

BEFORE AND AFTER ERADICATION: CONSIDERING THE ECOSYSTEM EFFECTS OF INVASIVE SPECIES

Most land managers in the National Park Service view the removal of invasive exotic species from natural landscapes as a top priority. However, as invasive species become pervasive elements of the communities they invade, their relationships and interactions with native species become established and complex. In the article “Viewing Invasive Species Removal in a Whole-Ecosystem Context,” the authors urge a careful analysis of invaded systems before removing a species.

Eradication projects can have unintended consequences on native systems. For instance, the removal of feral herbivores at Santa Cruz Island (Channel Islands National Park, California) led to an increase in fennel (*Foeniculum vulgare*), starthistle (*Centaurea solstitialis*), and other introduced herbs (see note following). Likewise, removing exotic prey can cause exotic predators to switch to native prey for food, as happened in New Zealand when exotic stoats (ermine [*Mustela erminea*]) increased predation on native birds and mammals after rats and possums were removed from forests. Native species also can come to rely on exotic species; for example, endangered Southwest willow flycatchers (*Empidonax traillii extimus*) often nest in thickets of invasive, nonnative tamarisk (*Tamarix* spp.).

To avoid unanticipated, “surprise” outcomes, the authors suggest that assessment precede eradication. Specifically, food-web interactions among exotics and between exotics and natives should be investigated, and functional roles of invasive species should be identified. In addition, post-eradication monitoring should be included in a program to determine the effects of management actions on both the targeted species and the affected ecosystem. By incorporating these processes into management plans before and after eradication, an informed framework can guide invasive species management and ecosystem restoration. —R. Harms, J. Selleck, and K. Faulkner (Channel Islands National Park)

Reference

Zavaleta, E., R. Hobbs, and H. Mooney. 2001. Viewing invasive species removal in a whole-ecosystem context. *Trends in Ecology and Evolution* 16(8):454–459.

Editor's note: As the authors note, the removal of sheep and cattle from Santa Cruz Island led to the recovery of native Bishop pine (*Pinus muricata*), but also to an apparent increase in the distribution and abundance of other rare plant species. (Klinger, R. C., et al. 1994. Vegetation response to the removal of feral sheep from Santa Cruz Island. Pages 341–350 in W. L. Halvorson and G. J. Maender, editors. *The Fourth California Islands Symposium: Update on the Status of Resources*. Santa Barbara Museum of Natural History, California.)