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ESTUARY: 1992, 2006, 2011

IN SIDE

ESTUARY NEWS

Bay-Delta News and Views from the San Francisco Estuary Partnership | Volume 20, No. 5 | OCTOBER 2011

State of the Estuary Conference Summary Preview

BANKING ON TULES

Will Delta farmers someday be able to cash in on carbon credits by growing tules instead of corn and asparagus? That's the vision of two State of the Estuary Conference speakers, Belinda Morris of the Environmental Defense Fund and Steve Crooks of the environmental consulting firm PWA.

Both point to a 10-year pilot project on Twitchell Island that raised the promise of carbon capture by native freshwater marsh vegetation. "A lot of the foundational science has been done there," says Crooks. Originally a study of whether the subsidence of Delta islands could be reversed, the joint US Geological Survey/California Department of Water Resources project also found that wetlands could sequester large amounts of carbon dioxide: a median value of 25 metric tons per acre per year. Beyond that, converting annual cropland to wetland stops the carbon emissions caused by the plowing and oxidation of peat soil.

Tule farm on Twitchell Island. Photo courtesy of Matthew Grimm, EDF.

The Twitchell project was recently mothballed because of federal funding cuts. However, DWR is still in the game, partnering with The Nature Conservancy and EDF to locate a larger, 200-to-400 acre site for feasibility testing in a farm-scale wetland. EDF is also developing economic models to project breakeven costs for replacing farmland with wetland. For his part, Crooks is working with Verified Carbon Standards, a registry for carbon projects, on protocols that would allow developers to trade carbon credits.

Morris cautions that there may be tradeoffs in terms of other emissions: "Wetlands store carbon but they also emit methane, another greenhouse gas. Methylation of mercury in wetlands will also be problematic. Our hypothesis is that methane and mercury can be managed."

Meanwhile, rising seas add urgency to the project of reversing subsidence. "If we started wetland projects in the most heavily subsided areas now, it would take 75 years to get them back up to sea level," says Morris. "The threat of sea level rise to stored carbon is uncertain." Although tules grow quickly enough to rebuild several inches of soil every year, Crooks points out they're very sensitive to salinity: "It very much depends on maintaining freshwater conditions within the Delta. We need a plan that extends out a hundred years. It took us that long to get into this hole and it will take us that long to get out of it."

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SOE CONFERENCE CLIP

MORE BAY BLOOMS

The phytoplankton community—the assemblage of diatoms and other microscopic photosynthesizers—is a key node in San Francisco Bay's food web. Copepods and other zooplanktonic species graze on phytoplankton, and clams filter it from the water column. They in turn support fish, and ultimately seabirds and marine mammals. But you can have too much of a good thing. Mass phytoplankton blooms can deplete oxygen levels, causing local fish die-offs and impairing water quality. Some species of dinoflagellates, diatoms, and other algal forms release toxins.

US Geological Survey biologist Jim Cloern has been tracking phytoplankton for over three decades; his colleague Tara Schraga presented their most recent findings at the State of the Estuary Conference in September. "Beginning in 1999, we've had a significant increase in phytoplankton biomass as measured by chlorophyll *a* levels" says Cloern. "We've also seen a slight but statistically significant decrease in oxygen concentration in bottom waters. This is happening everywhere: Suisun and San Pablo Bays, the Central Bay and South Bay. The Bay isn't currently impaired, but it's starting to look more like the Chesapeake Bay than the San Francisco Bay of 25 years ago." Phytoplankton blooms are also being observed in summer and autumn, not just in spring as in the past; warm-season chlorophyll levels have more than tripled since 1980.

Part of the change may be driven by oceanic climate regimes. The phytoplankton increase followed a shift from a warm phase to a cold phase in the northeast Pacific Ocean in 1999. Associated with this shift has been immigration of large numbers of shrimp and juvenile crabs and flatfish such as English sole into the Bay. In some areas, these bottom-feeding predators have decimated the filter-feeding clams that used to keep the phytoplankton in check. USGS' Jan Thompson, who samples the area yearly, has told Cloern that it's hard to find live clams and

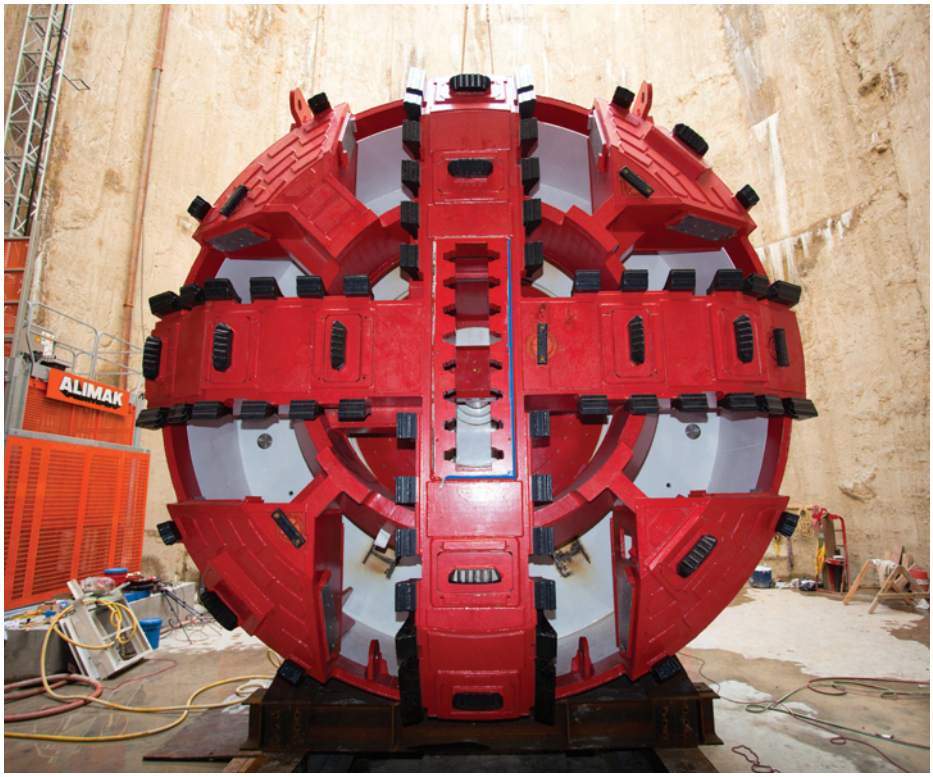
continued on side page 3

Technofix

TUNNEL VISION

Deep beneath the surface of the South Bay—as much as 100 feet in some spots—a giant high-tech "cheese grater" from Japan is hard at work sucking up Bay mud and extruding finished concrete pipe in five-foot lengths as it goes. "It's really an underground factory," says Bob Mues, construction manager for the San Francisco PUC's $313 million Bay Tunnel project, part of the $4.6 billion overhaul of its Hetch Hetchy water delivery system. The five-mile Bay tunnel will carry water coming from the Tuolumne River to Bay Area customers, replacing two aging pipes that currently cross the Bay partly on a trestle. After the tunnel is completed and thoroughly tested, those pipes will be abandoned in place to avoid impacts to sensitive habitat. Scheduled for completion in July 2013, the tunnel is longer than the BART tube (3.8 miles), which, according to Mues, is really not a tunnel but a sunken tube on the floor of the Bay.

The SFPUC tunnel will carry water from east to west across the Bay, but it is being built from west to east. Most of the construction work is invisible from the surface. A large shaft in Menlo Park carries workers below ground where they are delivered to the high-tech tunnel boring machine under the Bay on a man-car pulled on rails, explains Mues. The entire system is electrically powered, so as the workers make their way across the Bay with the movable factory and 600 feet of trailing equipment, they install electric cables that connect to transformers on the trailing equipment—and every 20 feet, install a new ventilation pipe.



This giant "cheese grater" from Japan is plowing a five-mile water supply tunnel beneath the Bay. Photo courtesy of SFPUC.

"The crew isn't working under pressure," says Mues, explaining that the tunnel-boring machine is pressurized to create a zone that equalizes the water and earth pressure and prevents caving in. "The computer reads what the pressure of the ground is, and automatically pressurizes with hydraulic rams," says Mues. If the cutter head needs maintenance, underwater divers come in and repair its back side.

The machine is operated from a submarine cab with a computer that reads 850 pieces of data every 5-10 seconds, says Mues. He explains that the PUC has taken core samples along the route to give them a vertical profile of the Bay mud. That's important when, as

Mues puts it, "You're driving five miles with no place to pop up."

The excavated soil, which Mues describes as "looking like bread dough, but very wet, almost like quicksand," comes out of the head of the tunnel machine onto a screw belt that runs the full length of the tunnel. Once the material reaches the bottom of the shaft, it is rolled into a hopper and taken to the surface on a vertical conveyer belt. From there it goes to a spoil storage area where it is tested and classified—and then is taken to Bair Island to use to restore wetlands if the material meets San Francisco Bay Regional Water Board soils standards. If it does not meet the standards, it is hauled off to a spoils facility for treatment, says Mues.

> "You're driving five miles with no place to pop up."

Mues has worked on lots of submarine excavation projects (subways and high speed rail tunnels), but the most fascinating and challenging aspects of this project, he says, have been taking core samples in areas specifically designated to prevent environmental harm, and, by building a tunnel instead of working above ground, negating the need to build a coffer dam in a wetland or the Bay.

According to the Estuary Partnership's Xavier Fernandez, the tunnel avoids impacts to 27 acres of salt marsh in the Don Edwards wildlife refuge—an early suggestion by US Fish & Wildlife's Clyde Morris—and will send an estimated 200,000 cubic yards of Bay sediment spoils to Bair Island and the South Bay Salt Pond projects.

Fernandez also points out that replacing the aging, leaky pipes currently crossing the Bay will prevent discharges of chlorinated water into the Bay.

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Helicopters deliver equipment without landing in sensitive habitat.

SOE CONFERENCE CLIP

(CONTINUED FROM SIDE PAGE 2)

mussels south of the San Mateo Bridge. In addition, diminished sediment supply from the Bay's watershed may foster phytoplankton growth by reducing water turbidity and increasing light availability for photosynthesis.

Nutrients from agricultural runoff and sewage inputs of nitrogen and phosphorus may also be a factor. "San Francisco Bay has been historically resilient to problems of water quality relating to nutrients," Cloern explains, due to a combination of strong tides, high turbidity, and filtration by mollusks. "There were no blooms of harmful phytoplankton species or loss of oxygen from bottom waters as in Chesapeake Bay and the northern Gulf of Mexico, despite high nutrient input." If that's changing, are nutrient inputs responsible? "We don't have a good handle on that. No one is measuring nutrient inputs to the Bay. There's a particular interest in sewage input because that's one of the knobs that can be controlled." The most recent published estimates of nutrient loading to San Francisco Bay (2006) didn't consider urban runoff.

Superimpose changes in sediment and nutrient loads on decades-long climatic cycles and you have a complex research challenge. "A career isn't long enough to study it," Cloern says. With sustained federal funding for research in doubt, he sees a critical need for locally-supported water quality monitoring coupled with computer models that incorporate currents and nutrients and can project trends over time. He says the wastewater community is taking an interest in the modeling aspect.

"It would be nice to be able to predict how it's going to change in the future," says Mike Connor of the East Bay Dischargers' Authority. "Monitoring alone is not going to be sufficient. It will take fairly sophisticated modeling of processes in the environment." The Regional Monitoring Program could be one channel of support for the modeling process.

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SOE CONFERENCE CLIP

WATERSHED WARRIORS

As the title of her State of the Estuary Conference presentation suggests, Doria Robinson of Richmond-based Urban Tilth and Friends of the Richmond Greenway sees small inner-city nonprofits as doing much of the heavy lifting in urban watershed restoration. Such groups, she says, are uniquely positioned to win neighborhood buy-in. The key is connecting with and engaging the community: "The difference between a successful restoration site and an unsuccessful site is community involvement."

Photo courtesy of Doria Robinson.

Robinson, born and raised in Richmond, started out there with the Watershed Project and later did restoration work at the Martin Luther King, Jr. Regional Shoreline and Arroyo Viejo in Oakland. "That's where I realized the potential power of the active engagement of community members in restoring streams," she recalls. "There are plenty of things unskilled people can do. When I was working for the Urban Creeks Council on the Rheem Creek site at Contra Costa College, we had hundreds of students planting, watering, and weeding. In other projects, community involvement had been an afterthought: 'When we get it in, we'll bring people down.' Rheem Creek was the first time I was allowed the resources to really explore the potential of community stewardship."

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Environment

FLIPPERHOLD IN THE BAY

Sea otters once abounded in San Francisco Bay. General Mariano Vallejo wrote that in 1812 they were so numerous that "they were killed by boatmen with their oars in passing through the kelp." That, unfortunately for the otters, was the year Russian fur hunters ventured down from their outpost at Fort Ross. At least 700 otters were killed in the Bay alone in their first week's work, speared from walrus-skin baidarkas by Aleut crews. Within five years the Russians had taken 50,000. Others joined the fray: a Señor Amador from Mission San Jose claimed to have lassoed 30 otters on shore at Point San Quentin. Yankee hunters hired Hawai'ians to retrieve carcasses from the water. A remnant otter population near the mouth of Sonoma Creek, which Vallejo had tried to protect, was wiped out in 1840. Records trail off after the outbreak of gold fever, but it's likely the species was locally extirpated by the end of that decade.

Now the iconic mustelids are only occasional visitors to the Bay. "To my knowledge, there have been only a few reports during the last couple of years," says California Department of Fish and Game's biologist Michael Harris. The current northern extent of the species' range is near Pigeon Point on the San Mateo coast. But in winter and early spring small groups, mostly males, will explore beyond the periphery of their range, exploiting rich foraging areas. Then they return to where the females are. "Range expansion is more driven by how quickly females occupy new areas," Harris explains. Pioneers are pushing beyond the southern end of the range, but expansion has stalled in the north. Translocation attempts in Southern California have proved unsuccessful; if the otters are going to return to San Francisco Bay, it's up to them.

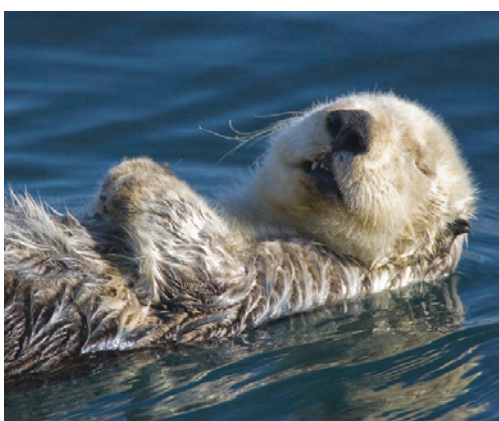
One marine mammal that has made a recent comeback is the harbor porpoise. Porpoise bones in the Emeryville shellmound indicate that Native Americans hunted them for hundreds of years. The small stubby cetaceans became scarce in the 20th century, although they still frequented the Tiburon docks in the 1930s. Then came World War II, when a steel anti-submarine net was installed between Sausalito and San Francisco. For decades, no porpoises were observed in the Bay. Then a San Francisco State University whale biologist spotted a few off Sausalito. William Keener, writing in *Bay Nature*, reports subsequent sightings near the Bay Bridge and Brooks Island, and a possible record from Suisun Bay. He says they're easily seen from the deck of the Golden Gate Bridge.

Although records are sketchy, it appears another cetacean, the common bottlenose dolphin, once frequented the Bay. A dolphin skull snagged by a fisherman in 1958 was estimated to have settled in the mud 50 to 100 years earlier. The brainy creatures expanded their range northward after the 1982-83 El Niño, eventually reaching San Francisco Bay. Most often seen near the Golden Gate, a few have ventured as far as Redwood City. California has distinct coastal and offshore populations of bottlenoses that may be genetically distinct; those seen in the Bay are most likely of the coastal type. Recent years have seen fatal attacks on harbor porpoises by gangs of young male dolphins where their ranges overlap, including the Bay.

The Bay also has its cohort of pinnipeds—sea lions and true seals. The largest species, the northern elephant seal and Steller's sea lion, were probably always scarce in the Bay proper. Sometimes an individual male Steller's will join the smaller California sea lions at Pier 39. Most of the Californias that hang out there were born in the Channel Islands, but a few may be Farallon natives. Their species has suffered from anthropogenic pollution, with high PCB and DDE loads acquired in Southern California waters. They're venturesome creatures; any pinniped found inland is likely to be a California sea lion. One even made it as far as Lodi.

Through all these changes, the harbor seal has maintained a flipperhold in the Bay. These small pinnipeds are highly adaptable. While most populations are shy of humans and their boats, the harbor seals that haul out on the Castro Rocks off the Richmond-San Rafael bridge seem oblivious to tanker traffic. As the mix of fish species has changed,

Mike Baird, flickr.bairdphotos.com



Iron deposits turn some seal coats red. Photo courtesy of Mark Rauzon.

the seals are eating more invasives like the yellowfin and chameleon gobies. Corinne Gibble of the Moss Landing Marine Laboratories, who discussed the diet of Bay seals at the State of the Estuary Conference, collected scat from haulouts (she used a Boston Whaler to reach North Bay rocks, a kayak for South Bay sloughs) and sorted out the otoliths (earbones) that allow identification of most fish species. The menu varies between subregions of the Bay: Gibble says North Bay seals eat more northern anchovies and plainfin midshipman, while yellowfin gobies are predominant in the South Bay. There's concern that the non-native gobies have less nutritional value than native fish. The diet of North Bay seals is more varied during the pupping season when females make shorter foraging trips.

The price of the seals' persistence in the Bay may be high contaminant loads. In particular, PBDE concentrations in local harbor seals are among the highest reported for the species; measured levels have doubled every 1.8 years since the 1990s. One study found a correlation between PBDEs and low red blood cell counts in seals. PCB residues have decreased but remain cause for concern.

Denise Greig of the Marine Mammal Center, another conference presenter, has been analyzing chemical levels in the blubber of stranded harbor seal pups, including those found dead on shore. Since the pups would have absorbed contaminants in their mother's milk, their levels reflect maternal loads. "Females are mostly fasting while nursing, so the contaminants are coming straight out of the blubber into the milk," she explains. "Nursing pups are feeding at a higher trophic level than they will be when they're mature enough to catch fish on their own."

Greig says her results show increased exposure to PCBs in San Francisco Bay and increased exposure to DDTs along the Monterey coast. Other contaminants in the pups' blubber included chlordane, a banned pesticide, and lindane, still used to treat lice and scabies, but these showed no clear geographic pattern. Except for one pup with high PCB and DDT levels and gross neurological defects, those Greig sampled did not have health problems that could be linked directly to contaminants. But a substudy following seals through their first year did support an association between contaminant loads and reduced survival. "It's hard to link contaminants with effects that have multiple causes," she says. She's currently working with SFEI's Susan Klosterhaus and Meg Sedlak on studies of emerging contaminants in seals.

On the other hand, the red pelage of some San Francisco Bay seals, caused by iron deposits on their hair follicles, appears unrelated to their health. It may be a matter of where they forage. "To date, we haven't found any contaminant correlations with the redcoat syndrome," says Greig. "Their whiskers are often shorter and more brittle, but they're in the same body condition as normal-colored seals. We've seen plenty of redcoats nursing beautiful fat pups."

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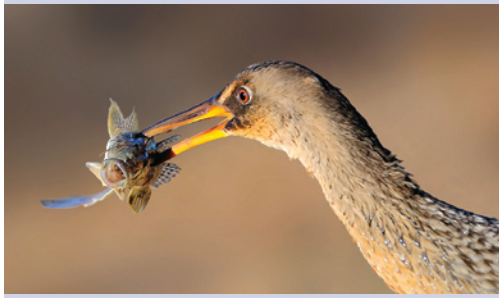
JE

birdwatch

RAILS IN THE CITY

For the California clapper rail, any expansion of its limited range is good news. The reclusive marsh bird has just been confirmed as breeding in San Francisco's Heron's Head Park near Hunters Point. A single adult was spotted there last summer, but nesting was not detected. On August 8 this year, Dominik Mosur saw and photographed two clapper rail chicks crossing a patch of pickleweed near a slough at the park. Their size and plumage indicated they were about six weeks old, suggesting they had hatched at Heron's Head rather than dispersing from another marsh.



Clapper rail. Photo courtesy Verne Nelson.

This may have been an unprecedented record. "Nobody alive today remembers ever seeing nesting clapper rails in San Francisco," local birder Alan Hopkins told the *San Francisco Chronicle*. "They nested along the Bay shore about 15 miles away, but there was no habitat in San Francisco." Joseph Grinnell and Margaret Wythe's *Directory to the Bird-life of the San Francisco Bay Region* (1923), a baseline for local avifaunal studies, has citations for San Mateo, Alameda, Santa Clara, Marin, and Contra Costa counties and one stray on the Farallon Islands, but no accounts of breeding in San Francisco.

Photographer Glen Nevill documented a juvenile rail on September 4 and two adults, one with a green leg band and a radio transmitter, the following day. The banded bird may have been part of a US Geological Survey study in the South Bay.

The endangered local subspecies of the clapper rail lays its eggs from early

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CORPS REPORT PUTS POLICY IN QUESTION

A new Army Corps of Engineers research report, based on field studies at eight sites (including Sacramento) and computer modeling, will apparently not affect the agency's policy regarding woody vegetation on flood-control levees. The document, entitled "Initial Research into the Effects of Woody Vegetation on Levees: Summary of Results and Conclusions" was prepared at the Corps' Engineer Research and Development Center at Vicksburg, Mississippi by 20 engineers and released on September 8. Even with new research findings that call existing standards into question, the Corps' recent press release endorses the status quo.

Contrary to the Corps' conventional wisdom, the authors concluded that trees could strengthen levees in some circumstances: "According to the numerical models, when the tree was located at the levee toe (either side), a reinforcing effect was observed and the factor of safety was increased." That factor was described as slightly reduced when trees were at the crest or mid-slope on the levee's land side. The analysis did not account for wind throw. Another finding was that a tree's root mass causes only local disturbance in the flow field: "… if the flow field and pressure conditions are within the margin of safety without woody vegetation, it will be equally safe if live woody vegetation is present." Tests of seepage effects at two field sites indicated that "the probability of initiation of internal erosion is negligible from woody vegetation at the toe of the levee…"

While not openly questioning Corps policy requiring the removal of most trees and shrubs from levees, the report acknowledges the limitations of a standardized approach to vegetation management: "Because of the extreme variability in geology, tree species, climate, and soils, the impact of trees on levees must be analyzed on a case-by-case basis." Issues not addressed include the phenomenon of piping, in which water supposedly infiltrates the levee through root cavities.

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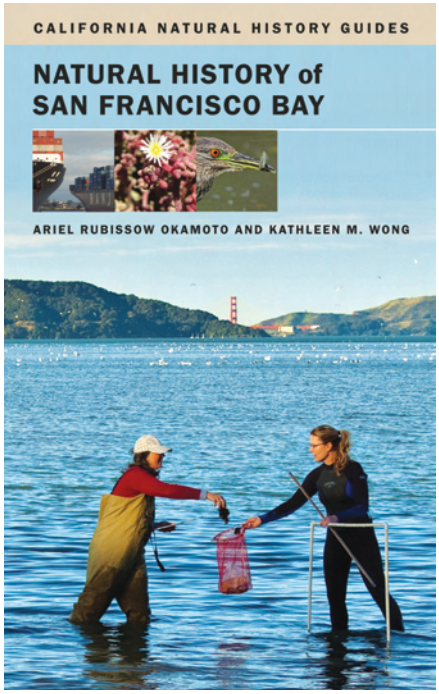
Now in Print

THE ESTUARY UP CLOSE AND PERSONAL



Harold Gilliam, the dean of local environmental journalists and longtime chronicler of San Francisco Bay, is a hard act to follow. Ariel Rubissow Okamoto and Kathleen M. Wong have done an admirable job in *Natural History of San Francisco Bay,* newest of the University of California Press's California Natural History Guides. Rubissow Okamoto is a former editor of this newsletter; Wong was the last editor of the California Academy of Sciences' late lamented *California Wild*. They bring their literary chops and extensive networks of science contacts to a lively synthesis of the Bay's natural and human history.

"I got to know my sources for the book pretty much through ESTUARY NEWS," says Rubissow Okamoto. "Their trust in me and my trust in them came from years of knowing that we were both being held to the Estuary Partnership's standard for publication: accuracy, balance, substance, and unswerving commitment to the health of the ecosystem."

As the authors note, this book is different from others in the series. While covering the geology, hydrology, and biology of San Francisco Bay, they also recount what we've done to this spectacular body of water, what we're doing now to restore it, and how climate change will complicate those efforts. They cover not just the Bay proper, but Suisun Bay, the Delta, and the whole valley/mountain watershed. Rightly so: hydraulic gold mining in the Sierra had—still has—enormous consequences downstream, and upstream dams and diversions affect everything from sediment and nutrients to the health of the salmon fishery.

A focus on contemporary Bay science sparks the book. Vignettes follow scientists trawling the Bay floor, working a water-sample transect, squelching through Bay mud to sample mercury levels in fish, tracking radio-tagged California clapper rails in a tidal marsh. California water politics have a labyrinthine complexity; Rubissow Okamoto and Wong provide a clear thread through the maze. Coverage of grassroots restoration efforts, particularly around urban creeks, is solid. Other environmental heroes, like the three women who founded Save The Bay, get their due.

Although it's not intended as a field guide, the book spotlights both common and endangered plant and animal species. Like all the UC Press guides, this one is lavishly illustrated with maps, charts, and photographs, many by Max Eissler.

Rubissow Okamoto says the most rewarding part of the project was "going out with the scientists and the Fish and Game people and seeing how they rose to the challenge of working in the Bay environment." The book as a whole is "about condensing an enormous amount of amazing activism, science, and government and showing how it all relates to one ecosystem—in 300 pages. It also tries to put the mantra of the Estuary Partnership clearly on the page: that you can't understand the Bay without thinking about the rivers and ocean as a living, changing, single system full of water. I like to call this book the kitchen sink of the Estuary, a stranger-than-non-fiction combination of rocket science, fish stories, local history, restoration recipes, and good solid government work." RS

"...you can't understand the Bay without thinking about the rivers and ocean as a living, changing, single system full of water."

Now in Print and On-Line

STATE OF THE BAY 2011

Hot off the presses, the *State of San Francisco Bay 2011* highlights the importance to the Bay's health of wetland restoration and fresh water flowing in from upstream rivers. As the climate changes and sea level rises, the Bay will need more wetlands around its perimeter—both to protect local communities from flooding as well as the millions of dollars' worth of restoration projects that have gone in the ground over the past two decades.

"These wetland restoration efforts will likely be viewed in the future as the most visionary flood control projects in the history of the Bay Area," says the Center for Ecosystem Restoration and Management's Andrew Gunther, the report's lead author.

Another critical finding in the report is that the Bay is suffering from inadequate fresh water flowing in from its rivers. The report concludes that dams and diversions have dramatically reduced the amount of fresh water that reaches the Bay, cutting inflows by more than 50% in most recent years. "The inflow of fresh water into the Bay is essential for the Estuary's health," says Christina Swanson, another report author. "For the past several decades, the Bay has been in a state of chronic drought. Protecting the Bay's ecosystem and recovering its fisheries will require changes in water management in the Bay's tributary rivers and the Delta to increase freshwater flows, particularly during the spring."

Other key findings in the report:

- Fish abundance and diversity are declining in all regions of the Bay except near the Golden Gate. Fish-eating birds like Brandt's cormorants, egrets, and herons are not finding enough food to feed their young. More wetlands will support a stronger food web for those birds and for fish and other wildlife.
- Shrimp and crab populations are increasing in the Bay, possibly due to improved ocean conditions outside the Golden Gate. However, with less fresh water coming into the Bay, the brackish water habitat of the native San Francisco Bay shrimp is shrinking, and this species is, at best, just holding its own.
- Some bird populations are benefitting from restored habitat, in particular tidal marsh birds, such as song sparrow, common yellowthroat and black rail, and dabbling ducks like pintails, shovelers, and mallards. Some marsh bird populations may be decreasing due to elevated predator activity, from non-native as well as native predators.
- The amount of sediment deposited in the Bay from dredging of ship channels and ports has greatly decreased, from 10 million cubic yards in 1986 to one million cubic yards in 2009. These sediments have been used to help restore the Bay's wetlands: In 2009, 2.7 million cubic yards went to the Hamilton Wetland Restoration Project and 156,085 cubic yards to Bair Island.
- San Francisco Bay is benefitting from the work of volunteers: In 2010, 25,000 Bay Area citizens rolled up their sleeves to clean trash from and restore creeks and marshes in the nine Bay Area counties on Coastal Cleanup Day.
- Residential water use around the Bay has decreased, from over 100 gallons per person per day, to less than 80 gallons per person per day. The use of recycled water has increased in the Bay Area, from 29.1 thousand acre feet in 2001, to 46.1 thousand acre feet in 2010. Water conservation by Bay Area residents and increased use of recycled water could leave more water in San Francisco Bay tributary rivers—but only if additional upstream diversions are not made.

Download the full report at www.sfestuary.org. LOV

burningissue

(CONTINUED FROM SIDE PAGE 6)

"This report indicates that vegetation on levees can be beneficial and supports our contention that the Corps' 'one size fits all' vegetation removal approach it mandates in its draft guidelines is contrary to the protection of water quality," says the San Francisco Bay Regional Water Board's Bruce Wolfe. "We hope the Corps will heed its report's findings and modify its draft guidelines to allow more flexibility in vegetation management."

Mitch Avalon of the Contra Costa County Flood Control and Water Conservation District has a similar reaction: "I think Corps policy starts out with the premise that trees are guilty until proven innocent. There's nothing here that says trees are guilty—no smoking gun. What they're looking at is tall levees with the land side way below, but that's not all levees. In the Bay Area we have little short stubby levees, where trees on top don't have the same impact of adding weight that could cause stress to the levee structure." Avalon adds that the report establishes "no connection between tree roots and levee failure."

The Corps press release says that "ERDC researchers have determined that because of the many variables…the full impacts of trees on levees may never be fully quantifiable." The report's actual language states "must be analyzed on a case-by-case basis." The release continues: "USACE remains confident that a well-constructed levee with well-maintained grass cover represents the optimal goal for reducing the uncertainty of the performance of levee systems…Although the results of this initial research do not warrant a change to the USACE national vegetation management standard, USACE will use the results to inform its decision making for trees on levees in the USACE levee safety program, such as with prioritizing deficiencies."

Army Corps spokesperson Wayne Stroupe declined to comment on any policy or guidance implications of the report.

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WATERSHED WARRIORS

(CONTINUED FROM SIDE PAGE 4)

Although Urban Tilth focuses on food production and nutrition, Robinson links stream health and personal health: "In the extended model of permaculture you connect with wildlands and the watershed. Urban Tilth is now at that stage." Young participants are trained to identify and manage native plants as well as crops. Other programs, including apprenticeships with a hydrologist, are planned over the next few years. "They come out of it with transferable skills for other employment opportunities," she says. "I still run into kids who ask me when there is going to be another project."

She frames projects to fit the community: "Earth Day pulled in a lot of one-timers. Then we realized that Martin Luther King Jr. Day was more resonant on a long-term basis. The whole message there is stewardship and service." Robinson also stresses the importance of collaborating with groups like the Asian-Pacific Environmental Network and local churches. Inner-city residents, she says, may initially perceive environmentalists as outsiders: "But then they see who we are. We don't just represent the community; we are the community."

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RAILS IN THE CITY

(CONTINUED FROM SIDE PAGE 5)

April through mid-July. Clutch size ranges from five to 14, with an average of seven, but few chicks survive to adulthood due to heavy predation. The precocial youngsters leave their nests shortly after hatching, fledge in 10 weeks, and are capable of breeding the following year.

The presence of the rails attests to the health of Heron Head's marsh. Thank to the California Coastal Conservancy, the San Francisco PUC and the San Francisco Bay Trail Project, this neglected Bay fill site became a public park in 1999. Since then, it's acquired a reputation among birders—well justified by the rail sightings. JE

Watch for full coverage of the State of the Estuary 2011 Conference in the December issue