

Culebra, Participatory GIS Mapping Exercise
September, 2015 – Culebra, Puerto Rico
Technical Report



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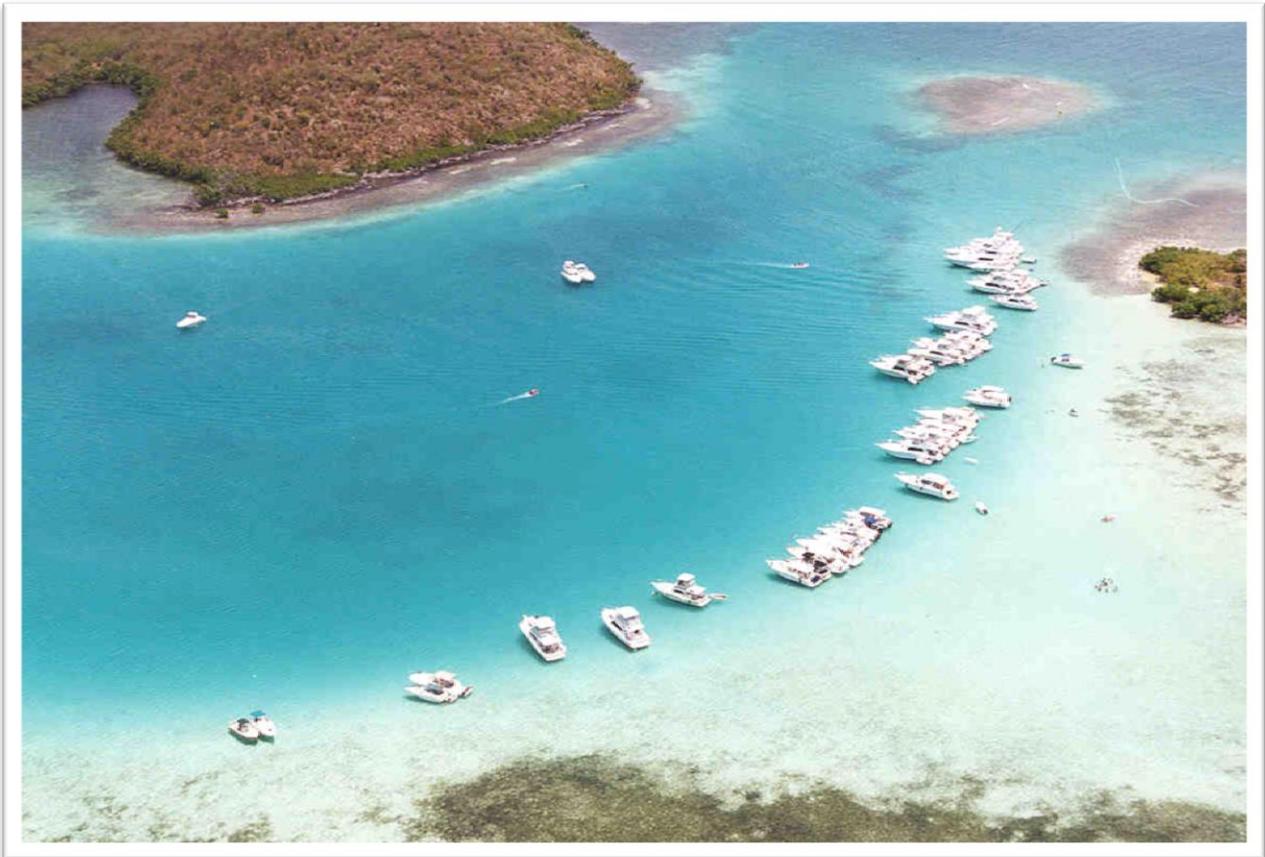
Introduction

Culebra is an island-municipality of Puerto Rico located approximately 17 miles (27 km) east of the Puerto Rican mainland and 12 miles (19 km) west of St. Thomas with a total area of 7,000 acres (including the cays). Much of the island and its surrounding 23 islets are protected by the U.S. Fish and Wildlife Service as a nature preserve. Culebra is a popular tourist destination for Mainland Puerto Ricans and Americans and its tourism industry depends greatly on its coastal and marine resources. People participate in a variety of activities such as fishing, kayaking, snorkeling, and scuba diving, amongst other. This increasing demand on the coastal and marine environment results in competition between human activities and natural processes and may lead to severe impacts on marine ecosystem.

It's not until recently that humans and their needs are considered an integral part of the coastal and marine ecosystems. However, compared to environmental information, there is little spatial information available on human activities in these areas. A central objective of marine spatial planning (MSP) is the identification and reduction of conflicts among human uses, and between human uses and the environment. In order to achieve this objective, it is necessary to have accurate and thorough spatial data representing both important and sensitive benthic habitats as well as the location of human activities. Unlike datasets related to physical and biological information, coastal and marine human use information is less common in geographic information systems (GIS). Collecting and putting this information into GIS allows for it to be visualized and analyzed for the purpose of MSP and management. This project filled those human activity data gaps through a coastal and marine use mapping project.

With support from the National Oceanic and Atmospheric Administration's Coral Reef Conservation Program (NOAA CRCP), The Nature Conservancy (TNC) interviewed partners and relevant stakeholders to up-date and collect spatial data that will help resource managers understand both the range and intensity of key coastal and marine activities in Culebra, Puerto Rico. Interviews were conducted in Culebra on September 3 and 4, 2015 with representatives from different marine sectors (recreation, watersports, marina, charter boating, SCUBA diving, and fishing industries). The exercise also included engaging the fishing community, mapping areas of biological and ecological relevance, visualizing non-motorized and motorized tourism and recreation features and confirming accurate transportation representation. Information was collected using the method of *Participatory GIS Mapping*, which provides participants a map on which to indicate the location of their activities. The purpose of the Culebra Participatory GIS Mapping exercise was to compile spatial data on existing human uses and develop a GIS geodatabase of the marine environment that will identify human stressors in coral regions of Culebra. During these 2 days, TNC staff met with relevant stakeholders and resource users to collect information on the following themes: a. Ecosystems and Environmental Interests and b. Coastal and Marine Human Uses.

The information collected is a critical piece to the decision making process and will facilitate the effort to advance integrated coastal and ocean management and help preserve coral reef areas in Culebra Puerto Rico. Data layers collected during these meetings is available to government agencies, industry, and community leaders engaged in ocean planning through the CROP data portal and marine planner (Caribbean-mp.org).



Data Layers and Metadata

The information for this report was collected through in-person interviews and participatory mapping with local community members, fishermen, businessman and marine resource users in Culebra held in September 2015. Seventeen new data layers were created (Table 1.) and the following maps resulted from this work (Figure 1 & Figure 2).

Table 1. Spatial Data Culebra

| Human use | Layers Created | Description |
|--|---|---|
| Ecosystems and Environmental Interests | <ul style="list-style-type: none"> a. Mangroves b. Sandy Bottoms c. Reefs d. Seagrass e. Natural Protected Areas f. Priority Areas DNER | These layers identify coastal and marine ecosystems and environmental and conservation interest in Culebra. |
| Coastal and Marine Human Uses | <ul style="list-style-type: none"> a. Kayaks b. Docks c. Vessels d. Swimming Areas e. Fishing f. Snorkeling g. Surfing h. Airport i. Port j. Scuba Diving Sites k. Mooring Buoys | <p>These layers identify areas within Culebra costal and marine environment where human activities take place.</p> <p>Information obtained from local resource users, business owners and other community members</p> |

Figure 1. Ecosystems and Environmental Interests in Culebra, Puerto Rico

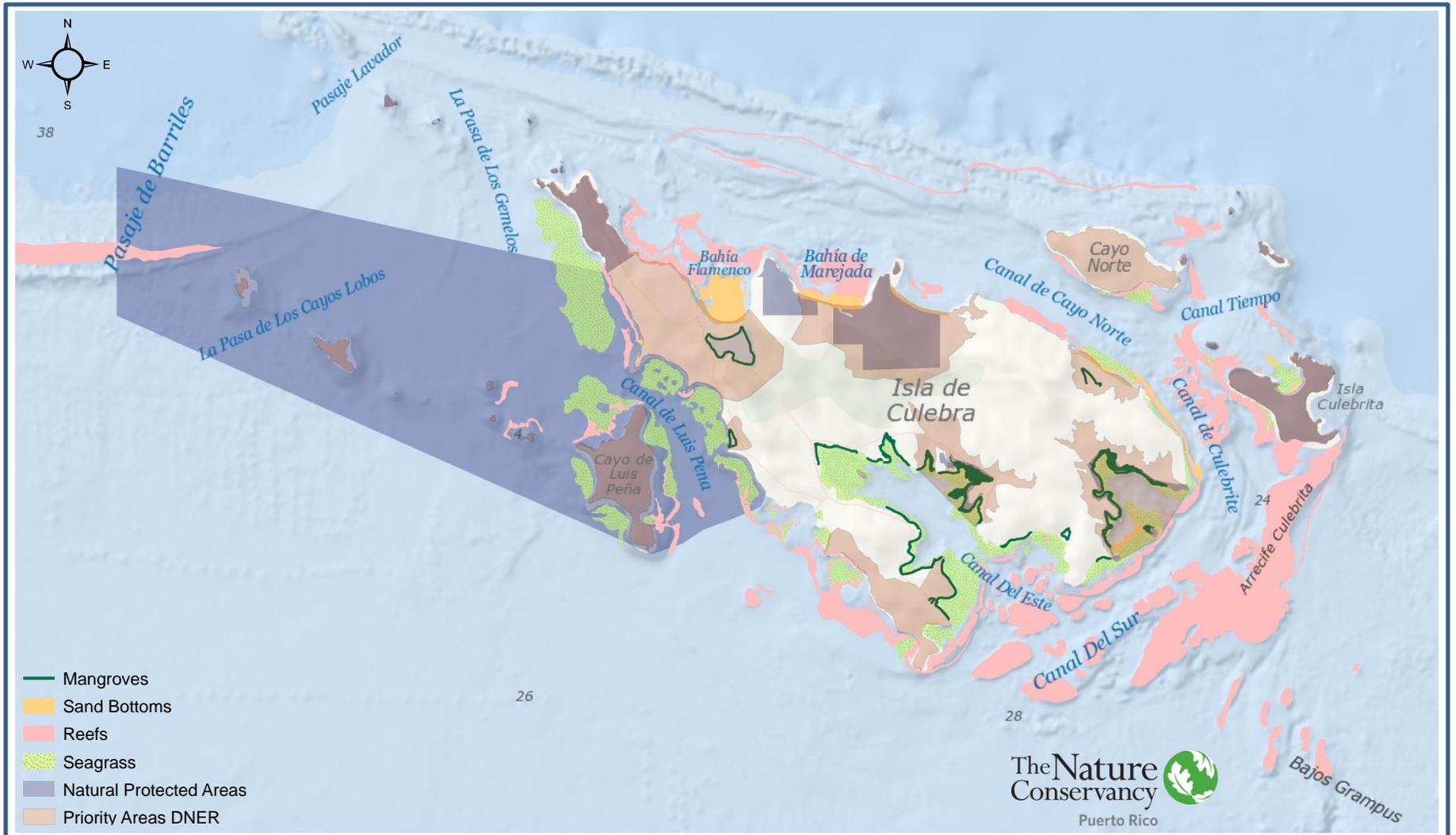
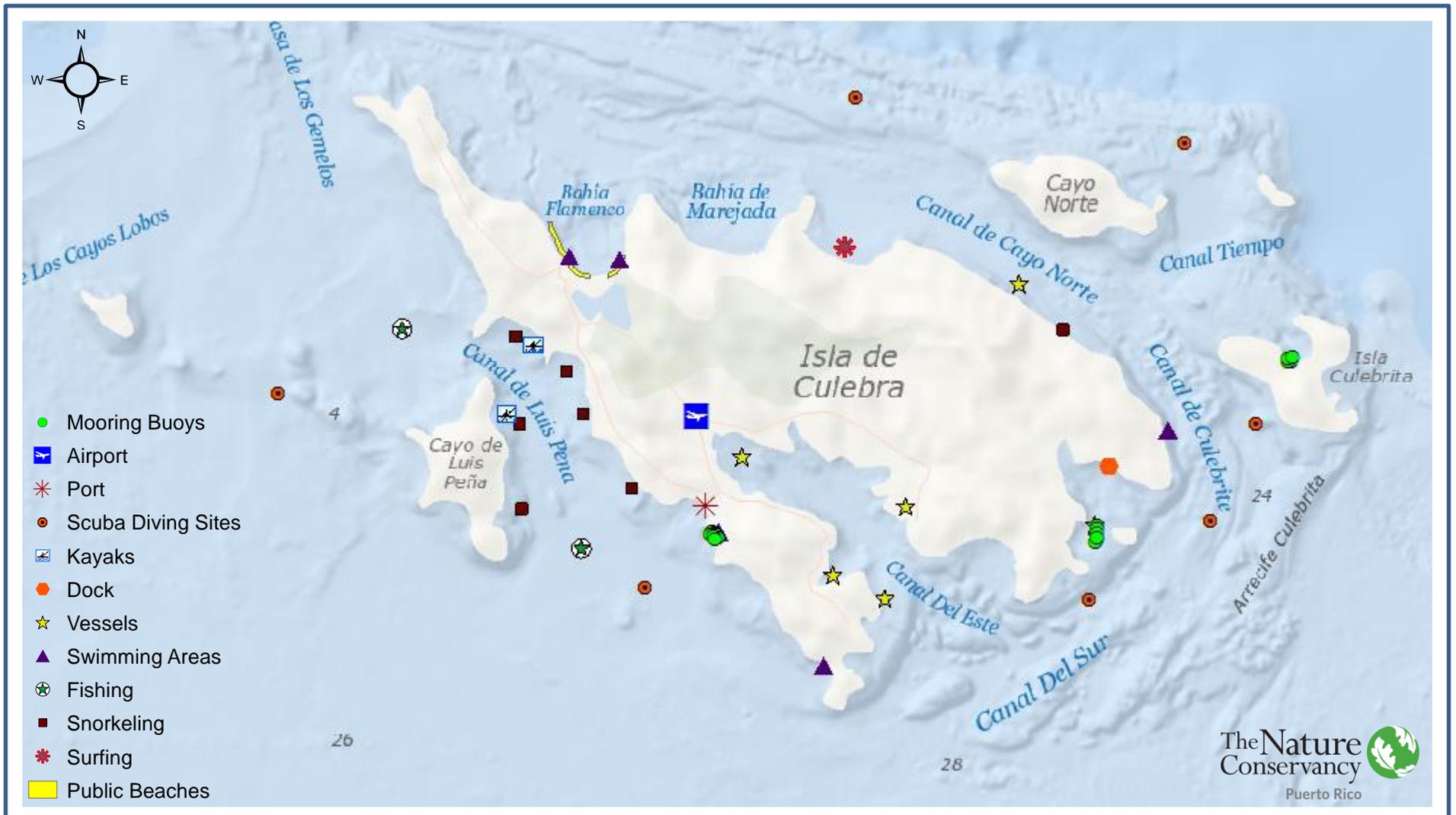


Figure 2. Coastal and Marine Human Uses in Culebra, Puerto Rico



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Pictures are courtesy of the Puerto Rico Department of Natural and Environmental Resources.

