

## Charles Darwin Research Station Fact Sheet

# Goats in Galapagos

Goats are a highly destructive invasive species causing damage to the ecosystems of Galapagos. A major ecology restoration program implemented by the Charles Darwin Foundation (CDF) and the Galapagos National Park Service (GNPS) required the removal of all feral goats from Santiago and northern Isabela Islands. Their removal will aid in the reestablishment of natural ecological conditions and evolutionary processes.

### *Arrival in Galapagos*

Goats (*Capra hircus*) were abandoned in Galapagos in former centuries by humans, including fishermen, pirates, and whalers, to ensure a fresh meat supply would be available to them on future trips. They were also brought by settlers as livestock.

The populated islands of Santa Cruz, Floreana, San Cristóbal, and southern Isabela all have feral goat populations where park areas border farmland. Complications associated with eradication programs in populated areas mean that these islands are difficult to target.

Islands or regions with no human settlements, such as Española, Pinta, Santiago, and northern Isabela, have benefited from controlled programs to remove the feral goats. Successful programs have resulted in Española being goat-free since 1978 and Pinta since 2001. Since 2002, the larger islands of Santiago and northern Isabela have been the focus of an intensive campaign. In 2006 the Galapagos National Park Service (GNPS) announced that no feral goats were found on Santiago or Northern Isabela. Monitoring will continue.

### *Impact on Galapagos*

Northern Isabela is separated from southern Isabela by a 12 kilometer-wide lava field, the Perry Isthmus. Northern Isabela remained relatively pristine until the arrival of feral goats in the early 1970's. In 1998, the population was estimated at between 75,000 and 125,000 goats. The most concentrated populations centered on the Alcedo and Darwin volcanoes.

Northern Isabela has the largest giant tortoise populations (estimated to be 15,000+) in Galapagos. Tortoises were being out-competed in grazing by the more agile and versatile goats. Fewer nesting sites were available and microclimates critical to tortoise survival (including drip pools under summit forests, and humid soils) were being altered. Other endemic animals, birds, insects and plants were suffering equally, potentially leading to the extinction of species and subspecies due to habitat

#### CDF FOCUS: RESTORATION



#### Key Facts

**Species:** *Capra hircus*

**Common Name:** Feral Goats

**Class:** Invasive

**Impact:** Competing with endemic and native species for habitat, transforming forests into barren grasslands, erosion.

**Origin:** Introduced by sailors and settlers

**Range:** Santa Cruz, Floreana, San Cristóbal, southern and northern Isabela, and Santiago

**Action:** Eradication

degradation.

Prior to intervention, goats were spread throughout northern Isabela, transforming pristine forests into barren grasslands. The loss of forest on steep volcanic slopes resulted in erosion as large herds of goats moved over bare land removing protective vegetation.

## *CDRS Research Activities*

In the face of this critical situation, eradication of the goats was a necessary first step for the ecological restoration of northern Isabela. Project Isabela was initiated as part of a long-term ecological restoration project undertaken in Galapagos by the GNPS and the CDF, which provided scientific, technical and management support to the project.

The eradication of feral goats from northern Isabela, as well as Santiago, used advanced technology and methodologies, including:

- Ground hunters and trained dogs
- Aerial hunting to reduce goat density, and
- Using “Judas goats” wearing tracking collars: Goats are naturally gregarious, and individuals wearing radio collars will group with remaining herds, allowing their location to be identified.

The eradication has been very successful and field eradication activities have been completed. Judas goats have been deployed across all vegetated areas on Santiago and northern Isabela and monitoring is ongoing.

## *For the future*

The removal of goats before the seed bank in the soil is depleted means that the area will now recover by itself quite well. Some trees may need to be planted in areas where the seed bank has been destroyed already.

Vegetation recovery has been swift on Santiago and in the northern Isabela highlands, even though the last few years have been drought years. Small trees are regenerating from the stumps left by the goats.

Other species of previously rare or uncommon plants that were palatable to goats are now relatively common, particularly in the highlands. During the next wet season vegetation recovery is expected to transform Santiago and Isabela Islands. However, complete recovery of these systems will take many years.

As funds become available, further control and eradication work targeting other introduced species will take place. Importantly, the removal of goats will allow CDRS botanists as well as invertebrate and vertebrate specialists to expand the restoration efforts already underway. This will help ensure that, over time, the island return to a state close to what it was before the arrival of goats.