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**Review of *Alien Species in North America and Hawaii: Impacts on Natural Ecosystems* by George W. Cox**

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**Alien Species in North America and Hawaii: Impacts on Natural Ecosystems.**

George W. Cox. Washington, DC: Island Press. 1999. xii+387 pp. Tables, notes, references, index. \$60.00 cloth (ISBN 1559636793), \$30.00 paper (ISBN 1559636807).

This enthusiastic conservationist chronicles the arrival and expansion of many keystone non-indigenous species into North America and Hawaii. A wealth of knowledge is pulled together to provide an overview of the impacts of invasive plants and animals on regional ecosystems. *Alien Species* should be required reading for natural resource managers.

The author provides regional, biotic, theoretical, and policy perspectives on invasive species and discusses key invasive plants and animals and their known impacts within ten regions. This is the most extensive and documented part of the volume and provides powerful testimony regarding the magnitude of the problem.

The section on biotic perspective focuses on the introduction and impacts of game animals, natives out of place, and domesticated animals. Though interesting, it is somewhat limited. Exotics, community structure, biodiversity, and ecosystem function are discussed as theoretical perspectives. The impacts of invasive species on basic ecological processes that direct plant community dynamics are scanned only briefly.

The final part discusses management and addresses the philosophical question of whether all exotics are undesirable. Management of invasive species is growing increasingly complicated, and the need for ecologically-based principles and strategies is both substantial and unmet. While offering a good introductory discussion, the section is underdeveloped and in need of reorganization. The topic might have been either eliminated entirely or expanded to reflect a more ecological approach.

The book's overall objective, "to evaluate exotic invasions in light of the emerging science of invasion ecology," is partially achieved, especially with regard to the influence of aliens on community composition and structure, but less so on their impacts on ecological community processes and functions. The science of invasion ecology is too poorly developed to provide an ecological framework for evaluating exotic invasions. More than anything, the book provides an in-depth introduction into the world of aliens and clearly documents the need for effective management. Like any good book of this nature, it asks more questions than it answers, which is no fault of the author since invasion ecology is just developing. The questions he poses are important and need further investigation.

Overall, the book is of considerable value. It presents state-of-the-art knowledge of the impacts of alien plants and animals on ecosystems in North America and Hawaii and ought to be read by anyone interested in biological conservation and natural resource management. **Roger Sheley**, *Department of Land Resources and Environmental Sciences, Montana State University, Bozeman.*