

## FLAKING FEET

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by scraping, sweeping, shoveling, and containing the flaking paint. The Water Board also ordered MARAD to come up with a plan to safely remove the invasives on the remaining ship bottoms. When MARAD did not comply with the orders, NRDC, BayKeeper, and Arc Ecology sued; the Water Board then decided to become a co-plaintiff.



Peeling mothball—or “ghost”—ships. Photo by David Elias.

“The Water Board had never sued the federal government before or partnered with environmental organizations as co-plaintiffs,” says Elias. But the end result was a good one for the Bay: the settlement that was ultimately reached after the Obama administration took over mandated that 25 of the most polluting mothball ships be removed from the fleet and scrapped by 2013, and 32 more by 2017. The battleship USS Iowa will be re-used as a museum ship. “This case demonstrates that we can work side-by-side with NGOs to achieve the kind of compliance we otherwise might not be able to achieve,” says Elias. “It’s a potential road map for other state agencies to regulate the federal government.”

And last but not least, says Elias, the simple act of sweeping the ships’ decks works: when MARAD tested stormwater from the decks after sweeping them this past winter, concentrations of heavy metals were greatly reduced. The Water Board’s Bruce Wolfe adds that the re-opening of the Mare Island dry docks where some of the ships will be dismantled, “provides an ecologic and economic win-win.” The re-opened Vallejo shipyard, which was closed in 1995, is expected to create 100 to 120 jobs when it is fully operational. **LOV**

## Feedback

### HYBRID SPARTINA AND THE CALIFORNIA CLAPPER RAIL

Editor:

It was just 11 years ago when managers at the Don Edwards San Francisco Bay National Wildlife Refuge realized they were losing the battle to control a non-native cordgrass that had invaded their marshes, and turned to the State Coastal Conservancy for help. UC Davis researchers had recently identified the problem as not merely the introduced cordgrass, *Spartina alterniflora*, an aggressive invader of world renown; even more critical, they found, was the hybridization between the introduced grass and the native, *S. foliosa*. They discovered that the initial offspring backcrossed with the parent species and with other offspring, creating a broad spectrum of fertile hybrid forms called a “swarm.” Many of these forms were much taller than either parent, produced bigger flowers with more seed and pollen, and could grow readily in areas where the native didn’t grow. Also, the hybrids could pollinate native stands of *S. foliosa*, and produce thousands more invasive offspring. By the time the Conservancy and the Refuge started regional control five years later, the hybrids had spread from 100 acres to over 800.

Protected by the tall stands of vegetation, the endangered California clapper rail, whose populations had been nearly wiped out over the last 100 years by habitat loss, quickly took up residence in the expanding meadows of hybrid *Spartina*, and their populations began to increase. Open mudflat and flood control channel, such as Colma Creek, north of San Francisco Airport, went from few rails in the 1990s, to dozens by the peak of the hybrid invasion. Modest clapper rail populations in native marshes, such as Arrowhead Marsh in Oakland, exploded as the hybrid cordgrass, dominated the marsh and displaced the native vegetation. Between 1995 and 2008, as the hybrid *Spartina* cover at Arrowhead Marsh increased from less than 1% to greater than 50% of the area, the clapper rail population increased 500%. While hybrid *Spartina* may be damaging to native marsh structure and other birds and wildlife, it seems that clapper rails were happy with extra support provided by early stages of hybrid *Spartina* invasion.

By 2007, the Invasive *Spartina* Project was seeing real success, and by the end of 2010 the net baywide hybrid area was again under 100 acres. Most of the infested sites now have less than 1% of the peak hybrid *Spartina* cover, and it is anticipated that by 2013 most of these sites will be at “zero-detection”. Where hybrid *Spartina* has been controlled, there has been a large-scale return to a native-plant dominated marsh at mid elevations, and to the original mudflat condition at lower elevations. At Eden Landing in Union City, non-native *Spartina* has been nearly eliminated from Old Alameda Creek, and the creek banks are now dominated with native tidal marsh plants like *Sarcocornia* spp., *Jaumea carnosa*, *Frankenia salina*, and *Distichlis spicata*. At Colma Creek in South San Francisco, the pre-invasion condition of the majority of the area was mudflat, and the area has transitioned back to mudflat-dominated habitat. Because of the difficulty discerning native *Spartina* from hybrid, and the risk to the native plants of being pollinated by still-present hybrids, *Spartina foliosa* has not yet been planted at many sites. However, the *Spartina* Project has begun experimental plantings to be able to facilitate the reintroduction of the native cordgrass in many areas in the near future.

At marshes where clapper rail populations expanded significantly during the years of hybrid *Spartina* invasion, annual rail surveys indicate that detections have declined to levels closer to “pre-invasion” conditions. In some cases this decrease is quite noticeable; at Colma Creek, which has returned to mudflat habitat, surveys detected three rails in 2011 (from a peak of 59 in 2005), and at Arrowhead Marsh, there were 35 birds counted (from a peak of 110 in 2008). At some sites, the decline is less dramatic, and at most, the annual change between years has leveled off. A few sites, such as the San Leandro marshes, showed an increase between 2008 and 2011 (from 31 to 52 rails detected). Surveys by the Invasive *Spartina* Project, PRBO Conservation Science, the Refuge, and East Bay Regional Park District collectively detected a minimum of 896 rails at 139 sites in 2010. Considering that over 1,900 hectares of prime clapper rail marshes were not surveyed, the current baywide rail population is likely greater than 1,400 birds—lower than the elevated levels of 2006, but higher than pre-invasion population estimates. There will be very little additional loss of clapper rail habitat from hybrid *Spartina* eradication, and the previously invaded marshes are now back on the trajectory to a healthier, more native restored ecosystem.

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