Stormwater Regs Used to Shift Homeless Away from Creeks and Towards Services

Options for Relocating or Preserving Orphan Species

Smelt and Salmon Starved for Habitat and Food

Not So Spot-On Flea Controls
Urban Jungle Inspires Unique Regulatory Tack

California has nearly one-quarter of the nation’s homeless people—the most of any state by far—and thousands of them live in the Bay Area. Many are in outdoor encampments that lack basic services most people take for granted, including clean water, sewer hookups, and garbage collection. Human waste and the pathogens in it are untreated, and refuse piles up and escapes.

And, out of all the social and environmental costs of homelessness, the trash that blows from encampments into waterways may help spur a solution to this problem in the Bay Area. Under a new resolution by the San Francisco Bay Regional Water Quality Control Board, trash from homeless encampments now falls under the stormwater permit that requires Bay Area cities and counties to get storm drains virtually trash-free by 2022.

“I was personally shocked that the homeless problem was going to be addressed through the stormwater program—that this was the strongest regulatory driver,” says Brett Calhoun, a Santa Clara Valley Water District (SCVWD) water quality specialist.

Bay Area efforts to keep trash out of storm drains, and so out of streams and the Bay, began in 2009. However, cities soon recognized that homeless encampments are another major source of trash in waterways. “Creeks have become a haven for homeless people to hide from society,” says Tom Mumley of the regional water board. “If you pick a stream adjacent to an urban area, you’re generally going to find an encampment there.”

But it probably won’t be obvious. Take the stretch of Coyote Creek that winds along Wool Creek Drive in the City of San Jose. From the curb, it looks like a nature reserve. It’s thick with oaks, sycamores and willows, and birds sing high above. But a single step into this green oasis will reveal the answer to the question of what they hide: a homeless encampment. Rough stairs cut into the ground, leading to a tent site carved into the stream bank, resembling a small cave. The earthen walls provide shelter from the elements and hides the site from view of the elementary school grounds across the street.

The land slopes steeply down to the creek, and a sycamore stands between the tent site and the slope. While this makes the site feel more secure, the trees—unseasonably brown leaves—say it’s dead or dying. The understory plants, which shelter salamanders and other ground-dwelling animals, are gone. And the stream bank is badly eroded. One good rain will wash loose soil down the slope and into the creek, where it will clog and brand gravel like cement. Steelhead in the creek that used to lose gravel for laying eggs as well as for overwintering fry habitat.

This encampment is vacant, except for the people who can’t. They are homeless, with nowhere else to go. They will make their way through the thick brush, where it will be easy for them to find a place to pitch a tent, perhaps using a discarded sheet for shelter. When it rains, their shelter will be torn apart, and they will be exposed to the elements. It is a tragic situation, one that needs to be addressed.

Due to a combination of open waterways and sizeable homeless populations, streamside encampments are particularly common in Contra Costa County, Oakland and San Jose. All three municipalities are addressing the issue. Contra Costa County cleans up encampments in flood control channels along streams, for example. However, while Oakland cleans up more than 100 encampments per year and provides housing for those within 250 feet of waterways, only San Jose is participating in a formal plan to clean up trash from homeless encampments under the stormwater permit’s new provision, along with participating include the SCVWD and Santa Clara County.

A Harry Potter View of SLR

As a recent graduate entering the climate workforce, choosing a climate change focused career is like choosing to be Harry Potter. Advocates are acutely aware of the need to save both the climate in-the-know and deniers from an evil so dangerous all public work. Like Harry, we must acknowledge that working together produces stronger results. Climate change work should reflect the interdisciplinary collaboration needed to save our planet, whether it’s supporting public transportation or negotiating global carbon emissions agreements like the 2015 COP21 Paris Agreement. Attending an event like this past September’s meeting of the Bay Science Collaborative this past September gave me hope that we can create a better future, even in the bleak one I spend my days trying to settle on a climate change focus.

This year’s theme was sea level rise: communicating and connecting science, including of nature-based solutions. The structure of the collaborative event, now in its second year and organized by the Romberg Tiburon Environmental Studies (RTES) at San Francisco State University, included lightning-round seven-minute talks followed by speaker-led round table discussions (see video). It offered a forum for scientists, policymakers, journalists and students to share their research and thoughts on climate change in the region, in essence connecting specific fieldwork to a network of Harry Potters.

I arrived at the RTC, which sits on the edge of the Tiburon Hills, in time to see the beautiful golden morning light awakening the Bay. On that day, the RTC became the Hogwarts of the bay-delta science and communication on sea level rise. The morning coffee room was quiet yet full of people not sure what to expect. This sleepy nervous energy soon became electric as the coffee kicked in and an opening session got off to a running start.

The opening talk left a lasting impression on me. It was Andy Gunther’s presentation, titled“Weeknag tox” of Maytagging, or the sense of impending doom when a monster wave approaches the shore. Mr. Gunther, to communicate about carbon dioxide levels and climate change to everyone in his audience, is like a professor. Not a surfer, but this visual example helped me understand exactly what the science is. Gunther emphasizes that, like Lupin, known for wise communication and talent as a Hogwarts professor, we need people like Cohen to be our “collectivism needed to save our planet, no one can be a Harry Potter analog. I feel like an incoming first-year who hasn’t been sorted yet into a Hogwarts House (their equivalent to fraternities) by the Sorting Hat. Luckily, I did feel the collaborative format encouraged socializing and discussion, helpful in my quest to settle on a climate change focus.

Ellie Cohen’s Dumbleodore-esque concluding talk also deeply inspired me. She encouraged scaling up climate smart solutions and taking risks in order to speed up the transition to clean energy future. When laid out current climate science, pointing to recent photos of once white, but now black, mountain peaks in melting Greenland. However, she also oozed optimism and enticed us with climate solution news from the future, in sustainable futures in 2045 and 2066. Just as Harry needed Dumbledore for support and guidance, we need people like Cohen to be our Bay Area climate cheerleaders.

Attending the 2016 Bay Science Collaborative reinforced my sense of urgency to act and adapt. Now more than ever, it seems this Harry Potter analogy has become our reality. Our bay will rise, in response, we too must rise. Let’s not let divisions and setbacks ruin our drive to create an equitable resilient future.

Author Tira Okamoto is 23 and interested in sociological changes on our planet. She says it’s dead or dying. The understory plants, which shelter salamanders and other ground-dwelling animals, are gone. And the stream bank is badly eroded. One good rain will wash loose soil down the slope and into the creek.

IMPRESSIONS

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Crews clean up a San Jose area encampment. Photo courtesy City of San Jose.

**HABITAT**

**Banking Fish Food?**

Delta smelt and Chinook salmon living in one of the world’s most productive agricultural regions are not getting enough to eat. Scientists now believe this shortage of food is a significant factor in both species’ dramatic decline in recent decades. But a pair of experiments designed to improve food supplies for the fish have shown promising results to date, and could soon be implemented on a larger scale.

There is widespread acknowledg- ment among scientists working in the field that endangering fish populations like salmon and smelt are literally starving,” he wrote. “But it takes a while for the science to penetrate into policy.”

**Just this fall, scientists assessing the state of Bay-Delta science con- cluded that the Delta’s aquatic food web bears little resemblance to that which existed prior to 1986 and no longer sustains native species. In a science summary for policymakers called *The Delta on Fast Forward*, the au- thors suggest *“any actions to improve conditions must be taken in light of this new food web structure.”*

The Delta smelt may not have much time left. The species is on the brink of extinction, with only thirteen adult individuals identified by the California Department of Fish and Wildlife (CDFW) in its most recent spring survey. The 2015 survey identified 86, itself a record low. The next few years are likely to bring either the turning of the tides or the fish’s complete disappearance.

In a last-ditch effort to save the smelt, this June a coalition of California and federal agencies, including the CDFW, California Department of Water Resources (DWR), U.S. Fish and Wildlife Service, and U.S. Bureau of Reclamation — among others — announced an ag- gregate new plan called the Delta Smelt Resiliency Strategy.

Designed to be implemented more or less immediately, it includes a variety of measures to improve smelt habitat and survival, including remov- ing introductions of toxic algae blooms, and adding sand to spawning areas. It also calls for aug- menting summertime food supplies by diverting pulses of water released from Lake Shasta through an extended wetland and tidal slough system to promote plankton production.

Over two weeks in July, agencies and water districts cooperated to send 12,000 acre-feet of water from the reservoir down the Colusa Basin Drain, through the Yolo Bypass, and into the Delta. Scientists Jordan Davis, Jared Frantzich of DWR measured phytoplankton levels in the Rio Vista area of the lower Sacramento River and discovered a tenfold increase as- sociated with the pulse water.

This was a very different and creative approach to target- ing specific habitats to gen- erate a food bank,” Somers says. “It is a key issue for this fish, so this opens the door to really targeting Disamnagement.” Yet finessing and expanding the program in the future will hinge on getting enough water, Somers says. “We have evidence that we can generate a positive benefit even if it only happens in some years.”

Elsewhere along the bypass, on rice fields left fallow over winter, a sec- ond project has had similar success in generating food for hungry fall-run Chinook salmon on their way to sea. The idea is to leave floodwa- ters on certain fields — 18 acres and counting, as more rice farmers opt to leave fields

*continued on next page*
The Underrated Avian Sense of Smell can Be Crucial for Birds that Need to Locate Food Sources at Sea. As plastic waste accumulates in the world’s oceans, more seabirds have been found with plastic in their guts, a Japanese study suggests. In this December’s issue of California Current, three eminent scientists report that it is increasingly irresponsible to focus entirely on a policy of in situ conservation through habitat protection and restoration. Conditions in the Delta are so dire, write Michael Healey of the University of British Columbia, Michael Dettling of the U.S. Geological Survey, and Richard Norgard of the University of California, Berkeley, that “alteratives to conservation in place” should be explored for the Delta’s most endangered native species. These so-called “orphan species” include winter-run Chinook salmon, green sturgeon, Lange’s metalmark butterfly, and the san francisco estuary orcas.

“The ecosystems of the Delta are classic examples of a habitat totally dominated by humans. We’re responsible for making it work, or not,” says Peter Moyle, emeritus professor with UC Davis. “The only way it’s going to be good for native fish is if we want to make it so. We can play God.”

“A POLDER FOR DELTA SMELT — With a refuge population near Byron, and a second backup population at the Livingstone Hatchery below Shasta Dam, Delta smelt might seem secure for the time being. But in a hatchery, smelt get domesticated fast. Its one-year life cycle leads to brothers mating with sisters. To keep the small population at the hatchery healthy, diverse, scientists genotype all candidates to conservation in place” should be explored for the Delta’s most endangered native species. These so-called “orphan species” include winter-run Chinook salmon, green sturgeon, Lange’s metalmark butterfly, and the sand hill harvest mouse.

“The longer the delay, the harder the decisions, and the less likely they are to produce positive results” the authors warn.

“Still, there’s this big desire to maintain species in the place that they currently exist. I’m all in favor of that, but it’s time to start asking the ‘what if’ questions. What if we can’t do that? What’s Plan B?” asks author and salmon expert Healey.

The “alternatives” they propose run the gamut from tame to radical. Some are extensions of accepted practices conducted for conservation purposes. Others require a level of human intervention that is nothing short of fictitious. But all seem destined to become a hallmark of conservation biology in the Anthropocene.

The Olfactory Trap

As plastic waste accumulates in the world’s oceans, more seabirds have been swallowing it. UC Davis researchers say the avians are deceived by chemical signals that reliably led their ancestors to tasty krill and other crustaceans.

When krill and other organisms strange to graze on marine algae, the latter produces dimethyl sulfide (DMS). This alarm signal draws hungry birds. Graduate student Matthew Savoca says some of the algae is now growing on floating plastic, and generating DMS as they die. The resulting smell is an alarm signal that reliably led their ancestors to tasty krill and other crustaceans.

“The Nigiri Project’s findings are significant,” says Tien-Chih Hung, Director of the UC Davis Fish Conservation and Culture Laboratory. Hung oversees this two-acre facility on the outskirts of the tiny town of Byron.

Opened in 1994, the facility was initially charged with producing Delta smelt for experiments. It took a decade for researchers to replicate the fish’s life cycle in captivity. “We joke that it dies if you look at it the wrong way,” Hung says.

Now, with smelt production down pat—“we might have more Delta smelt hatching in the wild,” says Hung—the facility is shifting directions. That’s why Hung has recently divided the facility in half, on one side are destined for science, while those on the other are what Hung calls “a living gene bank.”

Another way to think about culti- vated smelt is as an insurance policy. Should the unthink- able occur, and Delta smelt are no longer viable in the Estuary, this refuge popula- tion could someday be reintroduced to the wild. In that way, they would be like tiny versions of the California condor, maintained solely in captivity for years until conditions were right to release them again.

Playing God — Maintained by humans outside of its natural habitat for conservation, Hypomesus transpacificus could be the first of a number of Delta species on artificial life support.

In this December’s issue of San Francisco Estuary and Watershed Science, three eminent scientists report that it is increasingly irresponsible to focus entirely on a policy of in situ conservation through habitat protection and restoration. Conditions in the Delta are so dire, write Michael Healey of the University of British Columbia, Michael Dettling of the U.S. Geological Survey, and Richard Norgard of the University of California, Berkeley, that “alteratives to conservation in place” should be explored for the Delta’s most endangered native species. These so-called “orphan species” include winter-run Chinook salmon, green sturgeon, Lange’s metalmark butterfly, and the sand hill harvest mouse.

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assisted migration: relocating the fish
salmon, Healey proposed a case of Reservoir, “They are really five- to seven-year drought and there Dam for its young to survive. “Another temperatures are at their warmest, this considered at risk from a hotter climate.
ranges contract. A hotter climate will exacerbate drought conditions. And as levels rise wetland species like the salt marsh harvest mouse could get inundated.
Winter-run Chinook is one species considered at risk from a hotter climate. Spawning in summer when water temperatures are at their warmest, this salmon requires cool water from Shasta Dam to help it survive. Another five- to seven-year drought and there will be no cool water pool in Shasta Reservoir,” says Healey. “They are really in a tenous position.”

To preserve this genetically distinct salmon, Healey proposed a case of assisted migration, blocking fish the all way to the Arctic Circle. In virgin watersheds newly exposed by receding ice, it could access plenty of cold water. Certainly people have had lots of experience moving fishes to new areas; witness the longstanding programs to start Sierra Nevada lakes with trout.

Healey argues the difference between assisted and natural migration is merely a matter of degree. “We’re really talking about resisting a process that’s going to happen anyway,” he says. The Pacific is expected to serve as a corridor for millions of salmon and sturgeon to colonize cooler northern climes.
The time to act, the report scientists say, is now. “You need to generate the will to carry it through. So if you wait until the last lonesome individual is teetering on the brink, it’s too late,” Healey says.

UNCHARTED TERRITORY — Not so fast, argue other scientists. “Alternative conservation” measures are phenom- enally costly, raise a raft of ethical and conservation” measures are phenomena- enally costly, raise a raft of ethical and political questions, and could even sap the public’s will to make the Delta eco- logically healthy again.

One issue with assisted migration is that it spends the idea of species being integrally connected to habitat. The Endangered Species Act defines each species by unique ecological setting.” In other words, a species is inseparable from its habitat.

In the case of winter-run Chinook, fish spawn in the fall, the arictic will be on a completely different evolutionary trajectory than their Delta relatives, and there no longer be considered protected under the current language of the ESA.

“What those objections ignore of course is that these habitats are chang- ing dramatically as a result of climate change, and species already in the Arctic might not be able to survive that transition,” Healey says.

AN ETHICAL CONUNDRUM — Salmon and smelt are hardly the only organisms that could require intensive human intervention to survive. With a finite amount of political will and funding to devote to conservation, so- ciety will have to prioritize which to aid, and which to leave to their own devices.

“We probably won’t be able to preserve every species unique to the Delta by any of these techniques. So there’s going to have to be some tri- age. Which ones will we invest in and which ones won’t we? These are going to be really hard discussions,” Healey acknowledges.

“It goes right to the heart of what conservation is all about. Is it most im- portant to save every species? Preserve the functioning of natural ecosystems? What is our objective?” says John Wiens, former chief scientist of The Nature Conservancy.

“We need to stand back and have some thoughtful discussion about what we’re really trying to achieve in con- servation and management of these populations. Because if we don’t do that, then we’re going to get caught by the speed of change and find we haven’t really used our resources wisely and achieved as much as we could,” Wiens says. KMW

CHECK OUT our extended story online, including specific examples of alternative techniques. www.sfsestuary.org/estuary-news/

Fishway Under Freeway

When the state built the I-80 freeway in the 1950s, they put Pinole Creek in a 400-foot-long double box culvert below, creating an obstacle for migrating steelhead. After that, only a rare, super fish could find its way from the mostly-resident fishway, to make upstream to better spawning habitat. A resident population survived, but the natural connection between rivers and creeks for migrating fish was weakened.

“Every once in a while we’d see evidence of spawning,” says Bert Mulchaey, East Bay Municipal Utilities District biologist. “We knew the prob- lem was the culvert.” His agency has been monitoring the mostly-resident steelhead population for 20 years within the Pinole Creek city limits and EB- MUD’s property higher in the water- shed. In 2016, the steelhead finally got a new low-low chan- nel (“fishway”) to take them through one of the twin culverts.

The fishway (an- other term for fish ladder) was one of the goals identified in a multi-stakeholder, consensus-based vision plan for the watershed in 2001, but the culvert had been local on water- shed activists’ and bi- ologists’-to-do lists for years prior. Feasibility studies and habitat mapping had to be completed to convince resource agencies and funders that both the habitat and the steelhead populations were viable. And funding had to be cobbled together from several sources.

Ultimately, the Contra Costa County RCD stepped in to lead the effort—raising money and working with stakeholders to finesse the design. The price tag— including feasibility studies, design, permits from multiple agencies such as the Contra Costa County Flood Control District and Caltrans, and construction — came to just under $1 million, says the RCD’s Ben Wallace. “There were a lot of cooks in the kitchen and several iterations of design over the years, but [the outcome] is a shining example of good partnership,” he says. “It required everyone to go above and beyond their obligations.”

Engineer Mike Love says there are two pieces to the fishway design. Down- stream of the box culverts, he used boulders and smaller rock to create a new low-low chan- nel (“fishway”) to take the steelhead back up to the open water level. Upstream, he installed a new low-low chan- nel (“fishway”) to take the fish down to the ocean. “The real challenge was that we didn’t want to raise flood waters and reduce the capacity of the culvert,” says Love. The other culvert was left in place to absorb very high flows.

The Friends of Pinole Creek, which formed decades ago out of concern for the creek’s fish, will monitor the baffle boxes and make sure nothing blocks passage in the meantime, Mulchaey is hoping larger fish from the ocean will now make their way up the creek. “We’re hoping bolster the resident population, which has been hard hit by the drought. We’d like to see the steelhead from the Bay bring the energy they collect out in the ocean into the creek ecosystem,” he says.

In addition, when steelhead arrive in any urban creek, people see them and want to protect them. “If we give these fish the opportunity they can persist in the Bay Area,” says Mulchaey.

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Dehydrated Estuary

Ours probably aren’t the first thing that come to mind when people think about the Estuary. But a new report called San Francisco Bay: The Freshwater-Starved Estuary will likely shed light on the ongoing lack of freshwater in the system causing whales off the coast to starve—and the entire ecosystem is suffering, ultimately affecting commercial fisher- ies and humans as well.

Ours specialize on Chinook salmon, which are dwindling as freshwater flows into the Estuary decline. Similarly, forage fish like the smelt, salmon, and shrimp that are critical food supply for larger fish, birds, and mammals, includ- ing humans, are also collapsing.

“Flows affect productivity in the food web,” says The Bay Institute’s Jon Rosenfeld, the report’s lead scientist. Ongoing droughts have not helped, he says, the wet years that used to be somewhat common are now exceed- ingly rare from the point of view of fish and wildlife in the Estuary; the droughts that used to occur occasionally now oc- cur almost 50 percent of the time, due to freshwater diversions upstream. "If you’re a fish in the Bay or you’re a bird eating those fish, it has been a 1977-style drought for half of the last 40 years,” says Rosenfeld.

The report also analyzes myriad other impacts on the estuarine eco- system caused by lack of freshwater flows, from pollutants and nutrients being overly concentrated in certain areas to increased toxic algae blooms. Other impacts detailed include damage to commercial and recreational fisher- ies and reduced sediment flows through the Estuary, which helps nurture wetlands downstream.

We’re spending a lot of money to re- store and protect wetlands and beaches around the Bay. We’re even bringing dump trucks of sand and sediment to these places. Mother Nature could do this work for us, but we’re not letting her,” says Rosenfeld.

The new Bay Institute report, spon- sored by the Estuary Partnerships, was published just before the State Water Board released new documents related to its Bay-Delta Water Quality Control Plan Update. Phase 1 of the update focuses on flow requirements for the...
The Dirt on Flea Control

It’s hard to go to the big box pet store and not stumble over the flea control displays. Most pet owners have dabbed or squirted “spot-on”-style anti-flea products on their pets, such as Fiproguard or Frontline. But how much of this chemical ends up in our waterways, and what are the impacts on our ecosystems? This is the topic of a new study from the San Francisco Estuary Institute’s Central Valley RMP, which found that “spotted” flea-control products are contaminating wastewater streams around San Francisco Bay.

Scientists and regulators are increasingly recognizing the importance of tracking pesticide and flea-killing chemicals into our household wastewater, homes, businesses, schools, or other facilities. “We know that the chemical is getting into the wastewater,” says Kelly Moran of the San Francisco Estuary Institute, and that it may end up in San Francisco Bay. But how much of it is actually getting there, and how much is getting through treatment plants, is unknown.

The study monitored two ingredients in common “spot-on”-style flea killers – fipronil and imidacloprid – during drought conditions at eight wastewater treatment plants around San Francisco Bay. Scientists tested both the “influent” and the “effluent” of the eight plants, which ranged in size, location and treatment technology. Regardless of how advanced the treatment, very little, if any, of these pesticides were removed.

“Many of us have thought spot-on treatments were relatively benign,” says the San Francisco Estuary Institute’s Rebecca Sutton, the lead scientist for the project. “These results opened all our eyes to something that might need control at the source.”

A few years ago, the RMP had flagged fipronil as a moderate concern for San Francisco Bay because it had been found in Bay sediments at levels that would kill freshwater invertebrates (toxicity tests in the saltwater environment are still in the works). In terms of overall levels found in untreated wastewater as part of this study, results varied, with total fipronil and breakdown products ranging from 20-120 parts per trillion (ppt), and imidacloprid from 58-310 ppt.

Researchers and regulators are now scrutinizing other portions of this pollution pathway for more clues. The California Department of Pesticide Regulation ( DPR)'s Jennifer Teerling completed a study in which they washed dogs 2, 7, and 28 days after spot-on treatments and carefully tested the wash water for fipronil and breakdown products. Results are still forthcoming. DPR is also undertaking sampling throughout a municipal “sewershed” to see if homes, businesses, schools, or other facilities may be more or less important sources.

One interesting finding of the RMP study is that the San Francisco Airport treatment plant, a place where no one does much in the way of flea care for pets, had lower but still significant levels. “We checked pretty thoroughly that these particular chemicals weren’t being used to sprays for ants, or as pest control for shopkeepers,” says Sutton. Since that was not the case, people must be bringing it to the airport on them, with them, or in them.

“People think that putting flea control on the outside of their pet is better than getting it because it’s not inside the pet,” adds Moran. Results suggest, however, that it could be getting inside of all kinds of things, perhaps even our own bodies.

While DPR is exploring the human health effects of topical products containing fipronil, pet pills are the other co-chairs of the RMP’s counterparts in the Sacramento Regional San. “Monitoring required our plant’s discharge permit (NPDES) is very specific to one location,” says Dorn by way of example. “That doesn’t always help us make decisions in the context of the larger water body of which we are a part.”

That larger water body is an extremely convoluted web of channels and rivers compared to the more open expanses of San Francisco Bay, adds Trowbridge, making design of the program more challenging. “In the Bay, you can move your sampling site 100 yards in one direction or another and find no difference in water quality; in the Delta, 100 yards upstream or downstream can bring a whole new set of influences on samples,” he says.

The geographic complexity is mirrored by the number of entities already conducting monitoring, each for their own purpose. “We are a group of diverse stakeholders still learning to work together,” says Dorn. “It will take time for us to develop the personal relationships and trust you can see in the Bay RMP after 25 years of collaboration.”

Organizers stress that the Delta RMP is quite different from the Bay RMP, and the difference is not just geographical. In addition to dischargers and regulators several unique stakeholders are at the table, namely irrigated agriculture and water contractors that divert from, rather than add, water to the Delta. “Meeting regularly to talk through and plan studies together, that’s what we do here,” says Laputz. “Instead of just reacting to what we’re finding, we can be more in the driver’s seat.”

With so many stakeholders and such a complex system, there is also a lot of competing needs for limited monitoring resources. “We can’t sample everywhere all the time for everything,” says Laputz. “So if you’re working in the Delta and doing monitoring, we’d like to partner with you.”

To help pinpoint the source, researchers divided results per plant by population served. Results were so ubiquitous, and of such magnitude, that it helped them eliminate sources like occasional improper disposal or material tracked in from outdoor ant sprays, says Laputz. Low daily variability in per capita loading suggests widespread use.

**Water Quality**

**Valley Version of RMP**

“buckets in the water and boots on the ground,” is the current status of the Delta Regional Monitoring Program according to manager Phil Trowbridge of the Aquatic Science Center. While this effort to coordinate and synthesize water quality monitoring results from the Delta started actual sampling more than a year and a half ago, the Program is now poised to delve into its first data analysis. “In the Delta, 100 yards upstream or downstream can bring a whole new set of influences on samples,” he says.

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FLOWS, cont’d from page 9

San Joaquin River watershed and salinity in the southern Delta. Phase II will address flows in the other Delta tributaries, flows at the pumps, and flows through the Delta into the Estuary and San Francisco Bay.

For Phase I, says the State Water Board’s Steve Moore, the staff’s initial recommendation is to require that 40 percent of unimpaired flow in a given year remain in the San Joaquin River tributaries February through June, with an allowable range of 30 to 50 percent. Says Moore, “In the future, if non-flow measures help achieve biological objectives that are widely accepted by stakeholders, the Board could have discretion to require less percent unimpaired flow, or conversely, if the objectives aren’t met, the Board could have discretion to require more percent unimpaired flow, up to 50 percent. There are also proposed October fall-flow requirements.”

Rosenfield says those percentages don’t come close to the magnitude of flows needed to save the species or the estuarine ecosystem: “The legal requirement is to restore salmon populations in the San Joaquin River watershed to a certain level, and we can show, and have shown the Board before, that 40 percent of the San Joaquin River’s flow just won’t do it.” Fifty percent is the lower limit at which scientists begin to see the possibility of restoring salmon, says Rosenfield. “There are a lot of ‘ifs’; the range should really include 60 percent.”

In October, the Board released its draft scientific basis report for Phase II, which acknowledged the dire state of many Delta fish species, including spring-run and winter-run Chinook salmon, longfin smelt, Delta smelt, and Sacramento splittail, and recommends improving habitat and flows to support them, as well as more natural timing, distribution, and variability of flows. The report studies the effects of a range of flows into the Estuary (between 35 and 75 percent of unimpaired or natural springtime flows) from the Sacramento, Mokelumne, Calaveras, and Cosumnes Rivers.

San Francisco Estuary Partnership Director Caitlin Sweeney says adequate freshwater flows have always been—and continue to be—a great concern, especially with so many dollars devoted to restoring wetlands around the Bay. “Those investments are at risk unless we restore the physical processes that create and maintain habitats, and address the freshwater flow issue,” she says.

Moore says the Water Board is planning to hold five public hearings between the end of November and beginning of January; written comments are due January 17. Says Moore, “I want everyone to have confidence that we are listening to their comments about the proposal and that we remain open to suggestions.”

RMP, cont’d from page 11

In the meantime, the Delta RMP is focused on pesticides, pathogens, nutrients and methyl mercury. Early accomplishments have been a regional level analysis of existing data on nutrients and a forthcoming technical report on pathogens. “The word is they haven’t found any exceedances of cryptosporidium or giardia near drinking water intakes that would require a more advanced level of water treatment, so I’m excited to see the actual analysis,” says Dorn.