



Fig. 2. A female Common Cactus-Finch (*Geospiza scandens*) watches the author at lunch in Puerto Ayora, Santa Cruz Island.



Fig. 3 A male Small Ground-Finch (*Geospiza fuliginosa*) searching for food in the arid zone of Santa Cruz Island.

In nearly every taxonomic group the pattern is the same: on the Galápagos Islands, far fewer extinctions have taken place and the populations of the extant species tend to be larger. Why are the finches and fellow endemic species on the Galápagos in better shape than their Hawaiian counterparts? The short answer is people. Polynesians colonized the lush tropical Hawaiian archipelago with nutrient rich volcanic soils about 1600 years ago⁵. Over the last two centuries, the human population there has even grown to an estimated population of 1,428,557 people by 2016⁶. In contrast, humans have shunned the dry, spiny, and desert-like Galápagos Islands for a long time. If Polynesians ever made it to the Galápagos Islands, they did not stay around. Nowadays, only 3% of the surface area of the islands can be settled by people, with the remaining Galapagos 97% being protected as a national park. A total of 25,244 people were registered during the 2015 census⁷. Now, the human population is tightly controlled on the Galápagos. Even for an Ecuadorean citizen, a trip to the islands feels more like an international trip than a national one. The little appeal the Galápagos had for people in the past is the main reason the flora and fauna is still quite intact (Figure 3).

Only about 13 species of terrestrial vertebrates have become extinct in historic time⁸, although entire populations of some species have been extirpated on some islands⁹. In the broad spectrum of human impact among all Pacific islands, the Galápagos are perhaps the least impacted. At the other extreme, having passed through a devastating anthropogenic cataclysm, we have the Easter Islands whose terrestrial ecosystems have been nearly completely transformed¹⁰. The Hawaiian Islands fall somewhere in between.

The fact that the islands are still largely intact should not be viewed with passive complacency. Anthropogenic processes have already been set in motion that are starting to threaten this fragile island ecosystem. First among them are introduced species that are displacing, infecting or eating native plants and animals. According to the Charles Darwin Station¹¹, there are now nearly 2000 introduced species, some of which are wreaking serious havoc on the islands. For example, going back to the finches, one of the introduced parasites is now seriously threatening the famous Galápagos Finches, especially the critically endangered Mangrove Finch (*Camarhynchus heliobates*). The parasitic fly *Philornis downsi* has been identified as the main threat to survival of several finch species¹². It may also be responsible for the extinction of the newly confirmed species of San Cristóbal Vermillion Flycatcher (*Pyrocephalus dubius*)¹³. In an attempt to eradicate invasive species, authorities are sometimes resorting to drastic measures. For example, tens of thousands of goats have been eliminated from several islands at great cost¹⁴. This well-meaning measure has had its ecological backlash, however. Officials from the Ministry of Agriculture, Fishing and Livestock have noted that in the absence of the introduced herbivore, the first plants to recolonize goat-ravished areas are introduced, invasive species which are outcompeting the native species. In addition, populations of Galápagos Hawks (*Buteo galapagoensis*) have diminished¹⁵ as changes in habitat structure due to goat removal have made hunting for these animals more difficult¹⁶. Introduced species are perhaps the gravest problem, but the World Heritage Committee identified illegal and

unsustainable fishing, tourism, immigration, lack of education, and problematic governance as major threats as well¹⁷. Clearly, the islands require a creative and holistic approach for solving conservation problems. (Figure 4).

The Galápagos Islands are unique because of the limited damage people have done to its native flora and fauna. At the same time, they are increasingly under pressure from anthropogenic causes. In order to safeguard the islands into the future, a new generation of natural resource managers needs to be trained that is capable of using the latest technology and insights in the natural and social sciences¹⁸ to properly solve the problems faced by the island's biota. In addition, the full potential for the islands to become a unique natural laboratory has not been realized yet. The Galápagos require modern laboratories in addition to an intellectual research environment that is wholly based on the islands. National and foreign scientists can contribute to safeguard the islands, not only by creating and sharing knowledge, but also by increasing awareness in the population, and attracting funds for research and conservation. For this to happen, the scientific community not only needs the right incentives (particularly ease of access) to invest in the islands, but they also need qualified islanders who can at some time run the future labs. Perhaps it is time for a "University of the Galápagos Islands?"

All birds pictures used in this articles belongs to the author Markus P. Tellkamp



Fig. 4. A female Common Cactus-Finch (*Geospiza scandens*; left) and a female Medium Ground-Finch (*Geospiza fortis*; right) looking for scraps just after patrons of restaurant left, Puerto Ayora, Santa Cruz.

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