The Cabo Rojo Project:

Human Use Mapping and Priority Areas for Conservation Technical Report

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Introduction

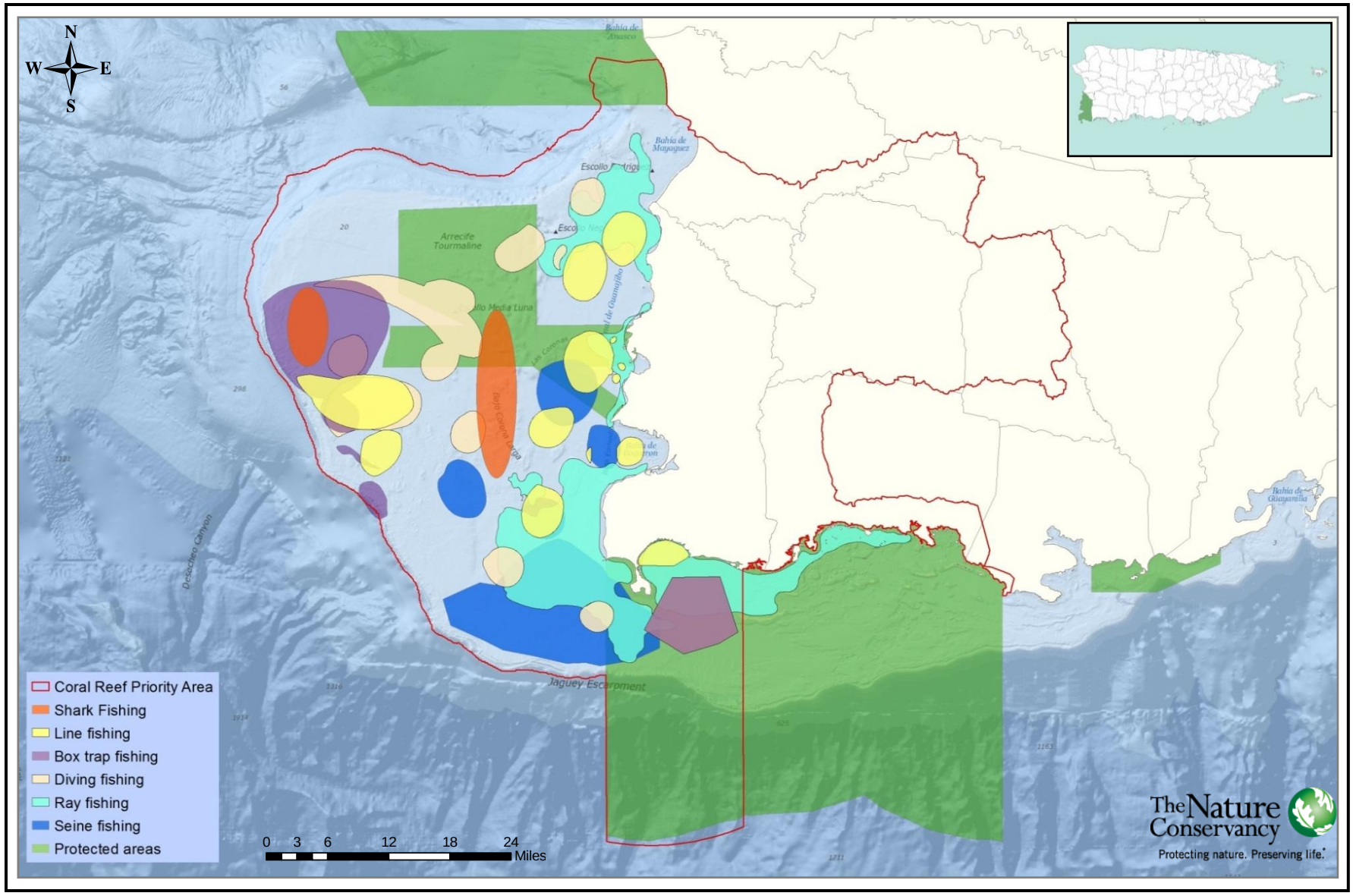
Several steps in coastal and marine spatial planning (CMSP) have been carried out for the waters surrounding Cabo Rojo, Puerto Rico. The step of "defining and analyzing existing conditions" and how the information related to human uses, human pressures, biological habitats and ecological areas was mapped and their corresponding description is described below (Ehler and Douvere 2009).

Unlike datasets related to the physical and biological information, coastal and marine human use information is less common as mapped data. This information is a critical piece to the decision making process thus mapping related information needs to be accomplished in some way.

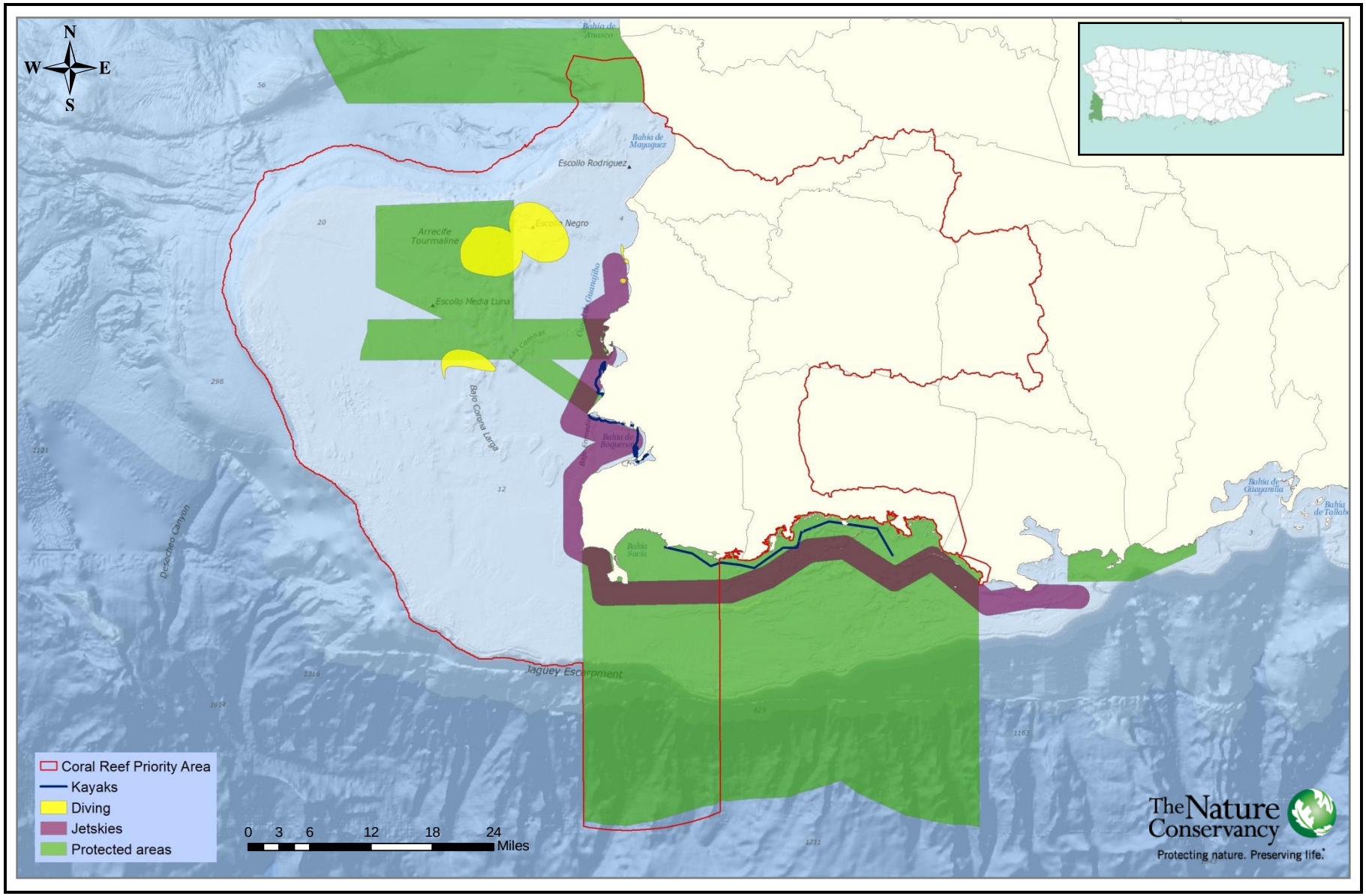
Figure 1 Participatory GIS using eBeam technology March 2013 Puerto Rico

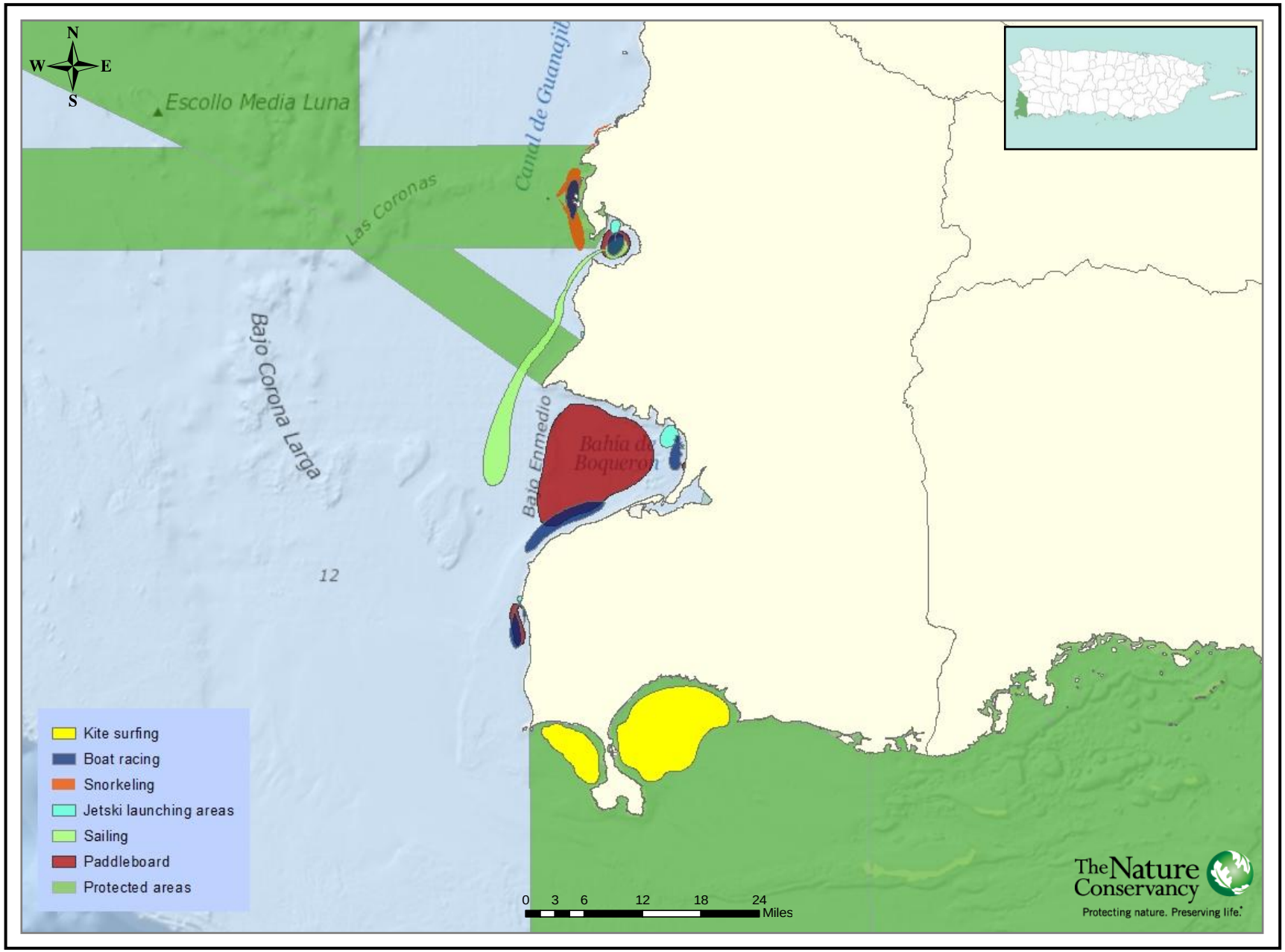
In Cabo Rojo, Puerto Rico, the relevant stakeholders and resource users where inventoried and asked to participate in mapping and ensuring existing spatial information was correct. This included engaging the fishing community, mapping areas of biological and ecological relevance, visualizing non-motorized and motorized tourism and recreation features and confirming accurate transportation representation. This was done through two main workshops and many face to face meetings. A majority of information related to biological and ecological relevant features and some of the transportation data was already in a geographic information system (GIS). However, all the information related to fishing, tourism and recreation was not in a GIS. Pulling this information into a GIS allows for it to be visualized and analyzed for the purpose of CMSP. A technique for doing this is using participatory GIS or a collaborative way to collect spatial information that hones expert knowledge from local individuals through the application of specialized GIS mapping tools. For this particular project, eBeam technology was used (http://www.e-beam.com) (Figure 1). Users and stakeholders for the waters surrounding Cabo Rojo, Puerto Rico were presented with an Esri ArcMap document with pre-loaded information of navigation charts, aerial imagery, benthic habitat and the extent of the project area. Workshop participants were asked to confirm the proposed uses to be mapped, map them out using the eBeam technology and then to submit other uses that might have been excluded. Twenty-five new data layers were created and the following maps resulted from this work.

Fishing Activities within the Cabo Rojo Coral Reef Priority Area



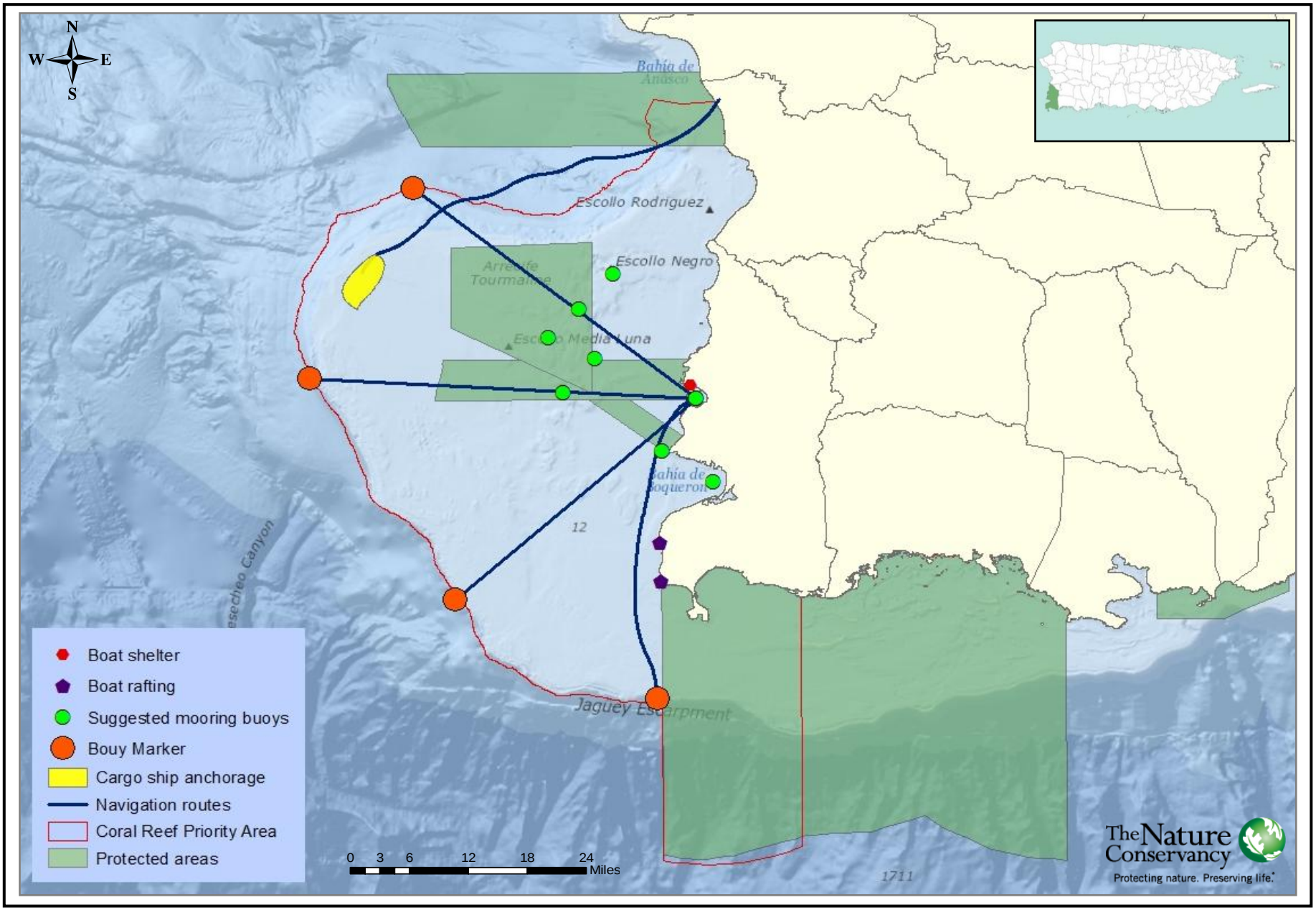
Recreational Uses within the Cabo Rojo Coral Reef Priority Area



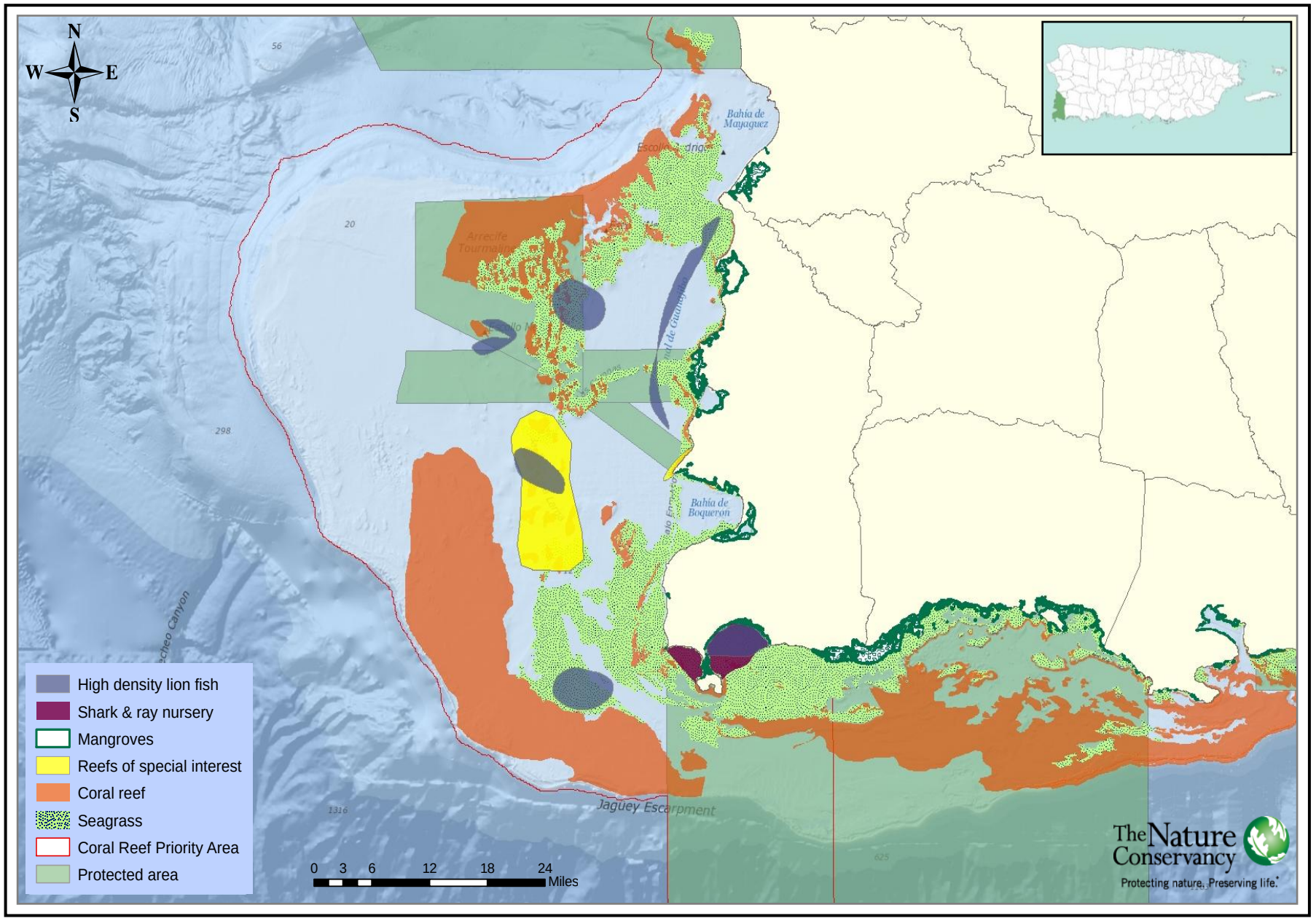


Recreational Uses within the Cabo Rojo Coral Reef Priority Area

Boat Related Uses within the Cabo Rojo Coral Reef Priority Area



Ecosystems and Environmental Interests within the Cabo Rojo Coral Reef Priority Area



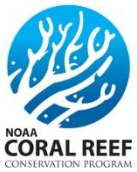
Data Layers and Metadata

The information for this report was collected during a workshop in Cabo Rojo (Puerto Real) held on March 2013 and through interviews and participatory mapping with local community members, fishermen, businessman and marine resource users. This information was created for the Cabo Rojo Coastal Marine Spatial Planning (CMSP) process, a NOAA/The Nature Conservancy (TNC) Cooperative Agreement pilot project. The main intention of this project was to map coastal and marine human uses in collaboration with DNER and stakeholders.

Table 1. Human uses in Cabo Rojo's Coral Reef Priority Area

Human use	Layers Created	Description	Credit
I. Fishing	a. Diving fishing b. Box trap fishing c. Seine fishing d. Line fishing e. Ray fishing f. Shark fishing	These layers identify areas within the Cabo Rojo coral priority area where different fishing activities take place.	Fishers from Cabo Rojo (Puerto Real and Combate)
II. Recreation	a. Boat racing b. Kayaks c. Sailing d. Jetski e. Paddleboard f. Diving g. Snorkeling h. Kite Racing	These layers identify areas within the Cabo Rojo coral priority area used for recreational activities.	Local resource users, business owners and other community members
III. Boat related activities	a. Boat shelter b. Boat rafting c. Buoy marker d. Suggested mooring buoys e. Transit routes f. Cargo ship anchorage g. Boat launching areas	These layers identify areas within the Cabo Rojo coral priority area that represent different boat related uses.	Local fishers, resource users, business owners and other community members
IV. Threats to Ecosystem	a. High density lionfish	This layer identifies areas within the Cabo Rojo coral priority area that were identified by the fishers to have a high density of lionfish presence. Fishers categorized areas as a high density lionfish area as places where they've observed many individuals and/or their fishing traps fill up with 20-40 lionfish.	Fishers from Cabo Rojo (Puerto Real and Combate)
V. Conservation	a. Reefs of special interest b. Shark nursery (e.g. lemon sharks, black tip, Caribbean reef and hammerhead) c. Ray nursery (e.g. spotted eagle, eagle ray and southern sting ray)	This layer identifies areas within the Cabo Rojo coral priority area that are of special interest for conservation.	Local fishers, resource users and other community members

This report was prepared by The Nature Conservancy under award NA09NOS419173 from the National Oceanic and Atmospheric Administration's (NOAA) Coral Reef Conservation Program, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA, the NOAA Coral Reef



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