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Orange-bellied parrot by Paul Ehrlich

Islands As Harbingers

Paul and Anne Ehrlich

The decline of animal biodiversity in the Pacific discussed in our last blog is hardly confined to birds. Having just finished a book (THE ANNIHILATION OF NATURE, to be published in the Fall) on the extinction of bird and mammal populations and species, we are only too aware that the Pacific situation is just the front line of a global one. Since the islands we visited were, curiously enough, surrounded by water, it seems appropriate to ask whether the marine situation is dramatically different from that on the islands themselves. Our old friend Jack Grove was travelling with us; we first met him in the Galapagos decades ago and helped persuade Stanford Press to publish his fine FISHES OF THE GALAPAGOS ISLANDS.¹ Jack is one of the most experienced ichthyologists working on coral reefs, and his answer to the question was a resounding “no.” He has observed a steady drop in marine diversity over the past three decades, with once abundant sharks becoming rare, populations of large parrot fish disappearing, and a general decline in the abundance of even smaller fishes such as butterfly fishes and bird wrasses on atolls where children hunt them for food. Paul recently swam transects near an atoll in Micronesia without seeing a single butterfly fish -- a group whose behavior and community structure we once studied ²and which fortunately is still common in some areas.

Birds and reef fishes share a common characteristic. Strangely, although fish swim and birds fly, many island birds and fishes have low powers of dispersal. Birds that fly around run the

¹ <http://amzn.to/11G5HrD>

² Anderson GRV, Ehrlich AH, Ehrlich PR, Russell BC, Roughgarden JD, Talbot FH. 1981. Community ecology of coral reef fishes. American Naturalist 117: 476-495.

risks of being blown out to sea and perishing, and fishes who leave reefs or produce eggs or young that float too long in ocean currents are exposed to predation and the very real chance of not finding a suitable habitat to colonize. So island birds and reef fishes tend to evolve mechanisms that keep them close to home, the loss of wings in birds being the most obvious.

Islands and their reefs generally are small, isolated habitats in contrast with vast prairies or great sweeps of tropical forest. Therefore their denizens tend to exist in relatively small populations, which makes them especially vulnerable to extinction. In part this is just a matter of probability. If a catastrophe wipes out 90 percent of a population of 20 individuals, 10 males and 10 females, then there is only a 50 percent chance the two survivors will be a pair. If the population were 200 individuals, the chance of the 20 survivors being unisex would be vanishingly small. An artificial example, but you get the idea. Small numbers also lead to a loss of genetic variation, and thus less potential for tracking rapidly changing environments evolutionarily.



Ch. lunula by Paul Ehrlich

Well, it turns out that humanity is rapidly remodeling all of Earth toward the island model. Building cities, roads, dams, and other infrastructure, clearing land for crop agriculture and widespread grazing is converting most natural habitats into mere islands in seas of human activity. And even those “islands” have been to one degree or another modified by *Homo sapiens*. With less habitat to occupy, populations of most species (except for those like rats, cockroaches, chickens and cows that thrive alongside people) are declining in both numbers and size.³ As populations blink out, the ecosystem services they supply to humanity go with them. It’s not just the climate-regulating, freshwater supplying, pollinating, pest-controlling kinds of services we refer to. These are critically important to humanity’s physical survival. But there also are ethical and esthetic services that are important to the psychological survival of

³ Hughes JB, Daily GC, Ehrlich PR. 1997. Population diversity: its extent and extinction. *Science* 278: 689-692.

many of us. It would be a sadder world without the Nukuhiva pigeon or the Tuamotu sandpiper.

This was brought home to us recently in the isolated and spectacular southwestern corner of Tasmania, where the southern ocean breaks along the cliffs and islets of a rugged coast. There is the last group of orange-bellied parrots breeding in the wild, some 50 individuals. The birds migrate from their breeding grounds in this small area of Tasmania north to southern mainland Australia. On their wintering grounds the parrots are subject to the usual anthropogenic threats of habitat fragmentation and degradation by grazing, crop agriculture, urbanization, industrial development, introduced predators and competitors, and so on. Ironically, the breeding grounds in Tasmania are now less desirable than in the past because of the extirpation of the aborigines. The fire regimes of Tasmania's original inhabitants created landscapes more favorable to the parrots' favorite food plants.

Comprehensive conservation efforts for the parrot are now under way, including the supplementation of natural tree holes with nest boxes at the main Tasmanian breeding site, and some 250 individuals are now in captive breeding programs. Whether the conservation efforts will prove adequate as Australia suffers more climate disruption and human population growth remains to be seen. The orange-bellied parrot is one of only two parrots that do long-distance migrations, the other being the closely related swift parrot, a member of the same genus. The swift parrot also breeds in Tasmania and risks the dangerous crossing of Bass Strait to winter on the mainland. And it, too, is highly endangered. But for us and the members of our party, seeing fully half of the remaining wild population of orange-bellied parrots, and getting photos of the stunning little bird, was both thrilling and depressing. We hope that others who are thrilled by seeing examples of our only known living companions in the universe will join the MAHB and join the fight to save them, before the islandification of Earth deprives us all of the opportunity to enjoy biodiversity, and perhaps even ends the chances that our great-grandchildren will be able to have long, happy, and rewarding lives.

MAHB-UTS Blogs are a joint venture between the University of Technology Sydney and the Millennium Alliance for Humanity and the Biosphere. Questions should be directed to joan@mahbonline.org

MAHB Blog: <http://mahb.stanford.edu/blog/islands-harbingers/>