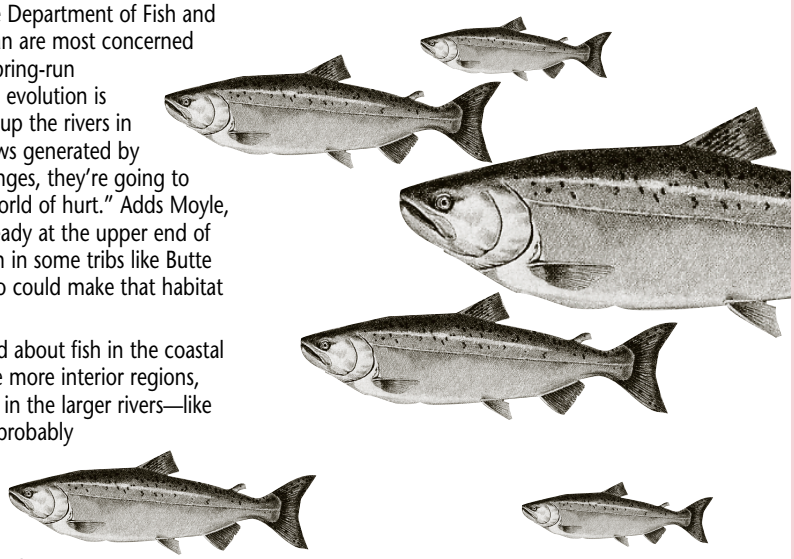
Moyle is less worried about fish in the coastal areas than those in the more interior regions, and he thinks that fish in the larger rivers—like the Sacramento—will probably do o.k. "It's a curious situation because now we have these dams, and the ability to release cold water in the summer. The Sacramento River is more hospitable to salmonids in the summer now than it was historically."

The greatest challenge will come in prolonged periods of dry years, says Moyle. "We need to think about how we're going to regulate flows from dams, how we're going to conserve cold water supplies from dams. Otherwise, we could really have a crunch and lose a lot of fish."

Moyle says that despite this generally gloomy picture, he remains optimistic about salmonids' future, even for spring-run Chinook in the San Joaquin River, where millions of dollars are about to be funneled into restoration. In fact, they may fare better than salmonids in more northern streams, he says. "The San Joaquin has the highest Sierra behind it. Even in some of the worst climate change scenarios, the snow level goes up, but it doesn't go away. The cold water source will stay there."

Moyle is also optimistic because we have the ability to manipulate flows from dams for fish—and because fish are so adaptable. "We've demonstrated that with hatcheries, you can change the timing of runs of salmon—the same thing could happen with even fairly rapid climate change, as long as lethal conditions don't develop." But McEwan points out that in the past, fish have adapted to changing conditions on a much slower, geological time scale. "The rate of climate change may be too fast. I don't think any species can deal with monumental changes within a century. Every facet of restoration ecology needs to be working on this one."

CONTACT:
Peter Moyle pbmoyle@ucdavis.edu;
Dennis McEwan dmcewan@hq.dfg.ca.gov LOV



## BULLETIN BOARD (CONTINUED)

consultants working on the city's General Plan. The group would like to see the city preserve the open space that exists, redesignate the current light industrial zoning to a shoreline protection zone, and move inconsistent uses along the shore inland to a new "parkfront economic and community opportunity zone." Save the Bay co-founder Sylvia McLaughlin urged the city to "think big," and make its shoreline part of the Eastshore State Park system. "Richmond's shoreline planning could be a model for other cities," said McLaughlin. "It is an economic and aesthetic asset to the region." Consultant Daniel Iacofano of Berkeley's MIG seemed to agree, citing the three quarters of a trillion dollars spent in the United States each year on outdoor recreation and ecotourism. "We can put the debate of the economy vs. the environment aside," he told the group. "Businesses are looking to locate where there is both quality of life and quality of the environment. The stage is set for doing that here."

### SNOW ON THE BAY

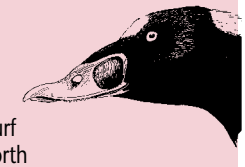
Like a harbinger of mid-January's freezing temperatures, a snowy owl was spotted in late December by a fisherman in Grizzly Bay. The rare visitor was on duck club property, not accessible by land; once word got out, boatloads of birders paid an enterprising captain to visit it. Snowy owls periodically drift south of their high Arctic breeding range, reacting to cyclical scarcities of lemmings. This year several snowy owls were reported in Washington State, but none between there and Solano County.

### RAILS RALLY

Early marsh restoration efforts are beginning to pay off for birds, says biologist Jules Evens. In the North Bay, clapper rails colonized Carl's Marsh at the Petaluma River mouth nine years after restoration and began appearing in Pond 2A (Napa-Sonoma Wildlife Unit) only a few years after the levee breach. At Sonoma Baylands, says Evens, there has been a dramatic shift from waterfowl use to shorebird use in the units restored to tidal influence, and clapper rails have been detected (though are not yet nesting there) about 10 years after restoration. Black rails have been detected at all three sites.

## BIRDWATCH

### SCOTER SCOOP



Sometimes the canary in the coal mine is a duck. The surf scoter, endemic to North America, nests in the Canadian and Alaskan boreal forest and winters in coastal waters. Awkward on land, it's an agile diver among breaking waves. The San Francisco Estuary hosts up to 78% of the surf scoters in the lower Pacific Flyway. Little studied until recently, this duck has declined since the late 1970s. Researchers from Baja California to British Columbia are scrambling to find out why.

U.S. Geological Survey's Susan De la Cruz and John Takekawa are completing a four-year study of surf scoters on wintering and breeding grounds and at migratory stopovers. In the 1980s, these ducks had the highest mercury and selenium concentrations of any waterfowl in the Estuary. For most of the winter, they feed primarily on mollusks, including the exotic overbite clam, which concentrates selenium at a rate triple that of other local clams. "It looks like mercury is lower than in the 1980s in scoters," says De la Cruz, citing preliminary results. But selenium concentrations remain elevated.

The USGS biologists used satellite telemetry to track scoters from San Francisco Bay to their breeding grounds in the Canadian Northwest Territories, between Great Slave Lake and Great Bear Lake. Grad student Matt Wilson flew to one nest site to sample freshly laid eggs, finding potentially problematic mercury concentrations.

De la Cruz sees general body condition as another key piece in the population trends puzzle. "Surf scoters arrive at their breeding grounds in late May and immediately initiate reproduction," says De la Cruz. "Otherwise they can't make it in that narrow time frame. If the condition of birds is being affected by contaminants or changes to the prey base, that has strong implications for reproduction."

One possible wild card: changes in the far North involving habitat loss or global warming. De la Cruz is trying to link habitat to nest site selection, looking for clues as to what may have changed over the last 20 years.

CONTACT: Susan De la Cruz, susan_wainwright@usgs.gov JE

### SKIMMY DIP, CONTINUED

claims is even less than the staff assigned to permits—the State Board has only 12 staff dedicated to enforcement. "And these staffers have other assignments unrelated to water right enforcement," she writes.

How does one police unauthorized diversions? Cal Fish & Game's Sarrow describes a labor-intensive process that includes aerial photography, water right records and database matching, and old-fashioned shoe leather detective work to see whether diversions are affecting fish in a watershed and whether the diverters have permits. "We're typically outgunned…we don't have the staff—regulatory, legal, or otherwise—to take on all the vineyards and other diverters," explains Sarrow.

**"We're typically outgunned . . . we don't have the staff . . . to take on all the vineyards and other diverters . . ."**

Not all is lost, however. Trout Unlimited and the Natural Heritage Institute filed a petition in 2004 calling on agencies like the State Board and Cal Fish & Game as well as Marin, Sonoma, Napa, Mendocino, and Humboldt Counties to improve the permitting and regulatory process for water diversions on central coast streams. The petition has called attention to the problems of permitting and enforcement.

One result of this spotlight has been the passage into law of AB 2121, which directs agencies like the State Board to develop binding standards for diversions from north coast streams. The bill faced opposition from agricultural interests, particularly the California Farm Bureau. Nonetheless, the bill passed in 2004 and Governor Arnold Schwarzenegger—who voiced strong support in advance of the legislature's vote—signed it into law.

Trout Unlimited's Johnson says the State Board, vintners, and other agencies and counties are talking and trying to work out an amiable solution to the permit glut. As a result of the petition, Johnson says the State Board and other agencies understand they have some kinks to work out to make obtaining a water right more efficient.

At the same time, Johnson says vintners appear amenable to moving the time of their diversions to the winter. Another key will be getting the vintners to build their small storage as off-river ponds instead of engaging in practices such as "spill and fill," where a crude dam is built simply by dumping dirt into a river and letting the water pool up behind it while excess spills over. These dams impede water and sediment flow as well as fish passage.

"A lot of them want to do the right thing, and if we can respond with a system to get them a permit in a reasonable time, then I don't think this is an insurmountable challenge," says Johnson.

Good faith notwithstanding, AB 2121 does not designate new funding for agency staff—including for much needed wardens.

Nonetheless, Hall is optimistic that he'll see some improvement in the Anderson Valley. "The [Water] Board understands that the system is broken, so AB 2121 is the best way we can get them to straighten out their act," says Hall.

CONTACT: Jeremy Sarrow (707)944-5573; Brian Johnson (510)528-4772; Steve Hall (707)895-2735 KC

# PLACES TO GO & THINGS TO DO

## WORKSHOPS & CONFERENCES

**FEB THURS-FRI 22-23**

**24TH ANNUAL EXECUTIVE BRIEFING**

TOPIC: Water Challenges–Opportunities for Action
LOCATION: Sacramento
SPONSOR: Water Education Foundation
(916)444-6240
www.watereducation.org

**MONTHLY ON TUESDAYS FEB-MARCH**

**CALIFORNIA COLLOQUIUM ON WATER**

LOCATION FOR ALL TALKS: U.C. Berkeley
SPONSOR FOR ALL TALKS: Water Resource Center Archives

**FEB TUES 13**

TOPIC: Steve Ritchie on the South Bay Salt Pond Restoration Project: The Wild Heart of Silicon Valley

**MARCH TUES 13**

TOPIC: B. Lynn Ingram on the Late Pleistocene to Holocene Evolution of the San Francisco Bay.

**APRIL TUESDAY 10**

TOPIC: Ellen Hanak on Envisioning Futures for the Sacramento-San Joaquin Delta
(510)642-2666
waterarc@library.berkeley.edu
http://lib.berkeley.edu/WRCA/ccow.html

**MARCH WEDS-SAT 7-10**

**25TH ANNUAL SALMONID RESTORATION CONFERENCE**

TOPIC: Workshops on dam and fish passage barriers removal; FERC relicensing, estuaries and lagoons; field tours; film festival.
LOCATION: Santa Rosa
SPONSOR: Salmon Restoration Federation
http://www.calsalmon.org/

**MARCH WEDS-FRI 7-9**

**MEXICAN DELTA TOUR**

TOPIC: Colorado River salinity, restoration efforts, estuary health of Upper Gulf of California, and Mexican water delivery systems.
LOCATION: Departs from Yuma, AZ
SPONSOR: Water Education Foundation
(916)444-6240; www.watereducation.org

**APRIL WEDNESDAY 11**

**S.F. BAY REGIONAL WATER BOARD GENERAL MEETING**

TOPIC: Consideration of permit for discharges into groundwater resulting from use of reverse osmosis.
LOCATION: Oakland
SPONSOR: State Water Control Bd.
Farhad Azimzadeh,
fasimzadeh@waterboards.ca.gov
(510)622-2310

## HANDS ON

**APRIL MON-FRI 9-13**

**WETLANDS COURSES**

TOPIC: Wetland Delineation
LOCATION: Romberg Tiburon Center
SPONSOR: S.F. State University
(Aimee Good); (415) 819-2073
wetlands@sfsu.edu
http://online.sfsu.edu/~wetlands/

**APRIL FRIDAY 20**

TOPIC: Ecology of invasive species in S.F. Bay marshes
LOCATION: Romberg Tiburon Center
SPONSOR S.F. State University
(Aimee Good); (415) 819-2073
wetlands@sfsu.edu
http://online.sfsu.edu/~wetlands/

## Celebration!

### FRIENDS OF SAUSAL CREEK TURNS 10!

**SATURDAY, MARCH 24**

**TOPIC:**
Help the Friends celebrate their 10th year; hear Malcolm Margolin, Heyday Books; Wendy Tokuda, watershed activist; silent auction

**LOCATION:**
Joaquin Miller Community Center, Oakland

**SPONSOR:**
Friends of Sausal Creek
(510)501-3672
coordinator@sausalcreek.org

## CALL FOR POSTER ABSTRACTS

for the 2007 State of the Estuary conference (October 16-18,2007) will be posted in March at http://wfep.abag.ca.gov/soe/

## NOW IN PRINT & ON LINE

*The Birds of Eastshore State Park.* December 2006. Checklist of birds found along the shoreline from Emeryville to Richmond. Golden Gate Audubon Society. (510) 843-2222 www.golden-gateaudubon.org

*The Reptile, Amphibian and Pesticides Database.* Californians for Alternatives to Toxics. December, 2006. http://www.alternatives2toxics.org/.

*Water Quality Assessment of the Condition of California Coastal Waters and Wadeable Streams* (Clean Water Act Section 305b Report). Surface Water Ambient Monitoring Program. California State Water Rsources Control Board. October, 2006. http://www.waterboards.ca.gov/swamp/docs/fact-sheets/305breport2006.pdf

## MARK YOUR CALENDAR NOW!

**CCMP UPDATE:**

**IMPLEMENTATION COMMITTEE MEETINGS**

**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

**FRIDAY, APRIL 6, 2007**

**9:30 A.M. TO 1:30 P.M.**

**TOPIC:** First presentation of Watershed/Land Use, Dredging & Waterway Modification groups; second presentation of the Aquatic Resources & Wildlife groups

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

**MARSH-MERCURY MINGLE,** CONTINUED

of the substance coming in on suspended sediments from Grizzly Bay during flood tide.

Stephenson is still sampling in Sycamore Slough for a follow-up report, but he already sees significant findings: "From the snapshots we have, we know a few of these places import methyl mercury. If we design a wetland area properly, we may be able to remove some of the methyl mercury from the Bay/Delta. Based on preliminary studies, Suisun Bay could take up as much as 20% of the methyl mercury going into San Francisco Bay from the Delta in the summertime, and you could have pretty big reductions." As for reaction from other scientists, Stephenson says, "People were excited about the fact that you might be able to design a wetland that would clean up the Estuary. It was a paradigm shift in everyone's thinking."

CONTACT: Mark Marvin-Di Pasquale, mmarvin@usgs.gov; Mark Stephenson, mstephenson@mlml.calstate.edu. JE

**Story ideas or scoops?**
**Send to lowensvi@earthlink.net**

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

**Estuary Web site at**
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**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

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