

NO CANAL - FOR NOW

To the relief of almost everyone, the California legislature adjourned in September without agreement on a package of bills aimed at “fixing” the state’s fragile and overstretched water system. The package, which was hammered out in secretive meetings among key lawmakers and major stakeholders as the deadline for action approached, included provisions that would have virtually assured approval of a so-called “peripheral canal,” or possibly a tunnel, to carry water around the Delta. Such a facility has been a flashpoint of California politics for decades, and the bills left its location and size undefined. “After standing on the sidelines on water for 30 years, the legislature decided to solve the problem in the last three weeks of the session,” said Bill Jennings of the California Sportfishing Alliance. “These bills were clearly not ready for prime time.” **CHT**

SNAILS DIG IN

Invasive New Zealand mudsnails have been discovered in a restored stretch of Baxter Creek in Richmond’s Booker T. Anderson Jr. Park near the Bay. Specimens of the tiny but prolific mollusk were collected late in April by Contra Costa Clean Water Program surveyors. Richmond’s Lynne Scarpa says the infestation appears to be new, because so few were obtained in the sample. The snails had previously turned up in West Antioch Creek and Alameda Creek in 2007. Reproducing parthenogenetically, they easily reach densities of 400,000 per square meter and displace other creek-bottom dwellers like midges, caddisflies, and mayflies that are important prey items for trout. Mudsnails can hitchhike to new bodies of water on waders, boots, and other fishing gear. The City of Richmond is working with the Department of Fish and Game to address the problem snail. **JE**

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ESTUARY

NEWS

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PAJAMA CONTAMINANT IN BAY MUD

Invisible hitch-hikers in house dust—chemicals designed to keep furniture, computers, TVs, and other modern-day life must-haves from burning rapidly in a fire—may be making their way into the Bay, according to new studies by the San Francisco Estuary Institute. SFEI’s Susan Klosterhaus found ‘chlorinated tris’ (tris(1,3-dichloro 2-propyl) phosphate or TDCPP), a flame retardant once added to children’s pajamas and now used to replace PBDEs, (some of which have been phased out in California), in biosolids from two wastewater treatment plants that discharge to the Bay as well as in Bay sediment samples. “Concentrations in sediments are in the low parts per billion range,” explains Klosterhaus, “similar to or higher than concentrations of BDE 209” [a flame retardant recently banned in the European Union and four states in the U.S.].

“... they are coming from dust—in houses, offices, anywhere the products are used, and where water is discharged to a treatment plant.”

Although no one is sure exactly how the compounds are getting into the Bay or treatment plants, which were not designed to remove them, Klosterhaus, co-author of a recently published paper in *Environmental Science and Technology* on flame retardants found in furniture foam and house dust, has a hunch. “We don’t know for sure but we’re speculating that they are coming from dust—in houses, offices, anywhere the products are used, and where water is discharged to a treatment plant. We know they are in house [and other] dust, and PBDEs have been found in laundry lint.” In studies performed in recent years, PBDEs were found in high concentrations in Bay harbor seal blubber, fish, mussels, clams, and birds’ eggs, and in human blood and breast milk in people from California and the Bay Area, prompting a phase-out of two PBDE mixtures.

While some flame retardants have been banned or are being phased out, chlorinated tris—the compound withdrawn from children’s pajamas in 1977 over concerns about its mutagenic properties—was increasingly used after PBDEs were banned. As furniture foam and other products wear and degrade, scientists hypothesize, tris makes its way into house dust. In the study reported in ES&T, Klosterhaus and others found concentrations of chlorinated tris similar to or higher than PBDEs in house dust; it was present in 96% of the study samples. These findings concern her. “PBDEs were banned in part due to their potential to cause development and reproductive effects in animals, including people. The use of chlorinated tris, which has been labeled a probable human carcinogen by the U.S. Consumer Product Safety Commission and the World Health Organization, demonstrates that chemical solutions are not always safer. I’m also concerned about the cumulative exposure to all of the chemicals detected in house dust—studies typically focus

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MINK VISIT BEAVER B&B



Photo by Cheryl Reynolds

The beaver dam on Alhambra Creek in downtown Martinez is becoming Grand Central Station for wildlife. In the past, muskrats,

river otters, and a single mink had joined the resident beaver family. Then on July 28, Worth a Dam founder Heidi Perryman and wildlife photographer Cheryl Reynolds spotted a whole mink family: an adult female and four kits. The mink were filmed cruising around in the pond and clambering into a muskrat burrow. An adult mink was also observed on August 1, the day of the second annual Beaver Festival.

These semi-aquatic members of the weasel family were most likely attracted by the muskrat population. Mink prey on juvenile muskrats; the larger adults are less vulnerable. Also on the menu: insects, crayfish, some fish (seldom trout or salmon), voles, and other small mammals, and sometimes birds and their eggs. Perryman thinks beavers, even young ones, would be too much for a mink to handle.

The presence of mink speaks well for the health of Alhambra Creek. According to Canadian wildlife biologist Serge Larivière, mink are extremely sensitive to environmental pollutants, and are often used as bioindicators for aquatic environments. As predators, they feed at a trophic level that puts them at risk for bioaccumulation of chemical compounds and heavy metals. Low concentrations of mercury and polychlorinated biphenyls have been shown to affect their health and reproductive potential.

Writer and wildlife-watcher Bob Arnebeck says the sighting isn't as unusual as it might seem: "Minks seem to like to raise their pups close to civilization." Although none have been observed since August 1, the place is still jumping. Just before press time, a female otter with two pups turned up at one of the beavers' dams.

CONTACT: Heidi Perryman: hdsrnrk@comcast.net. See www.martinezbeavers.com. JE

Wastewater

PESTICIDE PASS THROUGH

Pyrethroids—synthetic insecticides modeled on the pyrethrins that occur naturally in plants—were marketed as a safer replacement for hazardous organophosphates like diazinon and chlorpyrifos, highly toxic to birds, fish, and other wildlife. Recent research, though, documents risks from pyrethroids to aquatic invertebrates and fish. Data on pyrethroids in surface waters is limited; only a couple of studies have been done outside California.

UC Berkeley environmental toxicologist Donald P. Weston looked at the sources of pyrethroids entering Delta waters last year. His team sampled discharges from wastewater treatment plants in Sacramento, Stockton, and Vacaville, as well as the Sacramento,

"The biggest surprise was finding [pyrethroids] in municipal wastewater treatment plants."

San Joaquin, and American Rivers. They also examined urban stormwater runoff and agricultural drains. Toxicity was tested using the freshwater crustacean *Hyalella azteca*. Most pyrethroids paralyze or kill *Hyalella* at the low concentration of only two parts per trillion.

"We expected to find pyrethroids in stormwater runoff, and did—in every sample," says Weston, and far above acutely toxic concentrations. Only 25% of the agricultural samples contained pyrethroids, and those were infrequently toxic. "The biggest surprise was finding them in municipal wastewater treatment plants. People had just figured pyrethroids wouldn't make it through the plants."

All the water samples from the Sacramento plant were toxic to *Hyalella*. Pyrethroid concentrations in municipal wastewater were much lower than in stormwater runoff, but its high volume made the Sacramento plant the largest single discharge of pyrethroids to the Delta.

None of the Stockton samples were toxic, due, Weston suspects, to that plant's 30-day residence time for wastewater: "They have huge treatment ponds. Most treatment plants don't have that kind of space. The pyrethroids are probably degrading with bacterial action

or sunlight, or settling into sediment." The Sacramento plant, like most treatment plants, holds water for less than a day.

How do pyrethroids get into urban wastewater? Urban runoff could be one source. "Normally there are separate systems for stormwater and sanitary sewage," Weston says, "but in practice rainwater finds its way into the sanitary sewer system. Pipes leak, the ground gets saturated after rain, rainwater enters manholes. Water doesn't necessarily have to go down the drain to end up at the sewage treatment plant." Residents may also be disposing of the pesticides down the drain, giving pets a flea dip in the bathtub, treating children for head lice, or laundering pyrethroid-laced mosquito-repelling clothing.

Weston was also surprised to find pyrethroid toxicity in the American River,

considered relatively clean: "One sample from the American where it enters the Sacramento killed 80% of the *Hyalella*. After storm events, substantial lengths of the river for 20 to 30 miles would have pyrethroids at toxic levels. There's nothing but urban development in that whole stretch." Pyrethroid concentrations were highest in late February when flows are lowest. Tests fingered the pyrethroid bifenthrin as the culprit.

Bifenthrin is the pyrethroid most often found in the environment in toxic concentrations. Also one of the most toxic, it's heavily used in structural treatment for termites, ants, and other pests by professional pest controllers. Bifenthrin products are also available in stores.

According to Weston, there's not a lot the stormwater agencies can do about urban pyrethroid sources: "They didn't put the pesticides in there, and have little control except for public education efforts." A regulatory response began in 2006, with the California Department of Pesticide Regulation putting 600 commercial products containing pyrethroids into a reevaluation process that could lead to modified label instructions or outright bans on some substances.

CONTACT: dweston@berkeley.edu JE

BERKELEY'S LAGOON BLUES

Berkeley's Aquatic Park is an artifact, its three lagoons—from north to south: the Main Lagoon, Model Yacht Basin, and Radio Tower Pond—severed from San Francisco Bay by the I-80 freeway. It's also a magnet for birds, notably fish-eaters like egrets, herons, mergansers, grebes, cormorants, and terns. The park's lagoons receive stormwater from multiple sources en route to the Bay, including



Photo by Ron Sullivan

overflow from the Potter and Strawberry Creek storm drains.

A controversial city plan for the Park is entering a new phase with the preparation of an Environmental Impact Report; a draft version is expected later this year. City officials frame the Aquatic Park Improvement Plan (APIP), with anticipated Coastal Conservancy funding, as a long-overdue step to make the lagoons more hospitable to birds and more attractive to human users. Others see it as a backdoor attempt to divert more stormwater from the flood-prone streets of West Berkeley into the lagoons.

The lagoons are tenuously linked to the Bay by seven tide tubes beneath the freeway, most in disrepair. A report prepared by Laurel Marcus Associates and Hydrologic Systems Inc. blames poor tidal exchange for the Main Lagoon's high summer temperatures and low dissolved-oxygen levels, both unhealthy for fish. Water quality in the lagoons has been a concern since at least the early 1970s, and fish kills have occurred.

It's not clear who is responsible for maintaining and repairing the tubes. Caltrans' Glenn Behm told the *San Francisco Chronicle*

that the agency had handed the job over to Berkeley in 1991; Berkeley disagreed. Caltrans has not worked on the tubes since a fish-kill incident in 1997. Recent discussions over the collapsed tube between Radio Tower Pond and the Bay ended with Caltrans agreeing to fund a connection between the pond and the Potter overflow storm drain, as an alternative to replacing the tide tube.

Although tidewater from the bay flows upstream through the Potter and Strawberry overflow drains, little enters the lagoons. In addition to repairing the seven tubes between lagoons and Bay, Marcus's report recommended modifying storm drain overflow connections to allow more tidal exchange. A weir blocking tidal flows from the Strawberry drain into the Main Lagoon would be removed, and the opening from the Potter drain into the Model Yacht Basin would be enlarged. New gates at both connections

would be intended to restrict polluted water from "first flush" storms. The culvert between Main Lagoon and Model Yacht Basin would be replaced by a surface channel. Those changes, Marcus says, would improve circulation and reduce residence time of stormwater in the lagoons. To address runoff from other sources, the report suggested a bioswale on the east (upstream) side of the park and a biofiltration demonstration area elsewhere in the park's watershed.

The sticking point for critics like Mark Liolios of the Aquatic Park Environmental Greening, Restoration, and Education Team (EGRET) was the enlargement of the Strawberry and Potter overflow storm drains. Liolios contends the city already violates a 1970 SF Bay Regional Water Quality Control Board order prohibiting discharge of contaminated stormwater into the lagoons. He says APIP is "designed to serve the City as a flood control project by construction of four floodgates that allow the diversion of storm water into the Aquatic Park Lagoons." Liolios also argues that stormwater does more than introduce pollutants and trash; it can also cause sudden

NO FROST FOR FISH

Beyond pioneering the Fish Friendly Farming program in the North Bay's wine country (see "Good Grapes," August 2009 ESTUARY NEWS), California Land Stewardship Institute founder Laurel Marcus has taken on a new challenge. Last March, the Institute was awarded \$123,500 through the San Francisco Estuary Partnership's Estuary 2100 program to study ways of reducing stream diversions for frost control in vineyards, a practice that can jeopardize young salmonids.

Frost in early spring can severely damage the tender buds of grape vines, risking the loss of the whole crop. Air quality concerns prompted growers to shift from smudge pots and diesel heaters to using sprinklers to protect the new growth. The downside: "In some years you have a dry spring, and water use can conflict with the needs of fish," says Marcus. "In 2008 the Russian River area had the worst frost in 70 years and the driest spring on record—a perfect storm." At least twice, diversions for vineyard protection shrank the river's flow enough to strand coho and steelhead, leading the National Marine Fisheries Service to request a moratorium on using water for frost control in the entire Russian River basin.

Marcus is collaborating with Napa Valley growers to develop alternatives. Frost risks here vary with location: the Bay moderates temperatures in the Carneros area, while Calistoga is in a severe frost zone. Options on the table include pilot projects with low-volume sprinklers, potentially effective in lower-frost areas; and wind machines, which may work in creek bottoms and other hollows in rolling terrain. "We're looking at how growers are diverting and supplying water," she explains. "When there's a frost warning, they're out there in the middle of the night taking air temperatures. We're trying to quantify some of the decision-making process so you don't turn on the sprinklers too far ahead of time."

CONTACT: LaurelM@fishfriendlyfarming.org **RS**

\$ FOR SALT PONDS, SALMON, STORMWATER

Federal economic stimulus funds through the American Recovery and Reinvestment Act (ARRA) are finally reaching Bay Area projects, including two major habitat restoration efforts. But some local environmental nonprofits are frustrated with the funding process.

Channeled through the National Oceanic and Atmospheric Administration (NOAA), \$7.6 million is going to the South Bay Salt Pond Restoration project to open more ponds to tidal flow and remove invasive *Spartina*. Natalie Cosentino-Manning of NOAA's Restoration Center says work should start by mid-October. An additional \$8.5 million is slated for salt pond restoration at American Canyon via Ducks Unlimited. Other funds will cover California Conservation Corps restoration of coastal salmonid habitat.

ARRA's critics have resurrected the salt marsh harvest mouse canard, accusing NOAA of pre-selecting the salt pond projects to benefit the endangered rodent. Not so, says Cosentino-Manning: "We took an ecosystem approach. The mouse is not even our trust resource [i.e., not an oceanic or anadromous fish.]"

"ARRA funding seems to be going to government agencies at all levels that have projects already on file or to very big nongovernmental organizations," says Caitlin Cornwall of the Sonoma Ecology Center. That's an unfamiliar playing field for nonprofits. In addition, she says environmental groups "are operating in an information vacuum. The fact that it's all new leads to wasted time, inefficiency, and miscommunication. The funding landscape is shifting all the time."

For the next round, Cornwall says nonprofits might do well to partner up with local governments. The Estuary Partnership and Association of Bay Area Governments are receiving \$5 million in ARRA funding through the State Water Resources Control Board to partner with cities to install trash capture devices in storm drain inlets, one step in tackling the Estuary's trash epidemic, as well as \$392,000 to partner with the East Bay city of El Cerrito on two stormwater rain gardens along San Pablo Avenue.

CONTACT: caitlin@sonomaecologycenter.org; Natalie.C-Manning@noaa.gov.; jakelly@waterboards.ca.gov **RS**

SAVING TWO BIRDS WITH ONE RIVER

If what some call the state's "biggest and best" river, the Sacramento, were allowed to do more of what rivers want and need to do—meander, erode, and deposit sediment—two troubled California birds could possibly make a comeback.

The Sacramento River is home to more than 70% of the state's nesting population of bank swallows and 50% of the state's yellow billed cuckoo population. The 100 miles of river between Red Bluff and Colusa known as the "meander belt" (or middle Sacramento River) contain the most important habitat for bank swallows in the state, says U.S. Fish & Wildlife's Joe Silveira. That same area is critical for the cuckoo. But about 50% of this meandering reach has been riprapped, and new riprap—for levee repairs—is a constant threat. Meanwhile, Shasta Dam has reduced the river's ability to do "work"—erode and deposit.

While several species of songbirds are benefiting from riparian habitat restoration projects on agricultural land along the river, bank swallows, listed by the state as threatened, and yellow-billed cuckoos, state-listed as endangered, need help from the river itself. The bank swallow, an aerial acrobat and superior pest controller (it eats thousands of insects every day), needs soft, eroding banks in which to dig its burrows. Artificial burrows built by the Army Corps as mitigation for riprapping one of the swallows' prime nesting sites failed, says Silveira. "You can mitigate for a lot of species, but you can't mitigate habitat loss for the bank swallow," he says. The swallows used the artificial burrows, but they were too easily accessed by pests and predators, and the banks eventually failed, says Silveira. When natural river banks are allowed to erode, the river continuously recreates fresh habitat for swallow colonies, discouraging pests and predators. "The swallow is an indicator species for the health of the river. If you allow the river to move, you're going to have a self-sustaining ecosystem."

At the same time, the yellow-billed cuckoo, a highly secretive bird that eats lots of large bugs, needs the river to be able to deposit sediment, on point bars and oxbow lakes, where cottonwoods, habitat for its favorite prey, the sphinx moth larvae, can regenerate naturally. Says UC Davis's Steve Greco, "The cuckoo is as dependent on river processes as the bank swallow." Greco



Bank swallow by Peter La Tourette

explains that cottonwoods regenerate extensively after large flood events on the river. "If we were to have proceeded as was proposed



Yellow-billed cuckoo by Peter La Tourette

back in the '80s—to riprap all bends on the river—we'd arrest those processes and there would be little recruitment; the trees that exist would time out and die and we'd end up with very few in the future." Greco likens erosion of river bends to the old "Smokey the Bear" way of thinking about forest fires—that it is always bad. "We've been taught that erosion is bad, but erosion is incredibly important to river processes; you wouldn't have point bars, oxbow lakes, and the plants and animals that respond to those types of forests without it. Erosion is only bad when it's man-made."

To help the cuckoo, cottonwood patches could be planted along the river—as has been done successfully at Phelan Island. The river could also be "operated"—with releases from Shasta Dam—in a way that encourages cottonwoods to regenerate on their own and restores a more natural hydro-

DIPPING, DIVING, AND HIDING



In 1990, The Nature Conservancy purchased 630 acres of eroding, flood-prone prune orchards near Gerber to help Fish & Wildlife establish the Flynn Unit of the Sacramento National Wildlife Refuge. The river was allowed to flood its 100-year floodplain again, which was replanted using cuttings of native riparian plants, seedlings, and acorns. In 1995, TNC bought another 590 acres of eroding and flood-prone prune, almond, and walnut orchards, helping Fish & Wildlife establish the Pine Creek Unit of the refuge; it, too, was restored, to mixed riparian forest, elderberry savanna, and 140 acres of native grasslands. While the riparian vegetation boosted numbers of resident and migrant songbirds and the endangered valley elderberry longhorn beetle, Fish & Wildlife's Joe Silveira says the grasslands have been an unexpected boon to Sacramento River bank swallows. The grasslands are a bug-filled smorgasbord for the swallows, says Silveira. "You can see them foraging over the river and above the floodplain over the grassland." A graduate student at CSU Chico, Dawn Garcia, analyzed 10 years of bank swallow survey data on colony sizes and locations between Red Bluff and Colusa, and found that colonies were more persistent when riparian vegetation was present (than with agriculture alone), but that they were even more successful when grasslands and herbaceous vegetation were present as well.

Meanwhile, the secretive cuckoo loves to lurk in the canopy. On the Rio Vista Unit of the refuge, 1,200 acres of former almond orchard restored to dense, mixed riparian forest—willows and groves of cottonwoods—have become "cuckoo central," says Silveira. **LOV**



salmon." Silveira saw salmon spawning on the floodplain when levees were being taken out during restoration work. "You could see their dorsal fins rising out of the water."

"You need both sides of the river for the river to be able to truly function," says

"What we're advocating is a systematic inventory and justification for all of the rock that's out there presently."

Greco. One huge stakeholder effort that had been working for years on both sides of the river—the Sacramento River Conservation Area Forum—has been shut down due to the state bond freeze, even though the "vision is still there," according to the Forum's coordinator, Beverly Anderson-Abbs. "Our ultimate goal was to get restoration along the river on both sides, by working with landowners along the river, as well as local government agencies,

trying to create partnerships to get restoration done and to ensure that levee repairs avoided prime swallow habitat." After a Department of Water Resources levee repair project wiped out one of the biggest swallow colonies in 2007, a bank swallow working group was

formed—that group, which has some 40 members, including DWR and the Army Corps, still meets, says Anderson-Abbs. "That [colony wipeout] pushed people to the point where we needed to do something. The money for levee repairs is still flying in; we want to make sure we don't lose any more colonies."

Greco suggests that all rippapped sites on the river's banks between Red Bluff and

Colusa be reassessed. "What we're advocating is a systematic inventory and justification for all of the rock that's out there presently—that's never been done," says Greco. "At least half of what's out there has no justification." Greco adds that some bridges and structures—even though they were placed in less-than-ideal locations along the river—must be protected.

For now, discussions about where and when rock could be removed—and river processes restored—are continuing, say Greco and Silveira. Yet with or without human help, the river might have the last laugh. As the climate changes and storm events become more frequent and/or intense, says Silveira, "I don't think rock's going to do it anymore."

CONTACT: banderso@water.ca.gov; segreco@ucdavis.edu; Joe_Silveira@fws.gov
LOV

ESTROGEN EVERYWHERE

Since 2002, massive fish kills in the Potomac and Shenandoah Rivers, mainly involving smallmouth bass, have puzzled biologists. The fish had lesions on their bodies caused by fungi, bacteria, or parasites, as if their immune systems had been compromised. Male bass had immature egg cells in their testes.

US Geological Survey researcher Laura Robertson and her colleagues suggest that estrogen-mimicking chemicals might be a connection among the die-offs, lesions, and intersex fish. One clue is a hormone called hepcidin, found in all vertebrates. Human hepcidin regulates iron levels in the body. Smallmouth and largemouth bass have two hepcidins. "Hep-2 is expressed at a much higher level in fish that are exposed to bacteria," Robertson says. "They ramp it up."

As recently reported in *Fish & Shellfish Immunology*, Robertson's group found that both largemouth bass hepcidins were affected by the natural estrogen 17-beta estradiol. The function of hep-1 in fish is uncertain; however, exposure to estrogen reduces its expression in largemouth bass. Exposure to estrogen blocks the increase in hep-2 expression that normally follows exposure to bacteria. That could leave the fish vulnerable to opportunistic infections. Estrogen is also known to cause intersex characteristics in fish.

Robertson is now looking at how suspected endocrine-disrupting chemicals affect hepcidin expression. "There are so many chemicals that have estrogenic effects, coming from all sorts of places," she says. "Maybe it's agriculture, maybe it's wastewater treatment plants." Possible culprits include the herbicide atrazine, and nonylphenol, the degradation product of a surfactant used in pesticides, cosmetics, and detergents.

"There's ongoing work trying to relate the fish kills to land usage," Robertson adds. So far nothing has tied the die-offs to specific discharge sources. However, USGS colleague Vicki Blazer found that smallmouth bass from sites with the highest human population density and the most farming had the highest incidences of intersex.

CONTACT: lrobertson@usgs.gov. **JE**

BERKELEY'S LAGOON BLUES (CONTINUED FROM PAGE 3)

salinity decreases that kill saltwater-adapted fish and marine invertebrates.

Other environmental groups—Golden Gate Audubon Society, Citizens for East Shore Parks, the Sierra Club—have expressed reservations about the plan. "These groups have raised valid concerns about unintended consequences," says the S.F. Bay Regional Water Quality Control Board's Brian Wines. "The tricky thing is going to be coming up with a way of monitoring how this is affecting water quality." Wines points to stratification of fresh and salt water as a potential problem that would block transportation of oxygen to lower levels of the lagoons.

Berkeley's Deborah Chernin denies that APIP is about stormwater. "The Coastal Conservancy could not fund it if it was a

"You'll never solve the lagoon without thinking like a watershed—retrofitting the human landscape upstream."

stormwater project," she says. "Yes, there is a relationship between the project and the stormwater infrastructure. But all along the goal was not to increase stormwater discharge into the lagoon."

Chernin also minimizes the significance of the Water Board order, which she says was aimed at Cutter Labs and four other industrial polluters that were discharging waste into the lagoons, rather than non-point-source stormwater pollution. Wines says the order also addressed stormwater runoff. Both agree that the 1970 order will be superseded by a new Board order.

When the Parks and Recreation Commission considered the consultant's report last year, member Lisa Stephens proposed a significant change: eliminating stormwater currently entering the lagoons from the Potter and Strawberry drains. The Commission recommended that version. City staff countered in a report to the City Council: "Staff agrees that eliminating all stormwater... would be an ideal solution, but believes it is not a feasible option because it would result in more flooding than already occurs in West Berkeley neighborhoods." So the EIR will consider both the no-additional-stormwater and no-stormwater scenarios, the latter in terms of flood risks.

Last year, the Parks department explored the idea of a \$15 million distributed stormwater biofiltration network between Aquatic Park and San Pablo Avenue several blocks

upstream, to be funded by Caltrans, with bioswales, stormwater planter boxes, and tree wells along streets and sidewalks and in parking lots. If implemented, this would have reduced both the volume of water and the pollutant load entering the lagoons. But the proposal never got beyond the draft stage and was eventually dropped because Water Board staff told the city the proposed costs exceeded what Caltrans would be willing to fund. An alternative plan under review by the Berkeley Public Works department would not directly affect Aquatic Park. In any case, Chernin says the pending EIR will not consider biofiltration outside the park.

Watershed expert Brock Dolman of the Occidental Arts and Ecology Center finds this disconnect puzzling. "You'll never solve the

lagoon without thinking like a watershed—retrofitting the human landscape upstream," he says. That would involve the kind of low-impact development ("green stormwater") measures pioneered in Seattle and Portland, and finally taking off in the Bay Area (see August 2009 ESTUARY NEWS, "Slow It, Spread It, Sink It") that treat stormwater before it enters the lagoons or the Bay. Such an approach could address both water quality and quantity; to Dolman, "flooding is an indicator of bad watershed management."

Along with the CEQA process, says Wines, any modification of the storm drain outlet structures would require Water Board and US Army Corps of Engineers permits. But in the end, California's budget crisis might be the decider. The Coastal Conservancy's Tom Gandesbery points out that the Conservancy's board has not yet approved a grant—although the project got a favorable review from Conservancy staff—and the money may just not be there. Gandesbery says the early discussions took place "when the Conservancy and other state agencies were relatively flush with bond funds. Any future grant is awaiting both completion of CEQA and renewed bond sales by the state that will allow the Conservancy to resume grant making."

CONTACT: DChernin@ci.berkeley.ca.us; tgandesbery@scc.ca.gov; markl@lmi.net; laurel@laurelmarcusassociates.com; bwines@waterboards.ca.gov **RS/JE**



Conferences, Workshops, Exhibits & Tours

**OCTOBER 6
TUESDAY**

REGIONAL MONITORING PROGRAM ANNUAL MEETING

TOPIC: Recent findings on suspended sediment in San Francisco Bay
LOCATION: Scottish Rite Center, Oakland
SPONSOR: San Francisco Estuary Institute
www.sfei.org/rmp/annualmeeting

**OCTOBER 7
WEDNESDAY**

UNPAVED ROAD WORKSHOP

TOPIC: Unpaved road design and maintenance
LOCATION: Rush Ranch Nature Center, Suisun City
SPONSOR: San Francisco Bay National Estuarine Research Reserve and Solano Land Trust
www.sfbaynerr.org/training; sue@solanolandtrust.org

**OCTOBER 7-9
WEDNESDAY-FRIDAY**

NORTHERN CALIFORNIA RIVER TOUR

TOPIC: Dams, restoration sites, farms, fish hatcheries
LOCATION: Tour begins and ends at Sacramento Airport
SPONSOR: Water Education Foundation
www.watereducation.org/doc.asp?id=1070

**OCTOBER 8
THURSDAY**

TWAIN'S FROG AND THE MOST BEAUTIFUL SERPENT

TOPIC: Brent Plater on endangered species of Sharp Park
LOCATION: Randall Museum, San Francisco
SPONSOR: San Francisco Naturalist Society
www.restoresharpark.org; JKodiak@earthlink.net

**OCTOBER 10-11
SATURDAY-SUNDAY**

NATURALIST TRAINING PROGRAM

TOPIC: Coho salmon natural history and Creekwalk leadership skills
LOCATION: Tocaloma, Marin County
SPONSOR: Salmon Protection and Watershed Network (SPAWN)
www.spawnusa.org/upcomingevents/number-79; (415)663-8590 X 102

**OCTOBER 14
WEDNESDAY**

CALIFORNIA COLLOQUIUM ON WATER

TOPIC: Lecture by Major General Donald Riley, US Army Corps of Engineers
LOCATION: 112 Wurster Hall, UC Berkeley
SPONSOR: Water Resources Center Archives
www.lib.berkeley.edu/WRCA/ccow.html

**OCTOBER 14
WEDNESDAY**

OYSTERS ON THE HALF SHELL HAPPY HOUR

TOPIC: Benefit for subtidal restoration
LOCATION: Craneway Pavilion, Richmond
SPONSOR: The Watershed Project
linda@thewatershedproject.org

**NOVEMBER 5-6
THURSDAY-FRIDAY**

8TH ANNUAL CALIFORNIA WATER LAW CONFERENCE

TOPIC: Delta, Drought, Desalination
LOCATION: La Quinta Resort, Palm Springs
SPONSOR: Continuing Legal Education International
www.cle.com/palmsprings



Hands On

**OCTOBER 17
SATURDAY**

WETLAND RESTORATION IN PALO ALTO

TOPIC: Shoreline cleanup, transplanting native plant seedlings
LOCATION: San Francisquito Creek, Palo Alto
SPONSOR: Save the Bay
www.savesfbay.org

**OCTOBER 31
SATURDAY**

HALLOWEEDING

TOPIC: Non-native plant removal
LOCATION: Martin Luther King Jr. Regional Shoreline, Oakland
SPONSOR: Save the Bay
www.savesfbay.org

2009 California Climate Adaptation Strategy Discussion Draft, July 2009. www.climatechange.ca.gov/adaptation

A Clear Blue Future: How Greening California Cities Can Address Water Resources and Climate Challenges in the 21st Century. Natural Resources Defense Council, August 2009. www.nrdc.org/water/ld

Association of Bay Area Governments Water Web Page: www.abag.ca.gov/water

Bats of San Francisco: blog by bat researcher Jennifer Krauel. bat-time.blogspot.com/2009/08/bats-of-san-francisco-answers.html

Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions. Urban Land Institute, July 2009. www.uli.org/ResearchAndPublications.aspx

San Francisco Estuary and Watershed Science, Volume 7, Number 1: research on fish biology, hydrology, and restoration ecology. repositories.cdlib.org/jmie/sfews

Sustaining California Agriculture in an Uncertain Future. Pacific Institute, July 2009. www.pacinst.org/reports/california_agriculture

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Editorial Office

PO Box 791
Oakland, CA 94604
lowensvi@sbcbglobal.net

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To subscribe or ask questions

(510) 622-2499

Staff

Managing Editor Lisa Owens Viani
Associate Editor Joe Eaton
Contributing Writers Cariad Hayes Thronson
Ron Sullivan
Design Bobbi Sloan

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PAJAMA CONTAMINANT IN BAY MUD (CONTINUED FROM PAGE 1)

on the effects of exposure to one compound. What about potential synergistic or additive effects?" Until now, she explains, concerns about and research into human and wildlife exposure to flame retardants focused specifically on PBDEs because they were used in the highest volume to meet California's furniture flammability standards. "When they were phased out, because we still have the furniture foam flammability standard, other chemicals had to take their place," says Klosterhaus. At that point, she and others began investigating the replacements (see "Couch CSI," ESTUARY NEWS, August 2008).

The presence of chlorinated tris in the Bay and biosolids from treatment plants demonstrates how ubiquitous this compound is in the environment, says Klosterhaus. It has also been found in house dust in Japan, air and biosolids in Europe, and wastewater

treatment plant effluent in other areas of the United States and in Europe. While she is not claiming that the sky is falling, Klosterhaus is concerned and wants to know more. "We don't have enough science. We need more information on the potential toxicity and fate of chlorinated tris in both indoor and outdoor environments. Results from our study suggest that people—and particularly children—may be exposed to high concentrations of this chemical in house dust. Because chlorinated tris has also been detected in Bay sediments, information on the potential implications of wildlife exposure to low ppb concentrations of these chemicals is needed." She finds some irony in the fact that while we may be trying to protect ourselves from fire, "we are adding all of these potentially harmful chemicals into our environment. We took chlorinated tris out of children's pajamas

because of health concerns; now we're being exposed to it on a daily basis as a result of its use in our furniture."

When informed about SFEI's Bay sediment studies, Joel Tenney of ICL Industrial Products, which manufactures chlorinated tris, responded by citing European Union risk assessment studies that he says show that "very low levels found in the environment... do not present any risk." But Tenney adds that ICL Industrial Products finds the new research into chlorinated tris transfer and exposure pathways in the home to be "interesting subject matter." Says Tenney, "Gaining a more complete understanding of the issues will help manufacturers, suppliers, and regulators get a better sense of how to balance of the issues of risk versus hazard."

CONTACT: susan@sfei.org; tenneyj@ameribrom.icl-ip.com **LOV**