

# Galapagos giant tortoises

### (*Geochelone* species)

The Galapagos giant tortoise is the first species that many people think of as representing the natural biodiversity of the archipelago. Their populations were shattered by the arrival of humans. Hunting tortoises for meat greatly affected their numbers, and destruction caused by introduced species has compounded the problem. Scientists working for the Charles Darwin Foundation (CDF) are attempting to restore the Galapagos giant tortoise and the ecosystems it depends on for survival.

### *Unique to Galapagos*

Genetic studies have shown that tortoises in Galapagos probably evolved from a single ancestor. There are now 11 species of giant tortoises endemic to Galapagos:

- Five are found on Isabela Island, one on each of the large volcanoes connected by wide lava fields that tortoises cannot cross.
- Five are present on Santiago, Santa Cruz, San Cristóbal, Pinzón, and Española Islands, respectively. The last Pinta tortoise, “Lonesome George”, lives at the Charles Darwin Research Station .

The shapes of tortoise shells, or carapaces, vary between species. Smaller “saddle-backed” types are found on Española or Pinzón. Large “dome-shaped” tortoises are present on Alcedo volcano (Isabela) and on Santa Cruz Island. A Galapagos giant tortoise can measure up to 170 centimeters across its carapace and weigh up to 300 kilograms. Tortoises can live to more than 100 years in age, with the oldest animal thought to have been 170 years old.

Tortoises are vegetarian and eat a wide variety of plants, including *Opuntia* cacti. The different carapaces have probably evolved as adaptations to the different environments on each island. Saddle-back types are raised at the front to allow the tortoises’ long necks to reach for higher vegetation on drier islands. Dome-shaped tortoises do not need to reach for food on moist islands where lower vegetation is available; however the shape of their shell helps them push through dense growth.

In highland areas, tortoises can be seen wallowing in shallow pools formed by rain or dew dripping from leaves. Tortoises stand and stretch their necks to give birds access to remove parasites. When frightened, tortoises retract their heads and legs into the protective shell, making a hissing noise as air escapes from the lungs.

### *Vulnerability*

About 250,000 tortoises are estimated to have lived in Galapagos before the arrival of humans. Current populations stand at around 20,000 individuals. There were probably 14 species of Galapagos giant tortoises; only 11 remain. The IUCN Red List categorizes the species as Vulnerable, Endangered, Critically Endangered or Extinct in the Wild.

### **CDF FOCUS: RESTORATION**



### **Key Facts**

**Species:** *Geochelone* species

**Common name:** Galapagos giant tortoise

**Size:** Up to 1.7m over shell, up to 300kg in weight

**Habitat:** drier lowland or moist highland depending on species

**Diet:** herbivore

**Range:** Multiple islands with different species

**Status:** all are vulnerable; Pinta species is Extinct in the Wild.

**Threatened by:** introduced species, habitat destruction, historical predation by humans

The Floreana tortoise was common in the early 1700's, but Extinct by the 20<sup>th</sup> century, hunted by whalers, sealers and settlers. On Santa Fé Island, only remains have been found. Only one specimen was ever found on Fernandina; its remains are now at the California Academy of Science museum in San Francisco.

During the 19<sup>th</sup> century, tortoises were a popular source of fresh meat as they could stay alive for as much as a year without food or water. Females were hunted first as they were smaller than males and were more accessible in lowland areas during the egg-laying season.

Today, the biggest problem facing the endemic giant Galapagos tortoise on many islands is that of introduced species. Introduced rats and ants destroy tortoise eggs and consume hatchlings, preventing the regeneration of tortoise populations. Invasive herbivores, such as goats, donkeys, pigs and cattle, destroy the vegetation and compete with tortoises for food. Goat populations grow rapidly, causing erosion and changing the appearance of the land.

### *CDRS research activities*

Joint activities by CDF and the Galapagos National Park Service (GNPS) have succeeded in removing pigs and goats from Northern Isabela, Santiago, and Santa Cruz. This is paving the way for successful restoration programs helped by CDF botanists as well as vertebrate specialists, leading to a brighter future for the Galapagos giant tortoise.

The CDF provides technical support to the breeding and rearing centers run by the GNPS on San Cristóbal, Santa Cruz and Isabela Islands. The GNPS routinely collect tortoise eggs from nests, rearing them under controlled conditions. Tortoises are normally returned to the wild after their shells reach a width of more than 20 centimeters. This is particularly important for populations living on islands plagued with black rats that destroy eggs and kill hatchlings, for example Pinzón Island.

Breeding programs rescued the Española species from extinction. In total, twelve females and two males were found on the island and brought to the breeding center at the Charles Darwin Research Station (CDRS). Another male, known as "Diego", was returned to Galapagos from the San Diego Zoo. He plays a significant role in the breeding program that has returned over 1400 Española tortoises to the wild.

The last remaining male Santa Cruz tortoise was brought back to the CDRS, where he is housed in a corral with two females from Wolf Volcano, on Isabela. So far he has failed to breed successfully with these females.

Working with communities and establishing protected areas is crucial for the restoration and repatriation of young tortoises close to towns, such as Puerto Villamil on Isabela. By working together with communities, the CDF are optimistic that the Galapagos giant tortoises will continue to be part of the Galapagos landscape. Learning from the past is the only way to save the future of these iconic animals.