which incorporate captive propagation technology include six key elements: 1) information about the birds in the wild, 2) knowledge about the cause of decline in the wild and ongoing programs to reverse the trend, 3) captive propagation technology 4) release technology 5) practical considerations and 6) acceptable release sites where there is minimal risk from threats. This paper presents a review of applied restoration techniques for endangered bird projects worldwide and their application to current and future programs for endangered forest birds in Hawaii.

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RESTORATION OF KAHO'O LAWE ISLAND. From December 8, 1941 through October 22, 1990, the island of Kaho'olawe was used for live ordnance training by the U.S. military. On May 7, 1994 the U.S. Navy returned the island of Kaho'olawe to the people of Hawai'i. Under state law, the island, including the ocean out to 2 miles, is designated as a Hawaiian cultural reserve in which there will be no commercial activities. The state is to hold the island as a trust for a future Hawaiian sovereign entity upon its re-establishment and recognition by the state and federal governments. Under the Presidential executive order which set the island aside, the U.S. government is obligated to clean up the island to a condition safe for human habitation. The U.S. Congress has authorized up to $400 million to be spent to surface clear the entire island of ordnance and restore 25 percent of the island to be safe for human activities. In approaching the land use plan to guide the clean up of Kaho'olawe, the Kaho'olawe Island Reserve Commission is working with the following vision statement:

The kino of Kanaloa is restored. Forests and shrublands of native plants and other biota clothe its slopes and valleys. Pristine ocean waters and healthy reef ecosystems are the foundation that supports and surrounds the island.

Na Hawai'i care for the land in a manner which recognizes the island and ocean of Kanaloa as a living spiritual entity. Kanaloa is a pu'uhonua and wahi pana where Native Hawaiian cultural practices flourish.

The piko of Kanaloa is the crossroads of past and future generations from which the Native Hawaiian lifestyle spreads throughout the islands.

The presentation will discuss planning principles and project land use designations and include maps.


INVASION BY Miconia AND ITS IMPACT ON NATIVE BIOTA IN TAHTI. Miconia calvendens, a melastome tree (up to 15 m) native to tropical America, was first introduced to Tahiti (French Polynesia) in 1937 as an ornamental because of its large leaves with a purple undersurface. In less than 50 years, this alien plant has spread over two-thirds of Tahiti (ca. 75,000 ha), and has reached the neighboring islands of Moorea and Raiatea. Miconia forms monospecific stands in mesic and wet habitats (>2,000 mm/yr) up to 1,300 m elevation, progressively overwhelming the low statured native forests. Dense covers of Miconia cause: a dramatic decrease in the light regime (0.4% of the solar radiation reaching the ground in a "Miconia forest" compared to 3.6% in a primary Metrosideros - Cyathaea forest; an accumulation of Miconia litter leaves (up to 7.4 kg/m2/year in a "Miconia forest"); and certainly a change in the water regime and the nutrient cycling. Moreover, because of a superficial root system, Miconia stands are suspected of inducing landslides. An almost complete disappearance of the shrubby and herbaceous strata is commonly observed in "Miconia forests". At least 40-50 plant species of the 107 endemics restricted to Tahiti are endangered, especially species of the genus Cyrtandra (8 species), Opiurhiza (7 species), Myrsine (5 species) and Sclerotherca (3 species). Miconia calvendens appears to be a potential danger for the native forests of any high tropical
oceanic islands, including the Hawaiian islands where this plant pest has been introduced in the last 20 years.

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HAWAIIAN INVERTEBRATES: DIVERSITY, STATUS OF KNOWLEDGE, AND IMPORTANCE. Invertebrates make up most of the species diversity found in the Hawaiian Islands. Over 7900 species of insects, 800 species of other terrestrial arthropods (mites, etc.), 870 species of terrestrial and freshwater molluscs are known, along with an array of other phyla such as flatworms, nematodes, rotifers, earthworms, and tardigrades. These species are mostly endemic, but include many nonindigenous (alien) species, as well as some indigenous (but not endemic) species. The Hawaii Biological Survey has recently produced checklists and databases of the arthropods and molluscs, but much work remains in field surveys and systematics research to fully understand these organisms.

Although they have often been ignored, invertebrates are of great interest to conservation studies. Invertebrates, especially insects, are found in almost every habitat, but within that generality of distribution there is considerable specialization. Thus, some invertebrate group is available to measure or monitor almost anything: some have rapid response to environmental change, some are readily identifiable, some show areas of endemism especially well, and some well suited to quantitative sampling.


THE IMPACT OF RATS TO ISLAND ENVIRONMENTS. In the course of conducting eradication operations for rats on islands, it has been observed that they impact the entire ecosystem. We are probably all familiar with the impact rats have on the sea birds that nest on many of these islands, as the literature is full of such reports. Less obvious and receiving less attention is the fact that these alien rats impact invertebrate species such as insects and crustaceans. Rats also represent a serious threat to many species of native reptiles such as skinks and even marine turtles. Their presence in large numbers on islands can also result in the loss of plant species and interfere with the natural process of colonization by new plant species.

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CONSERVATION OF HAWAIIAN FRESHWATER GOBIES: APPRECIATION OF ENVIRONMENTAL ADAPTATIONS. In Hawaii the focus of development is often in coastal areas with freshwater resources. Anthropogenic impact on the riverine, estuarine and coastal biological communities is greatest for those species which at sometime during their life histories use all types of aquatic resources. Information necessary for determination of present habitat viability is often lacking, and effects of perturbations to the habitat are even more difficult to predict.

The endemic amphidromous goby, Lentipes concolor, exists as populations in the undisturbed upper reaches of Hawaiian freshwater streams. Many of these habitats are at elevations above 900 feet and are secured by steep waterfalls. Evident difficulties of field access and the remoteness of many Lentipes streams, makes the study of life history adaptations in this species impractical if not impossible. Analyses of calcium carbonate concretions found in the inner ear (otoliths), by microscopic and microprobe techniques revealed