

Conservation Biology in Hawaii: Highlights of April 1988 Issue of *Bioscience*

By Charles P. Stone

The Hawaiian Islands are renowned as a theater for evolutionary biology and are receiving increasing recognition as the site of the only tropical forests in the U.S. (except for Puerto Rico and the Trust Territories). Yet the emphasis in the April 1988 *Bioscience* Special Issue on Hawaii is not really "Hawaii's unique biology," as the cover says. Nor does the main message really address biological diversity of tropical rain forests. The underlying theme is most definitely the *conservation* of Hawaii's unique biology. Six of the seven articles (including the introductory feature by Laura Tangley) have a strong conservation focus. Throughout, there is the emphasis that unless we become more effective advocates and activists, Hawaii's unique ecosystems and species may be just something we read about in the next century.

What Articles Does the Special Issue Contain?

An article on deforestation at home (Laura Tangley) helps set the stage for the rest of the issue and discusses current developments. Hawaiian natural history

and conservation efforts are outlined by Frank Howarth and colleagues, and conservation of Hawaii's avifauna is discussed by Mike Scott and associates (including NPS scientist Charles van Riper III). Additional articles on translocation of endangered species by Sheila Conant, speciation in Hawaiian *Drosophila* by Ken Kaneshiro, conservation priorities by Wayne Gagné, and comparative conservation biology of oceanic archipelagoes by NPS scientist Lloyd Loope and associates (including NPS scientist Chuck Stone) round out the issue. Lacking is a focus on marine ecosystems and other aquatic environments impacted by tourists and residents alike, and an emphasis on the strengths and weaknesses of Hawaii's natural areas as acquired and managed by different agencies and organizations. (Invasions of alien species are covered in the Loope article.)

What Are Some Salient Points?

The most serious problems facing the native Hawaiian biota are introduced species and the degradation of aquatic ecosystems, according to one observer. Others

would point to these as symptoms of "inadequate government action" (specifics in Tangley's article) and lack of awareness and knowledge by decision-makers and public alike, caused by deficiencies in conservation education and research and management support. An additional problem is the difficulty of advocating values that sometimes seem remote and impractical.

Funding by the MacArthur Foundation of Chicago (see Stone and Stone, this issue) expresses a "recognition of the islands' global significance from the point of view of biological diversity" and begins to address many of the deficiencies. It also provides a challenge to state and federal governmental agencies to "more energetically protect Hawaii's endangered ecosystems in the future." This challenge has to be accepted, even in the face of budget constraints. As Faith T. Campbell, Natural Resources Defense Council, states, "in Hawaii, you lose it if you leave it alone."

Howarth and colleagues stress the importance of the Islands as a laboratory for evolutionary ecology and

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indicate that the B.P. Bishop Museum of Honolulu is planning a modern invertebrate survey for the next decade (stimulated, again, by the MacArthur Foundation grant). They note that, although extinction and endangerment rates are extremely high, the resilience of the surviving native species gives cause for optimism and for increased efforts in research and management on protected areas.

Scott and associates state that the diversity and abundance of seabirds are still impressive in Hawaii, and that forest bird densities are the highest documented anywhere. The percentage of extinct species (as high as 66 percent), of species with healthy populations (perhaps 10 percent of the species remaining), and the number of species confined to a small segment of historic range, provide sobering perspective, however. Recommended management measures for seabirds include control of alien plants and animals and monitoring. For waterbirds, acquisition, enhancement, and protection of habitat, together with control of alien species, are suggested. For land birds including the endemic honeycreepers, land acquisition and forest restoration in key locations above 1500 m elevation and reduction of ungulates are recommended. Captive propagation for many avian species is now, unfortunately, a necessity, and translocation will undoubtedly be used more in the future.

Sheila Conant notes that translocation of birds in Hawaii, inspired by the New Zealand experience with "marooning" rare birds on predator-free islands, can have unpredictable consequences. One effect may be harm to the new environment. For example, Laysan finches (*Telespyza cantans*), introduced to Pearl and Hermes Reef in 1967, may be reducing seabird nesting success by breaking and eating eggs. Another effect is rapid change in the translocated species in response to

the new environment. Such change seems to be the case in Laysan finches introduced to Pearl and Hermes Reef, and Conant speculates about "evolutionary tinkering" to the extent that new races or species are created by human action.

Wayne Gagné notes that 88 of 180 (or 49%) of native terrestrial ecosystems will soon be lost unless protected and managed. He recites a litany of threats to natural areas and native biota, including grazing, hunting, alien species of plants and animals, lack of awareness of conservation values in schools and society, lack of action by Federal and State agencies, tourists, the "powerful pet industry" (pit bulls maybe?), botanical gardens, the horticulture industry, the postal service, and (inadequate?) focus of some environmental groups. He is especially critical of the idea that sustained-yield management of ungulates, a well-known continental concept, can be applied where native biota are unadapted to ungulates. Managing of game species in general to "nondamaging" levels by hunting or other means is biologically meaningless. Hunters and their supporters have had considerable influence, but this should not extend to valuable natural areas.

Lloyd Loope and colleagues use the Galapagos Archipelago as a basis for comparison with Hawaii. Effects of alien predators, ungulates, arthropods, diseases, and plants are compared, and in most cases Hawaii is the loser. Even though Hawaii is more remote and has a shorter history of European visitation, logistics are more favorable for visitors and their introductions, human populations are higher and more dispersed, and – perhaps most importantly – the standard of living in Hawaii and the requirements of residents and visitors are incomparably higher. As oceanic islands, both areas are vulnerable, but the more rigorous climate of the Galapagos also works in its favor.

Despite the problems, the authors conclude that

oceanic islands may not prove any more difficult to protect and manage than many fragmented continental reserves. Hawaii's plants and animals, at least, are used to the economy of a smaller scale.

In summary, the Special Issue of *Bioscience* on Hawaii is worthwhile reading and will be the most up-to-date treatment available until *Conservation Biology in Hawai'i* appears late in 1988. The cost of the issue is \$7.50, and reprints should be available from most authors.