When eradicating invasive species threatens endangered species recovery

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A California Clapper Rail stands beside invasive *Spartina*, a salt marsh cordgrass, in San Francisco Bay. The endangered bird is threatened by both the removal and existence of the invasive plant. Credit: Robert Clark

Efforts to eradicate invasive species increasingly occur side by side with programs focused on recovery of endangered ones. But what should resource managers do when the eradication of an invasive species threatens an endangered species?

In a new study published May 30 in the journal *Science*, researchers at the University of California, Davis examine that conundrum now taking place in the San Francisco Bay. The California Clapper Rail—a bird found only in the Bay—has come to depend on an invasive salt marsh cordgrass, hybrid *Spartina*, for nesting habitat. Its native habitat has slowly vanished over the decades, largely due to urban development and invasion by *Spartina*.

Their results showed that, rather than moving as fast as possible with eradication and restoration, the best approach is to slow down the eradication of the invasive species until restoration or natural recovery of the system provides appropriate habitat for the endangered species.

"Just thinking from a single-species standpoint doesn't work," said co-author and UC Davis environmental science and policy professor Alan Hastings. "The whole management system needs to take longer, and you need to have much more flexibility in the timing of budgetary expenditures over a longer time frame."

The scientists combined biological and economic data for *Spartina* and the Clapper Rail to develop a modeling framework to balance conflicting management goals, including endangered species recovery and invasive species removal, given budgetary constraints.

While more threatened and endangered species are becoming dependent on invasive species for habitat and food, examples of the study's specific conflict are rare. The only other known case where the eradication of an invasive species threatened to compromise the recovery of an endangered one is in the southwestern United States, where a program to eradicate *Tamarisk* was cancelled in areas where the invasive tree provides nesting habitat for the endangered Southwestern Willow Fly-catcher.

"As eradication programs increase in number, we expect this will be a more common conflict in the future," said co-author and UC Davis professor Ted Grosholz.

The scientists used data from Grosholz's lab as well as from the Invasive *Spartina* Project of the California Coastal Conservancy in their analysis.

Spartina alterniflora was introduced to the San Francisco Bay in the mid-1970s by the Army Corps of Engineers as a method to reclaim marshland. It hybridized with native *Spartina* and invaded roughly 800 acres. Eradication of hybrid *Spartina* began in

2005, and about 92 percent of it has been removed from the Bay. The cordgrass has also invaded areas of Willapa Bay in Washington State, where efforts to eradicate it are nearly complete, and invasive *Spartina* has been spotted and removed from Tomales Bay, Point Reyes and Bolinas Lagoon in California.

The study, led by UC Davis postdoctoral fellow Adam Lampert, was funded by the National Science Foundation Dynamics of Coupled Natural and Human Systems Program.

Co-authors include UC Davis environmental science and policy professor James Sanchirico and Sunny Jardine, a PhD student at UC Davis during the study and currently assistant professor at University of Delaware.

"This work is significant in advancing a general, analytical framework for cost-effective management solutions to the common conflict between removing invasive species and conserving biodiversity," said Alan Tessier, program director in the National Science Foundation Division of Environmental Biology.

More information: "Optimal approaches for balancing invasive species eradication and endangered species management," by A. Lampert et al. *Science*, 2014: www.sciencemag.org/lookup/doi/ … 1126/science.1250763

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