

POND PRICE QUESTIONS PERSIST

The dispute over the value of Cargill Salt's former South Bay properties has been simmering since 2003, when the company sold 16,500 acres of industrial salt ponds to the state and federal governments for wetlands restoration. Cargill had been paid \$100 million for the land but claimed a value of \$232 million, and had been seeking a tax deduction for the difference as a charitable donation. Last November the Internal Revenue Service gave the company most of what it wanted, approving a \$100 million deduction.

Restoration activists and advocates for a larger Don Edwards San Francisco Bay National Wildlife Refuge expressed disappointment. "I was appalled," says Florence LaRiviere, co-founder of the Citizens Committee to Complete the Refuge. "Our goal is to restore all of the wetlands that haven't been developed, and these appraisals make it very difficult."

Save The Bay's David Lewis says he doesn't "see implications for future restoration efforts." But he reiterated his group's position that the appraisal of the Cargill properties was flawed and should not have been used as a basis for estimating their value.

"I don't know if the IRS took into account that the appraisers had been fined and had their licenses suspended," says LaRiviere. The appraisers, Charles Bailey of Mill Valley and Paul Talmage of San Mateo, were hired by the US Fish and Wildlife Service when Cargill first proposed the sale. They concluded the properties were worth \$243 million; Cargill knocked off \$11 million when a lead-shot-contaminated parcel was excluded from the initial sale. State officials did not release the appraisal to the public until the sale was a done deal, and only in redacted form. "One basic difficulty is the secrecy of these sales," LaRiviere adds.

The appraisal rested on several assumptions that have been called into

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ESTUARY NEWS

Bay-Delta News and Views from the San Francisco Estuary Partnership | Volume 19, No.2 | April 2010

TRESTLE TROUBLE

It isn't hard to imagine rail passengers along the Bay shoreline holding their breath as the heavy trains blast across the dozens of creeks that flow into the Bay: many of the crossings are ancient-looking wooden trestles, occasionally charred from being set on fire by vandals. But beyond scaring a few passengers, these remnants of the late 1800s/early 1900s—and even some of the newer,



The waters of Pinole Creek rise beneath this new railroad trestle during a January storm and five-foot tide. The storm was probably only a "two-year" event. Photo courtesy of Carol Arnold, Friends of Pinole Creek.

concrete trestles—are creating headaches for restorationists, planners, and flood control districts.

Railroad trestles and culverts old and new are undersized for today's increased urban runoff, especially during heavy storms (predicted to increase as the climate changes), causing floods and in some cases, preventing restoration. Says Contra Costa County Public Works Deputy Director Mitch Avalon, "Virtually every trestle that crosses a creek that has any development in the watershed is inadequate. I don't know what sizing they used when building them, but my guess is that they sized them to match the creek cross-section at the time. It's obvious they didn't look beyond the creek channel and take the floodplain into account. In an undeveloped watershed that old creek channel might only carry a two-year storm, and now, as the watershed has developed, we have flooding. I think the problem is pretty widespread around the Bay."

Efforts to restore urban streams and wetlands are being thwarted by railroad trestles, culverts, piers, and berms that act as hydraulic constrictions, causing water to back up behind them, creating localized flooding, and in some cases, preventing the ability of marshes to transgress (move landward). Usually the creek or river gets blamed for flooding. Stream restoration includes replanting riparian vegetation along creek banks. But that can increase the "roughness coefficient," and when a trestle is already constricting flows, the vegetation becomes an easier target, and flood control districts or the US Army Corps of Engineers may insist that the banks remain bare—or worse yet, cover them with concrete.

On Wildcat Creek in North Richmond, concrete flood control channels were put in in 1985-1986 to provide 100-year flood protection, says Contra Costa Flood Control and Water Conservation District's Tim Jensen, in part because of flooding caused by Union Pacific and Burlington Northern railroad

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POND PRICE QUESTIONS PERSIST

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question. One was that the Cargill salt ponds were worth \$20,000 an acre as mitigation for the San Francisco International Airport's proposed runway expansion. However, that project was dead by the time the sale took place.

In 2006, Bailey was accused by then Attorney General Bill Lockyer of 24 violations of professional standards in connection with the appraisal, including failure to evaluate comparable land sales, support revenue projections for the property, and explain the costs and risks of wetland restoration. The appraiser settled for a suspension of his license and a \$4,000 fine. Talmage disputed similar charges; an administrative law judge placed him on three years' probation and ordered him to repay the \$36,500 his investigation had cost. That decision was reversed by a superior court on procedural grounds, and the state Office of Real Estate Appraisers settled with Talmage for the \$12,000 already paid and restored his license.

Valuation aside, the Cargill properties that changed hands in 2003 may not have been the best prospects for restoration. "Cargill kept the parts that are really restorable and shallow," LaRiviere says. In a 2002 feasibility analysis of South Bay salt pond restoration, Stewart Siegel and Philip Bachand concluded: "Cargill is selling the public the most costly ponds to manage and restore, especially the deeply subsided Alviso ponds, and retaining the most easily restored ponds."

Cargill spokesperson Lori Johnson told *San Jose Mercury News* reporter Paul Rogers that the decision "reconfirm[ed] that the agencies that were involved in this played it straight. The property was worth well over the amount of taxpayer money that went into it." Johnson did not respond to ESTUARY NEWS' request for comment.

For her part, Florence LaRiviere is undaunted. "We are devoted to acquiring every single restorable acre that's left. We'll never give up—but it makes it so hard when the valuation is unreasonably high."

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TRESTLE TROUBLE (CONTINUED FROM PAGE 1)

trestles. "What's happening whether the flood control channel is there or not is that the 100-year floodplain is blocked by the railroad tracks. You can look at FEMA's floodplain maps and see a big pool of water upstream anywhere where the tracks cross the creek.



High flows on the old Union Pacific wooden trestle over Pinole Creek during a December 2005 storm. Photo courtesy Carol Arnold, Friends of Pinole Creek.

You see the same thing on San Pablo Creek, Rheem Creek, Pinole, Refugio, and Rodeo Creeks heading north around the edge of the Bay." And moving eastward, as the tracks trail along the banks of the Carquinez Strait, there are hydraulic constrictions at Bay Point, West and East Antioch Creeks, and Walnut Creek, according to Jensen. "The water backs up and floods an impoverished community west of Pittsburg and the communities in Antioch and Walnut Creek. When debris collects on the trestle pilings, and a big storm comes in and deposits more, a kind of dam gets created, which makes the problem even worse." With a predicted rise in sea level of 1.0-1.4 meters by 2100, flooding caused by too narrow or too low trestles and undersized culverts could become even more common.

On Pinole Creek, efforts have been underway for years to make the lower part of the creek that enters the Bay in an Army Corps flood control channel more accessible to steelhead. The Pinole Creek Watershed Council, regulators, and restoration designers urged Union Pacific to put in a bridge that would span the creek entirely and take into account the state-funded restoration plan that was in the works. Union Pacific instead

came in on a weekend with an unusual approval from the Coast Guard, circumventing the normal regulatory process, and dropped in a new concrete bridge that is almost a foot lower than the original trestle, according to the Restoration Design Group's Drew Goetting. Heavy flows coming down the creek head straight toward the new bridge, and the



flood control district now plans to put in flood walls to try to contain the backwater caused by the new bridge and another bridge nearby.

On Wildcat Creek, too, the railroads have performed emergency repairs on weekends, circumventing the usual permit process and the watershed planning process that has been in place for 20 years, says Jensen. In fact, says the San Francisco Bay Regional Water Quality Control Board's Ann Riley, the trestle-caused hydraulic constrictions on Wildcat, San Pablo, Pinole, and Alhambra Creeks may have been the true reason flood control projects on all of those waterways were ultimately deemed necessary. Says Riley, "Railroad trestles essentially became the equivalent of the full employment act for Army Corps flood control projects around the Bay because communities needed help with floodwaters backing up behind trestles or jumping the banks around them."

On Codornices Creek, at the boundary between Albany and Berkeley, the Union Pacific railroad tracks crossed the creek on an old wooden trestle that allowed passage of only about 100 cfs, says Roger Leventhal, even

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RIPARIAN VEGETATION AT RISK?

It's déjà vu for California's resource agencies. In proposing new regulations for variances to its strict policies on levee vegetation, the US Army Corps of Engineers has reopened a dispute many thought had been put to rest three years ago. (See "Debunking Levee Lore," ESTUARY NEWS, October 2007.) The survival of a significant portion of the state's riparian habitat—already only a fraction of what it once was—may be at stake.

Early in 2007, the Corps confronted local flood control districts with the choice of complying with national standards that required removing trees and most other woody vegetation from levees or losing federal funding to rebuild after floods. This included trees that federal and state resource agencies had planted to mitigate for loss of riparian habitat. "The reaction from the state was immediate and dramatic," recalls Ann Riley of the San Francisco Bay Regional Water Quality Control Board. Critics pointed out that there was no scientific data showing that trees compromise levee safety. The Corps appeared to step back; at a symposium that August, Sacramento District commander Colonel Tom Chapman promised a new and more flexible policy that would be "in alliance with all the science."

In the wake of that conference, a newly formed California Levees Roundtable launched a California Levee Vegetation Research Program to complement the Corps' own studies. Scientists from UC Berkeley, UC Davis, and the University of Georgia signed on to investigate whether, as

Corps engineers have claimed, tree roots can create pathways for water that lead to internal erosion and structural failure. Research began on the Sacramento River last fall and expanded to San Joaquin, Yuba, Bear and Feather rivers, and the Sutter Bypass this winter.

Last April the Corps issued Engineer Technical Letter 1110-2-571, essentially restating the guidelines in its 2007 White Paper. This February the new regulations were published in the Federal Register for a 30-day comment period (subsequently extended to April 25.) If finalized, the regulations would require flood control districts and other entities to seek variances for any departure from national standards, and to establish that the variance was "necessary to preserve, protect, and enhance natural resources and/or protect the rights of Native Americans." The regulations were accompanied by a Finding of No Significant Impact (FONSI).

The Corps' decisions on variance requests could not be appealed. Even if a variance was approved, the language makes it clear that no woody vegetation would be allowed on the upper third of the river side of a levee, any portion of the land side, or within 15 feet of the land-side toe. "That leaves a tiny little cross section where they may allow vegetation," says Riley. "The variance doesn't get you much."

Most state and local agencies that would be affected are still in the process of responding to the Corps' proposal. "The Sacramento Area Flood Control Agency (SAFCA) views this as a substantial policy shift on the part of the Corps," says SAFCA's Stein Buer. "The proposed policy... would, if implemented, have

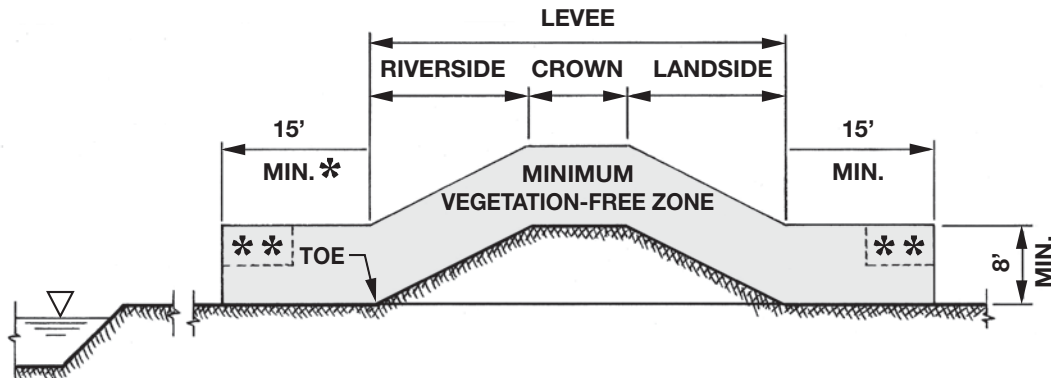
the effect of requiring the massive removal of trees along California stream banks and levees which have been allowed to remain up to this point in an effort to balance environmental and public safety mandates."

Responding for the San Francisco Bay Regional Water Quality Control Board, Will Bruhns said the Corps' vegetation management guidelines were "on a direct collision course with the State's Porter-Cologne Water Quality Act" and with a 30-year history of self-mitigating flood control projects negotiated by California regulatory agencies. Bruhns also wrote that the FONSI "will not be able to withstand a challenge because of the level of public controversy, area scale, and severity of environmental impacts."

Mitch Avalon of the Contra Costa County Flood Control and Water Conservation District wrote the Corps that his district "does not have the resources to fund the requirements" of the new policy and "should not be put in a position, through no fault of its own, where it faces financial crisis..."

Riley suggests that any Corps mandates should wait until the results of the levee vegetation studies are in: "There's a huge interagency collaborative effort to research issues like piping, wind throw, and burrowing rodents. Don't we want to see the results of that? It's time to have policy based on science rather than what many of us consider to be engineering folklore."

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* 15' OR DISTANCE TO EDGE OF NORMAL WATER SURFACE, IF LESS

** IN THIS 4' X 7' TRANSITION ZONE, TEMPORARY OBSTRUCTION BY LIMBS AND CROWN IS ALLOWED DURING DEVELOPMENT OF NEW PLANTINGS, FOR UP TO 10 YEARS

▽ NORMAL WATER SURFACE

Redrawn from April 20, 2009 U.S. Army Corps of Engineers Technical Letter

RAIN RULES

Taking a cue from cities like Seattle and Portland, Los Angeles is moving toward mandating more



Photo courtesy of Tom and Jane Kelly.

effective stormwater management in new development. A proposed ordinance approved by the city's Board of Public Works would require new large development or redevelopment projects to capture, reuse, or infiltrate all the rainfall from a ¼-inch storm. For single family residences, it would require the use of a rainwater capture device. Public Works staff estimates the measure would keep about 100 million gallons of polluted runoff out of the Pacific Ocean while recharging the groundwater basin.

"We've taken what we've been doing with the existing stormwater permit and made it better and stronger, given it broader applicability," says Public Works Commissioner Paula Daniels.

The present runoff requirement applies to multifamily units of ten or more; her proposal lowers the threshold to four units and adds in single-family residences.

"The basic concept," Daniels explains, "is to capture, retain, or reuse stormwater, with a priority of activity. If developers are unable to do that, they can treat the water with very high biofiltration and then release it. If they can't do that, they can do off-site mitigation along the streets and sidewalks surrounding the project. If they can't do any of that, they can pay an in-lieu fee for other projects."

Under the proposal, multi-unit projects would develop a landscape management plan, which might include rainwater storage tanks, permeable pavement, infiltration swales, or curb bump-outs. Single-family residences could use one or two options from a menu that's being developed: "One thing they can do is install a rain barrel, or redirect runoff from the roof onto the garden," says Daniels.

In its current form, the ordinance reflects discussions with the Building Industry Association. "The first draft re-

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TRESTLE TROUBLE (CONTINUED FROM PAGE 2)

though the 100-year storm is approximately 600-1,000 cfs. "[The railroad] fought having to make it any bigger, saying the trestle was adequate in 1890, and that Berkeley was at fault for urbanizing since then." After months of meetings with Bay Area regulatory agencies, with Union Pacific "fighting like crazy," it agreed to put in a new culvert that matched the capacity of Caltrans' culvert beneath I-80. "We figured they aren't coming back for another 100 years," says Leventhal. "I think the combined effort of all the agencies finally wore them down since they needed permits." But on Pinole Creek, he adds, they decided that they "didn't need no stinking permits."

In the South Bay, says the Guadalupe Resource Conservation District's Larry Johmann, "The trestles on the Guadalupe River were one of the primary causes of the flooding in downtown San Jose in the March 1995 storm due to hydraulic constrictions and debris build-up." Union Pacific did elevate and replace a bridge over the mouth of Coyote Creek on its own initiative, according to Don Edwards National Wildlife Refuge Manager Eric Mruz. But Mruz notes that the larger issue of the trestles throughout the refuge will need to be dealt with before the South Bay salt ponds are breached, especially since that land is so subsided. "We're already 10-11 feet below sea level down here."

For now, cities and agencies wanting to restore creeks and expand wetlands will need to pay for the cost of new clear-spanning trestles or adequately-sized culverts themselves (unless their waterways are part of an Army Corps flood control project). At Refugio Creek, as part of a new intermodal transit station it is building, the city of Hercules is paying to relocate and raise the existing Union Pacific trestle, which has sunk over time by a foot to a foot and a half, says the city's Lisa Hammon. In fact, most of the trestles at the Bay's edges are built in mud, so subsidence is probably common. (Union Pacific did not respond to questions on this topic.) Hammon estimates the cost of the Refugio Creek bridge replacement at \$1.6 million; the city is looking for a grant. Just around the bend, the city of Martinez was able to use some transportation grants to raise two railroad bridges as part of an intermodal transit station it built a decade ago, freeing up capacity on Alhambra Creek and helping alleviating flooding in its downtown.

Probably the largest scale and most successful example of the good things that happen when hydraulic constrictions are removed is in flood-prone Napa, where the water surface elevation downtown in a 100-year storm was lowered by three feet when railroad tracks on the river's banks were relocated and eight bridges raised and rebuilt to accommodate the river and open up the floodplain. Explains Dave Dixon, who facilitated much of the Napa River planning process with the Army Corps, "In our case the railroad track relocations were a local cost with state participation, but the railroad bridges are by law a federal responsibility in an Army Corps project."

Problems with railroad infrastructure have also affected wetland restoration projects, including Marin Audubon's Petaluma marsh expansion project and the Sears Point restoration project, says coastal ecologist and wetlands expert Peter Baye. At Petaluma, railroad berms blow out from time to time, depositing debris in the wetlands, according to Marin Audubon's Barbara Salzman, but a bigger issue is that the railroad required Audubon to protect its tracks from flooding. Says Baye, "In both cases, Bayland railroad berm and culverts imposed some of the most significant costs and constraints facing the projects, even though the rail line (Northwest Pacific Rail Authority) apparently remained derelict and unserviceable without major rehabilitation. The railroad was heavily damaged during the 1997-1998 El Niño flooding of the North Bay, so much so that many expected it to go bankrupt and be purchased so that it would not remain an obstacle to full benefits of public lands."

But Northwest did not go bankrupt, and repaired those tracks. Nearby, in a similar situation, Northwest holds the Sonoma Land Trust responsible for keeping its tracks dry, making it difficult for the trust to return 1,400 acres to tidal marsh. The trust's Julian Meisler says it had hoped to raise the tracks in order to allow tidal channels to flow underneath and restore tidal action to the land behind the tracks, but the railroad insisted that the trust build temporary tracks while the original line was being raised—despite the fact that the rail line is currently inactive—to the tune of \$50 million. The trust could not afford that price tag, so will restore only 960

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LEAF LITTER CRITTERS

You wouldn't think of an onion bag as a piece of scientific equipment. But that's as high-tech as the Leaf Pack Experiment gets. Leaf Pack, developed at the Stroud Water Research Center in Pennsylvania, is a hands-on way for students and community groups to understand stream quality by collecting and identifying insect nymphs and larvae, and other aquatic macroinvertebrates.

"The scientists at our lab have used leaf packs for quite a bit of time now," says Christina Medved of the Stroud Center. "Leaf Pack experiments with students began in 1989 when our director Bernard Sweeney piloted the program with his daughter's ninth grade class. He figured this was a really easy way to bring streams and students together in their classrooms."

The technique reflects the importance of fallen leaves as a food source in stream ecosystems. "Our research shows that if leaves don't get into headwater streams, the rest of the system will be affected," Medved explains. "Leaves get caught on rocks in a riffle area, where they're colonized by fungi and bacteria. Then macroinvertebrates move in and start breaking the leaves down by eating them."

To sample the macroinvertebrates, Leaf Pack users fill an onion bag with leaves from the three dominant tree species along the stream, anchor it in a riffle, and let nature take its course for three to four weeks. Then they collect the bags and sort through the leaf debris for organisms, identifying them with the help of a plastic placemat for sorting specimens, flash cards, and a taxonomic key. Once that's done, a biotic index can be calculated and used to understand the stream's health. Stonefly, mayfly, and caddisfly nymphs, picky about water quality, indicate healthy water; midge and blackfly larvae are more tolerant of pollution.

"Leaf Pack makes a strong connection between land use and the importance of trees to stream health," says Medved. School classes and other groups that use the system can post their data to a Leaf Pack Network web site. "We're getting some results as far as water quality that are comparable to other scientifically approved protocols. This suggests Leaf Pack can be extended from the classroom to monitoring groups and citizen scientists."

Oregon teacher Charlie Graham has been using Leaf Pack with his fourth-to-sixth-grade classes at Forest Grove Community School for five years. Graham and his students were invited by sustainable-forestry advocate Peter Hayes to monitor Lousignont Creek in his Hyla Woods property. "We're getting some pretty good data lines there," says Graham. "It tends to be a little less diverse than other creeks we've sampled"—possibly because of a history of clearcutting by previous owners.

"The kids are thrilled by it," Graham continues. "They love getting in the water. Their enthusiasm and engagement are incredible. They have to be pretty good scientists; the expectation I set is high and they rise to that occasion." Graham says one student was inspired to write his own science book, *Salmon Come From the Sun*.

Adam Burns of the nonprofit Yosemite Institute has just launched a Leaf Pack program for school groups, in classes of a dozen students. They're sampling four creeks—Ililouette, Tenaya, Bridalveil, and Yosemite—that feed the Merced River in Yosemite National Park. Burns says Leaf Pack "has been really successful both as a data-collecting activity and as an educational activity. The appeal is that they get to see this ecosystem that's totally hidden. They get engaged with the animals and develop a sense of stewardship for that stream."

In recent years the network has gone international, with participants in Mexico, Guatemala, Costa Rica, Peru, and Kenya, where Wangari Maathai's Green Belt Movement has adopted it. Medved says she hears from "teachers and professionals who had been looking for this very type of tool, something that can be used by people who don't have much science education in their background,

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A student scientist will study the critters in leaf litter with help from an onion bag. Photo courtesy of Charlie Graham.

SOIL AND STREAMS COMPETE FOR RAIN

It used to be straightforward: rainfall hits the ground, percolates through the soil, and enters the nearest stream, carrying its freight of nutrients. Recent field research in an experimental Douglas-fir forest in the Oregon Cascades has complicated that picture. Lead researcher J. Renée Brooks, a plant physiologist with the US Environmental Protection Agency, and her colleagues report in *Nature Geoscience* that the season's first fall rain at their site after the dry summer was locked into small pores in the soil and stayed there until plant roots sucked it dry. Their conclusion: "In this seasonally dry watershed... soil water is separated into two water worlds: mobile water, which eventually enters the stream, and tightly bound water used by plants."

Stable isotopes of oxygen and hydrogen cued the researchers to what was happening in the soil. "Heavy isotopes tend to fall first when it rains," says Brooks. "Through a storm you'll get lighter and lighter isotopes. When it gets mixed together and moved into the stream, the variation gets much smaller. We found a lot of variation within the storms, very little variation within streams, but lots of variation in bulk water in the soil." And that pattern persisted throughout the season: "What was surprising is that we don't have mixing when the rest of the rain comes through."

Soil pore size is the key to trapping that first flush of rainfall. "The very small pores have high surface tension, and gravity is not going to empty them," she explains. "The only thing that does empty them, other than evaporation in the top 10 centimeters of soil, is plant roots in summer."

"The implications of these findings are perhaps most profound for biogeochemical cycling and transport of nutrients to streams," the authors conclude. Brooks elaborates: "If some pools of water are not mixing with water moving toward the stream, the way we think about nutrient transport is going to change. It might explain some of soil-filling capacity, and it's certainly important for predictive models

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PESTICIDES STUNT SALMON

If a young salmon survives direct exposure to a pesticide like chlorpyrifos, it's not out of the woods yet. According to a recent study by NOAA Fisheries scientists, sublethal pesticide effects may reduce the fish's chances of living to adulthood, with significant consequences at the population level.

As lead author David Baldwin explains, organophosphate and carbamate chemicals block the activity of acetylcholinesterase (AChE) in salmon, disrupting swimming, predator avoidance, and feeding. He and his colleagues focused on the ration, or quantity of food, consumed by exposed fish. "The connection at the individual level from feeding to growth to size is fairly firm," he says. "We also know smaller salmon are more subject to predation in the marine environment in their first year." The scientists built a two-tier computer model, adapted from an empirical study of juvenile chinook salmon in the Columbia, to link individual and population levels.

The immediate effects of pesticide exposure depend on the class of chemical involved. Organophosphates like chlorpyrifos, diazinon, and malathion have a greater impact than carbamates because they inhibit AChE for a longer period of time. (Pyrethroids, which don't disturb AChE activity, were not considered in the study.) Baldwin says the model, based on chlorpyrifos data, doesn't consider synergistic effects of multiple chemicals. In real life, said Baldwin in the study, chinook traveling down the Columbia or the Sacramento "are likely to be exposed to multiple pesticides from multiple sources at multiple points..."

The model indicated that environmentally realistic organophosphate and carbamate exposures may reduce the survival of subyearling chinook in an estuarine environment, in turn depressing population growth rates and the number of returning spawners. The implications for the recovery of endangered populations are grim.

"It's important to have a link between exposure and its effects at a sublethal

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TRESTLE TROUBLE (CONTINUED FROM PAGE 4)

acres Bay-ward of the tracks instead. "The reduced acreage of tidal marsh restoration is ecologically less desirable and goes against the preferences of the scientific and environmental community, particularly with sea level rise in our future," says Meisler.

Leventhal and Jensen surmise that one reason the railroads are loathe to replace trestles are because trains need a relatively flat grade to run on, and to elevate a trestle would require raising a stretch of track before and after the trestle, a costly undertaking. Union Pacific, whose tracks run closest to the Bay, did not respond to questions about cost. Its spokesperson Aaron Hunt issued this statement in response to the concerns raised in this article: "We work with the Army Corps of Engineers on permitting for any new bridges we build, and we meet or exceed 100-year flood event requirements. We build our bridges to code and to accommodate water flows current with existing development. As communities grow and increase runoff, we have to spend more time maintaining our bridges, keeping them free of debris, etc. We have more than 20,000 bridges in our system across the country, and we work closely with local agencies to maintain those bridges."

Leventhal, Avalon, and others disagree with Union Pacific's claim that it meets or exceeds 100-year flood protection. On Pinole Creek, say Leventhal and Goetting, the railroad modeled its new bridge using 1960 conditions—the date the original Army Corps project was put in. Along with the Army Corps and the water board, the flood control district submitted written objections to Union Pacific, having established through their own models that the new bridge allowed passage of only an 11-year flood event. None of the agencies received a response, however, and the railroad proceeded with construction of the bridge.

Burlington Northern, whose tracks are slightly farther inland than Union Pacific's, says that any problems with hydraulic constrictions are caused by Union Pacific's tracks or by blocked culverts that are not its responsibility. Burlington Northern's Lena Kent adds that her agency has not been contacted by anyone with any complaints about trestles or tracks. "We do not have any plans to replace any trestles. We inspect them three or four times a year so we know they are in good

shape, and we monitor sea level rise." Yet on Wildcat Creek, say Jensen and Riley, Burlington Northern was not only contacted about problems but it also attended some watershed council meetings. In the end, though, it too, proceeded with weekend repairs that circumvented the normal regulatory process and ignored the watershed council's requests.

In the end, nature will probably bat last. Warns Jensen, "The time to act is now, when these old trestles near the ends of their lives and as sea level rises." He points out that while current FEMA standards require bridges to accommodate 100-year storm flows, the standards will likely be changed soon to 200-year flows, as well as to deal with sea level rise and localized wave action in the Bay.

"If these were Caltrans or utility pipe bridges, they would have to accommodate the future plan or project," says Jensen. "The railroad is not a federal agency but it can operate like it's at the top of the pyramid. They need to start accounting for FEMA issues, sea level rise, and community design as far as additional flows and runoff that might be coming off of these areas. The railroads should have to deal with these changes just like all of the other local agencies."

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High flows deposit debris on a trestle over the Gualupe River. Photo courtesy Larry Johann.



CONFERENCES, WORKSHOPS, EXHIBITS & TOURS

APRIL 14-16 WEDNESDAY-FRIDAY CENTRAL VALLEY WATER TOUR

TOPIC: San Joaquin Valley water issues
LOCATION: Tour begins and ends in Bakersfield
SPONSOR: Water Education Foundation
(916) 444-6240; www.watereducation.org

APRIL 16 FRIDAY RIVER PARTNERS ANNUAL DINNER

TOPIC: Dinner and silent auction
LOCATION: Sierra Nevada Brewing Company, Chico
SPONSOR: River Partners
info@riverpartners.org

APRIL 30-MAY 2 FRIDAY-SUNDAY CALIFORNIA GEOGRAPHICAL SOCIETY CONFERENCE

TOPIC: 62nd annual conference: speakers, workshops, tours
LOCATION: California State University, Chico
SPONSOR: California Geographical Society
www.csun.edu/~calgeosoc/meetings/CSUF/home

MAY 4 TUESDAY CALIFORNIA COLLOQUIUM ON WATER

TOPIC: History of a Ground Water Cleanup Project: Lawrence Livermore National Laboratory
LOCATION: Goldman School of Public Policy, UC Berkeley
SPONSOR: Water Resources Center Archives
www.lib.berkeley.edu/WRCA/ccow

MAY 8-JUNE 5 PADDLE TO THE SEA

TOPIC: Three-week festival celebrating the Tuolumne River
LOCATION: Groveland to San Francisco Bay
SPONSOR: Tuolumne River Trust
www.tuolumne.org



JUNE 15-17 TUESDAY-THURSDAY INTERNATIONAL GROUNDWATER/ AGRICULTURE CONFERENCE

TOPIC: Toward Sustainable Groundwater in Agriculture
LOCATION: San Francisco Airport Hyatt Regency, Burlingame
SPONSOR: Water Education Foundation and UC Davis
(916) 444-6240; www.watereducation.org



HANDS ON

APRIL 17 SATURDAY, 9AM - NOON OAKLAND EARTH DAY CLEANUP

LOCATION: Multiple Oakland locations
SPONSOR: City of Oakland Public Works Agency
www.oaklandearthday.com; (510) 238-7611

APRIL 24 SATURDAY EARTH DAY CELEBRATION AND CLEAN UP

LOCATION: El Sobrante Boys and Girls Club
SPONSOR: SPAWNERS
(510) 665-3538; www.spawners.org/events

APRIL 24 SATURDAY EARTH DAY CLEANUP CHALLENGE

LOCATION: To be announced
SPONSOR: The Watershed Project
www.thewatershedproject.org/events
(510) 665-3597

MAY 5 WEDNESDAY CINCO DE MAYO AT SAVE THE BAY'S NATIVE PLANT NURSERY

LOCATION: Martin Luther King Jr. Shoreline Park, Oakland
SPONSOR: Save the Bay
www.safesfbay.org; (510) 452-9261

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RAIN RULES (CONTINUED FROM PAGE 4)

quired retention of all the runoff, and they didn't want to have to do that," says Daniels. "They wanted to be able to treat and release the water. But that wouldn't recharge the groundwater, and treated water could still pick up pollutants on its way into the storm drain system. We did reach a compromise to treat and release as long as you highly treat it."

The ordinance must still be reviewed by two Los Angeles City Council committees and voted on by the Council. "Right now the Council is in the throes of a budget discussion, and that's taking up all the oxygen in the room," Daniels says. "But I've spoken with a number of the Council members, and they're generally supportive."

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PESTICIDES STUNT SALMON (CONTINUED FROM PAGE 6)

level and how that affects the population as a whole," says Baldwin. "That's one of the \$64,000 questions in ecotoxicology." The model has already been used in preparing National Marine Fisheries Service biological opinions on diazinon, malathion, and chlorpyrifos. It could also be adapted for pyrethroids if food web effects were included: "The pyrethroids wouldn't have to affect the salmon themselves, only the ration available."

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LEAF LITTER CRITTERS (CONTINUED FROM PAGE 5)

but are passionate about protecting their local streams." The identification aids travel well; stream insects, it seems, are pretty much the same everywhere.

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SOIL AND STREAMS (CONTINUED FROM PAGE 5)

and how ecosystems might change in the face of climate change."

How far can those results be generalized? "The California Sierra could be similar," Brooks says. Systems with wet summers might show other patterns of water movement.

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