Rugged forested interior of Rarotonga photographed from cultivated coastal strip of the island.

Valley bottom plant association characteristic of kakirori habitat.
All photos Rod Hay

including two pairs that were nesting. Now, the kakirori provides us with some hope for its continued survival. Because little is known of habitat requirements or behaviour, more study is urgently needed. With this in mind, we have colour-banded birds in one locality, to enable systematic data on nesting and habitat use to be gathered over the next breeding season.

Possible reasons for rarity

Why is the kakirori rare? Rarotonga's montane forests are largely unchanged by browsing mammals, fire or timber extraction. Perhaps, therefore, predation has had an effect, legacy of the almost Pacific-wide introductions of rats (Polynesian, Norway and ship species), cats or mynas. The ship rat (*Rattus rattus*) is an abundant feature of the forest and it has undergone dramatic fluctuations in numbers in the past. For example, in 1918, Rarotonga was experiencing a serious rat plague and Resident Commissioner reported paying out 600 pounds in "penny a tail" bounties but commented that "they are as numerous as ever". As in New Zealand, and on some of our offshore islands, rats may be an important limit to the bird's recovery.

Feral cats are found in moderate numbers according to locals. If, as on Little Barrier Island, they favour the drier ridges and spurs, then that could explain the current restriction of Kakirori to the bottoms of deep valleys. Who would have expected the dramatic recovery of stichbirds after the removal of cats from Little Barrier when there had been no direct evidence of predation? Perhaps a similar situation exists on Rarotonga, an island which invites close comparison in vegetation and topography.

The Indian myna (manu kavamani), or "government bird", named after its early introduction to control insect pests) is easily the most abundant of Rarotonga's birds, occurring in remarkable densities on the cultivated coastal strip of the island. Mynas also occur in the forest, but not in such high densities. It has been suggested, that they will prey on nestlings and eggs of other species and that they could be a major reason for the kakirori's decline.

The idea that habitat is restricted stems from the current distribution of the birds and from the fact that the coastal strip of the island is entirely cultivated. Perhaps they used to occur there. It appears, however, that this area has been cleared for hundreds of years and that the kakirori has undergone a decrease in numbers during European times in inland habitat that has remained essentially unmodified.

Though the foregoing explanations are speculative, they under-line the need for further research on this bird. What needs to be done and what is proposed? Firstly, volunteer assistants will follow the fate of nests during the current breeding season. Habitat use and area requirements will be studied in one catchment with reference to the eight birds that we have just colour-banded. Finally, survey of the few areas not so far investigated will be undertaken using playback of recorded calls to determine more accurately the size and extent of the population. It is not anticipated, however, that there will be many in excess of 30 birds.

Future work

It is gratifying that the International Council for Bird Preservation is considering funding a full study. Comparative work could then also be carried out on the other endemic Rarotongan species, the starling (*Aplonis cinerascens*), a bird whose reduction in numbers also gives cause for concern.

Officials of the government of the Cook Islands have shown enthusiasm for this type of work, and we understand that plans for development of parts of the island for growth of fuel-wood will not jeopardize those areas necessary for the survival of the important endemic birds.

Acknowledgement must be made of the assistance given so far by the Cook Islands Government, particularly by the Permanent Secretary of Internal Affairs, Mr Tony Utanga, by the Department of Scientific and Industrial Research, South Pacific Regional Environment Programme, Forest and Bird and ICBP.

*Education Department, Cook Islands.