



ESTUARY NEWS

Bay-Delta News and Views from the San Francisco Estuary Partnership | Volume 21, No. 2 | APRIL 2012

Bad Butterfly Chemistry: The endangered Lange’s metalmark butterfly, endemic to the Antioch Dunes, hit record low numbers last year when only 28 were counted in the annual census. Experimental research on a related insect, the Behr’s metalmark, implicates herbicides in its decline. John Stark and colleagues at Washington State University found that adult numbers of the proxy species fell by one-fourth to one-third when larvae were exposed to triclopyr, sethoxydim, and imazapyr. All three herbicides have been used to control yellow star-thistle and other invasive plants outcompeting naked-stem buckwheat, the Lange’s larval food, at the Antioch Dunes National Wildlife Refuge. **MORE:** www.sciencedirect.com/science/article/pii/S0269749112000280

Foggy Payload: UC Santa Cruz atmospheric chemist Peter Weiss-Penzias and colleagues sampled fog last summer at four Monterey Bay locations and measured its mercury content. Their article in *Geophysical Research Letters* reports concentrations of all forms of mercury averaging 10.7 nanograms per liter. Monomethyl mercury averaged 3.4 nanograms per liter, five times higher than the maximum observed level in rainwater. They estimate that up to 99 percent of the monomethyl mercury entering coastal ecosystems may be fog-borne. Biotic processes in marine upwellings may be involved. **MORE:** www.agu.org/pubs/crossref/2012/2011GL050324.shtml

Metal Threat for Rails? In addition to fish-eating waterbirds like terns, California clapper rails also accumulate mercury from their diet of aquatic invertebrates. A study by Josh Ackerman and six other US Geological Survey scientists measured mercury levels in 133 rails in San Francisco Bay tidal marshes. Mercury concentration was found to be negatively associated with body condition, accounting for an estimated potential 5 to 7 percent decrease in body mass. The authors say their results indicate the potential for detrimental effects of mercury contamination on the endangered rails. **MORE:** www.sciencedirect.com/science/article/pii/S0269749111006610

SEEING A WOMAN ABOUT A BOAT...

When Arthur Helwig died last year, he left behind a 1919 tug, a World War II landing craft, and a couple of work barges. In his prime, he’d kept these tools of his mom and pop marine contracting business ship-shape. He worked off them while he fixed docks and drove piles, and stocked them with the paint, varnish and sealants he spread on surfaces so they could stand in, and withstand, water and weather. Before he started this business, he’d run The Diver’s Exchange in Alameda and captained underwater rescue missions. Later he spent more time volunteering in East Bay Parks than working as a marine contractor, and the vessels fell into disrepair. When he died, inspectors found everything from old car batteries and waste oil to antifreeze and wood preservatives stacked on deck. So Helwig’s widow inherited a floating time bomb, in terms of Bay water quality. “If those barges sank in a storm, it would have been a bad outcome for the Bay, especially in the sheltered waters of Oakland estuary where they were tied up,” says Acting Director of the Bay Conservation and Development Commission, Steve Goldbeck.



The 1919 tugboat *Herbert* and work barge. Photo by Daniel McGlynn.

BCDC might not have even known about Helwig’s vessels if they had not been left at his last job site for so long – right in a nice residential neighborhood of Alameda. When locals called to complain, they were connected to Ande Bennett, who works for BCDC’s enforcement section.

Bennett tracked down Helwig’s widow, who wanted to do the right thing but didn’t have the wherewithal for a costly cleanup. Bennett thought to use BCDC’s Bay Fill Clean-up and Abatement Fund, but time was of the essence, winter storms were rolling in, and she knew getting money out of the fund practically requires an act of Congress – or at least the California legislature.

Bennett called around to the Coast Guard, the Port of Oakland, the US Army Corps of Engineers, and local law enforcement. In the past, all these entities helped with the towing, clean up and disposal of derelict vessels and navigational hazards. But these days, struggling with budget cuts, new mandates for homeland security, and inconsistent regulations and jurisdictions along the Bay’s shore, no one seemed able to help.

Bennett turned to the S.F. Bay Regional Water Quality Control Board. Together, the two agencies explored pulling the vessels up on an old seaplane landing ramp nearby, but the city said no. In the meantime, Mrs. Helwig had asked a marina friend to keep an eye on the vessels, but they were far from secure. “We didn’t want anyone taking care of the problem informally, with a dark-of-night disposal overboard,” says the Board’s Keith Lichten.

The Board hired NRC Environmental to remove the hazardous materials from the vessel, and was able to use a special fund made up of fines from water quality violations to do it. “It was a bit unusual for us to have the opportunity to use the funds for prevention, before the spill had occurred,” says the Board’s David

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THE DEVIL IN THE DETAILS

A new monitoring and evaluation plan – developed by 70 land managers and scientists from 35 entities – will help wetland managers across the region evaluate their progress in restoring wetland habitats on a landscape scale. Even more importantly, it will help them evaluate and report back in a way meaningful to everyone else.

“The time to do it is now, before we make any more big changes to the Bay landscape,” says Beth Huning of the San Francisco Bay Joint Venture, which facilitated work on the new monitoring process. “We need to know how these new habitats are functioning, and if they’re delivering the kind of habitat values identified in the region’s Bayland Habitat Goals.”

The Joint Venture is not trying to reinvent the wheel – many carefully thought-out protocols for monitoring wetland development and biological values, among other factors, are already on the books. The aim is simply “more coordinated, more organized, more efficient, monitoring and data sharing,” Huning says.

The plan, published last fall, suggests performance targets and monitoring objectives, and recommends metrics and protocols. Diverse teams of experts tackled different monitoring challenges such as measuring habitat quantity and counting shorebirds, and made recommendations. The teams all came together for a facilitated workshop to set priorities for the region. This spring and summer, another level of detail is being added to the plan, delving into wetland habitats ranging from tidal marshes to seasonal wetlands, considering target species, and addressing water, climate change, and other influences on bay landscapes.

Thanks to this undertaking, there’s regional agreement on how to monitor secretive marsh birds for the first time, for example. And there’s new software that enables everyone doing aerial surveys of mid-winter waterfowl survey to track species from the air. “Years of good data were collected in the past, but often it remained inaccessible,” says Huning.

Over time, coordinated monitoring will allow evaluation of trends at multiple scales: local, regional, flyway, and continental, and the linking of efforts in the Bay Area to national and international conservation goals. “Partners need to plan for monitoring up front,” says Huning. **JE & ARO**

Plan: <http://www.sfbayjv.org/monitoring-evaluation.php>

Technology

THE GREEN FACTORY

Those tanker trucks labeled “FOG” barreling around East Bay streets carry the fuel of the future: fat, oil and grease. Add a little chicken blood, cheese waste, restaurant leftovers and soda pop to a tank of sludge and you have EBMUD’s new recipe for reducing greenhouse gas emissions and energy consumption. On a grey morning this April, the East Bay Municipal Utility District fired up the first wastewater treatment plant in the nation to produce more energy than it needs to operate. The plant, whose round tanks lie in the shadow of the Bay Bridge maze, has a new turbine that uses methane gas to generate electricity.



EBMUD’s innovative new turbine, which produces enough electricity to power 5,000 homes. Photo by Ariel Okamoto.

The hum of the turbine permeated opening day speeches under a white tent. “That’s the sound of money,” said EBMUD’s Manager of Wastewater Engineering Ed McCormick to a crowd of 50 dignitaries, neighbors and press. His plant’s electricity bill just went from several million dollars per year to zero thanks to the new technology. EBMUD will even have one or two spare megawatts to sell to the grid.

The 4.6 megawatt turbine gets so hot, at night you can see a red glow, say the crew. Carollo Engineers developed the technology for EBMUD. According to Carollo’s Sarwan Wason, they “took some chances” with the design – studying older natural gas turbines in southern California and then experimenting with ways to boost efficiency. Their efforts paid off. Your average natural gas turbine has an electrical conversion efficiency of about 30 percent, but

this one burns biogas and achieves about 39 percent. The key is something called a “recuperator” on top of the turbine. “The recuperator boosts efficiency by using turbine exhaust heat to pre-warm the inlet air before combustion,” says Wason. It’s like the difference between a car engine and a jet engine, sums up EBMUD engineer Vincent Pon.

Jet engine or not, it doesn’t take rocket fuel to make energy. Wason talks enthusiastically about “lots of energy” in everything from chicken blood and cheese factory waste to excess sugar from soda bottling plants. EBMUD collects these biofuels from all over the East Bay, processes them, and adds them to its sewage sludge in eleven “digester” tanks, where anaerobic bacteria break them down and produce methane. Rather than flaring off the excess methane, as they have in the past and which produced unwanted greenhouse gases, they put the methane to work making electricity. This doubles the plants capacity to produce clean energy from waste previously thought “too gross, too toxic and too difficult to manage,” say EBMUD officials. Once “digested,” the residual from the tanks is put to work fertilizing alfalfa fields.

Getting permits to try something so untraditional wasn’t easy, says the green factory team leader, EBMUD’s Dave Williams. “There were a lot of safety issues and processing issues and production issues our operations people had to find a way around,” he says. But since EBMUD has a spotless record – no violations of its discharge and operation permits in 12 years – they got the go ahead to try something out of the ordinary. U.S. EPA provided seed money to get them started, sharing an interest in diverting waste from landfills and converting sludge to useful biosolids.

At the opening, speaker Matt Bond, President of the Water Environment Federation, suggested that EBMUD’s attitude reflected “a major paradigm shift” in the industry from waste disposal to resource recovery. “They’ve shown us what the water utility of the future will look like,” he said.

Many water utilities – built on shorelines where they can easily discharge treated wastewater – may face uncertain futures due to climate change. Sea level rise, and associated storm surges, could soon inundate plants like EBMUD’s, along with many important highways and utility lines. So it’s heartening to see EBMUD trying to reduce its own carbon footprint. “We need more plants like it,” commented West Oakland neighbors Jerome Jordan and Queen Thurston as they toured the “green factory.” **ARO**

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THE BIRD LABORATORY

Scientists know birds like to nest on islands, but they didn't know they would nest so quickly on the new man-made islands south of the Dumbarton Bridge.

Less than a year after bulldozers scooped and shaped 30 little islands out of the Bay mud in an old salt pond called "SF2," scientists counted 193 avocet nests and five snowy plover nests. Nesters used all but two of the islands, surprising scientists who expected more migratory and wintering birds the first year than the more cautious nesters. They also noticed the birds built more nests on islands with a linear shape than those with a round shape.

"This entire project is set up as a bird laboratory," explains the U.S. Geological Survey's Laura Valoppi, lead scientist for the 15,000 acre South Bay Salt Pond Restoration Project. The project is converting former salt production ponds to tidal marsh for endangered species, and making sure any waterbirds displaced in the process have optimal new habitats on "managed" ponds such as SF2. "With only 18 months of data, we don't know what's an anomaly and what's a trend yet, but we were pleasantly surprised to see such a positive response from breeding birds to the islands."

The USGS bird team is watching SF2 closely. They want to know which of the restoration features the birds respond to, among them two different shapes of islands, viewing platforms, a trail, and changing water levels engineered by humans rather than nature. They want to know not only which avian species are using which of



Avocet chicks. Photos by Judy Irving, Pelican Media.

the habitats they've created and how – for nesting, roosting or foraging for food – but also whether

the people on the trails and platforms seem to bother the birds.

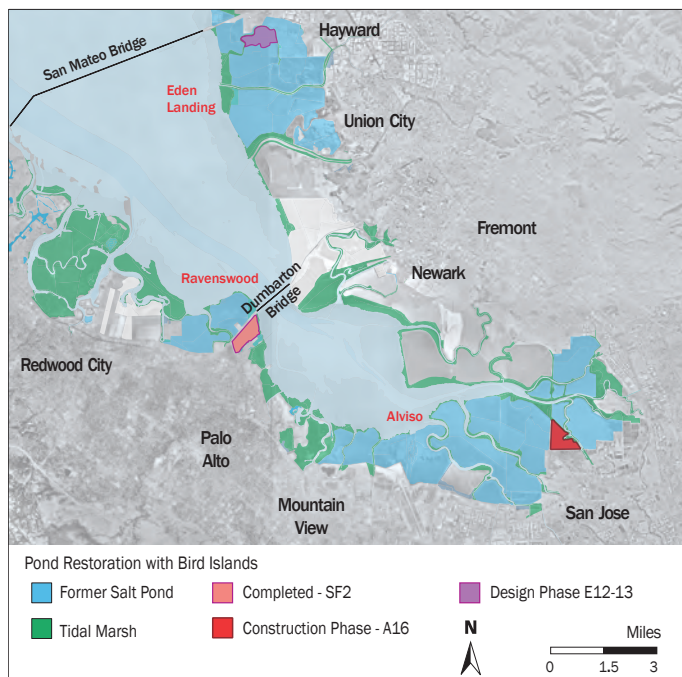
Though it's early days yet for scientific conclusions, preliminary observations are already informing design decisions for three other ponds in the restoration pipeline. This March engineers began construction on another managed pond, A16 near the town of Alviso. After finding that one end of the pond was much deeper than anticipated, they decided to reduce the number of bird islands from 30 to 16 and to place them only in the shallower northern end. "When you're building habitats in the water, you need to figure out where exactly you're going to get dirt and where you're going to move dirt, because every heap of dirt you move costs money," says Valoppi.

To keep the experiment going, Pond A16 will include both round and linear islands of the same dimensions as SF2. Not enough time has passed to confirm that the birds prefer the linear islands – which are sloped and shaped to shelter birds from the prevailing northwest winds – over the round ones. But A16 adds another dimension to the experiment. Scientists wonder how A16's location, tucked in a marshy backwater down a slough, will influence bird use, as compared to SF2 which is directly adjacent to open bay water and mudflats suitable for foraging. "We want to know if location in the

water landscape makes a difference to the birds' use of the islands," says Valoppi.

Two more ponds in the restoration pipeline will provide a laboratory for seeing how birds react to low, medium and high water salinities. Here at ponds E12 and E13 near Eden Landing, they've decided to only build linear shaped islands (6) and to take two other early lessons from SF2 into consideration.

First, observers have noticed birds standing out in the middle of the flooded area of SF2. The birds had found shallower spots – or mounds – to stand on. The way Valoppi explains it, no



Map courtesy of SFEI.

DAMAGE CONTROL

John J. Berger famously defined environmental restoration as "a process in which a damaged resource is renewed." That implies bringing a compromised environment back to its original structural and functional condition. How realistic is that goal?

To measure how close wetland restoration efforts have come to recreating reference conditions, Stanford research fellow David Moreno-Mateos, UC Berkeley professor Mary E. Power, and colleagues chose 621 published studies for a meta-analysis. The worldwide sample included both restored and newly created wetlands, freshwater and saltwater. The researchers scored each wetland on biological structure (abundance, species richness, and diversity of animals and plants) and biogeochemical function (storage of carbon, nitrogen, and phosphorus.)

Their results suggest that wetlands recover structure and function faster in warmer climates, riverine and tidal settings, and larger units. "In the Bay Area, with a temperate climate and dynamic tidal marsh hydrology, we're in a good situation to restore wetland," says Moreno-Mateos.

One surprising finding: newly created wetlands approached reference conditions more quickly than degraded wetlands that were restored. Moreno-Mateos says the mechanism involved is unclear.

He's emphatic that even incomplete wetland restoration is better than none: "Our study helps clarify what we are doing with restoration and how we should focus our efforts in the future."

Local practitioners agree. "The findings don't surprise me," says wetland engineer Michelle Orr of ESA-Philip Williams Associates. "The key is that people have realistic expectations for restoration when making decisions that result in the loss of existing wetlands."

Robin Grossinger of the San Francisco Estuary Institute was impressed that the projects in the study were doing as well as they were: "70 to 80 percent of function isn't bad, given the number of small projects. Size, scale, and connectivity all matter. In the Bay, it's good that we're doing more large-scale projects." JE

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The Bay-Delta Conservation Plan, described by Deputy Secretary Jerry Meral of the California Natural Resources Agency as “a \$250 million effort to get a permit [for water projects] to operate under the state and federal Endangered Species Acts,” is both ambitious and controversial. Some environmental leaders see it as a last best chance to balance the state-mandated coequal goals of water supply reliability and restoration of Delta ecological processes. However, draft versions of the plan have drawn criticism from other environmental leaders, scientists, a National Academy of Sciences panel, and other reviewers.

A draft “effects analysis,” released this February, seeks to anticipate the effects of the plan’s multiple components – from creating new wetland habitats to constructing a peripheral canal or tunnel to bypass the Delta. The analysis does not consider increasing freshwater flows through the Delta, even though the State Water Resources Control Board concluded in 2010 that current flows were insufficient to protect certain public trust resources in the Bay-Delta. More than half of natural flows through the Sacramento and San Joaquin watersheds are diverted for urban and agricultural uses, resulting in what has been described as a “chronic drought” condition for the Bay and stressing fish populations.

ESTUARY NEWS asked several scientists for their perspectives on the BDCP’s recently-released effects analysis, as well as a seasoned water manager. Although those with federal and state agencies declined to comment, two nonprofit-affiliated PhDs responded: Christina Swanson of the Natural Resources Defense Council, and Jon Rosenfield of The Bay Institute. In addition, ESTUARY NEWS spoke with Leo Winternitz, now with The Nature Conservancy but formerly with the Department of Water Resources and the State Water Board. On these two pages are their opinions and thoughts, as well as a brief on the new March 2012 National Academy of Sciences panel report.

Is the science in the BDCP effects analysis and appendices good enough to support the plan?

SWANSON: The Bay-Delta is one of the best-studied estuaries in the world with a strong local team of well-known scientists who have spent their careers working to understand this complex and dynamic system. But, from the beginning, the BDCP has rejected use of a logical, science-based approach for developing their conservation measures, ignored science related to key variables like flow that the plan’s developers don’t want to address, been unresponsive to independent scientific review, and even misrepresented published scientific information to justify their proposed conservation measures. The result of this systematic failure to use science correctly is a plan that, according to its own effects analysis, will further degrade estuarine habitat and harm most of the fish species it’s supposed to help, while exporting more water than ever before from this overtapped ecosystem.

How is what we’ve learned about freshwater flows and ecosystem health incorporated in the plan?

SWANSON: Even though BDCP documents cite scientific studies identifying flow as the “master variable” affecting habitat, productivity, water quality, and species’ distribution and abundance, the plan barely acknowledges the role of flow as an environmental driver or altered flow conditions as a stressor. Nor does it report that the magnitude of flow alteration and water diversion has increased during the

past several decades. Yet, in this ecosystem, the relationship between seasonal flow levels and abundance and/or survival of multiple species is the strongest scientific relationship we have between any environmental variable and biological response. The record high levels of flow alteration and water diversion in the last decade contributed directly to the recent precipitous fish declines. The BDCP plan calls for flows that are substantially worse than current conditions in nearly all months of all water-year types. While it’s understandable that the Delta water contractors developing the BDCP don’t want to include conservation measures to improve flow, which would prevent them from acquiring more water, it flies in the face of scientific reality and illustrates the dangers of delegating development of a public resource management plan to corporate interests.

ROSENFELD: The plan proposes to increase water exports from the Delta and decrease reservoir storage and freshwater flows throughout the Central Valley at times when they’re necessary to support native species. In most cases, the analyses ignore the negative impacts of these flow reductions and the extensive record regarding the relationship between flow and the productivity of native aquatic species. The science is unambiguous -- in order to prevent extinction of several unique species (much less contribute to ecosystem recovery, as BDCP must) freshwater flows into, through, and out of the Delta must increase at critical times of year. Every agency responsible for maintaining public trust resources and numerous independent science panels have concluded that more natural volume and timing of freshwater flows are necessary (if not sufficient alone) to restore this ecosystem.

WINTERNITZ: The plan’s preferred project results in flow conditions that are detrimental to some species. There needs to be more thought and work applied to this, particularly in the areas of reverse flow from Old and Middle Rivers and Delta outflow during spring and fall seasons.

What native species would be hurt most by the plan? What species could benefit?

ROSENFELD: The BDCP’s own analyses find that winter-run and spring-run Chinook salmon will be harmed by decreased flows and by increased temperatures upstream that result from decreased reservoir storage. Spring-run and fall-run Chinook salmon will also suffer increased entrainment problems at the South Delta pumps, despite the fact that the new diversion facility (peripheral conveyance) is intended to reduce entrainment. Longfin smelt will suffer from severe reductions in winter-spring outflow. Federal



From left to right: Jon Rosenfield of The Bay Institute; Christina Swanson of the Natural Resources Defense Council; Leo Winternitz with The Nature Conservancy.

biologists have already stated that the project may not be permissible if, as currently proposed, it eliminates protections in the Delta smelt Biological Opinion (such as a fall Delta outflow requirement) designed to prevent further jeopardy to this species. The plan may benefit Sacramento splittail: the habitat restoration projects are tailor-made to improve splittail spawning and rearing habitat. But the projected benefits to splittail and other species may be less than desired if reduced freshwater flows limit the frequency and extent of habitat inundation.

Have any of the criticisms from the National Academy of Sciences panel been addressed?

SWANSON: No, to the best of my knowledge. The Academy's main criticism was that, rather than using a logical, science-based process to develop conservation measures addressing the Bay-Delta's ecological problems and stressors, the BDCP "appear[ed] to be a post-hoc rationalization" for the water supply enhancement elements desired by the plan developers. The glaring mismatch between Bay-Delta science and the recently released plan provides strong confirmation of the NAS panel's concerns. Critical scientific reviews by the Delta Science Program, state and federal agencies, NGOs and other stakeholders have been similarly ignored.

WINTERNITZ: Some criticisms have been addressed. There are now, in many instances, quantifiable goals and objectives and a logic chain that ties conceptual ecological models to the conservation strategies. Whether or not correct interpretations from the conceptual models to some conservation strategies have been made is still a question. The context of the plan is important. The BDCP will not fix all that ails the Delta, but it must fully mitigate the impacts



The Delta's Staten Island. Photo by Leo Winternitz.

of any proposed project and it must do its share to help recover and ultimately deliver sustainable native fisheries populations in the Delta.

What could we better spend \$15 billion on that would help the estuary's health?

ROSENFELD: For a fraction of that cost, we could fund development of alternatives like water recycling, conjunctive use of surface and groundwater, and agricultural water conservation. The potential for "new" water from these sources far outstrips foreseeable demand. We would still need to improve the resilience of our water supply system in the face of growing threats from sea-level change and earthquakes – but that only emphasizes that continuing to rely on the Delta for an ever-increasing portion of the State's freshwater supply decreases the *reliability* of that supply. Improving the reliability of our water supply is important to the State's economy and public welfare; increasing the total volume of water we divert from the Delta won't advance either of the state's coequal goals.

WINTERNITZ: If you asked ten different stakeholder groups how they would spend \$15 billion, you would get ten different answers, none of them remotely palatable to all the others. What we have to assemble is a solution that isn't perfect for anyone, but that, on the whole moves us toward a better condition, for the ecosystem and the water supplies. JE

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Effects Analysis: (baydeltaconservation-plan.com/Library/DocumentsLandingPage/BDCPPlanDocuments.aspx)

ACADEMY STILL NOT HAPPY

The National Academy of Sciences, a Congressionally-chartered research institution, has weighed in again on the future of the San Francisco Bay-Delta. Their 2012 report, entitled *Sustainable Water and Environmental Management in the California Bay-Delta*, underscores the panel's continued concerns about scientific uncertainty and climate change, and about the limits of restoration and collaboration in water management.

In the report, a committee of seventeen scientists chaired by Robert J. Huggett of the College of William and Mary conclude that the multiplicity of agencies responsible for water management has prevented the comprehensive planning needed to meet environmental protection and water supply goals. The report says planners have not addressed the issue of water scarcity or the inevitable tradeoffs between the two coequal goals.

Among specific conclusions, the committee found "room for improvement in managing volume and timing of flows and flow paths" and cautioned that "efforts to remove any one stressor are unlikely to reverse declines in the listed [fish] species." Climate change was also addressed: "If the climate projections are correct, more frequent extreme events will increase the need for Central Valley water for both environmental and human uses. In this case, managers will be asked to consider hard choices."

The panel suggests a statewide review of water planning and management as a first step toward more effective coordination, and calls for "continued, substantial investments in monitoring, modeling, and other research to inform policy choices." Meanwhile, both demand-side management (conservation) and supply-side management (including reconsideration of past water allocations under the Public Trust Doctrine) can improve the productivity and efficiency of water use, they say. They did not analyze or make recommendations about a peripheral water conveyance or revisit the *Bay-Delta Conservation Plan*, the subject of a NAS critique in 2010. JE

Report copies: www.nap.edu/catalog.php?record_id=13394.



THE NEWBIE CANDIDATE: LONGFIN

Reversing a previous decision, the U.S. Fish and Wildlife Service designated the Bay-Delta population of the longfin smelt a candidate for listing under the Endangered Species Act this spring. Local longfins are now considered a distinct population segment, geographically isolated from their nearest kin. The feds found listing warranted by science but precluded by administrative constraints. The smelt joins 251 candidate taxa nationwide, 25 in California and Nevada.

The four-to-six-inch-long silvery fish have a flexible life history strategy that once enabled them to thrive in the Bay's changeable conditions. The salt tolerance of larvae increases as they mature and move toward the sea. Adults spawn when seasonal flows are favorable. The smelt's two-to-three-year life span leaves the population vulnerable to a host of changes in its habitat. The survey-based abundance index for Bay-Delta longfins reached a 40-year low in the decade ending in 2010.

Fish & Wildlife biologist Colin Grant cited reduced freshwater flows and the effect of the invasive overbite clam on the food web as the most significant stressors. The agency also concluded that longfin smelt reproduction in the upper estuary is impaired when freshwater flows are decreased, and that ammonium could be a problem for longfin too.

Entrainment in the pumps that divert Delta water southward remains controversial. The Center for Biological Diversity, co-plaintiff with The Bay Institute in the suit that prompted the status review, reports a recent increase in longfin smelt mortality at the Delta pumps. But Fish & Wildlife isn't sure this is typical; it may be due to year-to-year variations. The agency's Victoria Poage says existing regulations could help reduce the threat of entrainment.

Why did FWS change its position? "More things came to light in the last three years regarding ocean current patterns," says Grant. Along with the smelt's limited swimming ability and the distances between disjunct coastal populations, offshore currents make it unlikely that Delta longfins could disperse north to Humboldt Bay, or vice versa. JE

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Photo by René Reyes.

Politics

FIGHTING WORDS

While moderates like Maine's Republican senator Olympia Snowe and Democrat Jeff Bingaman of New Mexico announce their retirement, citing bitter partisanship in Congress, San Joaquin Valley Republican Devin Nunes is ratcheting up the rhetoric in the California water wars. Nunes is the prime mover behind HR 1837, a bill that turns the clock back to the Bay-Delta Accord in 1992, restoring long-term water contracts to irrigation districts that were voided because a judge found that they violated environmental laws. Nunes called the bill "a solution to California's government-imposed drought."

But Sen. Barbara Boxer (D-CA), called the Nunes bill a "radical" move that would undo years of court rulings and collaboration, including the Central Valley Project Improvement Act (CVPIA), and the \$85 million San Joaquin River restoration. The environmental community has mobilized against the bill, which could reduce water dedicated to the environment by more than 250,000 acre feet.

"Over the years, safety nets have been set up to protect ecosystems, endangered species, and water quality," said Cynthia Koehler of the Environmental Defense Fund. "There have also been major efforts to promote restoration and a more sustainable way of running the Central Valley Project. HR 1837 would use a whole host of legislative tools to eliminate every single one of these safeguards."

The Nunes bill passed the Republican-controlled U.S. House of Representatives in early February. With opposition from both California senators and a veto threat from the Obama administration, it is unlikely to pass the Senate. But key elements may show up as so-called "riders," amendments tacked on to budget or appropriations bills that are virtually veto-proof.

Environmentalists fear that the CVPIA's mandate of 800,000 acre feet of water for the environment is at greatest risk. Environmentalists say this "dedicated" water has played a critical role in preventing native fish from sliding further towards extinction, even though legal challenges and inadequate funding have prevented the full amount of water from being dedicated to the environment.

Despite HR 1837's poor chances in the Senate, Nunes appears determined to keep up the pressure. Andrew House, Nunes' press secretary, criticized environmentalists for emphasizing flows, which he called "junk science," while failing to address the problem of non-native species

such as bass, because they fear alienating allies in the sportfishing community. House blamed drought

and reduced water allocations for poverty and unemployment in towns like Mendota, where unemployment hit 41 percent in 2009.

"It is literally disheartening to see people on food lines," he said. "We have to come to terms with the reality that a long, long time ago the people who settled California made a judgment call that the state's prosperity was their primary purpose. They made significant changes to the Delta. These things have consequences."



The San Joaquin River ran dry in places for decades after the Friant Dam was built, but lawsuits and a 2006 settlement finally won it restoration flows and a commitment to restore a long-lost run of salmon. Photo courtesy The Bureau of Reclamation.

While these unemployment figures are striking, the Central Valley's chronic poverty has led the General Services Administration to compare it to Appalachia. A report by the Oakland-based Pacific Institute shows that most of unemployment is linked to the housing bust.

"This bill is about pure greed and boosting corporate profits for some of the world's wealthiest agribusinesses," said Bill Snape of the Center for Biological Diversity.

After compromise talks with Sen. Dianne Feinstein hit a dead end, reducing the bill's chances in the Senate, Nunes' aide Andrew House talked tough.

"If she's not willing to work with us, elections have consequences," he said. "I'm sure the new majority will be happy to tell the Senator she's been negligent in her responsibility."

John Fleck, an *Albuquerque Journal* reporter working on a book about Western water, suggested that after decades of consensus-building, the larger goal may be to move the goalposts from collaboration to confrontation, hoping to reframe California's eternal water debate. SZ

BREAKING NEWS

In April at press time, the Sacramento Bee reported the Nunes bill was "dead in the senate." But the key water battles remain on the political table.

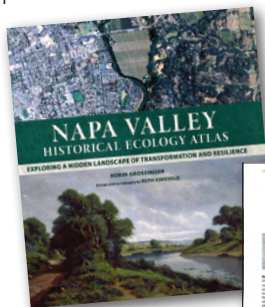
HISTORY DETECTIVES

The quality of the light can be a clue in the hunt for the history of a landscape. Sifting through old diaries, photographs and maps, authors of the newly published *Napa Valley Historical Ecology Atlas* found early descriptors like “scattered” oaks in a valley “dotted” with trees helpful. In this way, they confirmed that rather than hosting a dense oak forest, the nineteenth century Napa Valley had an “incomplete shade canopy” and might better be categorized, in terms of historical habitat, as “savanna.” More detective work confirmed that the landscape of great oaks and open meadows that led so many early visitors to describe the valley as “park like” was shaped by Native Americans with fire. And that the river never ran dry in summer but the creeks did. And that the soils once absorbed floods like a “sponge.” Indeed, compared to other local valleys shaped by tectonic faults, Napa was unusually wet – full of freshwater wetlands and vernal pools, frequently flooded.

Opening chapters of the Napa atlas introduce the study of historical landscapes, and the sources used to fill in the details. In this case, researchers tapped everything from sketches of Mexican land grants to coastal surveys, accounts of great botanists like Willis Jepson, local lore, and the photographs of Turrill and Miller – self proclaimed visual documentarians of California history who were out taking pictures in the early 1900s.

“Immersing oneself in all of the information so intensively for a long stretch of time, there was a moment when it did start to become real in my mind, when I could really picture the historic forests and the wood ducks and the beavers. I could almost close my eyes and walk through the valley in 3-D,” says author Robin Grossinger of the San Francisco Estuary Institute. “In reality, with all the restoration projects in the valley today, you can see many remnants of the 19th century landscape. It’s still vibrant and resilient.”

Grossinger started working on the Napa Atlas ten years ago, and developed methodologies he later applied to other projects. His detective team’s most recent reports on the Delta and Alameda Creek debut soon – but the Napa Atlas is their first bound book. Picking it up makes any reader remember what’s so special about books, with its heavy green hard back, gold lettered spine, and high quality eye-candy. You realize what you’ve been missing staring at low-resolution images on a computer screen when you study the cloud reflections in the Napa River painted by Manuel Valencia in 1885. Opening to his painting at the beginning of the fifth chapter, you can’t help wanting to touch the paper river water.



The atlas conveys the story of five distinct components of the valley landscape – oak savannas and wildflower fields, creeks, valley wetlands, the Napa River, and tidal marshlands – and how humans have changed them. Another chapter explores the landscape’s more recent transformation and resilience, as local community groups and resource agencies endeavor to restore natural processes to the river. A final chapter details four tours of landscape features, places where the great oaks are more than 500 years old or where locals used to fish through a trap door in a store floor.

“People have always loved Napa, and it really comes through in the historical record,” says Grossinger.

Wherever you open the book, the information is arranged to help you peel back layer upon layer of information, or to see what is at first not apparent. There are the two pictures of the same leaning tree, for example, nearly a hundred years apart. In the newer picture, you can’t help marveling at how much thicker the tree has become. On another page, we’re shown the stone arches of the Zinfandel Bridge in 1906 and 2006. The river is so much lower in the more recent photo it reveals a previously submerged concrete footing between the arches. According to the caption, this is a clue that the river is digging itself a deeper and deeper channel, or “downcutting.”

This reviewer, whose family has a farm in Napa, loved this book. It puts modern computer tools to work on history; it uses both romance and science to explain landscapes; it asks you to look deeply at the land and its history with an intimacy and reverence fast disappearing from our dealings with the natural world; and it does it all with white space left over. The vision of its designers and authors makes the *Napa Atlas* a very modern book. But so does the larger question raised by the relevance of historical ecology to the human future. “There are no pristine places anymore, so we really ought to be integrating nature into everything we build from now on,” says Grossinger. ARO

Napa Valley Historical Ecology Atlas: Exploring a Hidden Landscape of Transformation and Resilience, by Robin Grossinger. Design and cartography by Ruth Askevold. UC Press: <http://www.ucpress.edu/book.php?isbn=9780520269101>

JUST MOVED

A year after librarians packed up old maps, historic testimonies, letters, books and legal archives from California’s rich water history and shipped them south, the University of California Water Resources Collections and Archives is up and running again. Formerly the Water Resources Center Archives, this venerable water library moved from UC Berkeley to UC Riverside in January 2011 – the victim of budget cuts upstairs and space restrictions. But UC Riverside has been extremely supportive, says archive director Linda Vida.

The collection, well known for its stock of unique, hard-to-find information about all aspects of water supply and quality in California and the West, is now housed in UC Riverside’s Orbach Science Library. “Spring 2011 was hectic as the published and archival materials were re-shelved,” says Vida.

The collection is now 100% accessible, though staff continues to work on cleanup issues and Vida is looking for a new assistant. WRCA is also now able to lend circulating material, assist researchers using archival material, and provide interlibrary loan and document delivery services (copies) for a fee.

WRCA Web Site:

<http://library.ucr.edu/wrca/>.

UCR searchable catalog:

<http://scotty.ucr.edu/>

Additional access to holdings:

Melvyl <http://ucr.worldcat.org/>

JUST PUBLISHED

Collateral Damage: A Citizen’s Guide to Fish Kills and Habitat Degradation at the State and Federal Water Project Pumps in the Delta. The Bay Institute, March 2012. bay.org/publications/collateral-damage

Field Guide to California Rivers by Tim Palmer. University of California Press, April 2012. www.ucpress.edu/book.php?isbn=9780520266445

Introduction to Restoration Ecology by Evelyn A. Howell, John A. Harrington, and Stephen B. Glass. Island Press, October 2011. www.islandpress.org/ip/books/book/islandpress/l/bo8008310.html

Pulse of the Estuary, Pollutant Effects on Aquatic Life, Regional Monitoring Program, SFEI, 2011. <http://www.sfei.org/node/4002>

ESTUARY NEWS

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

Volume 21, No. 2 | APRIL 2012

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ESTUARY
PARTNERSHIP

ESTUARY NEWS is your news source on Bay-Delta water issues, estuarine restoration efforts, and the many programs, actions, voices, and viewpoints that contribute to implementation of the S.F. Estuary Partnership's Comprehensive Conservation and Management Plan (CCMP). Views expressed may not always reflect those of Estuary Partnership staff, advisors, or CCMP committee members. ESTUARY NEWS is published bimonthly and is funded by the San Francisco Estuary Partnership.

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BOAT CONTINUED FROM COVER

Elias. Tackling unintended or illegal discharges from orphan brownfields or historical mine sites or derelict municipal dumps are the more standard use of account dollars.

On March 6, 2012, NRC's crew arrived on Helwig's vessels in their orange vests and hazmat suits, placed all the barrels of paints and solvents in secondary containers, loaded them up on a very seaworthy barge, and took them to their yard for proper disposal. Whatever the current political hype, government regulations do have their upside.

Now that the vessels are "clean," BCDC is looking for a marine contractor or boatyard to take them for salvage. Neighbors are eager to get them out of their waterfront view. At press time in mid-April, the work barge with the crane on it was on the way to Salt River Construction.

If Bennett can find the tug *Herbert* and the other barges permanent resting places, the story of Helwig's vessels will have a happy ending. But thousands of other vessels around the Bay remain in limbo. The economic downturn has produced a proliferation of abandoned yachts, sailboats and motorcraft. Local marina operators, county sheriffs, regional regulators, and shoreline land-owners are all struggling with how to address the problem. Some of the vessels have been adopted

by the homeless and modern-day pirates. These inexperienced boat tenders don't always follow the rules about maritime anchorage, sewage discharges and safety.

In the meantime, the two regional agencies charged with protecting the Bay from fill and pollution feel good about the Helwig outcome. "This was a successful collaboration to remove a big hazard to the Bay," says Bennett. "It strengthened our connection with BCDC, so we can cooperate on the larger series of questions raised by the abandoned vessels," says Lichten. **ARO**

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BIRD LABORATORY CONTINUED FROM PAGE 3

giant piece of earthmoving equipment preparing a pond for better bird habitat can get it perfect. "They don't laser level this stuff like a cornfield," she says. Since the birds seem to like them, these mounds are now part of the design for E12-13.

Second, observers noted that when high tide flooded the bay mudflats outside the SF2 levee, and the water control gates into the pond were closed, the shorebirds congregated on the exposed pond bottom. "This tells me that they're taking every opportunity to feed, even during

high tide when they would normally be roosting," says Valoppi, whose team also conducted water management experiments to confirm their observations. "Diversifying these managed ponds is exactly the kind of thing we're trying to do. We're trying to maximize operational flexibility as much as possible by putting water control structures in and by varying topography inside the pond."

In terms of the bird laboratory, these three island construction experiments are in different phases. E12 and 13 are still being designed, while the bulldozers are already at work on A16. At SF2, restoration managers are going back to fix some unintended consequences. Here, the birds arrived to nest so fast the bay mud used to build the islands didn't have time to dry out and season. The mud cracked, and some chicks fell in the cracks and perished. When the birds leave their nests for the season, a crew from the National Wildlife Refuge is thinking about "roughing up" some of the island surfaces with an aquatic weed harvesting device called the Aquamog. The rough up could help fill in the SF2 cracks, and also pre-empt cracking at A16. "Losing the chicks was unfortunate, but a nesting success rate of 66 percent is pretty high. Build it and they will come," says Valoppi. **ARO**

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