

As it meanders through northeastern Sacramento, Arcade Creek may seem like just another beleaguered urban waterway, with a familiar litany of problems: toxic spills, trash dumping, exotic vegetation. But it's become something special to the students of Mira Loma High School. It's their outdoor classroom, where hands-on scientific research has turned them into creek advocates and activists.

When Mira Loma became part of the rigorous International Baccalaureate Program seven years ago, biology teacher Cindy Suchanek and other faculty members were looking for a field project that would pull all the sciences together while benefiting the community. Arcade Creek was handy, and Suchanek knew a stormwater specialist who wanted to help with mapping and a U.S.



EPA scientist who did bioassays. Other federal and state agencies and conservation groups got involved. Starting with five study areas, the Arcade Creek Project expanded to 11, including vertebrate and plant surveys, longitudinal mapping, data analysis, restoration, and outreach. "It's student-driven and student-led," explains Suchanek. Each study has two student managers who lead a team and work with a designated teacher. The students also run the project's Web site, where data from the studies is posted. This year, they've also begun writing grants. "You empower the kids," Suchanek says. "It makes them realize they really can make a difference."

When water quality samples showed a huge chlorine spike three years ago, Mira Loma students alerted the county to a previously undetected spill. The restoration team has removed red sesbania, an invasive plant that chokes Central Valley streambeds, and persuaded nurseries not to sell it. They're also tackling the creek's feral cat problem with the aid of local veterinarians. The students went to the city council when a creekside area with ancient oaks was about to be turned into a parking lot for a nonprofit group, and helped broker a deal for a better site away from the creek.

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Wetland Worries

To county planners, El Sobrante's "Subdivision 8533" is 10 acres slated for 40 homes; to neighbors, it is their last piece of open space and an urban wildlife refuge. This site would be no more remarkable than any other such site planned for infill development except for the fact that two forks of Garrity Creek run through it, and its steep slopes are spongy with seeps and springs. These wetlands—how to avoid impacting them and how to preserve them—are at the heart of a years-long battle between the Friends of Garrity Creek, county planners, and the developer.

Subdivision 8533 may seem insignificant in the grander scheme of things, yet it represents the types of small wetlands that are being impacted or filled throughout the country, with little fanfare. Says U.S. EPA Region 9's Mike Monroe, "These small areas shouldn't be written off. Because there is so little habitat left, small areas should really receive more protection. If you add up the cumulative losses, it's probably the small areas tucked away that have been damaged the most."

A report released last October by the Government Accountability Office found that the Army Corps is not preventing isolated, non-navigable wetlands from being filled. Yet at a press conference this March, then Interior Secretary Gale Norton and Agriculture Secretary Mike Johanns announced that there has been a net increase in wetlands in the United States since 1998. The increase is primarily due to the creation of golf course ponds, borrow pits, stock ponds,

and mining reclamation ponds, according to the National Wildlife Federation's Julie Sibbing; she describes those bodies of water as "wet deserts." Says Sibbing, "These ponds are not as complex as natural wetlands. They don't have the biological diversity of a wetland; they don't have the same functions. In general, they are too deep to have vegetation except on the edges—vegetation is the key to water filtration." Wetlands, says Sibbing, are also more dynamic hydrologically than man-made ponds—wetlands' water depth can change drastically, promoting an edge effect that encourages blooms of invertebrates important to migratory birds and the rest of the food chain.

In 2001, the U.S. Supreme Court ruled that the Army Corps was no longer required to have jurisdiction over "geographically isolated, non-navigable" wetlands. That same year, a report by the National Academy of Sciences concluded that the goal established by former President George Bush in the 1980s of no net loss of wetlands is not being met by wetland mitigation programs, nor are the government agencies tracking wetland mitigation projects doing an adequate job.

Many environmentalists are worried that these losses will only increase, especially with proposed regulations just released by the Army Corps and U.S. EPA encouraging the use of mitigation banks. "The emphasis on mitigation banks is really distressing," says Arthur Feinstein with Citizens Committee to Complete the Refuge. "It undermines the goal of



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CREEK GEEKS, CONTINUED

Senior Ellen Bane is one of this year's mapping study managers. Her team sets up transects for the other groups at six survey sites and monitors changes in the course of the creek using infrared rangefinders. Teams meet to share results, bringing the pieces together. "The teachers are our reference point and provide backing," she says. She plans to study neurobiology and sees the Arcade project as valuable preparation for college lab work. "You're getting real data that people are using," Bane adds. "It makes me feel like part of something big, fancy, and important."

Suchanek agrees that the Arcade experience pays off for students. Last year, five Mira Loma graduates were hired as research assistants while still college freshmen. Others have gone on to become interns to consulting firms, and three are studying ornithology at U.C. Berkeley.

The project was honored in 2004 with a Governor's Environmental and Economic Leadership Award. "The kids went to the ceremony in their waders," Suchanek recalls. "I was really proud of them." Suchanek herself has been recognized as the school district's teacher of the year, and received an AmGen teaching award that included a \$5,000 grant to the school. Sacramento's Urban Creeks Council bestowed creek steward awards in 1999 and 2005.

What lies ahead for the project? "We know historically we had salmon spawn along the creek," says Suchanek. "I think in the long run we can get them back." She'd like to see the California quail return, too, if the feral cats can be controlled.

Meanwhile, Mira Loma juniors and seniors will continue to see what they learn in the classroom applied to the real world, and to appreciate the web of connections among the sciences and the creek's natural communities.

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WETLAND WORRIES, CONTINUED

'avoiding' first and makes it easy for agencies and developers to say a project is mitigable."

The Clean Water Act requires developers to avoid, minimize, and mitigate impacts to wetlands, in that order, but enviros worry that if developers know regulatory agencies are inclined to look favorably upon mitigation banks, "avoid" may become less of a priority. Says the Association of State Wetlands Managers' Jon Kusler, "We are jumping straight to mitigate."

Another problem with wetland mitigation banks, according to a recent report by the Environmental Law Institute, is that they are usually built in rural areas, while most wetlands are destroyed in urban areas. This, says J.B. Ruhl, one of the study's authors, means that functions like stormwater retention and water quality treatment disappear from urban areas—not to mention the loss of the aesthetic, educational, and inherent values of those wetlands to urban residents, values that aren't usually taken into account when wetlands are filled.

Ruhl suspects urban wetlands are often undervalued in environmental impact reports and other documents. "They don't always look pretty, but they are probably providing stormwater treatment and flood control." The loss of these functions in the urban landscape has some regulators, like the S.F. Regional Board's Andree Breaux, pondering the idea of requiring mitigation both on and off site, in a bank or other area where large stretches of contiguous, high-quality habitat can be created.

Creating high-quality habitat is the goal of Wildlands, Inc., California's largest wetland mitigation banking firm, with 22 mitigation sites around the state and 14 more proposed, according to the firm's Carl Jensen. Headquartered in Placer County, where open space is under siege by suburban sprawl, Jensen says he is trying to create "big, contiguous ecosystems that function as a whole, away from development and the nearest Wal-Mart." Jensen explains that whenever possible, Wildlands tries to situate its banks next to existing refuges or other protected natural areas, to increase the total amount of habitat. From an ecological perspective, says Jensen, such large sites are better than individual on-site mitigation projects. Jensen says he is not opposed to on-site mitigation—or avoiding impacts. But, he says, "Development is going to

happen. We create high-functioning ecosystems that are good mitigation areas. We're part of a very good solution." He also says Wildlands' projects often replace wetlands with limited

functions with wetlands of higher value.

Jensen says it is getting harder to find land to buy to use for mitigation banks in Placer County (he is competing with developers for the same spaces), but the massive new housing subdivisions and big-box malls starting to line Central Valley freeways make it obvious that the practice of mitigation will continue somewhere, if not here. Says Monroe, "In California, population growth is such a huge pressure, and there's so much money involved in all of this development. It leads to the

spread of human habitat all over the landscape."

How will we deal with that spread and its impacts on wetlands? Monroe thinks the question of how and where to best mitigate needs to be determined on a site-by-site basis. He differentiates between highly urbanized areas and developments in more suburban areas, such as the Palos Colorados project in Lafayette and Moraga, where enviros have been fighting for 17 years to stave off a golf course and housing that would have filled streams and ponds that are home to the endangered red-legged frog. "Preserve Lamorinda Open Space" recently won the first round in the fight over the golf course—in the proposed project's current iteration, no golf course will be built, and only about 100 out of 460 acres will be developed with homes. Even if the golf course stays out of the picture, the group's members remain worried about the impacts from all those houses and all those people living in them—and so do regulators. "Once you move dogs and cats and kids onto the site, there's no way the ponds are going to stay the way they are now," says Monroe. Yet, he adds, Palos Colorados is a good example of a site that is amenable to on-site mitigation, whether through large buffers or the creation of additional ponds for the frogs or some combination of both.

Monroe says that when it doesn't make ecological sense to mitigate the impacts of a development on site (if the site is too far from other habitat or surrounded by development, for example), banks are not a bad option, since the idea behind them is to promote actual on-the-ground habitat projects before development impacts occur. He says banks are usually preferable over "in-lieu fee" mitigation, where a

"The emphasis on mitigation banks . . . undermines the goal of 'avoiding' first . . ."

POLLUTION

ROCKET FUEL ROILS WATER FORUM

The Water Forum's Leo Winternitz worries that he's watching the landmark agreement he helped implement slip down the drain. The agreement, signed in 2000, calls for its nearly 40 members—water agencies, cities, environmental groups, builders, farmers, chambers of commerce, and voters' leagues—to protect the lower American River by tapping into another rich water source—groundwater—in drier years. But this cornerstone of the agreement is in jeopardy due to the toxic legacy of Sacramento's aerospace industry.

Plumes of perchlorate—a chemical used to produce rocket fuel—have been found in the groundwater in Sacramento Valley communities near the lower American River. Already, 11 to 15 wells have been shut down (some permanently), and many more are threatened. "We need to contain the plume," says Winternitz.

Under the Water Forum Agreement, agencies are developing their groundwater wells to take the pressure off a lower American River overtaxed by development booms, numerous dry years, and, until recently, a lack of any flow standard for maintaining water levels favorable to fish. Local agencies are pouring hundreds of millions of dollars into developing groundwater sources and managing them. Today, nearly half the water for the Sacramento region comes from groundwater.

Without remediation of the perchlorate plumes, the whole agreement could collapse. Meanwhile, U.S. EPA and the Central Valley Regional Board estimate that it will take hundreds of years to clean up the plumes. "If the plume continues to spread and the groundwater becomes unreliable, then we have no choice but to go to the river," explains Winternitz.

Perchlorates, including salts of perchlorate acid, are manufactured and occur naturally. They are used in solid propellants for rocket fuel and fireworks and are also found in matches. Perchlorates can interfere with the thyroid's ability to absorb iodide, and this can alter the production of thyroid hormones, affecting pre- and post-natal growth and devel-

opment in children, and metabolic and mental function in adults.

The aerospace companies Aerojet General and McDonnell Douglas, when they tested rocket motors in the 1950s, disposed of perchlorate-laced wastewater in unlined ponds in what were then isolated parts of the Sacramento Valley. They continued doing so through the late 1970s. "At the time, perchlorate wasn't thought to be an issue," explains the State Water Resources Control Board's Alex MacDonald.

The perchlorate leached into the groundwater, and MacDonald says his agency began monitoring the extent of this contamination 10 years ago. Then, a 1997 report showed perchlorate in concentrations of up to 260 ppb in the drinking water wells near the property line of Aerojet's facility, 10 to 15 miles northeast of Sacramento. "The EPA had just provided us with a reference dose that if you translate into drinking water was 18 ppb," MacDonald says. (A reference dose is a scientific estimate of the maximum daily exposure to a contaminant that a human can withstand without falling ill.)

Presently, there are no official federal or state drinking water standards for perchlorate. Until a standard is determined, the California Department of Health Services is using a level of 6 ppb perchlorate as the defacto standard for issuing warnings about drinking water supplies.

Details of how far the plumes have spread are continually unfolding, says the Water Board's MacDonald. In 2004, officials in Carmichael—a town that flanks the Aerojet property and is north of the American River—reported contamination in monitoring wells within the community. Another plume in Rancho Cordova—between Interstate 50 and the American River—has not been completely contained. Yet MacDonald is confident that the agencies have a handle on stopping the plume's spread. "There have been a whole lot of monitoring wells out there over the years, so we know where the plume is. We're putting in treatment plants," says MacDonald.

But none of this—and certainly not the date of 2246 for completing the cleanup of a single plume—inspires confidence in Friends of the

"If the plume continues to spread and the groundwater becomes unreliable, then we have no choice but to go to the river..."

ENVIROCLIP

IMPERILED PLANTS

They're a botanical odd couple. The Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*) is a tall perennial with showy red flowers; the soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*) is an inconspicuous relative of the Indian paintbrush, parasitic on other plants. What they have in common is their high tidal marsh habitat and, since 1997, their federal endangered status. The thistle is known to occur at only two Solano County locations: Rush Ranch and Peytonia Slough in Suisun Marsh. The bird's-beak, with a somewhat wider distribution, also occurs at Rush Ranch and at scattered sites in Napa and Contra Costa counties, including the tidal area of the Concord Naval Weapons Station.

A lawsuit filed by the Center for Biological Diversity and the California Native Plant Society forced the U.S. Fish & Wildlife Service to propose critical habitat for the two plants: 2,119 acres for the thistle and 2,313 for the bird's-beak. The state, other public entities, or land trusts own most of the land under consideration. According to a FWS press release, the agency is exempting the Concord Naval Weapons Station, which has over 400 acres of thistle habitat, from the critical-habitat designation because it has adopted a resource-management plan providing for conservation of the species. The critical habitat proposal, issued April 11, will be open for comment until June 12. Fish & Wildlife says the accompanying economic analysis will be released in October.

Emily Roberson of the Center for Biological Diversity's Native Plant Preservation Campaign says the proposal may not include enough suitable habitat currently unoccupied by the two species to allow for recovery. Fish & Wildlife did designate one such area, Hill Slough Marsh, for the thistle. But other locations identified as suitable and unoccupied in the Solano County Water Agency's multi-species habitat conservation plan were not included. Roberson also notes a pattern of "massive cutting between proposed and final designations."

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Joe Eaton

WATER QUALITY

SURVEY POINTS FINGER AT EVERYONE

Have you ever lost a plastic bag to the wind, washed your car in your driveway, or neglected to pick up your pet's waste? If so, you've likely polluted the Estuary and you have something in common with many other Bay Area residents.



Original design produced by the Washington State Dept. of Ecology, King County, and the cities of Seattle and Tacoma.

Two recent surveys conducted by Save the Bay as part of its Keep It Clean! campaign showed that these—and other activities like driving and dumping old medicines down the drain—are common habits that are harming the health of the Estuary. Save the Bay developed the campaign to educate residents about urban runoff and inspire them to take action to stop contaminating the watershed, says Save the Bay's Jessica Castelli. Recent studies show that nonpoint source pollution (runoff from homes, cars, and neighborhoods via stormdrains) accounts for the majority of new (non-legacy) Bay pollution, says Castelli.

An online survey revealed that 95% of 1,700 respondents from around the Bay Area contribute to Bay pollution and should change at least one everyday habit to protect the Bay. Nearly half the respondents (42%) said they washed their car at home in the driveway or along the curb, or let the rain rinse it, rather than taking it to a professional carwash, which is required to send dirty water to a wastewater treatment facility. Eighty-eight

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SCIENCE

NEW LIGHT ON AN OLD FISH

As Josh Israel contemplates what he and other researchers are only now finding out about the genetics of green sturgeon (*Acipenser medirostris*), a fish that has swum the murky depths of California waterways since dinosaur days, he's reminded of the state of salmon genetics 25 years ago. "We didn't even know

whether the salmon stocks were all the same," says the U.C. Davis doctoral student. Today, fisheries biologists have a raft of genetic information on salmon that's enabled them to understand the spawning behavior of different species, among other things.

Israel, who began his doctoral work on green sturgeon in 2001, hopes the data he culls from genetic analysis will paint a clearer picture of the

population structure of this anadromous acipenserid on the Pacific Coast. His research builds on earlier work done by other researchers identifying the genes that differentiate white from green sturgeon, a significant finding as the two species were lumped together when agencies like Cal Fish & Game monitored the recreational sturgeon fishery.

Israel's current work is a collaborative effort with fish biologists working on the Sacramento River and to the north, including surveys on the Eel and Klamath rivers. By gathering dry fin clips and other wet tissue samples, researchers have sequenced the genes to determine the sibling relationships that exist between juvenile green sturgeons. Israel notes that his analysis has filled in some interesting holes in scientists' knowledge about the species' migration.

"The green sturgeon has a remarkable life history," Israel says, explaining that juvenile

sturgeon hang out in the river or Estuary from one to three years and then swim out to the ocean, where they go on a 10- to 15-year migratory journey. After this time—as adult sturgeon—they return to the river of their birth and spawn. Green sturgeons leave the river at an average age of two years. If they go on the 10-year trek, they return as 12- to 13-year-olds; if they journey for 15 years, they return as 17- to 18-year-old fish. So they can be close to 20 years old before they begin spawning. And the females, which have up to 100,000 eggs, can spawn every two to three years. "So they spawn multiple times, unlike salmon," Israel says.

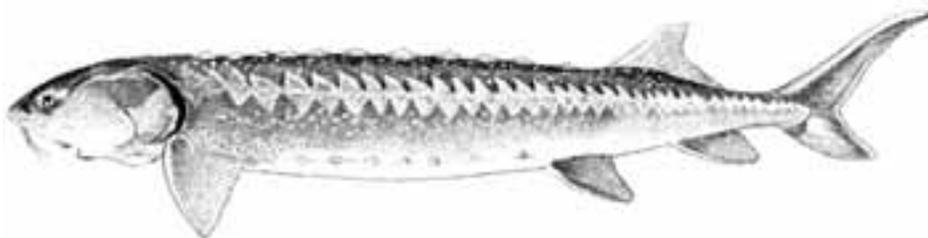
Back at the turn of the 20th century, sturgeon—both white and green—were fished down to almost nothing. Since then, the population seems to have increased slightly, says Israel. Just how much it has increased or what the abundance could be in the Sacramento River is something Israel is trying to find out.

One critical piece of information he is attempting to pinpoint is the number of spawners in the Sacramento River. The number dropped from 26 in 2002 to a low of 18 in 2003, then rose to 42 in 2005. According to past studies on green sturgeon, at least 50 spawners are necessary to maintain a genetically viable population.

Israel stresses that his work—funded in part by the Bay-Delta Authority and NOAA Fisheries—is preliminary. But he notes that what he sees so far tells him that Sacramento green sturgeon may be on the road to threatened or endangered status. Perhaps the fitness levels are going down or sturgeons are having trouble finding mates. "Nobody knows whether there's 100, 1,000, 10,000, or over 100,000, and we don't even have a sense of the order of magnitude for the population," he says.

While Israel will finish his current work on the sturgeon—the basis of his Ph.D.—in the next year, there is much more to be done. His hope is that this particular project will start the ball rolling toward a bigger, multi-party effort to learn more about green sturgeon and to develop a plan to manage and protect the population.

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BUREAUCRACY

POD GROUP PONDERES POWER PLANTS

Two power plants on Suisun Bay are the latest addition to a long list of possible suspects causing the decline of the Delta smelt, according to a recent report by the Pelagic Organism Decline (POD) Group, a team of scientists from the Department of Water Resources, BurRec, Fish and Game, NMFS, and the U.S. EPA. Because the plants' intakes are located near a low salinity zone at the confluence of the Sacramento and San Joaquin Rivers on Suisun Bay, an area that acts as a nursery for young fish, the plants have come under scrutiny as scientists try to narrow in on the causes of the Delta's ecological collapse. The plants' maximum water intake, 3,240 cubic feet per second, has sometimes been more than 10% of the rivers' total outflow here.

The problem of the plants harming smelt is not a new one. In the late 1970s, the two plants killed as many as 86 million Delta and longfin smelt each year, mostly by sucking them into the cooling water intakes. That was at a time when more units were run to produce more energy, requiring more water to be taken in for cooling; at the same time, smelt were far more abundant. Negotiations have been underway for years between the regulatory agencies and Mirant Delta, LLC, the power plant owners, over fish protection measures to be implemented as conditions of fish take permits. But nothing much has actually been done. Says The Bay Institute's Tina Swanson, "By doing nothing, Fish & Wildlife may be presiding over the extinction of a species they were supposed to protect. And this is not an extreme case. This is just another example of a federal agency failing to implement the Endangered Species Act and ensure that entities having impacts on species are doing what they said they would do. There is simply no emphasis at the management level to enforce the ESA."

In the 1990s, PG&E owned the plants and worked with Fish & Wildlife on a habitat conservation plan under the Endangered Species Act (ESA). They issued a draft in 1998 concluding that the take of listed fish was insignificant, but committed to operating the facilities in ways that would keep take to a minimum, and also to restoring to tidal marsh and monitoring the 139-acre Montezuma site at the north shore of Suisun Bay as mitigation. The draft plan was never finalized and approved by Fish & Wildlife, however, so many of the mitigation actions weren't implemented.

When Mirant bought the power plants in 1999, it began negotiations with Fish & Wildlife, but the agency didn't issue a biological opinion (BO) to dictate permit conditions until 2002.

The conditions still haven't been implemented, and no sanctions have been imposed on Mirant.

Fish & Wildlife's Al Donner says that the BO required Mirant to install a "gunderboom," or fish screen, at one of the power plants to prevent entrainment of fish and other organisms in the cooling water intake structures. If the gunderboom proved effective, it would have had to have been installed at the other plant as well. The BO also required restoration of the Montezuma site.

After the BO was issued, Cal Fish & Game was asked to determine whether the BO satisfied state laws covering listed species. Fish & Game's Jim Starr explains that the agency made an inconsistency determination mainly because the BO required that the gunderboom keep out 80% of the fish, and Fish & Game wanted the percentage to be higher, and because the BO required the gunderboom to be in operation between February and July, while Fish & Game thought it should be in place year-round. But soon after Fish & Game made the inconsistency finding, in July 2003, Mirant declared bankruptcy, so it became exempt from Fish & Game requirements, and negotiations ended. Negotiations continued with Fish & Wildlife, however, because bankruptcy does not exempt a corporation from complying with the ESA.

Mirant's Ron Kino says that as of 2004, two years after receiving the BO, the company explained to Fish & Wildlife that it didn't intend to install the gunderboom because at its power plant on the Hudson River, the technology had been fraught with problems: overtopping, clogging, tears in the screen. Dan Odenweller, formerly of NOAA Fisheries, is skeptical. "We were supposed to work collaboratively with Mirant on a gunderboom study, but they went ahead on their own, and we never saw the results," he says. "We know that gunderbooms have worked very well in some locations, so they might have worked in Suisun Bay."

Donner says that in informal meetings, Fish & Wildlife informed Mirant that other protections were needed to compensate for the fish screens, and asked Mirant once again to restore the Montezuma site and to begin monitoring. Kino explains that Mirant said that fish take would be reduced dramatically even without the screens because of changes to its operations—namely, it was shutting down four more power units, so that only five of the original 14 would be running. It was also installing variable speed pumps, which would cut down on the amount of cooling water—and fish—taken in. Mirant pointed

SURVEY, CONTINUED

percent said they either threw unwanted pharmaceuticals in the trash or flushed them down the drain, or held onto them because they didn't know what to do. Only 12% said they took medicine to a household hazardous waste facility, the best disposal method. And despite the fact that state law requires people to dispose of "universal waste"—household items containing mercury and other toxics—at a household hazardous waste facility or other safe disposal location, only half of the survey respondents do so.

The biggest bad habit is probably driving. Nearly half (46%) of those who took the online survey admitted to driving a car every day. According to the National Marine Fisheries Service, each car-owning Bay Area resident contributes about one quart of motor oil to the Bay every year. In an average year, car engine leaks and road runoff contribute more oil to coastal waters than oil tanker spills.

Meanwhile, a telephone poll of 500 voters from the nine Bay Area counties conducted from March 29 to April 2 asked people what they thought was the biggest source of pollution to the Bay. The most common response? Factories, industry, and refineries, said 22% of respondents; only 14% said people. Yet in response to the open-ended question "What comes to mind when the Bay is mentioned?" the number-one answer was pollution (18%), illustrating that most people know that Bay pollution is a problem without realizing how they contribute to it, says Castelli. The survey also showed that the problem is not a lack of concern: a majority (85%) stated that protecting the Bay from polluted runoff was very important or important. (The phone survey had a margin of error of +/- 4.4%.)

"The Bay Area's population is expected to grow by 15% to 7.9 million by 2020, which will increase the threat of runoff pollution," says Save the Bay's David Lewis. "The good news is that because we create this pollution, we have the power to diminish it. We need to act now and take simple actions to protect the Bay."

For more information about the Keep It Clean! campaign, plus tips for reducing pollution and protecting the Bay, see www.ikeepitclean.org.

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JC/LOV

INVASIVE SPECIES

FOUL HULLS



Another part of the Bay Area's naval tradition is nearing its end: Congress has directed the U.S. Maritime Administration (MARAD) to dispose of the 60-odd ships of the National Defense Reserve Fleet—better known as the “Mothball Fleet” or “ghost fleet” of Suisun Bay—by September 2006. Most of the collection of Victory and Liberty ships, tugs, tankers, and missile cruisers will end up in a shipbreaker's yard, to be dismantled and sold for scrap. But where that will happen is far from settled.

The only shipbreaking firms in the United States are on the Texas coast and in Chesapeake Bay, and that's a long way to tow a vessel. So Bay Bridge Enterprises, owned by the Adani Group of India and based in Virginia, has been exploring potential locations on the Oregon coast. Newport, Oregon, rejected a Bay Bridge bid in January, and Oregon Gov. Ted Kulongoski has ruled out any ship recycling outside a dry dock. But that hasn't stopped speculation about an alternate site in economically struggling Coos Bay, although port officials there say there's no formal proposal on the table.

Why the controversy? Among other environmental concerns, the ships have been in Suisun Bay long enough to acquire a rich fauna of hull-fouling organisms—seaweeds, barnacles, bivalves, bryozoans, tunicates. Portland State University scientists have taken samples, but their analysis hasn't been completed. When the USS Missouri was docked at Bremerton, Washington, it was colonized by 116 species—some of which survived nine days in Columbia River freshwater, followed by a passage to Honolulu.

Organisms that can tolerate Suisun Bay's changing mix of fresh and salt water “could probably survive in the Coos Bay and Yaquina estuaries,” says Sam Chan, with Sea Grant Extension at Oregon State University and a member of the Oregon Invasive Species Council. With luck, they'll never get there. “The main issue is what organisms are attached to the hulls and how well can they be cleaned before they move,” Chan says. “The Coast Guard won't permit them to be moved until MARAD addresses the issues on fouling.” That might be difficult, though, if—as some suspect—there's more fouling than there is hull on these ships.

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WETLAND WORRIES, CONTINUED

developer simply pays a nonprofit or land trust to preserve or acquire some land instead of performing actual mitigation. But he does think the geographic area that banks cover is often too large, and that a better idea might be to require mitigation within the watershed where the wetland is filled. That's not good enough for Feinstein. “It's flippant to say mitigating anywhere in the watershed is fine. Wetlands are where they are because nature and topography have said this is a good place. Whole ecosystems have evolved around them over hundreds and thousands of years.” Sibbing agrees with Feinstein's concerns. “We're just putting [mitigated wetlands] where we find it convenient.”

Even if mitigation wetlands are of good quality, says Kusler, mitigating for the destruction of urban wetlands in rural areas raises issues of environmental justice. “As long as you don't think about who's impacted and how, mitigating out in the boondocks is fine. You can create functions anywhere. But playing the ‘function game’ doesn't give any consideration to people. The ‘forces of evil’ have convinced us that we can't have wetlands in urban areas; they're going to get ruined. Banking should not be bad-mouthed, but it's got to be used very judiciously—not in stripping environmental considerations out of urban planning.” Kusler thinks more can usually be done to mitigate impacts on site. “If you're doing a project in an urban area, you've got to do as much as possible on site. There is nothing like maintaining buffers even in an urban area. Even if you have 50 to 100 feet on either side of a stream with a bike path—have a vegetated buffer to collect sediment and nutrients—it may not be total avoidance, but it is redesigning or avoiding to an extent.”

The State Water Resources Control Board is currently working on a report evaluating wetland losses and mitigation throughout California; results are not yet available. Meanwhile, a study conducted by the S.F. Regional Board in 2003 of 20 wetland mitigation projects it had permitted since the mid-1990s shows mixed results. The most disappointing were attempts to recreate riparian wetlands, or streams. One riparian mitigation site was planted with chaparral and upland species instead of riparian species; another developer was given credit for creating new habitat when he dropped some rock weirs into a stream to create little pools as mitigation for a downstream culvert. Those same projects

would not be permitted today, says the Board's Breaux. Most mitigation today, she says, involves restoring degraded or filled wetlands or expanding existing wetlands. Tidal marsh restoration projects seem to be among the more successful mitigation projects, says Breaux, especially when they are located between existing tidal marshes—if the site is graded to the proper elevation, it will often revegetate itself with plant stock from the nearby marshes.

“The ‘forces of evil’ have convinced us that we can't have wetlands in urban areas . . .”

Yet even when mitigation is successful, there are still issues that arise over time. According to Breaux, invasions by non-native species are a common problem; Tom Griggs with River Partners, says he has seen water control mechanisms fail at managed wetlands sites, leaving them high and dry. Griggs also points out that mitigation is not restoration. He is frustrated at seeing mitigation sites created for one target species, without regarding to restoring ecosystem processes. Mitigation is coming from a very different mindset than restoration, says Griggs. “We should be restoring functioning ecosystems and not museum pieces for one species.”

Breaux acknowledges that regulators simply do not have the staff or time, particularly with agency budget cuts, to monitor mitigation sites, particularly since many of them are in out-of-the-way locations. Monroe also acknowledges this lack of follow-up. “There's quite a bit of oversight through the development stage, but after five years [the monitoring period typically required by the Army Corps], oversight drops markedly. One of the good aspects of mitigation banks is that they get much more scrutiny before and after construction than do individual mitigation projects.”

Yet even in best-case scenarios where mitigation is done right, on the right site, by the best people, questions linger. Feinstein says large, contiguous wetlands are not always better than small wetlands or complexes of vernal pools, which he believes should never be built on. Referring to a large mitigation bank project in the Central Valley, he says, “It looks great, it looks lush, and they can talk about all the species that are there now, but that is not the issue. Neither is the issue whether or not we can create wetlands—we can. Sometimes they work, and sometimes they don't—it's a crapshoot. The real issue is what are they mitigating for, what was lost, and how many different, diverse wetlands are now compressed into this 200-acre bank?”

BULLETIN BOARD

SIERRA WATERSHEDS: TROUBLED WATERS

Pollutants including mercury and pesticides were found at levels high enough to violate the Clean Water Act in sections of 75% of 24 Sierra watersheds sampled by state and federal agencies, according to a March 2006 report from the Sierra Nevada Alliance. Seventy-nine percent of the sampled watersheds had either posted warnings against fishing or were closed altogether due to pollution levels in the water and in fish tissue. According to the Alliance, a monitoring and restoration plan is needed for the watershed. The Alliance is calling for California to make public information about Clean Water Act violations in the watershed and recommending that the state and federal government direct more money toward monitoring and restoration projects. See http://www.sierranevadaalliance.org/publications/db/pics/1143036971_22153.f_pdf.pdf



TACKLING INVASIVES

The San Francisco Estuary Project (SFEP) is leading the effort to complete the California Aquatic Invasive Species Management Plan. The goal of the plan is to minimize the harmful ecological, economic, and human health impacts of aquatic invasive species in California. SFEP will be holding 3 public meetings throughout the state in the summer of 2006 to obtain comments on the plan. Please visit SFEP's Invasive Species Web Page to get more information about the California Plan and the meetings, or call Karen McDowell (510) 622-2398.

http://www.abag.ca.gov/bayarea/sfep/projects/invasive_species.html

AG DISCHARGES IMPROVING?

Just 3% of 241 tests on ag water discharge in 2005 showed any water toxicity, according to a recent report from the Sacramento Valley Water Quality Coalition. The Coalition, made up of more than 7,500 farmers and wetland managers, was formed in 2003 in response to a new requirement by the Central Valley Regional Board that farmers, fish and game managers, and other irrigators get a permit to discharge their water. The permitting process became a new check in the system for water quality managers to assess if and where pollution exists in the valley's water. For an executive summary of the report, see http://www.svwqc.org/pdf/executive_summary_2005.pdf. For more information on the Coalition, see <http://www.svwqc.org/>.

LEEVE-ING THE RISK?

The Greenbelt Alliance filed suit in April in an attempt to halt the city of Oakley's plans for 4,000 new homes on former farmland situated behind levees and six feet below sea level. The Alliance charges that the city has not considered the potential for levee failure or contamination of drinking water supplies in the Delta. Oakley officials say they're requiring developers to meet federal 100-year flood standards—by building modern dry levees inside the existing ones.

But these same federal standards allow homes to have ground-floor living areas and do not require homeowners to carry flood insurance, and California officials, environmental groups, and academics have found that the standards aren't protective enough. For an in-depth assessment of the Delta's levees, see *Subsidence, Sea Level Rise, and Seismicity in the Sacramento-San Joaquin Delta*:

<http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1026&context=jmie/sfews>.



NOW ONLINE

Proposed Stream and Wetlands System Protection Policy. Comments from public scoping meetings. May 2006. S.F. Regional Board. <http://www.waterboards.ca.gov/sanfrancisco-bay/streamandwetlands.htm>

University of New Hampshire Stormwater Center 2005 Data Report
http://ciceet.unh.edu/news/releases/stormwater_report_05/

Wadeable Streams Assessment: A Collaborative Survey of the Nation's Streams. U.S. EPA. May 2006. <http://www.epa.gov/owow/streamsurvey/report.pdf>

AWARDS & GRANTS DEADLINE: July 21, 2006

The American Land Conservation Award and its accompanying \$50,000 grant is the nation's largest prize given to honor an individual volunteer conservationist. The winner will be announced at the Land Trust Alliance Rally in Nashville, Tenn., October 12-15.

Applications available at
www.conservationfund.org.

SAVE THE DATE

4th Biennial CALFED Bay-Delta Program Science Conference 2006

Making Sense of Complexity: Science for a Changing Environment

October 23-25

Sacramento Convention Center

<http://science.calwater.ca.gov/conferences/conferences.shtml>

ROCKET FUEL, CONTINUED

River's Ron Stork. "The frustrating thing is that EPA and the Water Board said, 'Don't worry, we got it under control,' and it's clearly not contained," says Stork. As a way of ensuring that local officials have a hand in mapping the perchlorate plume and containing it, the Groundwater Authority is lobbying for further studies to define exactly where the contamination is. The Authority has also assisted member agencies like the Carmichael Water District in working directly with Aerojet on a pump-and-treat effort that will expedite cleanup.

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POWER PLANTS, CONTINUED

out that the units weren't run as hard as they had been when the 1979 monitoring had taken place and the units were used a lot less—only during periods of peak power demand, usually in late summer, when hydroelectric power was no longer available.

Meanwhile, Fish & Game's mid-water trawls conducted in the falls of 2004 and 2005 revealed the lowest Delta smelt indices since the trawl surveys started in the 1960s.

In early 2006, after numerous meetings and informal warnings, Fish & Wildlife finally sent Mirant a letter stating that it was "not covered" for take of Delta smelt because the gunderboom had not been installed, as specified in the 2002 BO, and requesting re-initiation of formal consultation. "Now Mirant and the POD Group are

working on a study plan, a series of studies and sampling efforts that Mirant will be starting within a few months," says Fish & Game's Chuck Armor, a POD Group member. "We want to know the power plants' impacts on four species: longfin smelt, Delta smelt, striped bass, and threadfin shad." Says U.S. EPA's Bruce Herbold, "We want to know what fish are out by the plants and when. We'll see if Mirant operates at times when there are a lot of fish near the intakes." He says that at the same time that technical recommendations are being developed, a legal/policy group is figuring out permit conditions.

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