NATIVE BIRDS

In many areas of the world, birds are the indicators of ecosystem health and the rallying point for public support and conservation efforts.

Charles P. Stone

Birds most commonly seen in modern-day Hawai‘i are alien (or introduced) species such as common mynas (Acridotheres tristis), doves (Streptopelia chinensis, Geopelia striata), and house sparrows (Passer domesticus). Unlike native birds, alien species did not arrive in Hawai‘i on their own, are not unique to the Islands, and are usually found in many other parts of the world.

Native birds do not often cross paths with people for several reasons. First, humans in Hawai‘i mostly live in and visit lower elevations, much modified by Polynesian and continental humans. As a rule, native birds cannot meet feeding, breeding, and other requirements in cities and agricultural fields. Many species of native birds are now confined to remote areas such as the Northwestern Hawaiian Islands or high-elevation forests, to which they have adapted over long periods of evolutionary time.

A second reason for our lack of contact with native birds is that many are difficult to see. Unlike much "birding" on the U.S. Mainland, for example, a person cannot often focus binoculars or spotting scope out of a car window or follow an easy trail very far and hope to see a variety of species. Forest birds, especially, are often small and green and frequently found high in trees in forests that are hard to comfortably visit. One bird book (Pratt et al. 1987) even goes so far as to list "little green birds" in Hawai‘i by island and abundance categories to help people sort out some of the species!

But the most important reason that native species are not often seen is that most of them are no longer present. At least 50% of the native birds once found in Hawai‘i are extinct. About 41% of the existing species are rare enough to have been classified as Endangered or Threatened by the U.S. Fish and Wildlife Service. This horrendous reduction in the world’s biological and cultural heritage is partly the result of reduced forest cover caused by clearing for agriculture and human settlements at lower elevations. However, there are many other reasons for the loss. Polynesian and continental humans introduced predators such as rats, cats, and mongooses (Rattus exulans, R. rattus, Felis catus, and Herpestes auropunctatus). Polynesian humans probably hunted flightless species to low numbers or extinction. Continental humans brought in hoofed mammals (ungulates) such as pigs, cattle, goats, and sheep (Sus scrofa, Bos taurus, Capra hircus, Ovis aries), which destroyed, reduced, or degraded native bird habitat. Diseases such as avian malaria and avian pox were accidentally introduced and transmitted by introduced mosquitoes. Alien insect predators reduced numbers of native insects used
by birds for food and also reduced insects which pollinated plants used by native birds. Plants introduced by humans began to compete with and replace native species of plants. Even introduced species of birds, many quite attractive in their own right, competed with native birds and served as reservoirs for diseases to which native birds had not adapted. As a result of these limiting factors, working alone or in concert, many Hawaiian birds today are restricted to places least disturbed by humans and their introductions— and they are often found in very small numbers even there.

**STATUS OF NATIVE BIRD GROUPS**

Limiting factors introduced by humans have reduced many kinds of Hawaiian birds to the point of extreme rarity or extinction (Table 1). Groups with great mobility, such as seabirds (petrels, albatrosses, terns, and so forth), seem least affected at first glance, but many of these species once nested over larger areas and are now reduced to breeding on Hawai‘i’s leeward islands, offshore islets, or inaccessible cliffs. The Endangered Hawaiian petrel or ‘ua‘u (Pterodroma phaeopygia sandwichensis) now breeds only in a small part of its former range, largely on high-elevation slopes in Haleakalā National Park. Even there, petrels in nesting colonies are subject to predation by mongooses and cats (see Stone, Non-Native Land Vertebrates, this volume).

Many species of ibises (Plataleidae), waterfowl, and rails (Rallidae) were formerly native to Hawai‘i. The fact that flightless species were largely extinct before the arrival of continental man suggests that these readily available protein sources were hunted by Polynesians for food. We know that flightless birds were formerly found on many of the Hawaiian Islands because fossils have been unearthed by researchers from the Smithsonian Institution in Washington, D.C., and by workers from the B.P. Bishop Museum in Honolulu (Olson and James 1982a, 1982b). Surviving waterfowl include the Hawaiian goose or nene (Nesochen sandvicensis), the Hawaiian duck or koloa maoli (Anas wyvilliana), and the Laysan duck (A. laysanensis); extant (existing) rails include the Hawaiian moorhen or ‘alae ‘ula (Gallinula chloropus sandvicensis) and the Hawaiian coot or ‘alae ke‘oke‘o (Fulica americana alai). All these birds are classified as Federally Endangered. In addition to hunting, the draining and filling of wetlands in Hawai‘i, the disturbance of waterbirds by humans, and the introduction of predators such as mongooses and rats certainly reduced bird numbers in the past and are still important. The Endangered Hawaiian stilt or ‘ae‘o (Himantopus mexicanus knudseni) is affected by similar limiting factors.

Raptorial birds (hawks and owls), like seabirds, are quite mobile, but many vanished prior to the arrival of continental man. Reduction in flightless birds to prey upon (in the near-absence of mammals), predation by Polynesian humans, and forest reduction at lower elevations may have contributed to their decline. However, some species may have evolved in areas of open habitat, which simply became forested and less hospitable for these species as the Islands aged. Today, the Hawaiian hawk or ‘ia (Buteo solitarius) is an Endangered species largely because of habitat disturbance, hunting, and a low reproductive potential. Fortunately, it has adapted well to disturbed habitat and alien food sources.
Table 1. Status of native birds breeding in the Hawaiian Islands.*

<table>
<thead>
<tr>
<th>Group</th>
<th>Species Known</th>
<th>Species Left</th>
<th>Endangered or Threatened Species</th>
<th>Species with Individuals &gt;50 &lt;500**</th>
<th>Species with Individuals &lt;50#</th>
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</thead>
<tbody>
<tr>
<td>Seabirds##</td>
<td>22*</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td>2?</td>
</tr>
<tr>
<td>Herons</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Ibises</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Waterfowl</td>
<td>11</td>
<td>3</td>
<td>3</td>
<td>1?</td>
<td>0</td>
</tr>
<tr>
<td>Hawks</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rails</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td>1?</td>
<td>0</td>
</tr>
<tr>
<td>Stilts</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Owls</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Crows</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Honeyeaters</td>
<td>6</td>
<td>2?</td>
<td>2?</td>
<td>0</td>
<td>2?</td>
</tr>
<tr>
<td>Old World Flycatchers</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Old World Warblers</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hawaiian Thrushes</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Honeycreepers</td>
<td>45</td>
<td>20</td>
<td>9</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Totals</td>
<td>117+</td>
<td>59?</td>
<td>24?</td>
<td>8?</td>
<td>11?</td>
</tr>
</tbody>
</table>

* Modified from Scott et al., 1988.

Approximate minimum necessary for likely 1,000-year survival of a population. More than one population per species often exists (for example on different islands), so numbers per population are sometimes smaller. Population survival is often much more at risk than species survival.

** Approximate minimum necessary for likely 100-year survival of a population. More than one population per species sometimes exists (for example, on different islands), so numbers per population are sometimes smaller. Population survival is often much more at risk than species survival.

### Albatrosses, shearwaters, tropic birds, frigatebirds, petrels, terns.

The dramatic loss of forest birds (the rest of the groups in Table 1), in both kinds and total numbers, is thought to have resulted from a complex of limiting factors. Among these are destruction, fragmentation, and degradation of bird habitat; introduction of predators and hoofed animals; loss of invertebrates and plants needed for food; and avian diseases. Less mobile species may have been more vulnerable to disasters than birds that could move among habitat patches and even islands (see Freed et al. 1987 for a similar rationale on speciation). Disproportionately more species of finch-billed honeycreepers, for example, became extinct in proportion to honeycreepers that fed on fruits and nectar. Fruit- and nectar-feeders may have had to travel farther in search of a variable food supply than seed eaters; thus, they may have been more predisposed or preadapted for colonization of new areas, maintenance
CONSERVATION OF NATIVE HAWAIIAN BIRDS TODAY

Ecosystem Approaches
The survival of native birds in Hawai‘i depends upon survival of their habitat. The least costly and surest way to preserve birds is to keep wetlands and forests from further reduction in quality and quantity. This, and the conservation of offshore waters also important for some species, usually requires legal protection of large enough areas to support birds, plus some management to remove or reduce limiting factors. It is preferable to focus on lands (and waters) that have been little disturbed by humans, which are as large as possible, and which are rich in numbers of native bird species. Areas such as the Hakalau Forest National Wildlife Refuge on the island of Hawai‘i, Wai-kamoli Preserve and Haleakala National Park on Maui, the Alaka‘i Swamp Natural Area Reserve on Kaua‘i, and the Northwest Hawaiian Islands National Wildlife Refuge are good examples. We still have areas in the Islands that could benefit from legal protection, but we have even more that are legally protected but badly in need of management to reduce limiting factors for native birds. Again, it cannot be emphasized enough that the securing and managing of entire ecosystems is best, because numerous species benefit (birds, plants, invertebrates, and so forth); because processes such as succession, nutrient cycling, and evolution can remain as natural as possible; because species depend on habitat for their life processes and evolution; and because other approaches (for example, single species emphases) are far more costly in the long run and are less successful.

Single-Species Approaches
Unfortunately, we are already at the stage in Hawai‘i where a number of species of birds must receive costly individual attention. At one extreme, this can be encouraging and arouse public awareness, concern, and funding. The program at Haleakala National Park to reduce predation on breeding ‘u‘au‘u or Hawaiian dark-rumped petrels is an example of an effective single-species approach. A programs of trapping predators, reducing garbage and shelter attractive to rats, cats, and mongooses, and letting the public know about the problem through educational signs, talks, and news releases has been very effective. Petrel reproductive success increased from 39% in 1979 to 88% in 1984 as a result of this active management program.

An example of a less satisfactory, and often misunderstood, single-species approach is the program to "restore" the nene. State and National Park Service management programs have emphasized the production of birds in captivity for release into the wild. This has been well publicized and supported by the public, and the program is not too expensive, considering the fact that a charismatic and unique State Bird is involved. However, despite a comparatively great amount of attention paid to a single species in Hawai‘i for a long time, nene do not usually produce enough young in the wild to sustain populations. The released birds gradually grow old and die, and birds must be continually released from captive breeding programs to keep "wild" populations from declining. Predation, nutrition, genetics, aberrant behavior, and disease are all possible limiting factors. However, the overriding problem,
as with many forest birds, is probably that nene are now confined to a small and substandard portion of their former habitat.

**Captive Propagation**

Raising birds in captivity is also a single-species approach, but birds are out of their natural setting or habitat, or ex situ, often with no immediate prospects of successfully reintroducing them into the wild. (The ex situ approach is discussed in more detail by Giffin, this volume.) When a few of the last individuals of a species are removed from declining wild populations, the situation is usually desperate. The challenge of breeding wild birds in captivity requires development of techniques to allow normal feeding, breeding, and other behaviors for each species. Space needs must be determined, diseases readily transmitted by birds in close quarters must be prevented, and human handlers must be careful to keep young and old birds from reacting abnormally toward them. If the program reaches a stage where birds can be released and the remaining habitat is suitable for repopulation, release techniques, locations, numbers, and genetics of releases must be carefully considered. Released birds must be monitored to determine their movements, breeding attempts and success, and the survival of young. Obviously, captive propagation and release programs are costly, long term, and difficult. Failures are common. The public probably supports these programs partly because the situation is critical. When a species is in danger of extinction, people become concerned, but often not before. "Preventing extinction" is a more definite, worthwhile, and exciting concept to many than "protecting ecosystems" or "preserving biological diversity."

In Hawai'i, such species as the po'ouli (discovered in 1973), the large Kauai thrush, the 'o'au, and the Hawaiian crow or 'alala (Melamprosop phaeosoma, Myiastes myiastinus, Psittirostra psitacea, Corvus hawaiiensis) will probably not be saved without captive rearing programs, and some of these will probably not succeed. It is likely too late for the 'o'o 'a'u (Moho braccatus), the Moloka'i creeper or kakawahi (Paroreomyza flammnea), and the oloma'o (Myiastes lanaiensis) of Moloka'i (Scott et al., 1988).

**THE FUTURE**

Much useful information from the Hawai'i Forest Bird Survey, conducted by the U.S. Fish and Wildlife Service on most of the main Islands from 1976 to 1983, is available. Data on forest bird distribution and abundance at that point in time have allowed us to make inferences about habitat preferences and effects of diseases, ungulate disturbance, and altitude. Hypotheses about competition among alien and native birds have been generated. However, we know very little about limiting factors in different areas over long periods. Dramatic and rapid fluctuations in bird populations are known to occur even for Mainland birds, but in Hawai'i, where populations of many bird species are smaller, less mobile, and more vulnerable to outside disturbances, there have been alarming downward trends in recent years for such species as the 'alala, 'o'au, and even the 'i'iwi (Vestiaria coccinea), in some areas. We simply must understand more about limiting factors and try to reduce or eliminate them while there are still birds. We also need to consider captive propagation at a far earlier and less desperate stage for most species. The new State facility at the former prison at Olinda on Maui is an important step
In this direction. We can do a better job with captive propagation if we have enough birds to maintain genetic variability and to avoid depleting wild populations seriously.

In all approaches to native bird conservation in Hawai‘i, some difficult choices will have to be made. Preserving natural areas rather than developing them for energy production or hotels is but one of these decision points. For example, since most remaining habitat for forest birds is above the mosquito/bird malaria zone (4,900 ft or 1,500 m) on the islands of Maui and Hawai‘i, do we put most of our conservation efforts there? Probably the best opportunities for ecosystem approaches exist on these Islands, and the larger areas seem most favorable for survival of more species. (Of course, other areas not rich in birds are ecologically valuable too because of native plant or invertebrate diversity, and they may even serve as sites for native bird reintroduction in the future.) Choices about emphases placed on land acquisition, management, research, monitoring of populations, and conservation education must also be faced. There are not enough funds and personnel to do it all. What emphasis do we give captive propagation in bird conservation programs, as compared with management of natural areas? Which species do we choose to propagate—the ones that are most likely to become extinct in less than 100 years (less than 50 individuals), or those that are now declining but which still have more than one population and considerable genetic variability? Or do we write off all birds with less than a certain minimum viable population (MVP) size?

If Hawai‘i’s citizens and decision-makers are not informed about choices to be made, the choices will be made by default. Not to decide is to decide. In many areas of the world, birds are the indicators of ecosystem health and the rallying point for public support and conservation efforts. In Hawai‘i we need much more information about the birds that remain. But we also desperately need to secure and manage ecosystems which are large enough and undisturbed enough to support healthy populations of our native birds.

Important References


