

Conservation Problems in the Galapagos Islands

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Introduction

This report is submitted to draw attention to the mounting need in the Galapagos Islands for further measures to preserve the indigenous wildlife and its environment. Suggestions are made for the establishment of a series of Reserve Areas where protection could be enforced and where the disastrous effects of human intrusion can still be prevented.

In formulating these conclusions three criteria have been accepted:

1) *The unique character of the Galapagos Islands:*

This only needs amplification here in general terms. It would be useful to emphasise the wide scope of measures that should be applied throughout the Archipelago. Evolution and speciation in the Galapagos Islands has led to the differentiation of a large number of local races or subspecies, each with their character differences and each proper to one island or islet. All of these must be preserved, in order to retain the goal to keep alive clues for further evolutionary studies and research. One should mention briefly also worldwide concern and feeling of responsibility for the Islands. Many countries and organisations have become interested and associated with the manifold tasks of preserving their unique flora and fauna. Because of their historical associations, extraordinarily high degree of endemism and their scientific interest, it is not unreasonable to suggest that the Galapagos Islands deserve a special place in the process of World Wildlife Conservation.

2) An urgent need to define the interests of settlers whose livelihood is largely derived from agricultural pursuits.

3) That proposals for the future of the Galapagos Archipelago must inevitably be linked with the development of the area as a National Park, accessible for the enjoyment of tourists and visitors.

Background

An executive decree passed by the Government of Ecuador in July, 1959 declared that all land, *with the exception of areas occupied at that time by settlers or already legally assigned by the State*, was to form territory of a National Park. This decree required full legal protection to be given to important specified indigenous species of animals, and placed in the hands of local authorities responsibility

for the enforcement of these laws.

These steps, far-reaching in general terms, have unfortunately not been successful even in maintaining extant the indigenous wildlife communities of that time. An important case in point is that of the danger of contamination in the Islands from further introduced species. Authorities have not been able to check nor have they often been in a position to pass judgement upon the advisability of importing alien species. The introduction by man of nonnative plants has caused conspicuous changes in the flora of several Galapagos islands. The biotic communities of the higher regions, for instance, of San Cristobal, Santa Cruz, Isabela and Floreana could now be described as largely artificial. A major problem has, and always will be, concerned with distances in any island archipelago where laws have to be enforced. It is frequently not within the powers of local authorities to prevent the illegal removal of protected species. Today, various races of giant tortoise, notably those from San Cristobal, Espanola, and Santiago, are in imminent danger of extinction, and their survival must depend primarily upon whether or not these protection laws can be enforced.

The precarious position of the settlers (whose problems are being voiced at this time) is largely due to the fact that insufficient regard has been paid to the initial terms of the 1959 decree. New colonists continue to arrive and settle upon unoccupied land. Forests, some untouched by man previous to 1960, have been disappearing in a matter of months; cutting, firing and grazing have proceeded with haste and without established planning.

Grazing by introduced animals is leading toward the local extermination of certain plants, such as *Opuntia*, upon which the tortoises rely almost exclusively for food during the dry seasons. To redevelop natural conditions on Espanola, Santiago, Pinta, Santa Fe, and parts of San Cristobal, Santa Cruz, and Isabela, will mean the active control of freerunning domestic animals. A visitor travelling inland or to the remote parts of these islands expects to see cacti and tortoises, not goats. To maintain or reconstruct the moods of the Galapagos Islands as they were before Man's advent is indeed a great task, but as a point of policy it is one that should prevail above all others.

This is the broad background upon which proposals for the establishment of Reserve Areas are based.

Establishment of Reserve Areas

These proposals bring forward ideas previously presented in a draft report "Suggestions for the Protection of the Galapagos Biota, Scenery and Animals" of the Charles Darwin Foundation for the Galapagos Islands. These have already been discussed in outline with delegates, senores Ings. Irigoyen and Suarez, of the Ministerio de Agricultura on the occasion of their visit to the Islands in March, 1965. An attempt has been made to collate information arising from recent surveys carried out by members of the scientific staff of the Charles Darwin Research

Station. Proposed Reserve Areas are:

1) *Uninhabited*

Fernandina (Narborough):

This is the last remaining, untouched major island of the Archipelago. There are no introduced species of animals or plants and the island is therefore still close to its virgin state. An important part of the remaining populations of Galapagos penguin (*Spheniscus mendiculus*) and flightless cormorant (*Nannopterum harrisi*) nest around its shores. It supports a native rodent (*Oryzomys narboroughi*) and probably the largest populations of land and marine iguanas (*Conolophus sub-cristatus* and *Amblyrhynchus cristatus*). Tortoises (*Geochelone elephantopus phantastica*) probably still exist. Mention should also be made of its outstanding volcanic scenery.

Espanola (Hood):

(Including the small neighbouring island of *Gardner*). The native tortoise (*G.e. hoodensis*) is now in desperateneed of complete protection. This is very largely due to food-competition and change in habitat brought about by introduced goats. Already it seems very probable that the population is below the level from which it can recover. The island is the only known nesting site in the world of the waved albatross (*Diomedea irrorata*). There are large colonies of sea-birds: boobies (*Sula dactylatra* and *S. nebouxi*), frigatebirds and the endemic gull (*Creagrus furcatus*). The mocking-bird (*Nesomimus macdonaldi*), lava-lizard (*Tropidurus delanonis*) and marine iguana (*A. c. venustissimus*) are unique.

Santiago (James):

Noteworthy for its endemic and now extremely rare tortoise (*G.e. darwini*), breeding colonies of Galapagos fur-seal (*Arctocephalus galapagoensis*) and flamingo (*Phoenicopterus ruber*) and for the spectacular scenery of its volcanic landscapes. Santiago is the main breeding island for flamingoes in the Archipelago; but there has been killing and much disturbance by the crews of fishing-boats in recent years and, so far, there has been no evidence of successful breeding during 1965. Settlers should only be allowed to remove salt within defined limits in the area of Bahia James. We earnestly recommend that every other form of human impact be discouraged. The island is a breeding area for the Hawaiian petrel (*Pterodroma phaeopygia*), but their survival depends upon the control of introduced pigs. A native rodent (*Nesoryzomys swarthi*) still survives but is probably near-extinct as a result of the introduction of nonnative old world rats.

Rocky islets on the southeast coast of Santiago, such as *Bartolomé* and *Bainbridge*, are noted for their scenery.

Pinzon (Duncan):

A small, dry island which still retains its endemic tortoise (*G.e. ephippium*). This however is becoming rare and does not breed successfully because of introduced rats, which systematically destroy nests and newly hatched young. A number of eggs are at present being hatched at the Charles Darwin Research Station. If

this race is to survive established control areas are vital.

Santa Fe (Barrington)

Rabida (Jervis)

Genovesa (Tower)

Marchena (Bindloe)

Pinta (Abingdon)

Darwin (Culpepper)

Wolf (Wenman):

These seven islands are uninhabited and without permanent water. Each maintains different population stocks; many with specific and endemic characters.

2) *Inhabited*

The following islands have permanent human settlements but the Reserve Areas recommended are uninhabited and retain features of scientific and/or scenic interest.

San Cristobal (Chatham):

Northern and eastern regions which are unsettled, being arid or semi-arid and where small numbers of the tortoise (*G.e. chathamensis*) still survive. San Cristobal has a number of endemic species, including a mocking-bird (*Nesomimus melanotis*), a vermilion flycatcher (*Pyrocephalus dubius*) and various lizards—*Tropidurus bivittatus*, *Phyllodactylus leei*, and *P. tuberculosis*.

Isabela (Albemarle):

North of the Istme de Perry three distinct races of tortoise (*G.e. becki*, *micropyhes*, *vandenburghi*) live on the three volcanoes—Wolf, Darwin, and Alcedo. This area is unsettled and as far as is known unsuitable for agriculture. Isabela is one of the two breeding-islands of the rare endemic flightless cormorant and Galapagos penguin. There are appreciable colonies of marine iguana and fur-seal around the coast.

The case of southern Isabela is not easy. Careful planning will be required to equate the interests of colonists with those of two further endemic races of tortoise. These tortoises (*G.e. guntheri* and *vicina*) live in the area of the two mountains, Cerro Azul and Santo Tomas, but since much of this territory is so difficult to survey further information is still required regarding the extent of their range. It would seem clear however that the fate of these two tortoises will inevitably depend upon the extent to which ingress and colonisation into the Cerro Azul and Vulcan Santo Tomas area is permitted.

Any definite proposals concerning this southern part of Isabela should await the results of further field-work; and suggestions for the rest of the island should not conflict with human interests. The off-shore islets, *Crossman* and *Tortuga*, should be retained for their—at present-untouched biotic communities.

Santa Cruz (Indefatigable):

Human settlement on the south and in the south-central parts of the island.

An existing tortoise reserve covers 16,340 hectares of the south and southwestern parts.

To the east of the highland cultivated areas is a second and smaller area where tortoises still survive. At the moment no provision has been made for their protection, but it is felt it would be a grave decision to abandon at this time any population, however small, to competition with encroaching development. This population belongs to the same race (*G.e. porteri*) as those in the existing reserve and became separated from it presumably during the early years of settlement on the island.

This second group of Santa Cruz tortoises is centred east of the Camote Mountain and in an area known as "Los Negritos". There are probably fewer than 100 animals, and they tend to range eastward and northeastward toward the sea to breed. Most of the land in question would have marginal or negligible agricultural use, and it is suggested this area should remain as a site for further investigation outside the proposed scheme (Report of senores Ings. Irigoyen and Suarez already forwarded) to develop a *cabuya* (sisal) fibre industry in the island.

Bahia de Tortuga, on the south coast of Santa Cruz, should be preserved for its scenery, fine beaches and flamingo lagoon. A further area of scientific and scenic interest would be on the uninhabited west coast of Santa Cruz. This last supports the only large colonies of land iguana (*Conolophus subcristatus*) on Santa Cruz and a small population of undescribed saddle-backed tortoise.

The islets adjacent to Santa Cruz: *Guy Fawkes*, *Eden*, *North Seymour*, *Daphne*, and *Islas Plaza* should be conserved for their sea-bird and sealion colonies. Plaza has land iguanas also and easy accessibility for visitors and tourists.

Floreana (Charles):

The area and immediate surroundings of the salt-lagoon at Punta Cormorant on the north coast are valuable to safeguard the flamingo colony. The flamingoes of the Archipelago are extremely nervous and the birds in need of most urgent protection. Also the small islands off the eastern and northeastern coast of Floreana: *Enderby*, *Champion*, *Caldwell* and *Gardner* still retain their original communities of plants and animals including the endemic mocking-bird (*Nesomimus trifasciatus*)—now extinct on the main island.

Control and Administration of Reserve Areas

Reserves should be areas where effective protection can be enforced. In some instances schemes will have to be initiated to control such introduced animals as goats, pigs, wild dogs, and cats. All hunting, agriculture, human settlement, felling of trees, bushes and cacti, removal of sand from beaches, and other interference must be prohibited. Visits by tourists should be controlled to limit disturbance and the chance introduction of alien species. Notices should be displayed at recognized landing-places drawing attention to the protection laws. These are some of the measures which should come at this time before a National Park commission. Questions of wider application are:

Registration of Dogs. Packs of wild dogs already exist on the island of Isabel^a, Floreana and San Cristobal and, such is the carelessness of dog-owners, there will in all probability soon be a wild population on Santa Cruz. Dogs destroy the tortoises by eating the young and their eggs and also feed on land and marine iguanas and the young of flamingoes.

Captive Tortoises. For a number of years settlers have been in the habit of bringing tortoises from various islands to keep as pets in their homes. There exists the danger of hybridisation of island races, and this practice should be discouraged.

Mutilating Scenic Effects. Crews of visiting yachts and fishing-vessels should be discouraged from painting the names of their vessels on cliffs surrounding anchorages.

Animal Dealers. Mainland animal dealers should be prohibited from all trading in protected Galapagos species. Wider restrictions on the subsequent import of Galapagos fauna into foreign countries would assist protective measures in the Archipelago. (In the U.S.A., a Tariff Act and Customs Order of 1936 make it mandatory to confiscate all Galapagos fauna taken contrary to Ecuadorian law).

A major issue arising from the foregoing discussions concerns the interests of settlers and a definition of land open for settlement. Aspects of this question bearing upon this report are elaborated in a subsequent section.

Interests of Settlers

Three views are brought forward for discussion:

- 1) That every assistance be given to present settlers to develop farming belts in nonreserve areas
- 2) That further colonisation should be discouraged
- 3) That the development of the Galapagos Islands as a National Park with facilities for visitors should provide the basis upon which is planned both the economy and control of natural reserves in the Archipelago.

Agricultural Development

Providing recognition is given to the limitations of Galapagos soils and climate, it is felt that settlers should be afforded every assistance to consolidate and develop their farming interests in established nonreserve areas. This view has been expressed by senores Ings. Irigoyen and Suarez, who further recommended in their report the provision of an Agricultural Research Centre in the Islands.

Settlers should be aware that personnel concerned with conservation must enter private lands for the purpose of checking and marking protected species. They should also understand that the indigenous wildlife is afforded legal protection equally in nonreserve areas as in the reserves. It is not conceivable at this

time that any of the species granted protection under the terms of the 1959 decree could become harmful to agriculture.

Future Colonisation

It would be unwise to encourage further colonisation by farming communities and settlers without means. Suitable land is already at a premium, and a natural increase in population will in time provide its own problems.

Exploitation of the Islands by schemes (at present largely extraneous) intended to raise cattle or other produce for mainland markets should be viewed critically, especially when one realises that the Galapagos Islands cannot produce anything which is not already produced or can be produced on the mainland—nearer the market and without a 1,000 kilometer journey by sea to add to costs.

Facilities of National Park

The Galapagos Islands possess unique advantages in their unusual landscapes, equable climate, exceptional wildlife, and the fact that they represent new horizons to the traveller. The climate is predominantly warm at a time when the colder countries of the northern hemisphere have their winter. Besides the commercial advantages which would accrue from the development of facilities for visitors, it is felt that the overseeing of Reserve Areas and control of access to some could best be effected through the agency of a park service administering these facilities.