

**WHO WILL GIVE UP WATER** for Estuary fish is the question being hashed out in a series of State Water Board hearing on water rights this fall. The hearings are expected to last into early 1999 with a decision coming later in the year. (916)657-1873

**THE WATER FLEA** has been the organism most tested for its response to pesticides in wastewater and runoff, but scientists are at last branching out into the food chain. The U.S. Geological Survey recently started a study on pesticide concentrations in Delta smelt spawning and nursery habitat and is wrapping up analysis of the impact of some herbicides designed to stop photosynthesis on the tiniest plants in the Estuary. [kkuivila@usgs.gov](mailto:kkuivila@usgs.gov)

**UNOCAL, TOSCO AND EXXON** will contribute \$4.8 million for environmental restoration in the Bay under a settlement over selenium discharges from refineries. Under the settlement the refineries are also bound to daily and yearly discharge limits.

**MOST-WANTED DAM REMOVALS**, according to a new Friends of the River list, include Englebright and Daguerre Point dams on the Yuba River; Coleman, Eagle Canyon and Wildcat dams on Battle Creek; Centerville Head Dam on Butte Creek; the McCormick-Saelzer Dam on Clear Creek, Clough Dam on Mill Creek; and El Dorado Dam on the South Fork of the American River. Such removals — some of which are being considered as CALFED restoration projects — would help fish and improve habitat. Send your own dam removal nominations to [moe@freindsoftheriver.org](mailto:moe@freindsoftheriver.org).

**ENVIROS SUED EAST BAY PARKS** in early October, challenging the park district's decision to allow cattle grazing on 50,000 acres of public lands without reviewing environmental impacts under CEQA. According to the Southwest Center for Biodiversity and the Alameda Creek Alliance, livestock grazing in urban watersheds is especially pernicious, as cattle can contaminate drinking water with disease-causing *giardia* and *cryptosporidium*.

**BAYSHORE VOLUNTEERS WANTED** to help the Berkeley Marina Experience teach kids and adults about tides, boats and marine biology. Once trained, volunteers must lead or assist with at least two field trips per month (or six boat trips per year). (510)644-8623

**TWO NEW GRANT PROGRAMS** for coastal stewardship have been launched by the California Coastal Commission using funds from sales of its whale's tail license plates. For guidelines on Adopt-a-Beach grants or the Whale Tail Grant Program for Coastal and Marine Education contact (800)COAST4U or <http://ceres.ca.gov/coastalcomm> (deadline November 15).



## Spartina Shake Down

"The November gales blew through — things bent down, folded in place. The dead spartina broke, blew off, wrapped onto the next stalks, and sank under the rains down to the live roots, mixing into the blackness. It was useful death."

Useful death — but of a more intentional kind than that described above in John Casey's award-winning novel *Spartina* — is the goal of scientists and government officials championing an all-out eradication program for an alien species of the marsh plant spartina that is wreaking havoc on restored wetlands.

"This is worse than a weed problem," says Debra Ayres of the U.C. Davis Bodega Marine Lab. "For our native cordgrass, it's on the scale of rape, pillage and impending ecological doom. This invader appropriates the seed resources of the native, and basically genetically absorbs the natives right out of existence," (by doing the plant equivalent of one creature fertilizing another's eggs).

The culprit is an Atlantic species of cordgrass known as *Spartina alterniflora* — the most alarming among a dozen exotic wetland and riparian grasses now making inroads into the marshes, mudflats, creeks and channels of the San Francisco Estuary. It is one of the ironies of environmental restoration that as one attempts to reach a natural state, one frequently reaps unintended consequences that require even more human interference.

"Restoration projects create a blank template for plants to move into," says hydrologist and wetland designer Philip Williams. "If you have an uncolonized mudflat with the right conditions, sometimes it's a case of who gets there first."

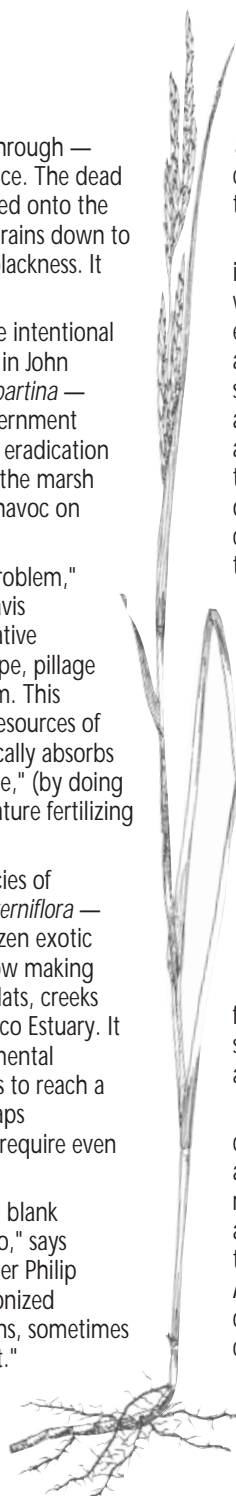
*Spartina alterniflora* has increasingly been first on site at restoration projects on the southeast bayshore, largely due to the outpouring of seeds from huge established populations of this smooth eastern cordgrass at New Alameda Creek and on the San Bruno coast — populations that got a foothold here two decades ago.

The first strains of smooth cordgrass, which is native to the coastline from Maine to Texas, were introduced in the 1970s by pioneers in ecological restoration who imported seeds and conducted planting trials on the East Bay shore. The action had unforeseen results. New and soon-to-be published research by Ayres and Don Strong, also of U.C. Davis, shows that in wetlands where smooth cordgrass was deliberately introduced, there's no native cordgrass left. Ayres examined 25 marshes throughout California, using genetic markers to identify the spread of *Spartina alterniflora* and the degree of hybridization with the natives. In addition to the influx around New Alameda Creek, she found extensive hybridization at salt ponds opened to the tides.

And it's not just the plant's phenomenal hybridization skills that make it so unpopular with those in the know. Smooth cordgrass grows to nearly twice the size of the native species, chokes off tidal channels and creeks, diminishes the holding capacity of flood control districts, and turns mudflats into salt marshes. It faces fewer habitat limitations than the native species, growing not only in mudflats but also in deep or shallow water.

In eastern and Gulf Coast areas, different conditions exert controls on this plant aggressor, says Strong. Hurricanes and storms regularly knock it out, as described by Casey, and open up space for other plants. And there's a lot more room for it — 70% of the Atlantic coast, but less than 1% of the Pacific coast, is estuarine, says Strong. "The West coast is a young coastline full of cliffs rising

*continued page 5*



*Spartina alterniflora*

## YOUR LETTERS

## STRIPED BASS

Dear Estuary:

We are writing in response to Larry Stenger's letter (August issue). He apparently misunderstands the content of our study on potential El Niño effects on the striped bass population. Although ESTUARY is not the appropriate forum for criticizing a report published elsewhere (IEP Newsletter, Autumn, 1997), we wish to respond to two fundamental issues. Mr. Stenger misrepresents the scientific process. Science builds on existing theory, addressing uncertainties in knowledge. While the prevailing theory has been the impact of water exports, key inconsistencies in that theory explored by us and others suggest several factors contributed to the decline of striped bass. To champion a popular explanation is acceptable, but to suppress uncertainty and exclude new and scientifically defensible ideas is not science, and clearly a dangerous way to manage a troubled resource. Mr. Stenger further insinuates our work is biased by collusion to divert attention from water exports. These unfortunate and slanderous statements are surprising, since Dr. Bennett is a recognized collaborator with the IEP. Such reckless evangelism, particularly in light of Mr. Stenger's professional affiliations, can only weaken the coalition among environmentalists, agencies, and stakeholders, striving to rehabilitate the estuary.

**BILL BENNETT, PH.D.**  
UNIVERSITY OF CALIFORNIA, DAVIS  
BODEGA MARINE LABORATORY

**LIZ HOWARD**  
ENVIRONMENTAL SPECIALIST  
U.S. BUREAU OF RECLAMATION

Dear Estuary:

Although scientists are human and none of us is pure, cases of deliberate distortion of results are very rare. I am confident that Dr. Bennett's conclusions are untainted by the preferences of his funding agency.

Mr. Stenger's willingness to put this backhanded accusation of scientific fraud into print suggests a broader issue: a tendency to dismiss unpalatable scientific conclusions on the basis of the funding source. I will continue to dispute such baseless accusations, and hope that others who understand the roles and responsibilities of scientists will also refuse to tolerate them.

**WIM KIMMERER, PH.D.**  
ROMBERG TIBURON CENTER  
SAN FRANCISCO STATE UNIVERSITY

## POLLUTION

## LUKEWARM PESTICIDE POLICY

President Clinton isn't the only one wrestling with word definitions these days: the state's Regional Water Quality Boards are attempting to define "frequent," following the State Water Board's adoption of a controversial guidance policy for preparing toxic hot spot cleanup plans under the Bay Protection and Toxic Cleanup Program.

Under the policy adopted on September 2 — which will guide the cleanup of toxic pollution from an array of sources, from abandoned mercury mines to oil refineries — pesticides in the water column detected as "infrequent pulses" are not considered hot spots.

"It's sort of like the rules changed at the very end of the game," says the Central Valley Regional Board's Jerry Bruns, noting that the definition of a hot spot should have been determined years ago. In the absence of state direction, Regional Board staff developed and used a working definition, concluded that water column pesticides qualified as high priority candidate hot spots — and submitted a draft cleanup plan to the State Board in December 1997. The new policy throws this cleanup plan into question.

Studies have found high levels of pesticides, including diazinon and chlorpyrifos, in Central Valley waterways. For example, a risk assessment conducted by Novartis, the registrant for diazinon, concluded that the mainstem San Joaquin River is probably acutely toxic to sensitive species about 30% of the time, while other studies have found toxicity in the river up to 50% of the time. The new policy doesn't provide any guidance as to whether this is frequent enough to qualify for hot spot status.

The new policy does require that cleanup plans be consistent with a 1993 Management Agency Agreement with the Department of Pesticide Regulation that lays out a four-step process for reducing pesticide releases, beginning with a program of voluntary controls. "We don't have the authority to regulate pesticide use on land — that's DPR's responsibility," says the State Board's Craig Wilson. "We felt that the managing agreement was the tool that should be used to deal with pesticides." Wilson notes that under the policy, pesticides that are detected as frequent pulses can still be addressed under the cleanup program.

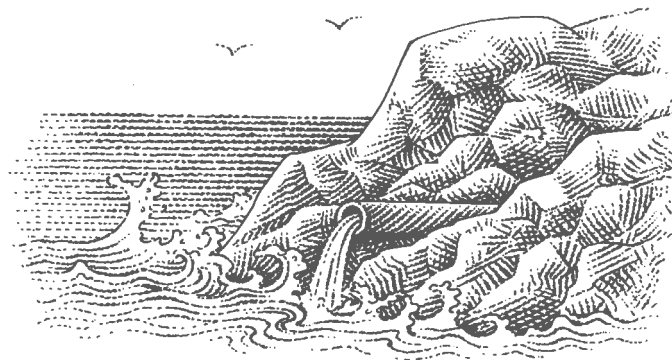
Critics say that by relying on the agreement, the Board is shirking its responsibility to protect the state's waterways. "This policy gives pesticides special treatment compared with all other pollutants," says another State Board staffer, who asked not to be identified. "The data available definitely support action against pesticides. This decision was totally political and had nothing to do with science."

"The State Board has declared that it is unwilling to regulate pesticides," says DeltaKeeper Bill Jennings. Jennings contends that the DPR has failed to keep several key commitments under the management agreement, including securing sponsors to develop and implement a self-regulation program for pesticides and developing quantitative response limits (QRLs) to help determine whether pesticide concentrations conform to water quality objectives. Jennings adds that the DPR receives 65% of its funding from a tax based on the volume of applied pesticides.

Both Jennings and Bruns also point out that unlike the Bay Protection Program, the management agreement process has limited public access and accountability. "The effect of the State Board's policy is to eviscerate the intent of the legislature and make it subject to a private deal between two agencies," says Jennings.

Brunns says the Central Valley Board has asked the Bay Protection Program's scientific advisory committee for guidance on what constitutes a frequent pulse. The issue was expected to be the focus of an October 23 Board meeting.

In the absence of action by regulatory agencies, DeltaKeeper is prepared to sue individual farmers to prevent pesticide discharges into Central Valley rivers. "We'd prefer to see effective enforcement of clean water laws by state agencies," says Jennings. "The failure to enforce them leaves us little alternative but to use the courts." Contact: Jerry Bruns (916)255-3093 or Bill Jennings (209)464 5090 CH



# INVASIONS



## PUSH FOR NEW BALLAST REGS

Given a choice between being sucked into the water export pumps or stuck in the salvage tanks with a bunch of clawing mitten crabs, fish might wish they lived anywhere but the Delta. This summer, up to 30,000 of the spiny, furry-clawed crabs from China have clogged the fish filtering and salvage system at the Tracy pumps every day — shocking scientists who counted no more than a few dozen in the Bay region four years ago.

This explosive invasion of a crustacean known for burrowing in levees, not to mention stressing and killing fish, is just the most recently visible among many alien introductions — some intentional, some unwitting — now rearranging the food chain, ecosystem and environmental protection programs of the Bay and Delta. And it may be the harbinger of the kind of "crisis" the fifty attendees at an October 5 state hearing on invasions wish to avoid.

"It took a water supply calamity in the Great Lakes to get regulation on this issue," said Cal Fish & Game's Pete Bontadelli at the hearing, referring to the European zebra mussels that clogged water intakes and powerplant cooling pipes and led to America's first-ever mandatory regulations forcing ships to dump and replace their foreign ballast water (and its hitchhikers) before entering the lakes. How to get similar regs in place for San Francisco Bay was the focus of the hearing held by Assemblyman Ted Lempert, Chair of the Select Committee on Coastal Protection.

"Invasions are one of the very few environmental problems facing the Bay Area that are unregulated," said the BayKeeper's Mike Lozeau at the hearing.

BayKeeper was the first local group to get impatient with the snail's pace of a federal process to first establish voluntary, and then, if necessary, mandatory ballast-water exchange requirements as a result of the National Invasive Species Act of 1996. The U.S. Coast Guard is two years behind on its deadline for developing the first round of guidelines (now due out April 1999). Likewise, a 1989 state law requiring reporting of ballast-water origins and discharges has produced no useful information to date.

BayKeeper took matters into its own hands by petitioning the S.F. Regional Water Quality Control Board to classify exotic species as a "pollutant" discharged from ships and impacting the beneficial uses of state waters — an entirely new arena for water quality law, according to the State Board's Steve Jenkins.

Such a classification makes ballast water discharges subject to waste discharge requirements under the federal Clean Water Act and state's Porter Cologne Act.

This June, the Regional Board responded by making exotic species a high-priority pollutant on its 1998 "Section 303 (d)" list of impaired waters. Once a pollutant is listed, the state is required to develop a program to attain water quality objectives for it — an objective Lozeau thinks can only be "zero discharge."

The regional action filtered up to the State Water Board, where staff began exploring extending the concept of exotic species as pollutants to the state's Ocean Plan — now being updated. The plan utilizes the same clean water authorities, but governs waters up to three miles from the ocean coast. However, the plan's authority does not extend to "vessel wastes," according to Jenkins, the definition of which is unclear (are we talking poop and trash or exotic species?). Overall, however, the state seems to have several possible hammers to wield against invasions.

"If the federal regulations prove inadequate, the state should move rapidly to prohibit ballast-water discharges using its authority under the Clean Water Act," Jenkins said at the hearing, quoting from recommendations his agency made to the governor in June 1998. "Whether we look at this from a biological or a water quality point of view, we feel comfortable there is a regulatory role we can play."

In March 1998, environmentalists found another legal inroad into the invasion problem. Nine groups co-signed a comment letter on the Port of Oakland's draft environmental impact report for its 50-foot deepening project criticizing the report for being "virtually silent on the issue of introduced non-native species." The groups — led by BayKeeper and the Center for Marine Conservation — called on the port to mitigate for the increases in ballast-water discharges that might result from its expansion by requiring shippers to exchange ballast offshore, creating facilities for onshore storage and treatment of any remaining ballast-water, developing inspection and enforcement programs for these measures and examining more permanent solutions.

The Port's first response was that the 50-foot project alone would not increase the amount of ballast water. Indeed the newer, larger vessels requiring the deeper channel have a lower ballast-to-load ratio than the older, smaller vessels slowly being retired, so the actual volume of foreign ballast water discharged from container ships will decline over time, according to the Port's Jody Zaitlin.

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## THE MONITOR

### CLEAN BOATING SURVEY

Ninety percent of California boaters claim to recycle used motor oil, according to a new survey by the California Coastal Commission. Of those who do not recycle, most said the reason was simply that it had never occurred to them.

"The survey was designed to help us determine what behavioral changes need to be made to improve environmental protection, and what motivates those changes," says Miriam Gordon of the Commission's Boating Clean and Green Campaign.

The survey, which questioned 1001 motorized-boat owners to assess their awareness of hydrocarbon pollution issues and used oil management and fueling practices, found that 76% of boat owners change their own oil. Unfortunately, many of them are failing to use a closed system when changing oil and engaging in practices, such as transferring oil in open containers, that are "likely to result in spills and illegal discharges," says Gordon.

However, information seems to be a powerful motivator of behavior change. Sixty-four percent of respondents cited knowing a practice is illegal as a reason for recycling, while 62% cited knowing it is better for the environment. "Clearly, our outreach efforts need to focus on making boaters aware of best management practices, and of the environmental impacts and legal issues," Gordon says.

The survey's best news was boaters' enthusiasm for using pollution prevention and oil recycling products and services if available. For example, 82% said they would use absorbent pads to prevent oily discharge, while 66% would use a bilge pump out facility, and 64% would use specialized containers for oil transfers. As a result of the findings, Gordon says the Coastal Commission will encourage marina operators and local jurisdictions to make such services available, as well as launch an intensive public outreach campaign aimed at boaters. Commission staff will discuss services and strategies for promoting oil recycling and preventing oily discharge at two upcoming conferences, including one in Stockton on October 27. Contact: Miriam Gordon (415)904-5214 CH

## CAPITAL BEAT

## POLITICAL POTPOURRI

The closing days of the legislative session in August saw the failure of a \$1.7 billion water bond measure that would have allocated \$300 million to ecosystem enhancements in the Delta, as well as the passage of three water pollution control bills.

The bond measure — which also included \$365 million for water recycling and pollution prevention, \$150 million for groundwater storage and \$50 million to strengthen Delta levees — fell victim to a dispute between Governor Wilson and Democrats over \$150 million sought by Wilson to study new reservoirs. Democrats argued that spending tax dollars on surface storage before CALFED decides whether or not to include it in its Delta fix is premature.

A spokesman for Governor Wilson blamed the demise of the bond measure on "elitist environmental groups from San Francisco" — a charge Cynthia Koehler of Save the Bay calls "offensive," noting that a coalition of more than 70 groups had expressed concern about the surface storage issue.

The governor vetoed two of the three pollution control bills that made it to his desk. As he did last year, Wilson vetoed legislation, AB 2339, that would have required the state and regional water boards to start cleaning up toxic hot spots identified under the Bay Protection and Toxic Cleanup Program (see related story p. 2).

Calling it "unnecessary," Wilson also killed SB 1453, which would have required the State Board and the Coastal Commission to develop and implement a non-point source pollution control program as required by the federal Coastal Zone Act Reauthorization of 1990. The State Board already has a non-point source program, but Save the Bay's Will Burns says that a federal review of the plan found it to be inadequate.

Wilson did sign one bill championed by environmental groups. AB 2019 will require tougher enforcement of the state's stormwater permit program. The new law directs Regional Boards to identify thousands of California businesses that should have stormwater permits but do not; those that do not respond to notification within 60 days would automatically be fined \$5,000. DeltaKeeper Bill Jennings doubts whether the new program will make much of a difference. "We've never lacked for penalties for non-compliance," he says. "All we've lacked has been resolve, and especially resources, on the part of state agencies." CH

## BALLAST CONTINUED

After a little research, the Port "realized there were measures we could take that would not put us at a competitive disadvantage with other Pacific ports," says Zaitlin. They discovered that California's Humboldt Bay and Canada's Vancouver already had largely mandatory exchange regs that hadn't driven shippers away. To the contrary, recent monitoring in Vancouver, including testing the ballast for salinity and the presence of local nearshore copepods, shows that ships are definitely complying. This summer, only 2-5% of ships sailing into Vancouver claimed they couldn't conduct the exchange due to rough seas (a exemption common to most ballast regs); in winter non-compliance was 20-25%.

Encouraged, Oakland sent out a draft ballast-exchange regulation to all its shippers in August, and was "surprised" when most of the shippers didn't balk, according to Zaitlin. The Port now intends to make the reg a mitigation measure not for the 50-foot project, but for a forthcoming new berth construction project (Berths 55-58), which has the potential to attract more lines and ships and thus generate more ballast-water discharges. The decision effectively delays local action on invasion prevention, however.

Whatever the mitigation measures, ports and shippers agree on one thing: keep the requirements consistent. More research is also needed on the alternatives to ballast-water exchange: on-board and on-shore treatment. On-board treatment would clearly require inventing filtration and treatment technologies and adding them to both new and old vessels — something the shipping industry has yet to embrace.

On-shore treatment, where water is pumped into coastal storage and treatment facilities, is an option that some say hasn't gotten any attention because there's no mandate. "The marine industry has always been cool to the idea," says former Great Lakes Coast Guard officer Eric Reeves. "No one is willing to make the investment without a powerful legal mandate to do so. There's no liability for a 'biological spill.'"

Reeves is one of the people Bay Area invasions expert Andy Cohen has been talking to in planning one of the first on-shore ballast water treatment feasibility studies; Canadian official Chris Wiley is another. According to Wiley, filtration on ship (many already have filters on their pumps) or shore can be used to exclude adult critters. Then any one of a variety of standard water treatment techniques (chemical disinfection, ozonation, ultra-violet light or heat) can be used to kill the small fry. Wiley likes the latter best — heating water to 47C kills most organisms. The only problem is that the hot water then needs to be cooled off.

Among 1,880 rare species, 49% are being adversely affected by non-native species, according to the Smithsonian Institution. (Chinesemitten crab, most likely a deliberate introduction.)



"There's nothing new about the technology here. The issue is cost and logistics," he says, pointing out that huge volumes of water are involved. It's not as if it hasn't been done before — oil tankers routinely filled empty holding tanks with ballast water and then pumped the oil-tainted mix into holding and treatment plants at refineries prior to the U.S. Oil Pollution Act of 1990, which required segregated ballast tanks. As a result, many refinery treatment facilities were dismantled.

In terms of ballast management or treatment, there's "no one perfect option for all trades," says Reeves. He thinks that on-shore pump outs may make the most sense for transatlantic oil tankers, which not only carry the most ballast water of all ship types — and thus have the most difficulty exchanging it at sea — but also tend to go from port A to port B and back again, so the on-shore investment makes the most sense for them.

Here at home, the Port of Oakland has already met with EBMUD to assess the feasibility of pumping ballast into the local municipal treatment system. Such an approach may be problematic because saline water can disrupt existing biological treatment systems, Zaitlin said at the hearing. But Cohen says ballast water doesn't need to be run through the biological systems, just the disinfection process.

The hearing helped point out both the big remaining ballast management and treatment questions and the many regulatory avenues available for curbing ships' discharge of exotic species to the Bay and Delta.

In the meantime, Vice President Al Gore will soon announce the formation of a permanent new commission on invasive species. Reeves isn't too enthusiastic about the prospect. "We've been studying the problem to death," he says. "There's no reason for any more commissions to sit around scratching their heads or other parts of their anatomy trying to figure out what to do about ballast water. This a relatively simple problem to solve. The question is when is there going to be the political push to create the legal force to solve it." (See also *Now in Print* or go to [www.anataskforce.gov](http://www.anataskforce.gov) ARO

Contact: Mike Lozeau (415)561-2299 ext 15; Scott Newsham (US Coast Guard) (202)267-1354; Eric Reeves (734)213-6728; Chris Wiley (519)464-5127; Jody Zaitlin (510)272-1179; or Andy Cohen (510)231-9539.

## SPARTINA CONTINUED

out of the sea, where the land marching upward vastly exceeds the rate of erosion," he says. "The Atlantic coast is the opposite, an old low-lying coastline full of estuaries." Strong adds that none of the Pacific coast cordgrass species have evolved to be as aggressive as their Atlantic cousin (more pushy New Yorkers?).

The good news is it's not too late to do something, say scientists. Not widespread yet, the smooth cordgrass invasion is densest on the southeast bayshore — and spreading to such newly restored wetlands as Ora Loma and Whale's Tail marshes — with small outposts in the lower North Bay.

The scale of the problem — the fact that the *Spartina alterniflora* invasion is still small enough to manage — is key to any eradication strategy for all plant invaders. Indeed, a recently completed year-long CALFED-funded study by the S.F. Estuary Institute of introduced tidal marsh plants offers the first prioritized list of 15 species worthy of further research, monitoring and/or control. The study, conducted by Andy Cohen and Robin Grossinger with input from 33 other scientists, identified *Spartina alterniflora*, *Spartina densiflora* and *Lepidium latifolium*, or pepperweed, as the species of most concern. Species of secondary concern included *Spartina anglica*, *Spartina patens*, *Salsola soda* and *Arundo donax*, a giant reed that grows in backyards and on the edges of the Bay and is troublesome in creeks, but remains more prevalent in Southern California. Eight other plants are on the report's "Watch List."

*Spartina patens* or salt meadow grass, another invader from the East Coast, is found in

San Bruno and in Southhampton Marsh in Benicia. Humboldt Bay is already saturated with *Spartina densiflora*, a Chilean species of cordgrass, which grows near the upper margins of marshes, displacing pickleweed. Here at home, *densiflora* has already made the jump from Corde Madera Creek in Marin County to Point Pinole in the East Bay.

"The political discussion is what needs to happen next; the debate over which is the best approach, and for which plants," says report co-author Grossinger.

According to U.S. Fish & Wildlife's Peter Baye, some of the debate already occurred during development of the sweeping Draft San Francisco Estuary Baylands Ecosystem Goals Project report, released in June in an attempt to provide scientifically sound guidance for future restoration (see June *ESTUARY*). The Goals Project favored control of *Spartina alterniflora*, as well as an effort to eradicate other, less well-established invasive marsh grasses.

The S.F. Estuary Institute's Andy Cohen believes that efforts should focus on getting rid of wetland grasses that have not yet taken hold. "Our greatest priority ought to be to eradicate those exotic plants that are not widespread, while we can do so easily, at low cost and with few harmful environmental side effects, rather than waiting until they become a bigger — and much more difficult — problem."

To this end, the Estuary Institute report recommends, among other things, that immediate efforts be undertaken to eradicate *Spartina patens* and *densiflora* while they are still restricted to a few sites; to check if *Spartina anglica* has yet arrived in the Estuary and, if it has, get rid of it; to consider an eradication program for *Salsola soda* (a threat to various endangered plants in the Estuary's more northerly brackish marshes); to coordinate control of *Arundo donax* (with an eye to source populations in the upper watersheds); and to eliminate new and outlying populations of *Spartina alterniflora*.

Cohen is concerned that committing to a regular program of control for *Spartina alterniflora* will result in repeatedly disturbing habitat with applications of herbicide or mechanical mowing. Although Rodeo — the aquatic counterpart to RoundUp — appears to be reasonably safe (some questions remain regarding the surfactants that are added prior to application), Cohen says he would not like to see it used "year-in, year-out, forever" in the Bay and Delta. He also fears that funding simply doesn't permit too broad-based an approach.

## TOUGH CHOICES

MUDFLAT INVADERS  
THREATEN BIRDS AND OYSTERS

One woman's Leonardo DiCaprio is another woman's pest. While this certainly applies to men, it also helps to understand the strange case of *Spartina alterniflora* in Willapa Bay, Washington. Willapa Bay is linked to San Francisco Bay through a delicate tracery of shorebird migrations along the Pacific coast and, like its California counterpart, is losing rich mudflats to this invading smooth cordgrass. Willapa also sustains oyster farmers who fear the loss of the mudflats where they grow their crop. Bay Area biologists and bureaucrats embarking on their own fight against invasive plant species are looking to Willapa Bay for possible solutions — and problems.

"The infestation is infinitely larger in Willapa Bay than it is in San Francisco Bay," says Janie Civile of the Washington Department of Natural Resources, one of several agencies battling the mudflat invader. Civile rattled off a litany of measures her department has taken to curb the grass, ranging from low-tech, non-herbicidal techniques in the beginning to the current use of airboats and aerial spraying. Her department spends about \$80,000 annually to control *Spartina alterniflora*, and she says she needs three times the money to do the job right.

If Fritzie Cohen has her way, Civile won't get it. Cohen, who owns a hotel and small oyster farm with her husband Ed, is against the use of herbicides in general and vehemently against them in Willapa Bay in particular. As part of the Ad-Hoc Coalition for Willapa Bay, the Cohens have proved formidable opponents. Fritzie Cohen, who has a law degree, once worked for Ralph Nader; her husband was a *Washington Post* reporter and Congressional aide.

Despite their environmental sympathies, the Cohens are pitted against groups like The Nature Conservancy, who favor the eradication of alien species. Several years ago, Cohen says her group negotiated a settlement with the state, Friends of the Earth, and the Shoalwater Indian tribe that would have made the use of the herbicide Rodeo experimental. Soon after that, the legislature, with the urging of the Conservancy, declared a state of emergency in Willapa Bay. The settlement became moot.

## SMOOTH CORDGRASS DISTRIBUTION BAYWIDE

- Tidal Marsh
- Tidal Flat
- *Spartina alterniflora*

## WILLAPA CONTINUED

Cohen believes *Spartina alterniflora* has beneficial uses, including erosion prevention, and may have medicinal qualities. She feels the threat of its continued spread is overblown and is unconcerned about the potential effects on migratory shorebirds or oyster farms. She's far more concerned about the surfactants added to Rodeo to make it usable aquatically, which she says have been shown to clog the gills of imperiled fish species such as sturgeon and salmon.

Civille disagrees that the threat to shorebirds and oyster farms is overblown — what with 6,000 acres of open mudflats lost to smooth cordgrass colonies to date. She's also worried that the cordgrass provides increased habitat for exotic green crabs, a particularly voracious predator that has appeared in her bay. Civille, a plant taxonomist who specializes in endangered species of grasses, says that reasonable efforts to control invaders in Willapa Bay have been hamstrung by "non-stop legal appeals" from the Ad-Hoc Committee.

"We are the last huge open mudflats after Gray's Harbor," says Civille. "We are losing our shorebird habitat rapidly; the mudflat level is moving from three and four foot tidal elevations to eight and nine foot elevations..."

Mudflats are the distinguishing factor of Willapa Bay, which makes it quite different from San Francisco Bay. With 47,000 acres of mudflats out of its total 80,000 acres, "the majority of the bay is exposed twice a day," says Civille. "It reminds me of being out on a desert playa (dry lake) an hour after a rain. Everything is glistening and wet."

Although oyster farmers have used herbicides extensively in Willapa Bay, the emphasis by environmental organizations such as the Nature Conservancy and Ecotrust, an Oregon-based group, has been on keeping a resource-extraction economy alive, partly as a means to control real estate development. That means tolerating a certain amount of pollution, both from herbicides and logging. It also means keeping the bay's mudflats intact.

If the mudflats decline enough to impact the bay's migratory shorebirds — which include grebes, geese, peeps and pintails — the greatest fear around Willapa Bay is that the finger-pointing will increase, but the action won't. Contact: Janie Civille at [janie\\_civille@wadnr.gov](mailto:janie_civille@wadnr.gov) SZ

## SPARTINA CONTINUED

"When you try to do everything all at once, chances are you'll accomplish little of value," says Cohen. "With that in mind, I look at the situation in the Bay and see that eradicating the uncommon and rare species of exotic cordgrasses will take a tiny fraction of the resources and effort that will be needed to eradicate *Spartina alterniflora*."

In the meantime, Bay Area agency officials have been in contact with their counterparts in Willapa Bay, Washington, where a debate over herbicide use to control invasive *Spartina alterniflora* has cost hundreds of thousands of dollars in legal fees and remains largely unresolved (see *Tough Choices*, page 5). So far, no similar political conflagration over herbicide use has occurred in San Francisco. But concerns over the endangered clapper rail have stalled efforts to spray the herbicide Rodeo during the summer, before the grass spreads its seeds. That delay is frustrating officials like Joy Albertson of the Newark National Wildlife Refuge and East Bay Regional Parks District biologist Debra Smith, who is coordinating her district's *Spartina* control program.

"It's impossible to control the plant if we're only able to get out there between September 1 and January 31 to avoid clapper rail breeding season," says Smith. "It's been our biggest stumbling block."

Negotiations are underway with U.S. Fish & Wildlife over a memorandum of understanding that would allow spraying during the summer after surveys for clapper rails. But Fish & Wildlife slowed negotiations down this summer pending further study, which meant that Smith and Albertson weren't able to spray.

"We believe our population of *Spartina alterniflora* doubled last year," says Smith. "My jaw dropped when I saw the aerial photos. I don't think it's death to the clapper rail if we spray. But if we don't, it's death to the marsh."

Clearly, smooth cordgrass' propensity for choking out creeks makes it detrimental to the clapper rail. But the tough, ubiquitous grass also provides cover for the endangered bird. The relationship between clapper rails and *Spartina* — whether native or introduced — is complex. The equation is not simply that the more native *Spartina foliosa* you have, the more clapper rails you will have, but a question of where and how *Spartina* is growing and what else is in the immediate vicinity. For example, slump blocks of



Purple Loosestrife, *Lythrum salicaria*, on the Estuary Watchlist for freshwater marsh invaders.

*Spartina*, whether native or introduced, seem to provide good habitat for rails in the middle of stream channels.

Eventually, however, *Spartina alterniflora* behaves differently than *Spartina foliosa* in streams, effectively choking them and reducing drainage densities.

One place smooth cordgrass doesn't seem to be growing is in the "seed-safe sites" long colonized by Pacific cordgrass, where tall canopies and established native populations are successfully resisting invaders, according to Ayres. This situation could soon change, however. Last winter's El Niño rains and freshwater influx not only created new mudflat areas, but also promoted *Spartina* seed germination, which may fuel hybridization.

"For now, native marsh may be the best protection we have," she says. "We shouldn't trade native marshes for restored salt ponds in the name of mitigation until we have *Spartina alterniflora* and the hybrids under control."

There's little else restoration proponents can do. There's no way to design a new wetland to keep out invaders, and no fish-screen equivalent for plants that only lets in the natives. "The good stuff hybridizes with the bad stuff, so you can't tell your enemies from your friends," says East Bay Parks' Joe Didinato. "Unless everyone works together regionally, we'll just be putting out fires in one place and starting them up again elsewhere."

"All this dike breaching and ribbon cutting and picture taking with politicians is getting us into a big *Spartina* mess," says U.C. Davis' Strong. Indeed he, Baye and a newly formed group of scientists and resource managers are considering calling for a moratorium on levee breaching and restoration south of the Bay Bridge until a regionally coordinated attack on smooth cordgrass can be mounted.

"Until then the solution is geographic," says Baye. "We should focus restoration on areas where invasion pressure is low." At the moment, this means the North Bay and the extreme South Bay, according to Baye.

In the meantime, scientists are trying to come up with a more integrated set of tools and plans for ridding the region of this plant pest. According to Strong, all the tools of traditional weed control can be used except competition and biological control (which would impact the natives too). Strong's excited about three different versions of a macerating machine he's seen around the

# PLACES TO GO & THINGS TO DO



## WORKSHOPS & SEMINARS

NOV  
11  
THRU  
13  
WEDS - FRI

### ENVIRONMENTAL MEDIATION TRAINING

Topic: Facilitating and Mediating Effective Environmental Agreements.  
Sponsor: CONCUR, Inc.  
Cost: \$795  
Location: Clark Kerr Campus, UC Berkeley  
(510) 649-1980

DEC  
1  
TUES

### ACWA PRECONFERENCE WORKSHOP

Topic: Conjunctive Use and Water Transfers: Who Pays, Who Plays?  
Sponsor: Assn. California Water Agencies  
Location: Palm Springs  
(916) 441-4545



## MEETINGS & HEARINGS

NOV  
6  
FRI

### CCMP IMPLEMENTATION COMMITTEE

Topic: Appraisal and Evaluation of Wetlands in the Bay Area  
Sponsor: S.F. Estuary Project  
10:00 AM-12:30 PM  
(510) 622-2325

NOV  
18  
DEC  
16  
WEDNESDAYS

### FRIENDS OF SAUSAL CREEK

Topic: Monthly Meeting  
Location: Dimond Library, Oakland  
7:00-9:00 PM  
(510) 231-9566

DEC  
2  
THRU  
4  
WEDS - FRI

### ACWA 1998 Fall Conference

Topic: California's Water Security: Consider the Co\$  
Sponsor: Assn. Cal. Water Agencies  
Location: Palm Springs  
(916) 441-4545



## HANDS ON

NOV  
7  
14  
SATURDAYS

### EDUCATORS' CONFERENCE

Topic: Teaching About Creeks, Wetlands and Watersheds. Consists of field trips covering topics such as water quality monitoring, native plant propagation and wetland habitat restoration. Pre-registration required.  
Sponsor: Aquatic Outreach Institute  
Cost: \$25.00 per trip  
Location: Various  
(510) 231-9547

NOV  
21  
DEC  
19  
SATURDAYS

### SAUSAL CREEK WORKDAYS

Topic: Activities include planting native shrubs to prevent winter rain erosion, removing invasive plants and general winter clean up.  
Sponsor: Friends of Sausal Creek  
Location: Oakland  
9:00 AM-12:00 PM  
(510) 231-9566

C O N T E S T C O N T E S T C O N T E S T

## HIP INDICATOR SOUGHT

Every year, retired Maryland politician Bernie Fowler dons a pair of white tennis shoes, calls in the cameras and reporters, and wades out into the waters of Chesapeake Bay. Fowler remembers the good old days — before pollution, erosion and red tides — when he could wade far out into clear waters and still see his feet. How deep he can get today before the tennies disappear in the murk has become his own and the community's informal measure of the success of efforts to improve the bay's environmental health.

The annual stunt, widely known as the "Chesapeake Bay tennis shoe index," provides an indicator of the bay's health that's easy for the public and the press to embrace. Can anyone think of something equally accessible for San Francisco Bay?

In preparation for the State of the Estuary Conference coming up in March 1999, its organizers — the S.F. Estuary Project — will be publishing a brief assessment of the "state" of



our ecosystem using leading ecological indicators recently developed by local scientists and environmental groups. We'd like our own tennis shoe-style indicator to add a little spice to the science. The index must be environmentally meaningful and appeal to the citizenry and media. It can relate to any aspect of Bay or Delta health.

The WINNER will receive a \$75 gift certificate to Footlocker (to buy your own pair of tennies) and free entry to the three-day State of the Estuary conference. Entries must be received by December 1, 1999.

Mail or email to Ariel Rubissow Okamoto, ESTUARY newsletter, P.O. Box 791, Oakland, CA 94604 or bayariel@aol.com. Please include your name and phone number.

## NOW IN PRINT & ONLINE

*CALFED Draft EIS/EIR Public Comments*  
<http://calfed.ca.gov>

*From the Sierra to the Sea: The Ecological History of the San Francisco Bay-Delta*  
Copies (\$40.00) from The Bay Institute, 55 Shaver St., #330, San Rafael, CA 94901 (415) 721-7680

*Hamilton Wetland Restoration Plan, Draft EIR/EIS*  
California Coastal Conservancy, U.S. Army Corps of Engineers, Copies from (510) 286-4161

*Integrated Coastal and Ocean Management: Concepts and Practices*

Biliana Cicin-Sain and Robert W. Knecht (Island Press, Washington, D.C., 1998)

*Introduced Tidal Marsh Plants in the San Francisco Estuary: Regional Distribution and Priorities for Control*

Robin Grossinger, Janice Alexander, Andrew N. Cohen and Joshua N. Collins, San Francisco Estuary Institute, October 1998, Copies from (510) 231-9539

*Peninsula Watershed Management Plan Executive Summary, Draft*

Copies from Water Supply and Treatment Division, 1000 El Camino Real, Millbrae, CA 94030

*Providing Safe Drinking Water in America: 1996 National Public Water System Annual Compliance Report and Update on the 1996 Safe Drinking Water Amendments*

U.S. Environmental Protection Agency  
Copies from (800) 426-4791  
[www.epa.gov/safewater](http://www.epa.gov/safewater)

*Santa Clara Basin Watershed Management Initiative Fact Sheet*

Copies from (408) 945-3024

*Ships' Ballast Water and the Introduction of Exotic Organisms into the San Francisco Estuary: Current Status of the Problem and Options for Management*

Andrew N. Cohen, San Francisco Estuary Institute, October 1998  
Copies from (510) 231-9539

*Troubled Waters: A Report on Toxics Releases into America's Waterways*

California Public Interest Research Group  
Copies from (415) 292-1487

*News from the Bureau of Land Management, Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Forest Service and the National Park Service*

<http://Fedpage.doi.gov>

*Water in the West: The Challenge for the Next Century, Western Water Policy Review Advisory Commission, 1998*

Copies from (303) 445-2100  
[www.den.doi.gov/wpprac](http://www.den.doi.gov/wpprac)

### CORRECTION:

*Enforceable State Laws and Regulations to Control Nonpoint Source Pollution*

[www.epa.gov/OWOW/NPS/elistudy](http://www.epa.gov/OWOW/NPS/elistudy)

## SPARTINA CONTINUED

world — basically a big tractor with a beet flailer on the end that chops the offending *Spartina* to bits. He'd like to rent such a machine and integrate its use with chemicals.

"It's time to stop the organic gardening mode, the backpack sprayer, and stop the Vietnam mode, with helicopters dumping chemicals on everything, and get an industrial-duty macerator on the job to be followed by a light-duty, low-volume herbicide," he says. "We can use these techniques to scorch the earth, so to speak, on a local scale." The scorch approach is necessary given the inability to separate the good grass from the bad and ugly.

Other techniques, according to Baye, may be to relood or dewater restored areas or to apply vinegar, which may weaken the plant in preparation for other treatments. To pave the way for an integrated regional control plan, concerned scientists plan to hold a workshop on smooth cordgrass on November 18.

The technical and chemical options, not to mention who will champion and pay for any

regionwide control effort, are not the only questions on the invasion table. There are greater intangibles lurking in the mud. Protection of native species is almost a religious tenet to biologists, but the pervasiveness and rapid pace of alien introductions may eventually create a number of situations around the country where one is forced to be choose one's battles, as Andy Cohen is advising officials to do in the Estuary.

Philip Williams believes that San Francisco could be riven by the same debate now polarizing Washington state, where oyster farmers want to carry out an industrial-strength herbicide-based eradication program of *Spartina alterniflora*, but, in Williams' words, "There's another group that says, 'hey, relax, this is part of the evolution of the ecosystem.'"

As an Englishman, Williams is acutely aware of another grass super-race, *Spartina anglica*. This hybrid was born in the 1870s, when steamships carried *Spartina alterniflora* across the Atlantic to England, where it crossed with an English *Spartina* species to create a sterile hybrid — and then became

fertile through internal genetic change, creating *Spartina anglica*. Now *anglica* has moved across the Channel to France and "it's basically a new species, and it's creating a new habitat," says Williams.

Whether or not eradication becomes a political issue, it's a fairly safe bet that the next decade will decide the question of whether *Spartina alterniflora* and most of the other alien invaders become permanent fixtures in the Estuary's marshes, mudflats and creeks. "There's a grim admiration you get for these kinds of species," says Baye. "It's evolution at work."

Don Strong disagrees. "Invasive species homogenize the world, so it's not really evolution, it's extinction." SZ/ARO

Contact: Debra Ayres, [drayres@ucdavis.edu](mailto:drayres@ucdavis.edu); Peter Baye (707)562-3003; Andy Cohen (510)231-9539; Debra Smith (510)635-0138; or Don Strong (707)875-2022

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[www.abag.ca.gov/bayarea/step/news/newsletter/index.html](http://www.abag.ca.gov/bayarea/step/news/newsletter/index.html)

Subscription Q&A: (510)622-2321

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