



Exploring How the Galápagos Islands Can Promote Sustainability and Build Resilience in Response to Rising Tourism

Researcher: Luke Campo, International Relations & Environmental Studies student, College of Arts and Sciences
Research Advisor: Dr. Eugenie Birch, Nussdorf Professor of Urban Research, Weitzman School of Design



Introduction

- A UNESCO World Heritage site, the Galápagos is home to 8 different ecosystems, over 2000 endemic species and is considered a “living laboratory”
- Starting in the early 2000s, the Galápagos Islands have experienced a rapid rise in tourism and increased development (200+ hotels built between 2006 and 2017)
- The islands currently face a number of environmental and sustainability-related challenges as a result of increased anthropogenic activity
- The archipelago has developed a heavy reliance on imports which is highly unsustainable and has led to major environmental disasters and the introduction of invasive species
- 150+ species native to the Galápagos are classified as endangered or critically endangered, and invasive species are considered to be the largest factor causing this
- These problems will continue to grow under the status quo, as tourism expected to grow at a rate of 8% annually between 2018 and 2030



95%
Species with optimal conservation status
GNP Management Plan, 2014



2017
Endemic species
Data Zone FCD 2013



1579
Introduced species
46% intentional, 28% accidental
10% stowaway, 2% unknown.
Taral et al., 2017



8
Ecosystems
4 terrestrial: coastal, arid, transitional, humid;
4 marine: aquifers, wetlands, subtidal, pelagic.
GNP Management Plan, 2014

Research Questions

- How can the Galápagos become less-reliant on imports? What are the underlying drivers of the archipelago's heavy reliance on imported goods?
- Which sectors of the economy should the Ecuadorian government prioritize investment in, in order to reduce reliance on imports?
- How can the Ecuadorian government better regulate and monitor the import processes in the Galápagos in order to reduce the risk of an environmental disaster (fuel spill, for example) and minimize the number of invasive species entering the islands?
- How can the companies involved with shipping goods and transporting people to the Galápagos reduce the emissions intensity of their ships and planes? What role can the Ecuadorian government and the Special Regime of the Galápagos play in enforcing carbon emissions reductions?



3096
Flights to Galápagos
(Galapagos Observatory 2018)



271 238
67% Foreigners
33% Ecuadorians
(Source PNG, 2019)



183
Tourist Sites
(Galapagos National Park)



8460
Homes



1,803
Galapagos Special Consumer Price Index



16%
Renewable energy consumption

Research Phases

Secondary Source Analysis

- Literature review focused on policy, environmental, and economic analysis

Site Visit

- Interview of relevant persons; observational research of key processes

Findings and Synthesis

- Policy recommendations; inform public-private dialogue; enhance community awareness



Photograph from Site Visit: Fuel Transfer Process in San Cristóbal

Research Overview

- Primary source analysis (site visit):**
 - Met with leaders of ElecGalápagos, the utility responsible for energy production and distribution throughout the archipelago
 - Interviewed employees working in the following sectors: energy, water, aviation, shipping, biosecurity, waste disposal, trucking, fuel transfer, and goods distribution, and observed processes they took part in (such as fuel transfer)
- Secondary source analysis:**
 - Analysis of international, national, and subnational policies relevant to the Galápagos energy, water, aviation, maritime shipping, and biosecurity sectors, as well as policies focused on carbon emissions more broadly
 - Analysis of Ecuador and Galápagos government structure with a focus on entities responsible for trade, development, environmental protection, urban planning, and aviation
 - Analysis of economic data with a core focus on trade, tourism, and energy production

Findings

- The lack of long-term infrastructure planning is the root of many of the problems the Galápagos faces today
- The Galápagos has **underinvested in renewable energy infrastructure**, which has led to a **heavy reliance on imported fuel**
- The Galápagos does not have the infrastructure or government resources dedicated to **safely handle the import of goods**, which has led to **significant environmental problems**, such as the introduction of hundreds of invasive species and several major fuel spills
- The Galápagos Islands have a very **high embodied carbon footprint**, driven largely by a heavy reliance on **imported goods**, the **transport of tourists** to and from the islands, and an energy system that largely runs on **fossil fuels**

Recommendations & Next Steps

Recommendations:

- Community engagement and education:** Educate the full-time residents on how the systems put in place to support the tourism sector are environmentally hazardous and highly unsustainable; enable the community of residents within the Galápagos to come up with solutions and push the government to take action
 - Renewable Energy Development:** Establish the production of renewable energy within the islands, through investments in wind, solar, and geothermal energy
 - Deep Water Port:** A deep water port that centralizes biosecurity and minimizes the environmental risk of importing goods is critical to environmental protection
 - Biosecurity:** Allocate greater government resources to biosecurity
 - Emissions Governance:** Establish a policy framework that regulates the emissions of the ships and aircraft nationally (Emissions Trading Scheme, Jet Fuel Tax, Ship Fuel Tax, Carbon Tax)
- Next Steps:**
- In collaboration with Environmental Animation, a course co-taught by Dr. Simon Richter and Joshua Mosley, a team of undergraduates is creating an informational animated video about this research project
 - Publish a Policy Brief in Penn IUR



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Selected References:

- Council, G. G. (2022). Galapagos 2030: Galapagos Islands Strategic Action Plan. Puerto Baquerizo Moreno, Ecuador.
- Bigue, M., Rosero, O., Brewington, L., & Cervantes, K. (2012). The Quarantine Chain: Establishing an Effective Biosecurity System to Prevent the Introduction of Invasive Species Into the Galápagos Islands. San Francisco, CA. 21 years of the UNESCO Courier: special anthology number; The UNESCO courier: a window open on the world; Vol. XXII, 8/9; 1969. (1969). The UNESCO Courier.
- Pizzitutti F, Walsh SJ, Rindfuss RR et al (2017) Scenario planning for tourism management: a participatory and system dynamics model applied to the Galapagos Islands of Ecuador. J Sustain Tour 25:1117–1137.
- Urgent Action Fund for Endangered Species. (2021). Retrieved from Galapagos Conservancy: <https://www.galapagos.org/projects/saving-species/urgent-action-fund-for-endangered-species/>
- Society, N. G. (2022, May 20). Galapagos Islands. Retrieved from National Geographic: <https://education.nationalgeographic.org/resource/galapagos-islands/>
- Reale, N. (2022, October 14). The Galápagos Islands: Economy over Ecosystems. Retrieved from Harvard International Review: <https://hir.harvard.edu/the-galapagos-islands-economy-over-ecosystems/>