San Francisco Estuary Partnership

Delta Fix Still Moving Target

Tracking Tiny Toxins

Pivot or Pirouette?

High Tech Levees

ESTUARY NEWS

SCIENCE • RESTORATION • WATERSHED • POLITICS • SPECIES • BAY

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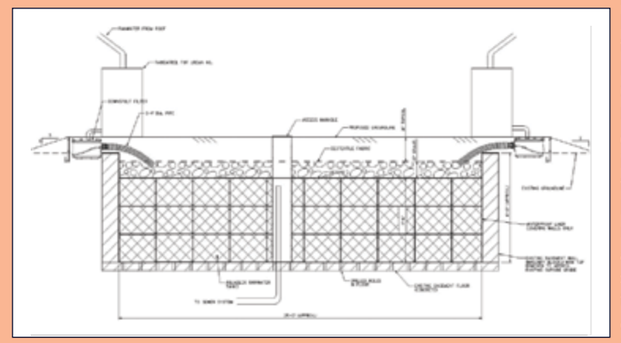
SPECIAL
CCMP Revision Preview

AROUND THE WORLD

BUSY BEAVERS — Once treated as a nuisance, beavers are beginning to be viewed in a much different light — as partners in restoration. A new guidebook just published by US Fish and Wildlife, NOAA, Portland State University, and the US Forest Service — *Working with Beaver To Restore Streams, Wetlands, and Floodplains* — delineates the multiple benefits of these industrious, paddle-tailed engineers. Beaver dams retain water and sediment, creating pools and reconnecting and expanding river floodplains, which in turn can offer benefits to other wildlife, fish, and plants. According to the manual's authors, beaver dams also help recharge groundwater tables, increase summer base flows, expand wetlands, improve water quality, add habitat complexity, increase diversity and richness of plant, bird, fish, amphibian, reptile, and mammal populations, and increase overall complexity of river ecosystems. The manual also discusses beaver/human conflicts and misunderstood beaver behaviors. See www.fws.gov/oregonfwo/Tools-ForLandowners/RiverScience/Beaver.asp LOV

Photo: Cheryl Reynolds and Worth A Dam

BARGAIN BASEMENTS — In Milwaukee, the basements of some old, abandoned, foreclosed homes are seeing a second life as stormwater detention basins. Erick Shambarger, deputy director of Milwaukee's Office of Environmental Sustainability, did a GIS analysis, finding that the most severe flooding was in neighborhoods with the highest rates of abandoned, foreclosed homes. He decided that after tearing down the city-owned structures, their basements could be put to work, helping detain stormwater by acting as rainwater/stormwater cisterns. Before the end of the year, Milwaukee will complete its first "BaseTern" prototype, said to be the first such system in the world. After the houses are demolished, the basements are waterproofed and filled with gravel and stormwater-harvesting cells. Depending on the size of the basement, the system can hold from 13,000 to 40,000 gallons of stormwater, helping reduce flooding in the area. The old homes have basement floor drains



Design for BaseTern: Erick Shambarger

connected to the sewer system; after the stormwater fills the "BaseTern," it is released slowly into the sewer system. Shambarger says it's not "the" solution but one more tool in managing stormwater more sustainably. LOV

SEA LEVEL RISE THROUGH AN OWL'S EYES — Remember coin-operated binoculars? The ones designed for tourists to gaze upon scenic vistas? They've been repurposed and digitized by a San Francisco startup called Owlized and have just been installed in Marin County. People can look through the "OWL" (loosely named for the shape of the device) and see how the land they are standing on will look like with different scenarios of sea level rise. The OWL also shows people different solutions to sea level rise—floodwalls, green infrastructure solutions, and horizontal levees—and even surveys them about their attitudes toward sea level rise and climate change. The OWL has also been used on the Napa River to show people the industrialized river as it looked 100 years ago vs. today's restored river and floodplain. LOV

Mill Valley shoreline with 3 feet sea level rise and seawall — as visualized by the OWL. Photo: Owlized

OCEAN ECONOMICS REVEALED — The contribution of coastal and ocean economies to the national GDP is often overlooked. At the July 30th Bay Planning Coalition Expert Briefing in Oakland, however, NOAA's Jeffery Adkins and Tola Adeyemo explained just how important they are: In 2012, the U.S. GDP amounted to $16.16 trillion—with the coastal and ocean economies accounting for $6.6 trillion and $343 billion, respectively. California has the largest GDP out of all U.S. states, and depends heavily on the ports to facilitate its booming economy. The Bay Area alone represents a third of the California economy and, in 2012, generated $45 billion in exports. This eye-opening data comes from the Economics: National Ocean Watch (ENOW) program. The program also helps NOAA monitor climate change impacts to our coasts and ports, giving us a chance to avoid damaging a substantial chunk of the U.S. economy. For more information, see http://noaa.maps.arcgis.com/apps/MapTour/index.html LC

ENVIRONMENT

Scaled-Down Plans to "Fix and Restore"

Surprising many observers, Governor Jerry Brown announced late in April that the Bay Delta Conservation Program, which had embraced the new water conveyance popularly known as the Twin Tunnels and a broad program for restoring the complex and heavily impacted Delta environment, was being split into two new entities: Cal WaterFix and Cal EcoRestore. This was followed by the release of a Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement spelling out the changes: on the conveyance side, reduction of the project footprint and relocation of intakes, and the substitution of Section 10 of the federal Endangered Species Act for Section 7 as authority for permits; on the restoration side, a more modest goal of 30,000 acres, down from the original 100,000. (An additional 2,000 acres would mitigate for impacts from the construction of the tunnels.)

Early reactions to the swerve broke along predictable lines. Elected officials from the Delta region were strongly critical. "This flawed California WaterFix proposal that solely looks at a Delta plumbing fix does nothing to improve the Delta ecosystem or provide a more reliable water supply," said Contra Costa County Supervisor Mary Nejedly Piepho.

"This project is not about restoring the environment," commented US Representative John Garamendi (D- Walnut Grove). "California law requires meeting the co-equal goals of providing a reliable water supply and preserving the environment. The twin tunnels are about building a plumbing system that will suck the Sacramento-San Joaquin Delta dry and damage water quality in the San Francisco Bay."

From the other camp, Jeffrey Kightlinger of the Metropolitan Water District hailed "the bold leadership of Governor Brown in pursuing this necessary project," and Californians for Water Security, a coalition of business and farm groups, expressed "strong support" for the new direction. Responses from other interested parties, notably the State Water Contractors, were tepid.

The Pacific Institute's Peter Gleick sees the decoupling of the water and restoration components as an explicit retreat from the dual goals enshrined in the 2009 Delta Reform Act: "A fundamental part of the whole program has been the idea of linking reliable water delivery for humans and the health of the Delta. It seemed a core principle of what we were trying to do." The restoration element, he says, may have kept some potential opponents of the water conveyance on board, and its retrenchment "may make it harder for a broad coalition to support the project."

One recurring theme in reaction to the changes was that the science supporting large-scaled restoration was flawed—too uncertain to allow for 50-year guarantees. According to Dan Ray of the Delta Stewardship Council, the decision to scale back restoration "reflects a recognition that agreement on a comprehensive, enforceable, long term science-based plan for Delta ecosystem restoration isn't feasible now. The science is too spotty and the future, especially with climate change, is too uncertain to ensure priority fish and wildlife species can be recovered." Similar views have been voiced by Fish and Wildlife head Chuck Bonham ("It was not possible to provide a 50-year certainty, both on the water supply front and on the species protection front") and Department of Water Resources head Mark Cowin ("The uncertainty that exists within the scientific community regarding just what it's going to take to recover specific species is tremendous right now.")

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Thousands of greater sandhill cranes (state endangered) and lesser sandhill cranes (state species of special concern) winter in the Delta. Plans for construction of the tunnels have been modified to reduce impacts to Staten Island, a Nature Conservancy preserve with important habitat for greater sandhills. Photo: Dave Harper

SCALED-DOWN

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Geologist Jeffrey Mount, now with the Public Policy Institute of California, sees merit in this argument: "The scientific community has not delivered enough understanding of the Delta and how it works in ways that we can mesh it closely with water operations." In particular, Mount says, the early consensus view that populations of species like the Delta smelt were limited by food resources and that restoring tidal marshes would help restore those populations by creating food for them has not held up well. One problem was getting that food to the fish, past a gauntlet of invasive clams and other consumers. "The underlying approach of the BDCP was to substitute physical habitat for water, allowing us to continue to take water out of the Delta at the current rate," he adds. "We now know the magnitude and temperature of flows is important. Cool abundant water produces a measurable response in fishes. But in a year like this you can't cool off the water or produce a wet-year outflow. The uncertainty ran headlong into the requirement of the water contractors to have a 50-year permit, a guarantee of the amount of water that can be exported from the Delta. It's not clear that you could meet the recovery goals with the conditions as set in that permit. The contractors wanted certainty and the scientific community couldn't provide it."

In addition to reducing the restoration footprint, Cal EcoRestore moves away from the concept of a Habitat Conservation Plan under Section 10 of the federal Endangered Species Act in favor of a species-specific approach under Section 7. Under Section 7, as Bonham told a State Senate committee, "the projects will be managed on a continual basis against a threshold of jeopardy, and if things change, you've got initiation of reconsultation, and potential for adaptive management right there," as with the existing Biological Opinions for Delta smelt and salmonids. If flexibility is gained by this change, a comprehensive ecosystem perspective may be lost. "Governor Brown did this for very pragmatic reasons," says Mount. "But you lose one of the really big benefits that's lost on most of the people who've been fighting over it. There are a lot of aspects to the ecosystem: birds, insects, and plants, not just fishes. The beauty of the Natural Community Conservation Plans and Habitat Conservation Plans is establishing an ecosystem-based approach to management that scrapes together all the listed species. That's lost—there's nothing for that right now. We're back to what I and others have been highly critical of: a species-based management approach." Carl Wilcox of Fish and Wildlife, a veteran of wetland restoration, foresees NCCPs and Habitat Conservation Plans in the Delta's periphery taking up some of the slack, especially for species like the giant garter snake and sandhill crane.

Giant garter snake. Photo: Hanes Brian

EcoRestore is less ambitious than the previous BDCP iteration in its acreage goals, but more ambitious in its three-year time frame—to some, unrealistically so. "The original 100,000-acre goal seemed unduly large," says Mount. "There's not enough high-quality habitat to make up that acreage. The smaller number is perfectly reasonable." He adds that much of it is already owned by the state or "friendly entities" like the State and Federal Water Contractors Agency, land trusts, and other nonprofits. But Mount calls the three-year schedule "wildly optimistic." Even with the appointment of former Solano County Water Agency director David Okita as what Wilcox calls the "Restoration Czar" to coordinate efforts, Mount anticipates problems with steering permits through the Delta's maze of overlapping authorities. "There's a call for increased coordination," he says. "That's a code for a lot of meetings. It doesn't translate to increased efficiency."

Ray is more sanguine about getting it all done on time: "Many of these projects are close to breaking ground now. It will be a challenge but not impossible." He says a new Delta Restoration Network, modeled after the San Francisco Bay Joint Venture, is "developing a shared vision of how things fit together" and will generate a standard approach to monitoring restoration. Wilcox also underscores "the state's commitment to making things move forward" and points to projects already underway in the Yolo Bypass and the North Delta.

A related issue is the fate of specific initiatives on methylmercury, fish barriers, and other concerns that would have been part of the original restoration package. In his Senate testimony, Bonham said he wanted to put 21 orphaned conservation measures into an existing program: "I'm going to try and find a home for [each one], put it in programs, and get it in play." Ray says he takes comfort from this assurance. "I take Bonham at his word, but I'm not sure what the new homes would look like," says Mount.

If others claim the science supporting restoration was too uncertain to support 50-year guarantees, Gleick is less convinced: "The fact that the science is difficult should not be used to abandon the goal of ecosystem restoration." He likens that argument to "hiding behind uncertainty to avoid action" on climate change. "The uncertainty about ecosystem restoration is no worse than the uncertainty about the economics of the entire project—not knowing what's it's going to cost and who pays for it," he adds.

Save the Delta, the most vocal anti-tunnel group, warned that the "repackaging" would "waste up to $60 billion dollars without creating any new water, won't help desperate communities during the drought, or fund innovative water conservation, stormwater capture, or water recycling projects that cities are eager to build for resilience in a changing climate."

What happens next? According to Ray, the Delta Stewardship Council needs to determine whether WaterFix and EcoRestore require amending the Delta Plan. At some point, the State Water Resources Control Board will consider applications for the conveyance's new diversion points. Water contractors will assess their commitment to funding a project that now lacks long-term supply guarantees. Factor in the vagaries of weather and climate and the prospect of new faces in Sacramento after Brown's term ends, and the one thing that's certain is uncertainty. **JE**

CONTAMINANTS

Tracking Tiny Toxins

San Francisco Bay and the region's other water bodies have an unfortunate legacy of human pollution. But we're not the only culprits: beyond the mercury and PCBs, the Bay contains toxins produced by phytoplankton—photosynthesizing microorganisms classified as blue-green algae (also known as cyanobacteria), dinoflagellates, and diatoms. Under conditions still not well understood, these tiny organisms secrete chemicals that can enter aquatic food webs and impact human health. Funded by the San Francisco Estuary Institute's Regional Monitoring Program for Water Quality and the San Francisco Bay Nutrient Management Strategy, researchers are surveying the Bay for microcystin, from the freshwater cyanobacterium Microcystis, and domoic acid, from the marine diatom Pseudo-nitzschia, and trying to account for their presence in the Bay.

In a classic double whammy, the Bay can receive algal toxins from both its inland watershed and the open sea. Microcystis has limited tolerance for salt water, but the toxin produced upstream in freshwater systems gets flushed into the Bay. UC Santa Cruz (UCSC) ocean sciences professor Raphael Kudela suspects Microcystis may also grow in sloughs in the South Bay. In coastal waters, Pseudo-nitszchia experienced a massive bloom this spring and summer because of El Nino-like conditions. Its product, domoic acid, has killed seabirds and sea lions in the past, and is suspected in this year's unusually high whale mortality; the whales may be picking it up from krill, their shrimplike dietary mainstay. Either the microorganisms or the toxin enter the Bay through the Golden Gate.

As David Senn of the San Francisco Estuary Institute explains, multiple approaches are being used to monitor algal toxins in the Bay. In the Solid Phase Adsorption Toxin Tracking (SPATT) project, scientists on the US Geological Survey's research vessel Polaris collect water samples on Bay cruises. At UCSC, Kudela and joint SFEI/UCSC postdoc Misty Peacock analyze those samples, along with toxins in mussels collected on the Sonoma coast and deployed in cages within the Bay, and algal samples collected by USGS. This year, Peacock has also begun collecting naturally occurring mussels at Point Potrero, Point Isabel, the Berkeley Marina, and the Alameda docks. The approaches are complementary, says Senn: "SPATT integrates toxin abundance over space, the mussel studies over time, and the algae samples provide a snapshot at specific locations."

"In San Francisco Bay, we see both toxins pretty much all the time in SPATT and mussels," says Kudela. "The concentrations are low compared with Monterey Bay, but there are periods, generally in spring and autumn, when they are quite high"—although still below current regulatory thresholds. "We haven't been sampling long enough to know that what we're measuring is representative." The emerging picture is complex; multiple species of potentially toxin-producing organisms are present, and they don't all produce it all the time. Peacock has also found a third toxin of concern, saxitoxin, produced by a dinoflagellate, in some Bay mussels.

Scientists hope to clarify the role of nutrients entering the Bay-Delta through urban wastewater and agricultural runoff in promoting the growth of harmful algae. "That's one of the regulatory drivers behind why we care," says Senn, "and exploring whether there's a linkage is a key focus." It's uncertain whether Pseudo-nitzschia is proliferating and producing domoic acid within the Bay and if so whether nutrient inputs are responsible. So far there's no conclusive evidence.

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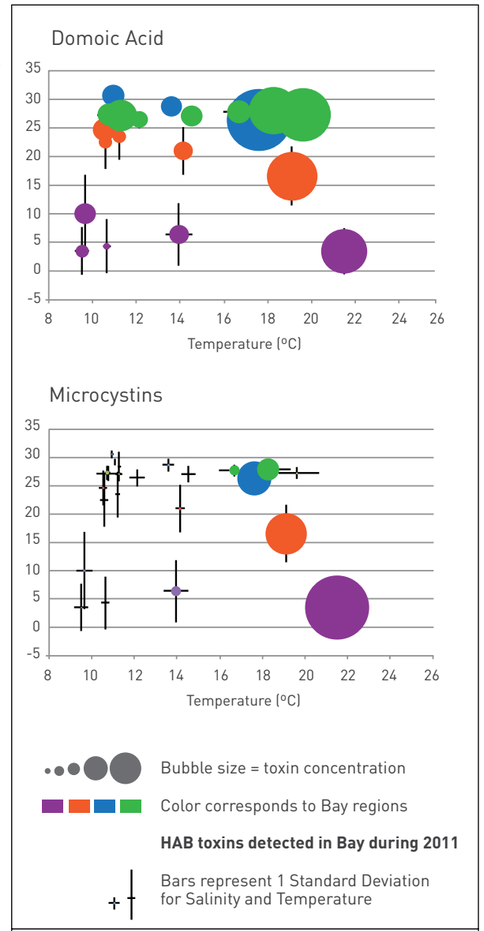

Source: R Kudela, UCSC, reprinted, slightly modified from SFEI Pulse 2013.

OPINION

Pivot or Pirouette?

Droughts and water shortages, dry creeks, heat waves, snowpack loss, sea level rise, bigger floods, species at risk, scarcer funding for public works and restoration projects, and California's ever-growing population—as Jeff Mount put it in The New York Times *recently, it's a frightening, uncertain new world. How are Bay-Delta resource managers responding to these changes? Are we pivoting away from old institutional and decision-making structures that need to change or dancing in circles?*

Change is hard, especially when things have been done a certain way since the dawn of institutional memory. We asked nine experienced, opinionated, knowledgeable Estuary experts — scientists, engineers, environmental advocates, and regulators — to share their ideas about what's working and what isn't, and to identify old ways of thinking that may need to be re-thought — or "old" ideas that may have become new again. We promised our experts anonymity to encourage their candid responses and a continued dialogue about the future of the Estuary. Our experts did not always agree on what the problems are or what needs to be done. Yet certain themes came up again and again, including the state's archaic water rights system, institutional silos, inadequate communication and collaboration, and lack of leadership. To help us be better prepared for the "new normal" of extended droughts, rising seas, and extreme flood events, said our experts, we'll need to stop spinning in circles, and perhaps even turn in a completely new direction to create some grand new plans on a Bay-Delta scale.

WATER RIGHTS

In California, water isn't free for all — some people have more of a right to it than others. The first water "rights" were issued way back in the 1800s. Today, Californians hold the "rights" to 500% more water than has ever flowed through our state's rivers and streams. And older rights holders are increasingly having to defend their liquid dues from incursions on all sides, whether it's frackers, well-drillers, suburban encroachment on old pastures, or hundreds of illegal diversions by the burgeoning marijuana-growing industry.

These days the priority given to first rights sometimes results in "last rights" for ecosystems and species — dry creek beds, stranded or dying fish, and not enough fresh water for birds and other wildlife, and even humans in some places. Our water rights system was put in place in a different era, say our experts, and needs to change now.

EACH SOURCE WAS ASSIGNED A DIFFERENT PHOTO MONIKER.

"The characteristics of decisions made over a century ago around water in Gold Rush days—when we thought water supply was limitless—are embedded in today's decision making. It was first in time, first in right, with no accounting for sustainability or finite resources; the idea was to transform any arable land into a breadbasket—and we were successful."

"No one likes our current water rights system save for the most senior water rights holders sitting in the catbird seat. We need to change our system of administering water rights, and we need to start now—it will take decades. Agriculture, perhaps now and certainly in the future, will be deemed an unreasonable use of water."

"We're up against [150 years] of cultural and institutional momentum around single or dual-purpose type water management. The science behind sustaining our exceptional salmon fishing industry came about 100 years after the development of our water supply systems for municipal, industrial and agricultural use."

"Eternal water rights are an idea whose time has gone. We need to find ways to use less water: this may mean that California may need to have dramatically less animal agriculture. Can we really afford to grow all that alfalfa to feed all those dairy cows to be exporting water in the form of cheese? There are nine million acres under irrigation in California—that's unsustainable."

With less and less snow and rain falling from the skies in the right seasons, and more demand than supply, who has priority has become a miasma of old laws, new legislation, dire circumstances, and moral ambiguity. At some point, especially in a prolonged drought, human beings in need of drinking water are going to start easing out field crops or orchards now at the head of the line. Time will tell if the last little fish and the tail end of once glorious salmon runs and commercial fisheries can cut the line and claim what federal and state laws have long promised but failed to ensure they get: priority as the last of their kind.

"We need to be realistic about allocations and get water to the people—and the fish—who really need it. We're operating the ecosystem now day in and day out at less than the standard [for Delta outflows]. Standards were meant to be minimums. If the water goes down for a week to minimum flows, fine. But for 440 days, that's a problem...

"We need to let go of old politics driving today's decisions: science is not reflected in current policy. We need to use every drop of usable water wisely—more water transfers for farmers, but without relaxing outflow standards. For too long the water projects have operated for little risk on supply and maximum risk for fish and wildlife. Relaxing water quality protections for other beneficial uses is quickly taking us to the extinction of species, ecosystem regime change, and an unsustainable future. We need freshwater outflow to sustain the ecosystem—we're going to lose it; we may have already lost it."

Story continues at length on line: water board, silos, drought, integrated water management, green infrastructure and more. See: www.sfestuary.org/estuarynews/

TECHNOLOGY

Low-tech Levees Meet a High-tech World

One hundred and fifty years ago, farmers and Chinese laborers built levees of sand, silt, and peat in the Sacramento-San Joaquin Delta to protect local farmland from flooding. They worked with shovels and wheelbarrows at sea level. Today, we rely upon 1,100 miles of levees to protect farmland, highways, pipelines, railroad and transmission lines, and communities with thousands of people on 60 islands, some of which are 20 feet below sea level.

Clearly the levees need to be sound. One way to detect structural problems is through on-the-ground inspections by engineers, but more often than not it's a farmer or landowner who discovers a weakness when his truck falls into a rut on a levee road, a sure sign that a beaver has built a den in the levy. "You could say it's low tech," says David Mraz, principal engineer for the California Department of Water Resources (DWR).

Although the effectiveness of a wheel-in-the-rut discovery is undeniable, DWR is looking into higher-tech monitoring concepts such as a remote sensing system that can determine levee health from 41,000 feet in the air. For the past six years, DWR has worked with senior systems engineer Cathleen E. Jones and the Jet Propulsion Laboratory at the California Institute of Technology on using interferometry to detect ground movement in Delta levees. NASA, the Department of Homeland Security, and DWR provided financial support for this pilot project in which Jones has managed 50 multiple-track flights with NASA's UAVSAR radar pod mounted on the bottom of a Gulfstream III airplane. UAVSAR stands for Uninhabited Aerial Vehicle Synthetic Aperture Radar. The pod is uninhabited, but the plane it is mounted to is not.

UAVSAR is a full polarization instrument, which Jones equates to a pair of sunglasses that polarize reflection from water. A wavelength pulse is sent to the earth, and the "backscatter" that returns provides information about the surface it hits. With layered data obtained by going over the same ground at different times, you can measure "phase change" and surface deformation such as cracks, seepage, slope instability, subsidence, sand boils, and sink holes.

"It's game changing because it can tell you what's going on in a large area," says Jones. Although remote sensing won't replace ground surveys, it has advantages, she says. It provides rapid assessment of large areas such as the Delta; it detects standing water, which is useful during floods; it captures isolated areas where people seldom go; and it detects changes before they are visible to the naked eye.

DWR senior engineer Joel Dudas likes that the technology provides a lot of useful information quickly and inexpensively, but points out that the data require a fairly advanced level of analysis and interpretation.

"It's getting to the realm of viability, but it's not there yet," he says.

In future, the plan is to put radar similar to UAVSAR on a satellite instead of paying for dedicated aircraft flight time, which currently costs $14,000 per flight. **AG**

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San Francisco Bay and the Sacramento-San Joaquin River Delta comprise one of 28 "estuaries of national significance" recognized in the federal Clean Water Act. The San Francisco Estuary Partnership, a National Estuary Program, is partially funded by annual appropriations from Congress. The Partnership's mandate is to protect, restore, and enhance water quality and habitat in the Estuary. To accomplish this, the Partnership brings together resource agencies, non-profits, citizens, and scientists committed to the long-term health and preservation of this invaluable public resource. Our staff manages or oversees more than 50 projects ranging from supporting research into key water quality concerns to managing initiatives that prevent pollution, restore wetlands, or protect against the changes anticipated from climate change in our region. We have published *Estuary News* since 1993.

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COVER PHOTO *Sandhill crane*
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TOXINS

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Although commercial shellfish harvesting in the Bay is a thing of the past, algal toxins in herring and sport fish are a potential problem. "If toxin thresholds were exceeded, we would close the harvesting of those organisms and post warnings," Kudela says. Microcystin bioaccumulates in aquatic food webs, water-soluble domoic acid less so.

Meanwhile, toxic algal blooms in East Bay Regional Parks have killed three dogs that swam in lake water and shut down popular swimming holes. The Regional Water Board's Karen Taberski says freshwater algal blooms have increased significantly in California over the past decade, with 200-mile-long blooms in the Klamath River stretching from upstream reservoirs to the sea every year since 2012. The problem hit home last year, affecting Lake Temescal, Lake Chabot, and other Regional Parks lakes for the first time. "Lake Chabot, where the dogs died, had an incredibly high level of microcystin," says Taberski. Another potent algal toxin, anatoxin-a, has also been detected in lower levels at Chabot.

Lake Chabot. Photo: Mercurywoodrose

White pelican. Photo: Dave Harper

The State Water Resources Control Board's Surface Water Ambient Monitoring Program (SWAMP) is developing guidance documents and holding trainings so lake managers can monitor and cope with these outbreaks.

Cyanobacteria like Microcystis, she explains, thrive in warm, clear, slowly-moving water, conditions exacerbated by the current drought. Working with NOAA and the San Francisco Estuary Institute, Taberski is helping set up programs to download satellite images of algal blooms, train lake managers, and organize information networks. Control techniques include algaecides, other chemicals that curb blooms by preventing algal uptake of phosphorus, and solar-powered mixers that keep lake water from stratifying. "Algaecide killed off the bloom in Temescal last year," she adds. "This year it's back again" — and the lake is now off limits to swimmers. **JE**

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CCMP Revision

DRAFT 9/1/2015

VERSION 1

Great egret by Rick Lewis

Goals for 2050, Actions for the Next Five Years

Your ideas for urgent actions?

The Comprehensive Conservation and Management Plan, originally published in 1993, was the first master plan for improving the health of the Estuary encompassing the San Francisco Bay and the Sacramento-San Joaquin River Delta.

The CCMP represents a unifying collaborative blueprint for the future of our Estuary. We need your help to make the CCMP relevant, implementable, trackable, and visionary!

To learn more, visit www.sfestuary.org/ccmprevision

LOOK INSIDE

(Gently remove insert to view both sides of the goal matrix)

You are invited to learn more about the CCMP revision and provide input in the following ways:

State of the Estuary Conference
September 17 - 18, 2015
Marriott, Oakland City Center

Help Raise Awareness
Ongoing

Provide Input on the Draft
September - December 2015
Online or via email/mail

San Francisco Estuary Partnership

GOAL 1: Sustain and Improve Habitats and Living Resources of the Estuary	Objective A: Protect, restore, and enhance environmental conditions and processes that support self-sustaining natural communties	Objective B: Eliminate or reduce threats to natural communities	Objective C: Conduct scientific research and monitoring to measure status, develop and refine management actions, and track progress
ACTIONS			
1. Develop and implement watershed approaches to comprehensive aquatic resource protection	●	●	●
2. Protect, restore and enhance tidal marsh and tidal flat habitat	●	●	
3. Identify, protect and create transition zones	●	●	
4. Maximize habitat benefits of managed wetlands/ponds	●	●	●
5. Protect, restore and enhance subtidal habitat	●	●	
6. Protect, restore and enhance riparian habitat	●	●	●
7. Protect and restore critical coldwater habitat in tributary streams	●	●	●
8. Establish Regional Wetland and Stream Monitoring and Assessment Program	●		●
9. Protect, restore and enhance seasonal wetlands	●	●	
10. Minimize the impact of invasive species		●	
11. Increase the efficacy of predator management		●	●
12. Increase carbon sequestration through wetland restoration, creation and management	●		●
13. Restore Estuary-watershed connections for multiple benefits	●	●	●
14. Manage sediment with a regional comprehensive approach that advances beneficial use of dredged or excavated material	●		●
15. Demonstrate how restored habitats serve as “natural infrastructure” that provide multiple benefits	●	●	●
16. Advance natural resource protection while increasing shoreline community resiliency		●	

GOAL 2: Increase the Resiliency of the Estuary to Sustain Functions in the Face of Changing Climate Conditions	Objective D: Increase resilience of tidal habitats and tributaries to climate change	Objective E: Increase resilience of communites at risk from climate change impacts while promoting and protecting natural resources	Objective F: Promote integrated, coordinated, multi-benefit approaches to increasing resiliency
ACTIONS			
1. Develop and implement watershed approaches to comprehensive aquatic resource protection	●	●	●
2. Protect, restore and enhance tidal marsh and tidal flat habitat	●	●	
3. Identify, protect and create transition zones	●	●	
4. Maximize habitat benefits of managed wetlands/ponds			
5. Protect, restore and enhance subtidal habitat	●	●	
6. Protect, restore and enhance riparian habitat	●	●	
7. Protect and restore critical coldwater habitat in tributary streams			
8. Establish Regional Wetland and Stream Monitoring and Assessment Program		●	
9. Protect, restore and enhance seasonal wetlands			
10. Minimize the impact of invasive species			
11. Increase the efficacy of predator management			
12. Increase carbon sequestration through wetland restoration, creation and management	●	●	●
13. Restore Estuary-watershed connections for multiple benefits	●	●	●
14. Manage sediment with a regional comprehensive approach that advances beneficial use of dredged or excavated material	●	●	●
15. Demonstrate how restored habitats serve as “natural infrastructure” that provide multiple benefits		●	●
16. Advance natural resource protection while increasing shoreline community resiliency		●	●

GOAL 1: Sustain and Improve Habitats and Living Resources of the Estuary	**Objective A** Protect, restore, and enhance environmental conditions and processes that support self-sustaining natural communties	**Objective B** Eliminate or reduce threats to natural communities	**Objective C** Conduct scientific research and monitoring to measure status, develop and refine management actions, and track progress
ACTIONS			
17. Integrate natural resource protection into local government hazard mitigation, response and recovery planning		●	
18. Improve regulatory processes regarding permitting and monitoring innovative multi-benefit projects			
19. Develop long-term drought plans		●	
20. Reduce landscape water use			
21. Increase water recycling			
22. Change public's perception of the value of water to achieve long term reduction of water use			
23. Implement indirect potable reuse standards and increase public acceptance of direct potable reuse			
24. Assess potential application of the constitutional standard of waste and unreasonable use in the Bay-Delta Estuary			
25. Integrate water issues into Plan Bay Area			
26. Adopt new Bay-Delta freshwater inflow/outflow standards that better protect all beneficial uses	●	●	●
27. Increase agricultural water use efficiency			
28. Identify and work to eliminate illegal water diversions in the San Francisco Bay region			
29. Address emerging contaminants		●	●
30. Decrease raw sewage discharges		●	
31. Manage stormwater with Low Impact Development/green infrastructure practices	●		
32. Implement select Total Maximum Daily Loads (TMDLs)		●	●
33. Manage nutrients in the Estuary		●	●

GOAL 2: Increase the Resiliency of the Estuary to Sustain Functions in the Face of Changing Climate Conditions	**Objective D** Increase resilience of tidal habitats and tributaries to climate change	**Objective E** Increase resilience of communites at risk from climate change impacts while promoting and protecting natural resources	**Objective F** Promote integrated, coordinated, multi-benefit approaches to increasing resiliency
ACTIONS			
17. Integrate natural resource protection into local government hazard mitigation, response and recovery planning		●	●
18. Improve regulatory processes regarding permitting and monitoring innovative multi-benefit projects			●
19. Develop long-term drought plans			●
20. Reduce landscape water use			
21. Increase water recycling			●
22. Change public's perception of the value of water to achieve long term reduction of water use			
23. Implement indirect potable reuse standards and increase public acceptance of direct potable reuse		●	
24. Assess potential application of the constitutional standard of waste and unreasonable use in the Bay-Delta Estuary			
25. Integrate water issues into Plan Bay Area			●
26. Adopt new Bay-Delta freshwater inflow/outflow standards that better protect all beneficial uses			
27. Increase agricultural water use efficiency			
28. Identify and work to eliminate illegal water diversions in the San Francisco Bay region			
29. Address emerging contaminants			
30. Decrease raw sewage discharges			
31. Manage stormwater with Low Impact Development/green infrastructure practices		●	●
32. Implement select Total Maximum Daily Loads (TMDLs)			
33. Manage nutrients in the Estuary			

GOAL 1: Sustain and Improve Habitats and Living Resources of the Estuary	Objective A: Protect, restore, and enhance environmental conditions and processes that support self-sustaining natural communties	Objective B: Eliminate or reduce threats to natural communities	Objective C: Conduct scientific research and monitoring to measure status, develop and refine management actions, and track progress
ACTIONS			
34. Reduce trash input into the Estuary		●	●
35. Develop and expand public involvement, education and advocacy efforts that support CCMP goals			
36. Foster support for natural resources by providing public access and recreational opportunities compatible with wildlife		●	
37. Increase regional coordination among elected officials at all levels of government to support decisions and provide funding to implement the CCMP			
38. Expand funding mechanisms to implement CCMP			

GOAL 2: Increase the Resiliency of the Estuary to Sustain Functions in the Face of Changing Climate Conditions	Objective D: Increase resilience of tidal habitats and tributaries to climate change	Objective E: Increase resilience of communites at risk from climate change impacts while promoting and protecting natural resources	Objective F: Promote integrated, coordinated, multi-benefit approaches to increasing resiliency
ACTIONS			
34. Reduce trash input into the Estuary			
35. Develop and expand public involvement, education and advocacy efforts that support CCMP goals			
36. Foster support for natural resources by providing public access and recreational opportunities compatible with wildlife			
37. Increase regional coordination among elected officials at all levels of government to support decisions and provide funding to implement the CCMP			
38. Expand funding mechanisms to implement CCMP			

GOAL 3: Improve Water Quality and Increase Water Quantity to the Estuary

ACTIONS	Objective G: Increase drought-resistance and water efficiency and reduce demand on imported water	Objective H: Improve freshwater flow patterns, quantity, and timing to better support natural resources	Objective I: Reduce levels of contaminants present and the delivery of additional contaminants to the estuary
1. Develop and implement watershed approaches to comprehensive aquatic resource protection		●	●
2. Protect, restore and enhance tidal marsh and tidal flat habitat			
3. Identify, protect and create transition zones			
4. Maximize habitat benefits of managed wetlands/ponds			
5. Protect, restore and enhance subtidal habitat			
6. Protect, restore and enhance riparian habitat			
7. Protect and restore critical coldwater habitat in tributary streams		●	
8. Establish Regional Wetland and Stream Monitoring and Assessment Program			
9. Protect, restore and enhance seasonal wetlands			
10. Minimize the impact of invasive species			
11. Increase the efficacy of predator management			
12. Increase carbon sequestration through wetland restoration, creation and management			
13. Restore Estuary-watershed connections for multiple benefits			
14. Manage sediment with a regional comprehensive approach that advances beneficial use of dredged or excavated material			
15. Demonstrate how restored habitats serve as “natural infrastructure” that provide multiple benefits			

GOAL 4: Champion the Estuary

ACTIONS	Objective J: Build public support for the value of natural resources and the need to protect, restore and maintain a healthy Estuary	Objective K: Build regional leadership and support to protect, restore and maintain a healthy Estuary	Objective L: Promote efficient and coordinated regional governance
1. Develop and implement watershed approaches to comprehensive aquatic resource protection	●		
2. Protect, restore and enhance tidal marsh and tidal flat habitat			
3. Identify, protect and create transition zones			
4. Maximize habitat benefits of managed wetlands/ponds			
5. Protect, restore and enhance subtidal habitat			
6. Protect, restore and enhance riparian habitat			
7. Protect and restore critical coldwater habitat in tributary streams			
8. Establish Regional Wetland and Stream Monitoring and Assessment Program			●
9. Protect, restore and enhance seasonal wetlands			
10. Minimize the impact of invasive species			
11. Increase the efficacy of predator management			
12. Increase carbon sequestration through wetland restoration, creation and management			
13. Restore Estuary-watershed connections for multiple benefits			
14. Manage sediment with a regional comprehensive approach that advances beneficial use of dredged or excavated material			●
15. Demonstrate how restored habitats serve as “natural infrastructure” that provide multiple benefits			

GOAL 3: Improve Water Quality and Increase Water Quantity to the Estuary	Objective G	Objective H	Objective I
	Increase drought-resistance and water efficiency and reduce demand on imported water	Improve freshwater flow patterns, quantity, and timing to better support natural resources	Reduce levels of contaminants present and the delivery of additional contaminants to the estuary
ACTIONS			
16. Advance natural resource protection while increasing shoreline community resiliency			
17. Integrate natural resource protection into local government hazard mitigation, response and recovery planning			
18. Improve regulatory processes regarding permitting and monitoring innovative multi-benefit projects			
19. Develop long-term drought plans	●		
20. Reduce landscape water use	●	●	
21. Increase water recycling	●	●	
22. Change public's perception of the value of water to achieve long term reduction of water use	●	●	
23. Implement indirect potable reuse standards and increase public acceptance of direct potable reuse	●		
24. Assess potential application of the constitutional standard of waste and unreasonable use in the Bay-Delta Estuary		●	
25. Integrate water issues into Plan Bay Area	●	●	●
26. Adopt new Bay-Delta freshwater inflow/outflow standards that better protect all beneficial uses	●	●	
27. Increase agricultural water use efficiency	●	●	
28. Identify and work to eliminate illegal water diversions in the San Francisco Bay region	●	●	
29. Address emerging contaminants			●
30. Decrease raw sewage discharges			●
31. Manage stormwater with Low Impact Development/green infrastructure practices			●

GOAL 4: Champion the Estuary	Objective J	Objective K	Objective L
	Build public support for the value of natural resources and the need to protect, restore and maintain a healthy Estuary	Build regional leadership and support to protect, restore and maintain a healthy Estuary	Promote efficient and coordinated regional governance
ACTIONS			
16. Advance natural resource protection while increasing shoreline community resiliency			
17. Integrate natural resource protection into local government hazard mitigation, response and recovery planning			
18. Improve regulatory processes regarding permitting and monitoring innovative multi-benefit projects			●
19. Develop long-term drought plans			
20. Reduce landscape water use	●		
21. Increase water recycling	●		
22. Change public's perception of the value of water to achieve long term reduction of water use	●		
23. Implement indirect potable reuse standards and increase public acceptance of direct potable reuse	●		
24. Assess potential application of the constitutional standard of waste and unreasonable use in the Bay-Delta Estuary	●		
25. Integrate water issues into Plan Bay Area	●	●	●
26. Adopt new Bay-Delta freshwater inflow/outflow standards that better protect all beneficial uses	●		
27. Increase agricultural water use efficiency			
28. Identify and work to eliminate illegal water diversions in the San Francisco Bay region			
29. Address emerging contaminants	●		
30. Decrease raw sewage discharges			
31. Manage stormwater with Low Impact Development/green infrastructure practices			

GOAL 3: Improve Water Quality and Increase Water Quantity to the Estuary

ACTIONS	Objective G: Increase drought-resistance and water efficiency and reduce demand on imported water	Objective H: Improve freshwater flow patterns, quantity, and timing to better support natural resources	Objective I: Reduce levels of contaminants present and the delivery of additional contaminants to the estuary
32. Implement select Total Maximum Daily Loads (TMDLs)			●
33. Manage nutrients in the Estuary			●
34. Reduce trash input into the Estuary			●
35. Develop and expand public involvement, education and advocacy efforts that support CCMP goals			
36. Foster support for natural resources by providing public access and recreational opportunities compatible with wildlife			
37. Increase regional coordination among elected officials at all levels of government to support decisions and provide funding to implement the CCMP			
38. Expand funding mechanisms to implement CCMP			

GOAL 4: Champion the Estuary

ACTIONS	Objective J: Build public support for the value of natural resources and the need to protect, restore and maintain a healthy Estuary	Objective K: Build regional leadership and support to protect, restore and maintain a healthy Estuary	Objective L: Promote efficient and coordinated regional governance
32. Implement select Total Maximum Daily Loads (TMDLs)			
33. Manage nutrients in the Estuary			
34. Reduce trash input into the Estuary	●		
35. Develop and expand public involvement, education and advocacy efforts that support CCMP goals	●		
36. Foster support for natural resources by providing public access and recreational opportunities compatible with wildlife	●		
37. Increase regional coordination among elected officials at all levels of government to support decisions and provide funding to implement the CCMP	●	●	●
38. Expand funding mechanisms to implement CCMP		●	●

1. Sustain and improve habitats and living resources
2. Increase resiliency to sustain functions in the face of climate change
3. Improve water quality and increase water quantity
4. Champion the Estuary through public understanding and stewardship

Your input is important because:

- The CCMP can help move forward your organization's goals.
- The document governs eligibility for some Environmental Protection Agency grants and other funding sources.
- Your organization will be helping to implement the actions in the plan and can also help to track progress.

CCMP OVERVIEW

The goal of the current revision is to streamline the number of actions (from over 200 to less than 50) and refocus on contemporary issues (changing estuarine conditions, new pressures from ongoing urbanization and development, and climate change). The revised CCMP will be organized into four goal categories with corresponding objectives, actions, and tasks, as shown below.

GOALS
The 35-year vision for the Estuary

GOAL 1 GOAL 2 GOAL 3 GOAL 4

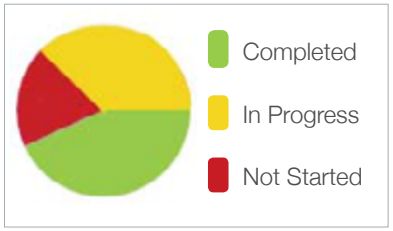
OBJECTIVES
Specific outcomes to be delivered by the CCMP

A B C D E F G H I J K L

ACTIONS & TASKS
How the goals and objectives will be advanced over the next 5 years

Note: Actions may serve multiple goals and objectives.

TRACKING PROGRESS
The CCMP Report Card will include a framework for tracking the success of all the actions.



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The enclosed matrix summarizes how the draft goals and objectives are met by the draft actions. In the final CCMP document, each action will be fully fleshed out, with tasks, milestones, background, owner, etc. The final CCMP will also include more background information, findings, and a section on tracking and reporting. The expanded draft document will be available for public review on September 17th at www.sfestuary.org