Charles Darwin Foundation

Proyecto GALÁPAGOS VERDE 2050 Project

Restoring the ecosystems of the Galapagos Islands

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Why?

More than 2000 endemic species call Galapagos their home

Preserving the biodiversity and ecological integrity of the Galapagos is important for:

- Ecosystem services
- Scientific contributions to ecology and evolution
- Beauty and inspiration for locals and visitors
- **$258 millon yearly**
- **43% of the economy**
- Tourism

(Ministerio de turismo, 2015) (Guzman y Poma, 2015)

THE CHALLENGE

Introduced herbivores, invasive species, and human disturbance threatens the biodiversity of the Galapagos islands. More than 60 endemic species in the Galapagos are critically endangered.

THE SOLUTION

Plants form the foundation of the ecosystems and are linked with the biodiversity of the Galapagos. So, actively restoring the populations of plants that were destroyed by introduced herbivores, invasive species, and human disturbance is a direct way to support and protect the native ecosystems and biodiversity of these islands.

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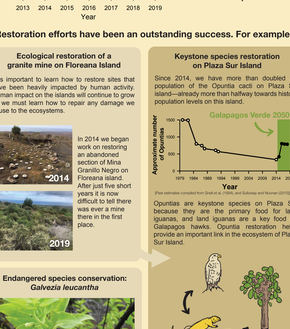


What?

Galapagos Verde 2050: the science and application of ecological restoration

Through large-scale planting experiments, GV2050 not only helps plant native and endemic species, but it does so while actively testing the most efficient methods for successful ecological restoration.

Restoration efforts have been an outstanding success. For example:

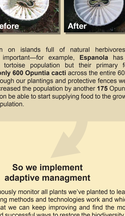
Ecological restoration of a granite mine on Floreana Island

It is important to learn how to restore sites that have been heavily impacted by human activity. Human impact on the islands will continue to grow so we must learn how to repair any damage we cause to the ecosystems.

In 2014 we began work on restoring an abandoned section of Mina Granito Negro on Floreana island. After just five short years it is now difficult to tell there was ever a mine there in the first place.

Keystone species restoration on Plaza Sur Island

Since 2014, we have more than doubled the population of the Opuntia cacti on Plaza Sur island—already more than halfway towards historic population levels on this island.



(Past estimates compiled from Snell et al. (1996) and Galloway and Novoa (2018))

Opuntias are keystone species on Plaza Sur because they are the primary food for land iguanas, and land iguanas are a key food for Galapagos hawks. Opuntia restoration helps provide an important link in the ecosystem of Plaza Sur Island.

Endangered species conservation: ***Galvezia leucantha***

In 2012 we discovered only 8 remaining individuals of this endemic species on Isla Isabela Island. By 2016 there were only 5 left. As of August 2019, we have more than tripled the population of *Galvezia leucantha* in the wild to 18. Though this species is still critically endangered, at least now it has a fighting chance.

Environmental education

Teaching the next generation about the values of conservation and restoration is essential for ensuring restoration efforts are continued after the Galapagos Verde project ends. Education through collaboration with schools and planting botanical gardens to teach locals and tourists about the biodiversity and importance of the endemic plants of the island.

17 Ecological Gardens

5 Schools

2000+ Students

How?

Native and endemic species must be restored quickly and efficiently

Goats and other introduced herbivores have been eradicated from many islands, but their destruction persists and makes it easy for invasive species to take over. Thus, we must restore native and endemic species quickly and efficiently. We can do this by giving native and endemic species an advantage compared to invasive species.

2-year survival in arid zones

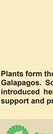
Growth in arid zones

Technologies can help plants survive and grow faster

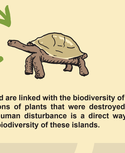
We use technologies such as the Groasis Waterboxxe (Groasis) that help plants get more water in the arid environment of the Galapagos. This helps increase their chances of survival and accelerates their growth. Groasis works by collecting rainwater and dew and consistently feeding it to the plants roots over time.

We also protect plants with fences

We accelerate the population growth of the species we plant by using fences to protect plants from herbivory by tortoises and land iguanas until plants are large enough to protect themselves.



If we don't use fences...



Restoration on islands full of natural herbivores is especially important—for example, **Espanola** has an increasing tortoise population but their primary food source is **only 600 Opuntia cacti** across the entire 60 km² island. Through our plantings and protective fences we've already increased the population by another **175** Opuntias that will soon be able to start supplying food to the growing tortoise population.

Learning is essential...

So we implement adaptive managment

We continuously monitor all plants we've planted to learn what planting methods and technologies work and which don't so that we can keep improving and find the most efficient and successful ways to restore the biodiversity of the Galapagos.

Emergency action!

In July 2019, we learned that two of the fences we used to protect plants had trapped some endemic Galapagos doves on Espanola island.

10654 plants

Although only two (0.02%) of all of our plantings were the problem, we immediately set out to fix this issue. We learned that the doves crawled under the fences so we reinforced all of our fences to ensure this never happens again.

Help support our continued efforts to protect and restore the biodiversity and ecological integrity of the Galapagos Islands for generations to come

www.DarwinFoundation.org www.GalapagosVerde2050.com

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