Project Floreana: A Plan for Island Restoration

Project Floreana is an ambitious 5-year initiative that will begin the process of restoring Floreana Island’s ecosystems to their earlier, more natural state through a combination of community-based conservation and adaptive management. The project seeks to restore natural systems and landscapes by controlling invasive species and re-establishing locally-extinct species. Implemented jointly by the Charles Darwin Foundation (CDF), the Galapagos National Park Service (GNPS), and local residents, Project Floreana will ensure critical public involvement to create a collective vision for Floreana’s future and determine the conservation management framework needed for the long-term protection of the island.

Ecological degradation on Floreana Island

Floreana, the smallest of the four inhabited islands of Galapagos, was the first to be colonized. It has a colorful history, including the establishment of the Post Office Barrel by British whalers in 1793 and the mysterious deaths of several settlers in the 1930s. The long connection of humans with Floreana has resulted in significant habitat degradation and the highest level of species loss of any island in Galapagos. There have been two global extinctions — the Floreana giant tortoise (Geochelone elephantopus) and a cucumber vine (Sicyos villosus) — and additional local extinctions, resulting in eight Galapagos species no longer found on Floreana. These include the Floreana mockingbird (Nesomimus trifasciatus) and the Galapagos racer (Alsophis biserialis), both of which are now restricted to two of the satellite islets of Floreana, Champion and Gardner-by-Floreana. The loss of the Floreana tortoise is of particular concern as giant tortoises are important herbivores and seed dispersers, and their movement through their environment creates openings and greater habitat diversity. Introduced species have heavily impacted the island, destroying some of the unique habitats and threatening much of the remaining biota. Many marine species have been over-harvested from Floreana’s coastal areas, reducing the possibility of establishing small, local fisheries and marine tourism activities, such as diving and snorkeling.

The need for conservation action on Floreana and the other three inhabited islands of Galapagos has been overshadowed by the pressing needs on the uninhabited islands and the challenges of working on populated islands where personal interests and conservation are often at odds. Protection of biodiversity on inhabited islands has traditionally relied on regulations that prohibit specific activities and access. In most cases, little effort has been made to link conservation goals with benefits for local residents. Project Floreana represents the first time in Galapagos that a community will be directly involved in all phases of a conservation program, including project planning, implementation, monitoring, and evaluation.
Today, Floreana has a small human population of 120 people, most of whom are subsistence farmers. Its population has remained relatively stable, primarily because of limited water resources, electricity, and employment opportunities, as well as infrequent transportation to and from the island. However, in recent years, there has been an increase in the frequency of boat transportation. New tourism ventures have been established, and others are being considered. This heightened activity is worrisome, as Floreana is not prepared for a significant increase in residents or visitors. The environmental impacts of unplanned growth will be severe.

**Project Overview**

Because of its small size and population, Floreana offers a unique opportunity to develop an integrated approach to restoration by engaging the community in looking for practical solutions to many of the problems affecting the island. The project will use local, national, and international technical expertise to help develop effective strategies for sustainable restoration programs and livelihoods. By linking conservation goals, adaptive management practices*, and benefits for local residents, it is hoped that Floreana can be restored to a state more similar to that which Charles Darwin would have observed on his voyage to Galapagos in 1835.

Preliminary work in Floreana began in 2007, when the GNPS carried out goat eradication and the CDF trained a team of local residents to work as wildlife technicians to initiate surveys of rare plants. The success of these actions, combined with growing community support and interest in conservation work, as well as the historic importance of the Floreana mockingbird in the development of evolutionary theory, has resulted in strong local, national, and international interest in developing a large-scale, integrated project on Floreana.

**Project Goals and Anticipated Results**

The four project goals include:

1. **Build long-term economic and environmental sustainability**

   During the first year of the initiative, project leaders and local residents will meet regularly to chart out the economic and social drivers specific to Floreana. By understanding the short- and long-term consequences of different kinds of economic development, and the benefits associated with more sustainable use of local natural resources, local residents can make informed choices about the trajectory of their economic development. The project will strengthen formal education curricula and provide vocational training to ensure the skills and knowledge needed by Floreana’s residents. It will also begin to identify the community’s current and projected resource and infrastructure needs (energy, water, waste management) within the broader framework of recapturing and restoring Floreana’s unique flora and fauna.

*Adaptive management integrates design, implementation, and monitoring of conservation actions in order to systematically test assumptions and ensure adjustments and learning.*
2. Strengthen conservation management in Floreana

The ecological restoration of Floreana requires much more complete information on the current status of the island’s biodiversity. One of the basic tools needed for establishing conservation priorities and strategies is a series of maps showing the distribution of plant and animal species and habitats. During its first year, the project will establish a baseline of Floreana’s biodiversity, which will be accessible to residents, scientists, and conservation managers via an online database. Surveys will focus on key groups of flora and fauna on hilltops and in craters, where remnant pockets of native vegetation can still be found. In subsequent years, data collected in the field will be complemented by aerial and satellite imagery and analyzed using GIS methodologies to help determine key areas for biodiversity conservation. With these data in hand, priority sites will be identified, and management plans will be developed and implemented. In the coastal areas, community members will establish “no-take” zones. Biodiversity surveys of these areas, compared with surveys in areas where fishing is still allowed, will provide information on the recovery of the marine community over time.

3. Protect Floreana against further introductions and spreading of invasive species and disease

The restoration and subsequent preservation of Floreana will require increased awareness among community members regarding the fragility of Floreana and the dangers associated with invasive species. It will require that residents have the necessary skills to employ improved agricultural practices that will reduce the spread of invasive species and poultry management techniques to reduce the risk of avian disease. The project will utilize training activities that have proven effective elsewhere in Galapagos, such as the Native Garden Program on Santa Cruz, which encourages the use of native plants for landscaping and home gardens. A community nursery and model farm will be established to support these training efforts. The project will also establish an effective inter-island quarantine system to prevent the arrival of new species from other islands in the archipelago.

Priorities for invasive species and disease control

**Disease.** Native birds of Galapagos are highly susceptible to diseases carried by domestic and feral chickens. Many potential poultry disease problems could be mitigated by improved animal husbandry.

**Weeds.** Gardens in Floreana are currently filled with aggressive invasive species. In addition, four species of introduced plants that cause significant problems on other islands within Galapagos are still restricted to small areas on Floreana and could be eliminated. These include: blackberry (*Rubus niveus*), rose apple (*Syzygium jambos*), Cuban hemp (*Fucraea hexapetala*), and leucaena (*Leucaena leucocephala*).

**Rats.** The release of mockingbirds and continued efforts to enhance the Galapagos petrel population will be unsuccessful if rats are not controlled. While rat eradication is feasible on Floreana, it could be prohibitively expensive. However, rat and mice control over a 400 ha area (the town, proposed mockingbird release site, and the petrel colony) could be maintained at relatively low cost.
4. Re-establish self-sustaining populations of locally-extinct species

Returning locally-extinct species to Floreana is an important part of Project Floreana. However, before the release of any species takes place, the project must ensure the systematic control and elimination of aggressive alien predators, using methodologies proven elsewhere and adapted to Floreana. As these steps are taken, preparatory work on the biology and social behavior of the Floreana mockingbird will be completed on the islets of Champion and Gardner-by-Floreana, and potential release sites on the main island will be studied for food availability. The project will also work to determine which tortoises should be released on Floreana to serve as “ecosystem engineers” and to return the island to its more natural state. The Galapagos racer, whose population like that of the mockingbird remains only on Gardner and Champion, could also be released onto the main island following analysis of its behavior and diet and adequate predator control.