

BIRDS OF THE BAY CONTEST

The Estuary Partnership is looking for 12 great photos of birds using the San Francisco Bay Estuary: shorebirds, waterbirds, raptors, songbirds—any species you see in and around the Bay or Delta's waters and wetlands—for our 2011 calendar. Photos can be taken anywhere in the Estuary: from the South Bay Salt Ponds to the North Bay to Carquinez Strait to sloughs or islands in the Delta. Photos of birds in, on, or around the water or wetlands are all acceptable. Winning photos will be published in our 2011 Birds of the Bay calendar; photographers will receive a \$50 honorarium, credit, a calendar, and a link to their web site if desired. Please include a one paragraph description of the spot where you saw the bird and what the bird was doing, and include your email and snail mail addresses.

The Estuary Partnership retains the right to use the artwork (credited) in print and on-line. The calendar will be published in late 2010. Judges consist of Estuary Partnership publications staff and graphic designers.

DEADLINE: Please submit your entry as a jpg file—no larger than 2 MB—emailed to lowensvi@sbcglobal.net no later than March 31, 2010. We will contact the finalists to obtain a high resolution version of the image before making our final decision. Final images must be suitable resolution for high quality professional printing at 10" wide x 7.5" tall.

No more than three entries per photographer, please. Contest submission is considered permission to use.

For more information: lowensvi@sbcglobal.net or (510) 622-2337.



Bay-Delta News and Views from the San Francisco Estuary Partnership | Volume 19, No.1 | February 2010

Delta and California Water Forum

CALIFORNIA'S BROKEN HEART

At the Estuary Partnership's Delta and California Water Forum in Oakland on December 10, 2009, speakers and panelists examined the state of the Delta, implications for the Bay Area as a whole, and how the newly enacted water management legislation and bond proposal will shape its future. Despite general agreement that the Bay-Delta system is in trouble, participants differed as to whether the legislative package is a meaningful move toward a solution. The devil, once again, is in the details.

Speakers throughout the day described the Delta as "the heart" of California's water problems—and solutions. Comparing the health of the Estuary to that of an aging human, the U.S. EPA's Bruce Herbold suggested recognizing pre-existing conditions, current symptoms, and

"We're going from species we had valued into a world of aquatic cockroaches and rats."

inevitable long-term changes. "Some things won't come back. Restoration is not a useful term. The Delta is manageable but not restorable." The dendritic system of the historic Delta has been replaced by a grid of ditches, said Herbold. Salmon have declined, in part because of oceanic conditions but also because rivers have been turned into water management canals.

Parallel to the salmon, populations of Delta smelt, longfin smelt, striped bass, and threadfin shad crashed around 2000 and have not recovered. Herbold explained that the habitat of the Delta smelt, for one, had been diminished by changes in water turbidity and salinity: "We've really shrunk the habitat for these fish." Changes in the copepod populations that form the smelt's prey base may also have played a role in its decline; the currently dominant copepod species are lower in nutritional quality. Striped bass, on the other hand, are more impacted by the contaminants that accumulate during their longer lives. Researchers have also investigated ammonia, predation, and losses (entrainment) at the pumps as contributing to the smelt's decline.

Conditions in the new Delta, according to Herbold, are less favorable for pelagic fish and more favorable for edge and benthic fish, invasive clams and jellyfish, toxic blue-green algae, and submerged aquatic vegetation. "The system has been pushed over a hump," he concluded. "We're going from species we had valued into a world of aquatic cockroaches and rats."

The Delta is also a crucial—and vulnerable—nexus of the state's water system, said Eileen Hanak of the Public Policy Institute of California, and it's at a tipping point. "There's a huge amount of fragile infrastructure there," she said. "Earthquakes and floods are ready to happen. If there's a massive levee failure, saline water will fill up the holes in the Delta and we'll have to shut down the pumps that deliver water to urban and agricultural users." The cost of protecting all the Delta's islands against such a catastrophe by building up existing levees are prohibitive,

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Clapper Rail Splash! Photo courtesy of Verne Nelson.

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PERCH PRESENCE



A green heron discovers a tule perch at the Martinez beaver dam on Alhambra Creek. Photo by Cheryl Reynolds.

Thanks to one of the green herons that frequent the beaver pond in downtown Martinez, a new species has been added to Alhambra Creek's growing list of fauna. The heron was photographed with a silvery fish that U.S. EPA biologists Bruce Herbold and Robert Leidy believe to be a tule perch (*Hysterocarpus traski*). Leidy says this may be the first such record for Alhambra Creek. The only freshwater-adapted member of the otherwise Pacific marine viviparous perch or surfperch family, the tule perch is native to the Sacramento-San Joaquin system, with isolated subspecies in Clear Lake and the Russian River. As the name suggests, female viviparous perches give birth to large fully developed young. Estuarine tule perches feed on small crustaceans, midge larvae, crabs, clams, and shrimp. In his *Field Guide to Freshwater Fishes of California*, Samuel McGinnis describes them as "delicious"; the heron obviously agrees. **JE**

SAVING SPLITTAILS

The Center for Biological Diversity filed suit last August to restore the federally protected status of the Sacramento splittail, a California-endemic minnow whose declining population is concentrated in the Delta, Suisun Bay, Suisun Marsh, and Napa Marsh. The fish was federally listed as threatened in 1999 but stripped of protection four years later in a decision overseen by Julie MacDonald, the Bush administration's controversial Deputy Assistant Secretary of the Interior for Fish,

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Delta and California Water Forum

Hanak argued: "The \$1.5 billion needed to upgrade the levees to minimal federal standards would reduce flood risk only about ten percent." Despite its thriving agricultural economy, she predicted that the future Delta would look more like an inland sea: "That's not a policy choice that we have. Mother Nature is saying it's going to happen."

Hanak said that in addition to helping landowners through that transition, and moving infrastructure, water conveyance alternatives are a necessary part of strategic planning for the Delta. "Dual conveyance—through and around the Delta—is where the policy discussion is heading," she said. "In a dual conveyance system, we can continue to keep the Delta fresh enough to meet water quality standards." She cited PPIC studies that point to a peripheral canal as "the best way to meet economic and environmental goals. If we choose a peripheral canal, we'll have the opportunity to invest more in the ecosystem and may get a better tradeoff." But a canal, she said, should allow for improving conditions for Delta fish: "We'll have to be careful with flows to balance objectives." The other big caveat is how to pay for a canal, since "the bond proposal doesn't include money for building a facility." With or without a peripheral canal, cautioned Hanak, water users should expect reduced exports: "We're not likely to be pumping 6 million acre-feet in the future."

Karla Nemeth of the California Natural Resources Agency explained the nuts and bolts of the Bay-Delta Conservation Plan, which she described as "a regulatory method for deciding between human and environmental needs" and "an alternative to a piecemeal project permitting approach." The Delta, she pointed out, has 500,000 residents and a vibrant agricultural economy: "We need to recognize the limits of restoration in this kind of environment." BDCP's approach, Nemeth said, is "to build off the tremendous amount of science that's been generated to develop biological goals and objectives," beginning with the 11 fish species covered by the plan. Goals typically include improving the survival, fitness, and geographic distribution of the target species, and reducing mortality. That would involve reducing stressors, including water operations: "We have a really clumsy way of dealing with entrainment. One goal is to create a system where fish can move through the Delta without being handled."

Another: better managing the balance between native and non-native fish species. BDCP will also need to coordinate with county-level plans for terrestrial species, said Nemeth.

Nemeth said BDCP envisions reestablishing an east-west flow pattern in the Delta linked with newly created and strategically distributed habitat: 10,000 acres of new floodplain, 65,000 acres of tidal marsh restoration, 5,000 acres of riparian restoration (see map, page 3). How that plays out, she added, will depend on what choices are made about a peripheral canal or other conveyance option. "Any new diversion is years

"One goal is to create a system where fish can move through the Delta without being handled."

off," she continued. "What do we do until the diversion point is built? How do we design a conveyance system?" She mentioned that preliminary cost studies put an underground facility within range of possibility. Whatever the specifics, Nemeth said, minimum flow requirements must be determined before diversions can be made: "We won't be diverting the entire Sacramento River. We'll need measures to manage flows in the South Delta to prevent reverse flow conditions, and other rules for operating cross channels. It will be critical to our success to align water operations so the Delta mimics natural seasonal flows."

Following Nemeth, the Pacific Institute's Peter Gleick looked at what he called "California's water taboos" and the legislative water-policy package (see page 7).

The Delta may mean different things to different people and interests; "most Californians know it's someplace somewhere that water flows through," said Will Travis of the Bay Conservation and Development Commission. "Environmentalists see the Delta as a spectacular natural resource, potentially on a par with the Florida Everglades. Water users see it as a broad leaky ditch where the water they want to use gets wasted and lost. Developers see it as a place to build houses they can't get approval to build in the Bay Area to sell to people who work in the Bay

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Potential Aquatic Habitat Restoration Areas



Channel Margin - Restore/enhance shaded riverine, marsh, mudflat habitat (20 linear miles)



Floodplain (new) - Levee setbacks, land surface re-contouring, natural meander belts (the plan currently identifies a narrow area along the eastern alignment of the Sacramento Deep Water Ship Channel for future study as a potential new flood bypass) (10,000 acres)



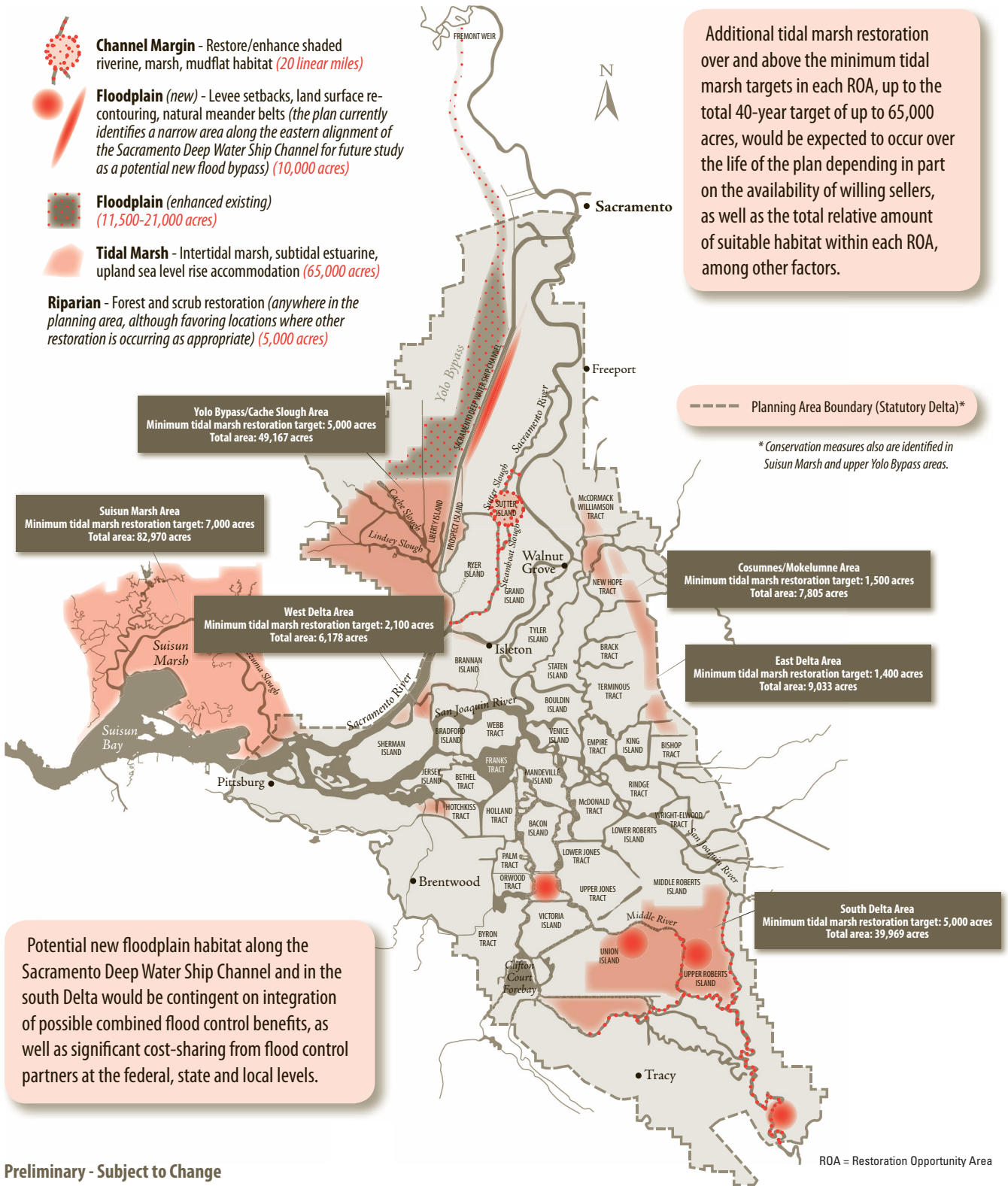
Floodplain (enhanced existing) (11,500-21,000 acres)



Tidal Marsh - Intertidal marsh, subtidal estuarine, upland sea level rise accommodation (65,000 acres)

Riparian - Forest and scrub restoration (anywhere in the planning area, although favoring locations where other restoration is occurring as appropriate) (5,000 acres)

Additional tidal marsh restoration over and above the minimum tidal marsh targets in each ROA, up to the total 40-year target of up to 65,000 acres, would be expected to occur over the life of the plan depending in part on the availability of willing sellers, as well as the total relative amount of suitable habitat within each ROA, among other factors.



Potential new floodplain habitat along the Sacramento Deep Water Ship Channel and in the south Delta would be contingent on integration of possible combined flood control benefits, as well as significant cost-sharing from flood control partners at the federal, state and local levels.

Preliminary - Subject to Change

This map includes potential aquatic habitat restoration areas as of September 2009. Details are preliminary and may change pending decisions made by the BDCP Steering Committee in early 2010. Additional information on proposed habitat restoration for wildlife and plant species will be available early-2010 as the draft Plan is further developed.

For more information, visit www.baydeltaconservationplan.com or contact **Karla Nemeth** at 916-651-7587.

Wildlife and Parks, who owned farmland in key splittail habitat. Since 2003, Delta splittail numbers have reached historically low levels. "It should be a no-brainer for the Fish and Wildlife Service under the Obama administration to clean up this shameful relict of the Bush legacy and again protect the splittail," says the Center's Jeff Miller. **JE**

LAG EFFECTS LETHAL

Researchers at the University of Pittsburgh report that the four-day testing period for acute toxicity used by the U.S. EPA may be missing lag effects of pesticide exposure on amphibians. Devin Jones, Rick Relyea, and John Hammond exposed larvae of nine frog and toad species to the neurotoxin endosulfan for four days, then moved them to clean water for an additional four days. Up to 97% of the leopard frog tadpoles that had been exposed to concentrations of 35 and 60 ppb died after the transfer. Relyea had previously found endosulfan to be much more toxic than other pesticides to amphibians. He says the study "demonstrates that the standard four-day toxicity test would have dramatically underestimated the lethal impact of endosulfan on even this notably sensitive species." Lethal effects were observed in Pacific tree frogs, western toads, and Cascade frogs at exposures as low as 7 ppb. **JE**

SLOUGH OFF SURPRISE

Facial cleansers, of all things, turn out to be a potential source of plastic pollution in marine ecosystems, according to a recently published study by Lisa Fendall and Mary Sewell of New Zealand's University of Auckland. The culprits: polyethylene microplastic particles that act as exfoliants in cleansing products the average consumer is likely to use every day. Too small to be filtered out at wastewater treatment plants, the particles make their way into waterways and the ocean, where they can be ingested by planktonic organisms. Fendall and Sewell also report that the microplastic particles can absorb polychlorinated biphenyls (PCBs.) **JE**

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Area but can't afford to live here. And until recently, politicians saw the Delta as California's Bermuda Triangle, where people of good will enter never to be seen again."

Travis saw the water package as "on balance, a much-needed and positive step forward," with the creation of a viable governance structure for the Delta. "There's no individual elected to represent the Bay/Delta," he continued. "Our region is more balkanized than the Balkans, and local officials react from the narrow self-interests of their constituents." Even the region's myriad environmental groups find it hard to reach consensus at a regional level said Travis. "The status-quo bias compounds parochialism. We shouldn't merge Bay/Delta governance systems or abolish local government. But we should recognize the connections."

He urged Californians to look past the compromises of the water package and examine Bay/Delta problems from the perspective of the future: "Global climate change will make the Bay and Delta far different. We need to move beyond trying to protect

"You've heard this was done in the dark of night, but we had more than a dozen hearings."

the Bay and Delta the way they are now and abandon the folly of restoration. We need to create conditions that can adapt to global warming changes." Toward that end, Travis said, regulatory agencies "need to treat each other as collaborators, not enemies"—an approach that can be field-tested in Suisun Marsh, which will fall under the jurisdiction of both BCDC and the new Delta Commission. "It's an opportunity to forge new alliances that will treat the Bay-Delta as a complex connected regional system," he concluded.

After the lunch break, Alf Brandt, consultant for the Assembly Committee for Water, Parks, and Wildlife, gave an insider's perspective on the legislative package. "We set the stage for making decisions," he said. "We made some difficult decisions, but it's only the start." He placed the legislation in the context of the collapse of the Delta's ecology and the "failure" of CALFED, which "created the sense of urgency that led Senate President Pro Tem Darrell Steinberg to declare: 'Now is the time for the legislature.'" Brandt defended the transparency of the legislative

process: "You've heard this was done in the dark of night, but we had more than a dozen hearings."

Brandt said reduced reliance on the Delta for water supply was a controversial but key part of the package. "Some Republicans objected, but the leadership stuck with it. The estimate of flow is critical at the front end. This is historic—we've never done that. This is saying, 'What does the Delta need?'" He sketched the new governance structure created by the package, including the Delta Stewardship Council ("a big piece"), the restructured Delta Protection Commission, and the Delta Conservancy to oversee "economic development and ecosystems." The Council, he said, "is not some huge new end-all for the Delta. We didn't structure it to be the implementer; agencies have an important role to play." Good science will continue to be crucial: "The Delta needs a real adaptive management program, not the kind we claimed to have with CALFED."

What about the conveyance issue? "We did not approve the Peripheral Canal," Brandt

said. "There's legal debate on whether the Department of Water Resources has the authority to build it. This bill does not give them any new authority. It actually puts limits on it: funding and a permit will be needed before starting construction. The Governor's office was talking about turning dirt before 2011."

Brandt acknowledged that the legislative package leaves loose ends to be addressed: "We've got to figure out how to pay for these Delta entities before we can even get into bond funding." Coordination with federal agencies is another large issue. He also recognized the opposition to the bills: "There are losers. A lot of the Bay Area legislators voted no on the Delta Bill. The Sierra Club was very angry and very vocal, and legislators were very nervous about taking on the Sierra Club." But he urged all sides to collaborate: "It will be up to all of us to figure out how to move forward. There's a responsibility to participate whether you're an opponent or a supporter. We may not have the consensus model any more, but we

still have to work together.”

The forum ended with a panel discussion that brought water agencies, environmental groups, and other players to the table. Andrew Michael of the Bay Area Council opened with a positive take on the legislation: “We’re generally supportive of the legislative package, including the bond. It’s not perfect and will need follow-up legislation. We’ll need to fund the infrastructure even if the bond passes. Overall it’s a step in the right direction. We know it will be a challenge to get the bond passed because of the economic situation.”

Speaking for the Association of Bay Area Governments, Ezra Rappoport called for building trust among those affected by the legislation: “There’s always been the unseen economic hand of powerful agencies that swoop in at the last minute and twist or change something. People in the Delta believe their interests will not be taken into account whatever the law says.” The bond measure, said Rappoport, “has everything to do with how you get to Peter Gleick’s taboo subjects. If we don’t get the language together about investment in water infrastructure, there’s a good chance the bond measure won’t pass.”

Kate Poole of the Natural Resources Defense Council said her group was “part of the ‘coalition of the willing’” that supported the water bills. “The final package is a very important first step,” she said. “There’s more to be done but it sets things on the right path.” Poole described the Delta’s governance structure as “badly broken” and said the governance bill put some key pieces in place. She pointed to “a fundamental paradigm shift from the way we’ve approached water supply—‘there’s always more water!’—to an approach recognizing we’re at the limit of that system. It’s amazing that we’ve never looked at how much flow the Delta ecosystem needs.”

EBMUD’s Randeke Kanouse introduced himself as “one of the losers Alf described.” The package, he said, “is a bold step by the legislature but it can amount to nothing if we don’t stay engaged. We’ve seen new dawns before. We don’t know whether the six new institutions will work or not.” His utility has not taken a position on the bond. “We’ll have to grapple with water user fees,” said Kanouse. “People in Fresno should pay for their system as we pay for our system.” And he differed with Brandt on conveyance: “We

think new conveyance is going to emerge from the process. The governor and Central Valley water agencies are pushing a canal. If you take up to six MAF out of the Delta, and more through a canal, making up that water is not the obligation of EBMUD or any other utility in the watershed.”

“We’re one of the environmental groups that opposed the package and bond measure,” said Clean Water Action’s Jennifer Clary. “We agree the status quo is not adequate, and CALFED was a catastrophic failure. The reasons for that failure, including spending, were not addressed. There’s enough money to fund what water agencies want but not enough to fund what they don’t want to do.” The new Delta Stewardship Council, she said, “can’t compel agency action, has no authority of its own, and can only make consistency findings.” She also criticized the legislative process: “A lot of people were not at the table. We think this does enable the Peripheral Canal. The water agencies will pay for their piece—the canal and mitigation—but since 2000, water exports have increased as the Delta collapsed. Who pays to fix the damage that has been done since 2000?” Her last word: “Don’t go down the same path as CALFED where we went to boring meetings for years and ended up with less than nothing.”

Finally, Jim Fiedler of the Santa Clara Valley Water District weighed in on the side of the new legislation. “Our needs include long-term water supply reliability,” he said. “We’re looking for the Delta to be a baseline supply for us. The legislation is a step forward. We realize there will be costs, but there will also be benefits for years to come.” He added that his agency has not yet taken a position on the bond.

In subsequent discussion, panelists handicapped the likely success of the bond issue. “Agricultural funding will support the bond,” predicted Clary. “The big voices are the Latino Water Coalition and Westlands. But the farm workers are not going to benefit from this. Any projects are twenty years down the line.” Kanouse and Fiedler agreed that agriculture could and should do more to conserve. “We’ve given up on the idea that agriculture will be held to tough schedules or benchmarks,” Kanouse said. Panel moderator Paul Rogers of the *San Jose Mercury News* pointed out that urban water conservation provisions in the package were weak as well.

JE

SINKING IT IN SACRAMENTO

Sacramento County residents now have an up-to-\$250 incentive to slow, spread, and sink rain water on their property, as part of a pilot rebate program about to be launched by the Sacramento County Department of Water Resources. Says the Department’s Summer Christensen, “We want to encourage homeowners to help us recharge the shallow groundwater table and reduce flows into the storm drain systems. We’re going for reducing the volume of stormwater running off of yards into the creeks.” Twenty homeowners will be reimbursed for 50% of the cost—up to \$500—of installing a rain garden.

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LOV



A small residential rain garden in the city of Portland. Photo courtesy of Portland Sustainable Stormwater Division.

NOW IN PRINT: URBAN RAIN

Designing public art installations that celebrate watersheds seems to be a growth industry for environmental artists (local example: the water feature at El Cerrito’s new city hall.) *Urban Rain*, a slender, heavily illustrated paperback, documents two features created by Jackie Brookner for San Jose’s Roosevelt Community Center. Both channel runoff from the building’s roof through filtration systems that visually evoke watershed processes.

The Coyote Creek filter at the south entrance sends water through a scupper box (there’s a word you seldom see in a non-nautical context) through an amber glass container filled with rocks and into a planter below. The dendritic pattern of

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GEM IN THE REDWOODS

As an ecologist with the U.S. EPA, Rob Leidy has worked for years to protect wetlands throughout the Bay Area and elsewhere. Recently he found himself getting involved close to his own back yard, high in the Oakland Hills.

"I'd been watching this unusual palustrine wetland in as I ran or hiked through Joaquin Miller Park and noticed that it was becoming degraded as was the understory of the redwood grove along the creek. The stream was starting to erode and incise and pick up a lot of sediment."

Leidy says the area, known as Fern Ravine, is heavily used by day campers, off-trail bikers, and many other folks who love the park just a little too much. When the Friends of Sausal Creek contacted him for advice about the steelhead trout they had found downstream in Dimond Park, Leidy mentioned his concern about the degradation of the wetland at the top of the redwood forest. A partnership was born, along with a plan to revegetate the forest understory and protect the wetland. The Friends' Karen Paulsell says the wetland is home to Pacific bog rush and two sedges that are relatively rare in the East Bay, native blackberry, and some cattails, not often seen in the hills.

In November, the Friends sponsored their first exotics plant removal work day at the site, to be followed by others. Acacia and non-native cypress are causing the wetland to be drier than it would be naturally, says Leidy. Another problem is invasive elm, says Paulsell.



Pacific bog rush in the Sausal Creek headwaters.
Photo courtesy Karen Paulsell.

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DELTA NEEDS HEART TRANSPLANT, NOT BAND-AID

While some Delta Forum speakers suggested that most environmental groups were on board with the new Delta legislation and water bond, the Sierra Club California's Jim Metropulos begs to differ. According to Metropulos, environmental groups opposing the legislation and bill include Friends of the River, the Planning and Conservation League, Clean Water Action, Environmental Justice Coalition for Water, California Water Impact Network, and the California Sportfishing Protection Alliance, among many others.

"This legislation sets up a lot of processes that will cause people to continue to fight."

"The Sierra Club's opinion—as to both the legislation and the water bond—is that they are a lot of platitudes without substance," says Metropulos. "There's talk about a mandatory groundwater monitoring program—but there's no 'there there'; there's no penalty for failure to monitor groundwater, and if a county does not want to do it, DWR does not have the ability to go in and monitor on their own. Our request [to monitor and report on groundwater elevations and quality] was never seriously considered or put in the bill."

Another criticism involves the provision requiring 20% reduction in water use by 2020. "There is no penalty for failing to comply, and agriculture is not included in any sort of conservation target, he says. "They are only required to come out with efficient water use plans; but there is no penalty if those don't get implemented."

Cities like Sacramento and Fresno will easily reach 20% water use reduction by 2020 simply by complying with metering laws and without this legislation, says Metropulos, a point also made by Clean Water Action's Jennifer Clary, speaking on the panel. Those cities are required to begin metering water use and charging by volume, he says. "Right now, in Sacramento, we just get charged a flat rate."

Metropulos says the new governance structures put in place by the legislation have

no regulatory teeth. "The Delta Stewardship Council has no authority to reduce water exports from the Delta. We need to figure out how to reduce those exports and increase local or regional water supply reliability rather than relying on the Delta." And he adds that while he thinks a stewardship council and independent science review committee are good ideas, most of the people who sit on them are appointed by the governor—and will influence water policy for years to come. The state senate will confirm the appointees, but, says Metropulos, "I don't know what kind of a great check that will be."

Although many comments were made at the forum that the legislation and bond measure are "a step in the right direction," the Delta "needs a heart transplant," says Metropulos. "This [legislation] is more like a Band-Aid. People are saying this is the best thing since sliced bread because of the so-called consensus around this. That's not true. This legislation sets up a lot of processes that will cause people to continue to fight."

Metropulos adds that the Sierra Club did not support the \$11 billion bond measure. "We will be opposed and working to fight it. There are lots of things we can do before we build a tunnel or canal. We don't oppose a canal per se, but we need to look at the kind of water needs the Delta has. Any new water conveyance for the Delta needs to be tied to reduction in exports from the Delta and environmental safeguards to protect the ecosystem."

A group of 16 environmental groups sent a letter to the governor in October, urging him to take a more "values-driven" approach to the Delta and California's water future. Among other recommendations, the letter suggests building regional self-sufficiency through conservation, tiered water rates, mandatory water metering, water recycling, groundwater cleanup and management, stormwater capture and re-use, graywater use, conjunctive use, and investments in watershed health. The letter also urged the governor to set measurable water quality standards for the Delta and to improve water quality upstream.

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LOV

GLEICK ON WATER TABOOS, MYTHS, AND STRAW MEN

Alluding to the recent Public Policy Institute of California report *California Water Myths*, Peter Gleick of the Pacific Institute began his Delta Forum presentation by discussing California water

taboos. "It's time to talk about things we're reluctant to address," he said. "We don't measure or monitor all water use, and we need to. We don't know who uses how much water to do what." California, he pointed out, is the last state in the nation to fail to keep track of groundwater.

Other taboo subjects include money and water rights. "We need to talk about money—understand the true cost of subsidies in dollar and ecosystem terms. There's also the water rights issue. People are using water who don't have the right to use it; we don't know who or where."

In a follow-up interview, Gleick elaborated on the need for measuring and monitoring: "Almost every European country requires urban water use to be metered. There are substantial urban areas in California, including vast swaths of Sacramento and Fresno, that don't have meters. The obstacle to effective monitoring is entirely political. It's just a question of putting meters on deliveries and monitoring them. It would impose a little more expense, but help alleviate water shortages."

Gleick said the Pacific Institute's new report identifies huge potential water use savings through conservation and efficiency: "Our studies have identified 7-8 million acre-feet (MAF) of savings—2-3 MAF urban, 4-6 in agriculture. There's a quick MAF we could save easily and cost-effectively. We're trying to balance the argument that we need to build expensive infrastructure. There's a combination of things we could do: more efficient home appliances, changes in industrial operations, expansion of smart irrigation practices, better soil moisture management."

California Water Myths criticized the "myth" that California can conserve its way out of its water problems. "That 'myth' is a straw-man argument," Gleick countered. "No one, including the most ardent supporters of conservation and efficiency, argues that's the only thing we need to do." The report's

authors, he said, "failed completely to understand the difference between gross and net consumption of water" and "confused rather than clarified the issue. They were trying to say the only conservation and efficiency that makes sense is saving consumptive uses [which prevent water from being reused]. But we argue that's not right. The demand for water hasn't gone up in the last couple of decades because we're saving nonconsumptive uses of water. Every gallon you don't have to take out of the river or aquifer saves energy and leaves water in the ecosystem."

According to Gleick, the new package of water legislation is procedurally and substantively flawed. "The last-minute deal-making was especially inappropriate," he said. "In

"People are using water who don't have the right to use it; we don't know who or where."

exchange for special consideration in either the bond or the policy package, all sorts of things, including efforts to strengthen the State Water Resources Control Board and groundwater monitoring, were stripped out at the last minute in exchange for votes." Despite lobbying from both sides, the Pacific Institute took no position on the bills: "I'm glad we didn't, because a lot of things we liked disappeared." Funding mechanisms and urban efficiency measures in the final legislation are weak, Gleick said, and agriculture is "off the hook completely."

Beyond the short-term, Gleick is concerned about lack of preparation for unavoidable changes that will affect the Delta: "We need to think about the Delta not as a plumbing fixture but as a heart. One piece we could focus on is figuring out how to reduce human reliance on water supply from the Delta." This could involve one-for-one reductions in water withdrawals from the Delta as desalination plants come on line. "I really believe a healthy Delta is possible," he concluded. "I don't know if we'll muster the political will to come up with an agreement that meets both human and environmental needs. I think we have no choice but to try."

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After the invasives are removed, the site will be replanted with natives grown from the Friends' own nursery. One of the longest-running "friends of" creek groups in the Bay Area, the Sausal Creek group got started in 1996, and have conducted several major stream restoration projects, for which they ended up building their own nursery.

Says Paulsell, "We want local natives, grown from locally-collected seeds and cuttings. Growing our own plants leverages large amounts of volunteer time with modest amounts of staff time, while simultaneously providing great learning opportunities for the volunteers and staff."

Other partners in the Fern Ravine restoration effort include the friends of Joaquin Miller Park, the Bicycle Trails Council of the East Bay, and the city of Oakland, which is working on ideas to get people back on the trail and off of the creek banks.

While mountain bikes in natural areas are not always appreciated, the Bicycle Trails Council's Brent Englund says his group supports the Friends of Sausal Creek's efforts and thinks it is only natural that they work together. "Over the years we've partnered with them to dig water bars, drainage trenches, and grade dips; we've cleared clogged storm drains and culverts, drained and graded boggy stretches of trails, picked up trash, repaired landslides, cut brush, remove non-native plants, repaired fences, rerouted trails, and built new ones."

At Fern Ravine wetland, a log cribwall will be installed to stabilize an eroding creek bank, and the Friends are looking for funding to build a little bridge across the creek to replace the "Arizona crossing" that occurs anywhere along 100 feet of the stream, says Leidy.

He adds, "The way I see it, [this project] is a perfect bookend to the nearby Chabot science center with the stars and the planets; just a stone's throw away they can come to a natural environment and see a forest, stream, and headwater wetlands. So kids get the other world and then our world."

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BACKHOES VS. BURROWS

These are not the best of times for the western burrowing owl. Once considered “fairly common” along the Bayshore, this semi-diurnal species that nests in burrows dug by California ground squirrels is declining throughout its local range. Breeding burrowing owls have been almost or completely extirpated from Marin, Sonoma, Napa, San Francisco, and San Mateo counties and the southwestern portion of Solano County. They’re hanging by a thread in Santa Clara County and coastal Alameda County. And their populations in interior Alameda and Contra Costa are threatened by unchecked development.

In 2003, the California Department of Fish and Game rejected a petition by the Center for Biological Diversity to list the owl as threatened or endangered. The agency’s rationale: although burrowing owl populations are disappearing through most of its California range, there are still large numbers in agricultural lands in the Imperial Valley and along the lower Colorado River. Fish and Game designated the bird a Species of Special Concern, which confers less protection than threatened or endangered status.

There are a few bright spots in the generally gloomy picture. At Berkeley’s Cesar Chavez Park, concerted efforts are being made to protect a small wintering population, down from a high count of 15 a decade ago. The burrowing owls have adopted California ground squirrel burrows and riprap along the water’s edge, where they had been vulnerable to harassment by people (including bicyclists) and off-leash dogs. However, for the past two years Golden Gate Audubon member Della Dash and others have worked with waterfront manager John Mann to put up seasonal fencing and signage around the birds’ winter quarters. Dash says two owls have been seen inside the fence this year, with another in the adjacent meadow. Two more are wintering in a nearby area of Eastshore State Park. Volunteer docents keep track of their whereabouts, collect other data, and provide public education.

Advocates of the Berkeley owls had to deal with a potentially disruptive environmental art installation at Chavez Park. Dash, who was on the design review committee, says GGA provided technical guidance that allowed the committee to select an owl-



A burrowing owl at the “Blue Ridge” development in Antioch awaits eviction (flag in foreground, bottom of photo, indicates location of burrow to be collapsed). Photo by Cheryl Reynolds.

sensitive winning proposal. Some designs included 15-foot-high statues that could have provided perches for raptors that would prey on the owls. Artists Jennifer Reed and John Madden won the competition with a relatively unobtrusive low-walled seating structure, which will not be installed until the birds depart in the spring.

The dwindling burrowing owl colony at the Mountain View Shoreline Park, which consisted of three breeding pairs last year, may also have dodged a bullet. According to Santa Clara Valley Audubon’s Shani Kleinhaus, the city of Mountain View plans to convert one of the owls’ primary foraging areas into a soccer field. “The city is interested in working with us,” Kleinhaus says. “I think they really have the good will and didn’t realize the implication of what they were planning. Hopefully they’ll create a manage-

ment plan aimed to increase the owls’ prey base before they build the athletic field.”

Although some populations, like that at Moffett Field (currently 15 pairs), have been relatively stable, overall Santa Clara County’s owls are in trouble. Moffett Field has a stable population, currently 15 breeding pairs. But there’s concern about how a pending California Air National Guard realignment there might affect the birds. CAANG recently issued a final Finding of No Significant Impact/No Practicable Alternative for the project; SCVA sees a “significant impact on biological resources” and has requested a comprehensive EIS/EIR. A handful of owls persist at Mission College and in and around Alviso.

Biologist Jack Barclay of Albion Environmental has been monitoring the species at the San Jose Airport, where the population has fluctuated from a low of 7 breeding pairs

in 1991 to 40 in 2002, down to 9 in 2009. "Our analysis indicates 60 percent of the contribution to the decline was due to lower adult survival rates," he says. When Barclay surveyed for owls in 2008 in Santa Clara's Habitat Conservation Plan/Natural Communities Conservation Plan area, which includes the airport but not Shoreline, Moffett, or Mission College, he estimated 19-20 pairs, plus a few more immediately outside the boundaries. In 1997, the county's total breeding population was estimated as 120-141 pairs.

The Oakland Airport was once home to what was described as one of the largest burrowing owl populations in the Bay Area. Port of Oakland environmental scientist Doug Herman says 12 individuals were counted in 1997 and breeding-season surveys detected one pair in 2007, none in 2008 or 2009. To mitigate the loss or displacement of owls at the airport, the Port has bought potential owl habitat near Fish and Game's Byron Burrowing Owl Conservation Bank. A few breeding pairs are hanging on elsewhere in coastal Alameda County, mainly in the Newark area. Barclay says there are also 10 breeding pairs at Camp Parks, which straddles the Alameda/Contra Costa line.

The east Contra Costa County city of Antioch is the scene of the latest clash between developers and owl advocates. Antioch resident Scott Artis spotted Kiper Homes in

the act of evicting up to 11 burrowing owls, first by blocking their burrows with one-way doors. The last environmental analysis for the property was approved in 1995 for a previous developer, with no mention of burrowing owls being present. The city ignored requests from Artis and others to require supplemental review of the outdated EIR to take the presence of the owls into account and provide for adequate mitigation and proper relocation. Kiper was allowed to proceed with the eviction. The developer's next move is to backfill the burrows and gas the California ground squirrels that dug them. No alternative nest sites were made available for the Antioch owls. A biologist working with Kiper told a *Contra Costa Times* reporter that the Antioch owls "will all find happy homes."

Relocation can be either active, with owls trapped and released at a new site, or passive, in which new habitat including natural or artificial burrows is made available adjacent to the original location. Barclay says passive relocation is more prevalent in the Bay Area, but active relocation is widely practiced in Southern California or Arizona. "Passive relocation, as originally conceived of, was intended to apply to short-distance moves of burrowing owls out of a relatively small area of disturbance, such as a pipeline corridor," he explains. "The technique has been expanded to apply to entire areas. In some

cases where there's no contiguous habitat, it's claimed the owls are being passively relocated when I think it's accurate to call it eviction."

Active relocation is rarely successful. Burrowing owls are considered site-tenacious and are prone to return to areas from which they have been removed. Owls removed from a least tern colony in San Diego County and released 30 miles away found their way back the same day. In five cases reviewed by San Jose State University biologist Lynne Trulio, 17 of 27 actively relocated burrowing owls disappeared within a year of their release; 7 returned to their original site.

There's little hard data on the fate of passively relocated owls. Barclay says he has records of passively relocated owls at the San Jose Airport and elsewhere surviving and reproducing. An unpublished Fish and Game study in 2002-03 found a 47% survival rate for 30 radio-tagged owls that were passively relocated from Sacramento County construction sites, not counting 6 missing juveniles. An Idaho study reported a 40% relocation success rate; however, the subjects were migratory owls, while most breeding owls in the Bay Area are sedentary.

Fish and Game allows cities and developers to mitigate for owl losses by buying mitigation bank property in other areas, accepting the local extirpation of the birds. In practice, it's unclear if owls breeding on mitigation-bank land are offsetting those lost to development. Kleinhaus has been trying to follow the situation at the Wildlands, Inc.'s Haera Wildlife Conservation Bank in eastern Alameda County. "It's impossible to figure out from their reports if there has been any kind of trend over the years," she says. "There's no reporting on reproduction or active burrows. There's no adaptive management."

In the absence of effective federal or state protection for its habitat, the fate of the western burrowing owl is in the hands of local jurisdictions. "The city of Berkeley has been extremely positive about the owls," says Della Dash. Elsewhere, as in the Antioch case, cities have allowed development pressures to override the survival of this unique species.

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Burrowing owls sometimes use artificial burrows. Photo courtesy of Tom Grey.

DINO-FISH GETS SAFETY NET

Everyone needs a sanctuary from this hostile world, and the green sturgeon (*Acipenser medirostris*) is no exception. The southern population of this armored fish, which spawns exclusively in California's Sacramento River, has been on the ropes in recent years. For decades it has suffered severe losses of spawning habitat to dams and overfishing. These and other factors have combined to decimate its breeding population by 96% between 2000 and 2006, the year it gained threatened status under the Endangered Species Act. This past October, in an effort to protect the green sturgeon that remain, the federal government designated 8.6 million acres of rivers and coastal waterways as critical habitat for the species.

Most species of sturgeon tend to prefer freshwater. Not so greens. These ancient fish, which emerged 200 million years ago during the Jurassic, follow a life path more similar to steelhead. Juveniles mature at sea, migrating through the Golden Gate and along coastal waters as far north as southern Alaska.

To accommodate these wandering ways, the protected zone encompasses the Sacramento River and Delta as well as San Francisco Bay and nearshore waters and estuaries from Monterey to Cape Flattery, Washington. "After they leave the system they spawned in, they're out in the coastal environment until they're 14-17 years old before they're even ready to contribute to the population," says Melissa Neuman, a biologist with the National Marine Fisheries Service (NMFS) who helped lead the habitat designation process. "We're trying to protect the habitat that these subadults and adults depend on in the ocean," Neuman says.

Critical habitat designations operate on the precautionary principle: that changes to important habitat features have the potential to harm species. It means that even if the fish are not present in a given season, the quality of the habitat must still be maintained in preparation for their return.

Protecting habitat conditions for green sturgeon is tricky because the fish use such a wide variety of environments. They appear to rely on high water pulses to trigger spawning, and cooler waters for embryo survival, yet slightly warmer waters afterward will speed embryo development. And though the

"It is very risky that every individual is counting on this one small area..."

fish prefer to spawn over clean gravel, staple adult foods include clams and shrimp from the muddy bottom as well as fish higher up in the water column.

The critical habitat designation names a variety of factors necessary for sturgeon survival. These include an open migratory pathway, appropriate water quality and sediment, deep enough water for spawning and overwintering, and low pollution levels. In practical terms, the designation only affects activities that currently require a federal permit, such as dredging. How proposed activities will affect the named habitat features will be analyzed before any permits are granted.

Along the coast, the regulations will also affect power plants that emit heated effluent, and desalination plants that can alter salinity levels. In the Bay and Delta, dredging will require review because it can alter the composition of bottom prey species. Dredge disposal practices may also be forced into deeper offshore waters to avoid smothering benthic prey species.

The decline of the green sturgeon has mirrored the recent collapse of the Delta ecosystem, in which numbers of Delta smelt, Sacramento splittail, threadfin shad, and other species have virtually flatlined (see cover story). Meanwhile, copepods, an important food source for green sturgeon, are now at the lowest density ever recorded in the Delta.

Habitat protection for green sturgeon should help to drive additional water policy changes in the area, Neuman says. "It's not one species designation that will bring about

change, but enough listings in this area to change how we conduct different activities throughout bays and rivers. I would hope overall that there would be more water available for fish in the area, a higher water quality, and that different features for green sturgeon and salmon and Delta smelt will improve over time."

Neuman also hopes the designation will spark creative solutions to improve the sturgeon's lot. Ideas include designing fish ladders suitable for sturgeon passage, as well as restoring more tidal marshes, rich sources of green sturgeon staples such as zooplankton and shrimp.

NMFS announced in November that it will develop a recovery plan for green sturgeon. The plan will delineate the steps that must be taken to restore fish numbers. To draw up a functional plan, biologists need to gain far more insight into green sturgeon habits. "Sometimes they're just out in the Estuary and we don't particularly know what they're keying in on. We're still learning a lot about what environmental drivers might be encouraging them to move around their environment," says UC Davis's Josh Israel, whose genetic work was instrumental in establishing the uniqueness of the southern green sturgeon population.

Until then, the fact that the entire population of southern green sturgeon spawns solely in the Sacramento River makes protecting those waters vital to their survival. "It is very risky that every individual is counting on this one small area," Neuman says.

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A green sturgeon in the Klamath River. Photo by Thomas Dunklin.

Places to Go and Things to Do



Conferences, Workshops, Exhibits & Tours

FEBRUARY 3, 4, 5 WEDNESDAY-FRIDAY State of the Beaver 2010

LOCATION: Seven Feathers Convention Center and Resort, Canyonville, Oregon
SPONSOR: The Beaver Advocacy Committee of The South Umpqua Rural Community Partnership
<http://www.surcp.org/beavers/index.html>

MARCH 10-13 WEDNESDAY-SATURDAY Fisheries Restoration in a Changing Climate: 28th annual Salmonid Restoration Conference

LOCATION: The Redding Convention Center, Redding
SPONSORS: Salmonid Restoration Federation and American Fishery Society
<http://www.calsalmon.org/index.php/conferences/srf-conferences.html>

APRIL 9 FRIDAY Greening Our Water Infrastructure

LOCATION: Sheraton Petaluma
SPONSOR: North Bay Watershed Association
<https://www.acteva.com/go/nbwa2010>

APRIL 11-14 SUNDAY-WEDNESDAY Redefining Water in the City: 2010 International Low Impact Development Conference

LOCATION: Westin San Francisco Airport Hotel, San Francisco
SPONSOR: American Society of Civil Engineers
<http://content.asce.org/conferences/lid10/index.html>

APRIL 14 WEDNESDAY 2010 S.F. Bay Decisionmakers Conference

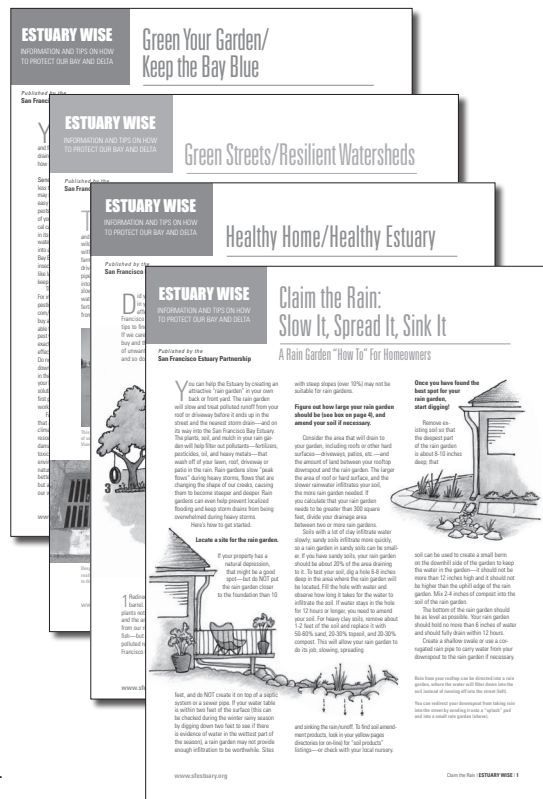
Hear the latest ideas on Bay management, planning, and permitting to support thriving commerce, recreation, and a healthy natural environment.
LOCATION: Oakland Marriott City Center, Oakland
SPONSOR: Bay Planning Coalition

NEW at www.sfestuary.org

ESTUARY WISE downloadable fact sheets:

<http://www.sfestuary.org/pages/index.php?ID=7>

- Claim the Rain: Slow It, Spread It, Sink It
- Green Your Garden/Keep the Bay Blue
- Green Streets/Resilient Watersheds
- Healthy Home/Healthy Estuary



Some highlights from the December 10, 2009 Delta Forum (audio file downloads):

<http://www.sfestuary.org/pages/index.php?ID=31>

Three YouTube videos from the Estuary Partnership's October 9, 2009 Green Streets tour in El Cerrito:

- Slow it! Spread it! Sink it!
- From Storm Sewer to Babbling Brook
- Let Plants do the Work

CALL FOR VOLUNTEERS, SHORE-BIRD NATURE CENTER, BERKELEY MARINA

Do you enjoy exploring with children in the outdoors and helping them to discover and appreciate their natural environment? If you get excited investigating the beach, riding a boat on the Bay, peering under docks and rocks for animal life, or bird watching from the pier, the City of Berkeley Marina Volunteer program could be for you! This hands-on training is great for people exploring a career in outdoor education or looking for worthwhile retirement activities. Training covers such topics as the history of the Bay, marine habitats, Bayshore plant and animal life and how to teach children creatively. The training will take place at the Shorebird Nature Center at the Berkeley Marina. Sessions begin Jan. 14 and continue through March. People welcome any time.

CONTACT: Patty Donald at (510) 981-6720;
<http://www.cityofberkeley.info/marina>

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ESTUARY NEWS

Bay-Delta News and Views from the San Francisco Estuary Partnership

Volume 19, No.1 | February 2010

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URBAN RAIN (CONTINUED FROM PAGE 5)

the creek's watershed is etched into the glass and continued onto a stainless steel panel. On the north side, chutes divert roof runoff into a bioswale by way of a horizontal steel sculpture based on a human thumbprint.

Brookner likes to incorporate body parts into her designs: feet, hands, tongues. Some of her "biosculptures" use mosses, ferns, and

other plants to filter water. In a Cincinnati stormwater catchment project, sculpted human hands morph into a school of native fish.

Her work in San Jose is elegant, economical, and strong enough to speak for itself. For the most part *Urban Rain* allows that to happen, with the occasional aside about the cosmic significance of spirality. (Note:

fingerprints are whorls, not spirals.) The publisher, ORO *editions* (their italics), in an effort to offset the carbon footprint of the book, has arranged to plant two trees for every tree used in its manufacture. The book was printed in Singapore. **JE**