

FISH ASSEMBLAGE CHARACTERIZATION AND HABITAT CONNECTIVITY FOR MPA DESIGN CRITERIA

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Marine Protected Areas

- Function as a control area for understanding ecological processes
- Goal of an effective MPA is achieving proposed objectives
- Criteria for designing zones:
 - governance
 - compliance
 - biological (species and habitat)
 - socioeconomic
 - cultural
 - educated guesswork
 - (due to lack of information)
 - compromises



Research Needs

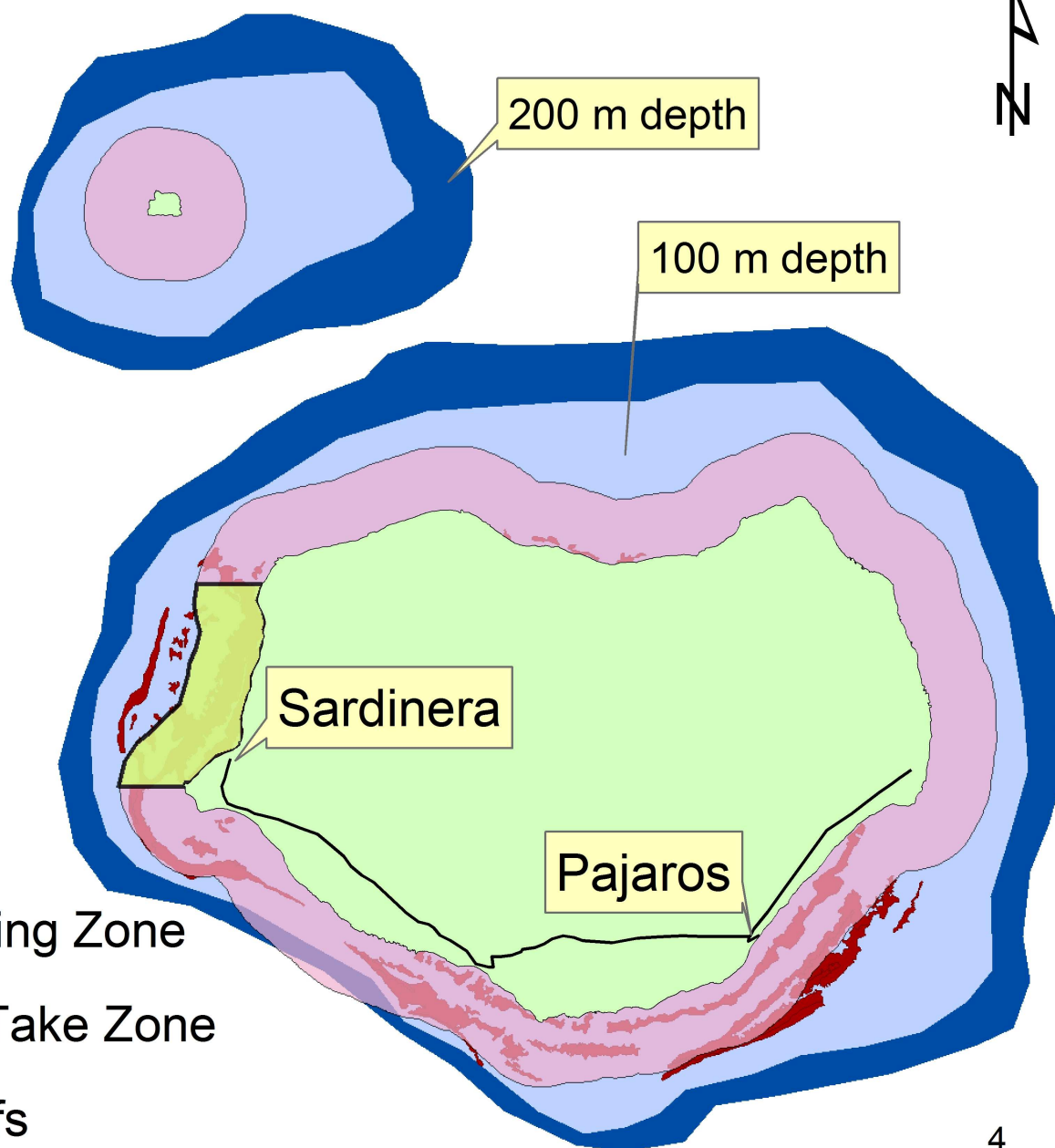
- **MPA design and evaluating management effectiveness require:**
 - Ecological data
 - Where are species and habitats distributed (spatial variability)?
 - Which habitat characteristics affect species distributions?
 - What habitats are necessary for species to complete their life cycle (Ontogeny)?
 - How are habitats connected to each other based on species distributions and migrations?



Objectives

- Describe the coral reef community
- Elucidate how habitat types structure the reef fish community
- Determine differences in the abundance of reef fishes by:
 - Stratum
 - Habitat type
 - Habitat patch size
 - Habitat Connectivity (distance from nursery habitats)
- Identify habitats critical for the completion of ontogenetic migrations
- Provide a spatially explicit baseline for monitoring marine reserve effectiveness





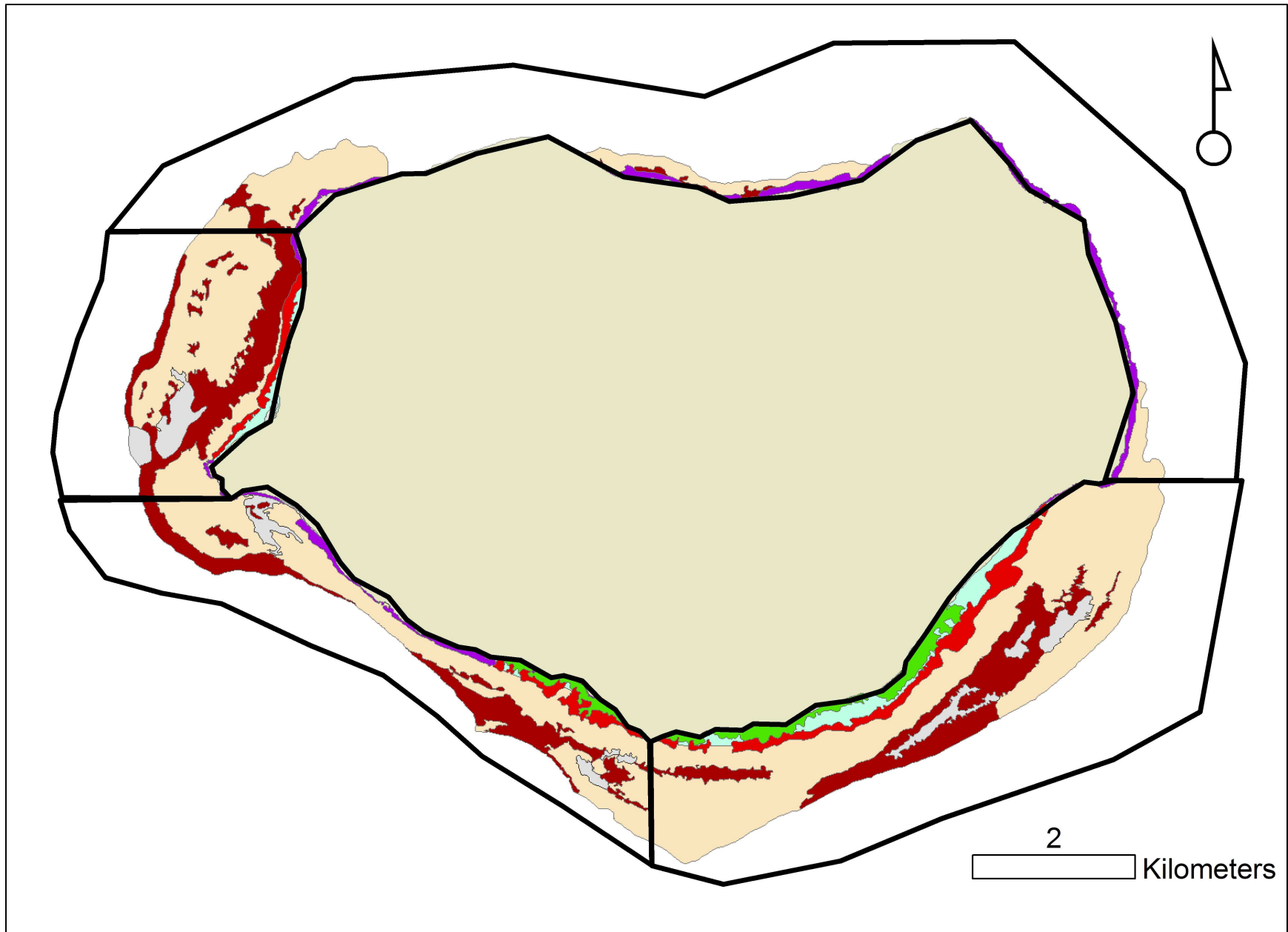
-  Fishing Zone
-  No-Take Zone
-  Reefs

4 Kilometers

Study Site

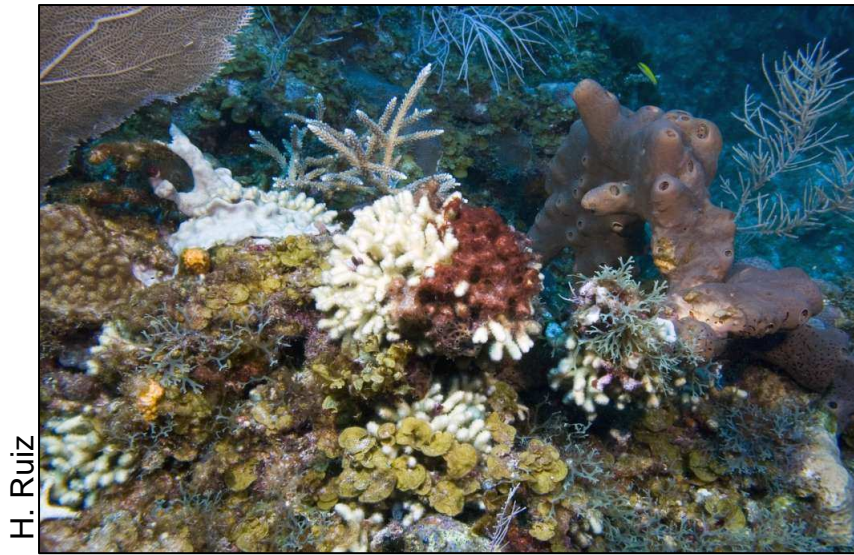


Comparisons across strata and habitat types



Methodology

- Benthic Habitat Surveys
 - 15 m video transect
 - 5 depth measurements
 - habitat type
- Fish Visual Surveys
 - 30 X 2 m belt area
 - estimate fork length
 - ID to species



Methodology

- Invert abundance
 - *Diadema antillarum*
 - *Panulirus argus*
 - *Strombus gigas*

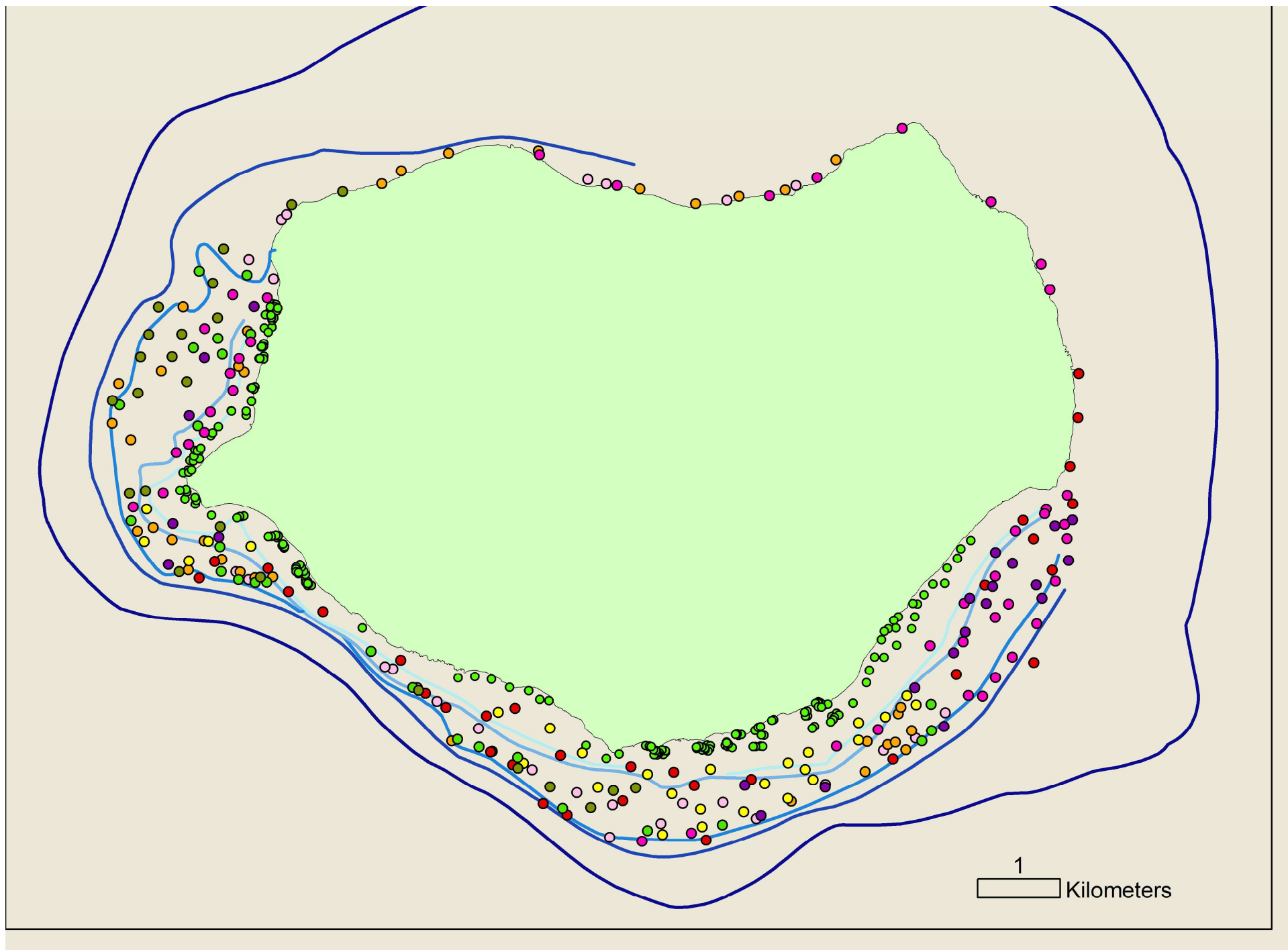


H. Ruiz

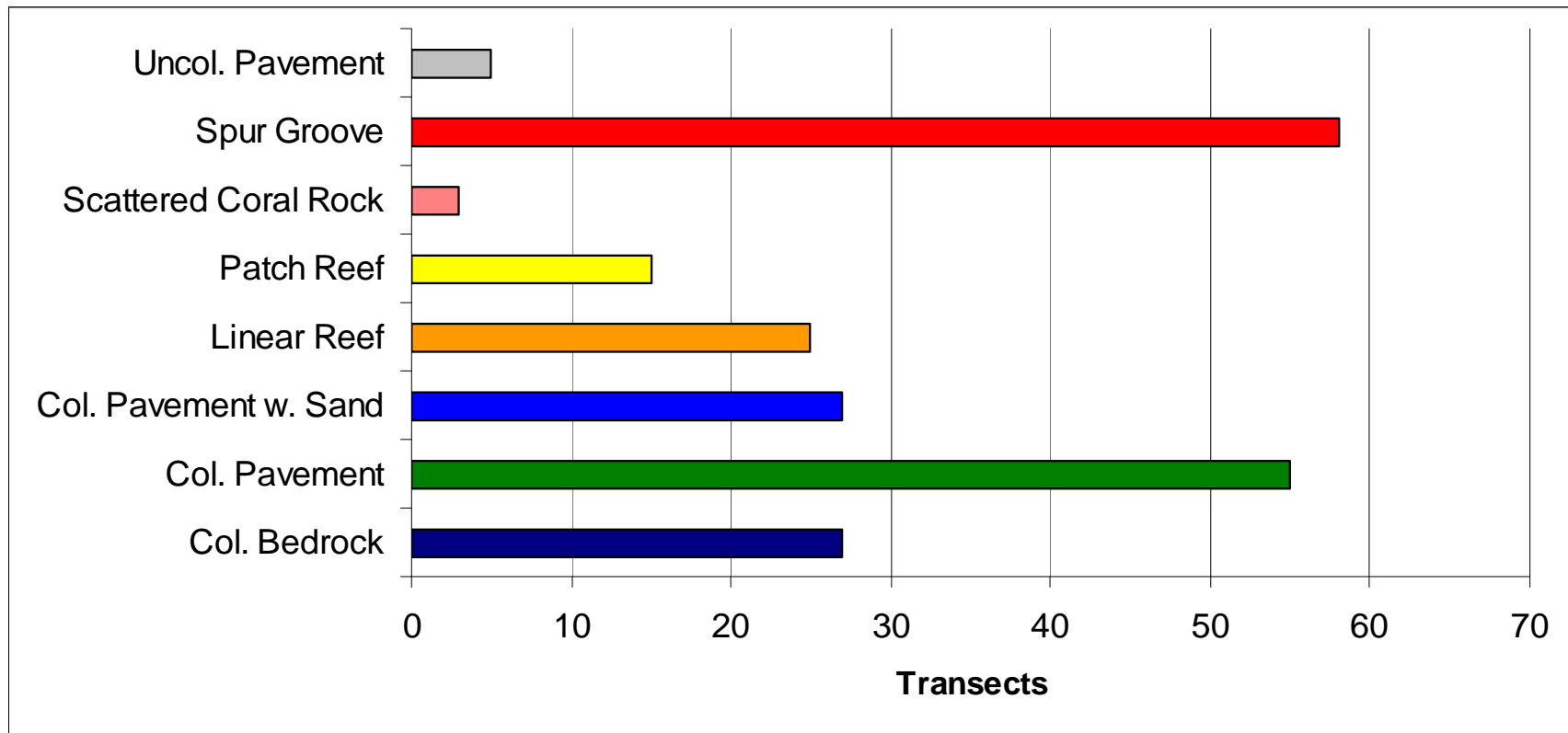


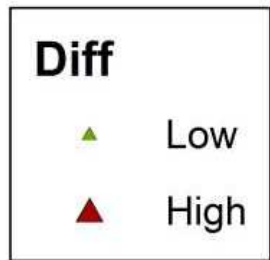
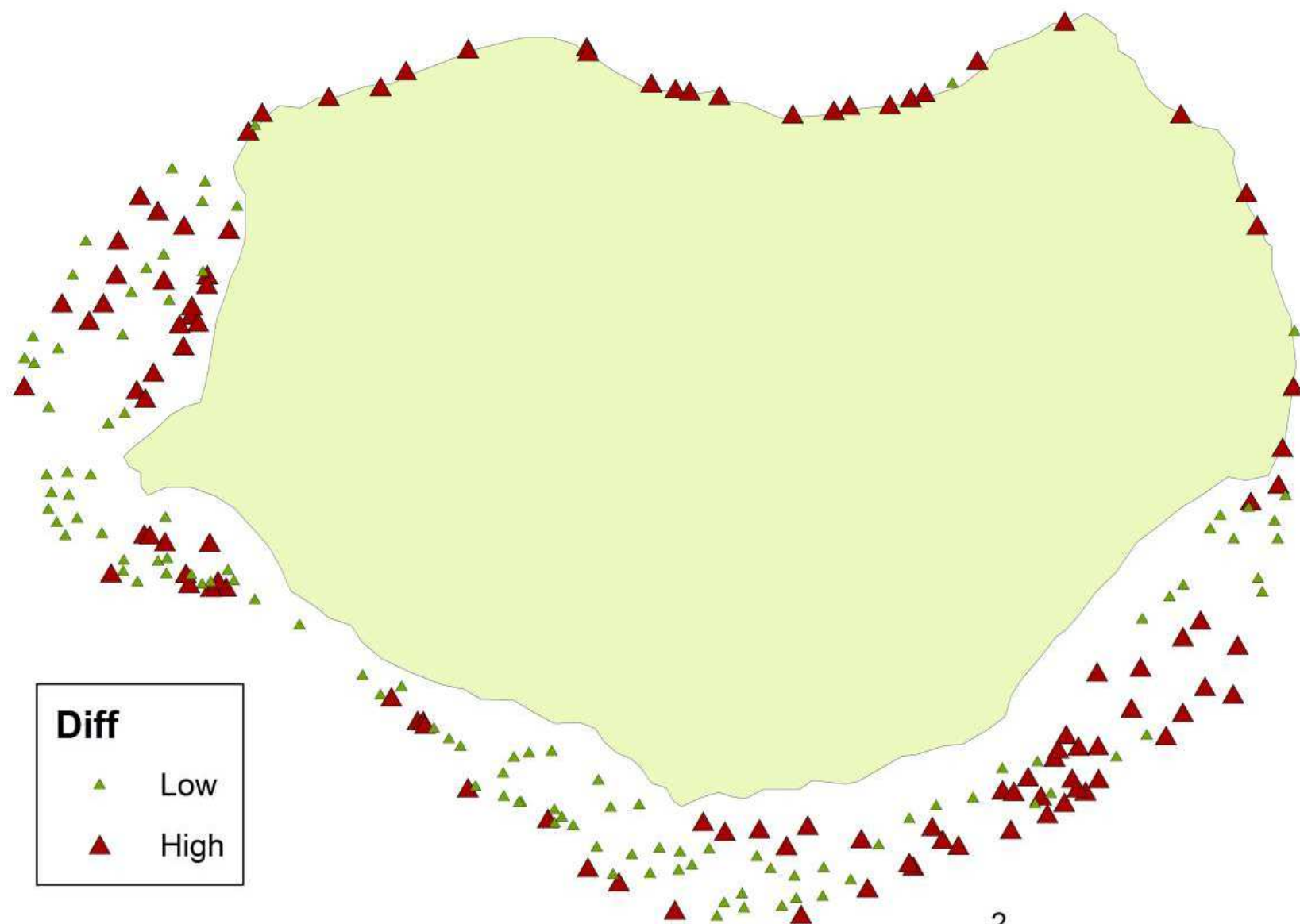
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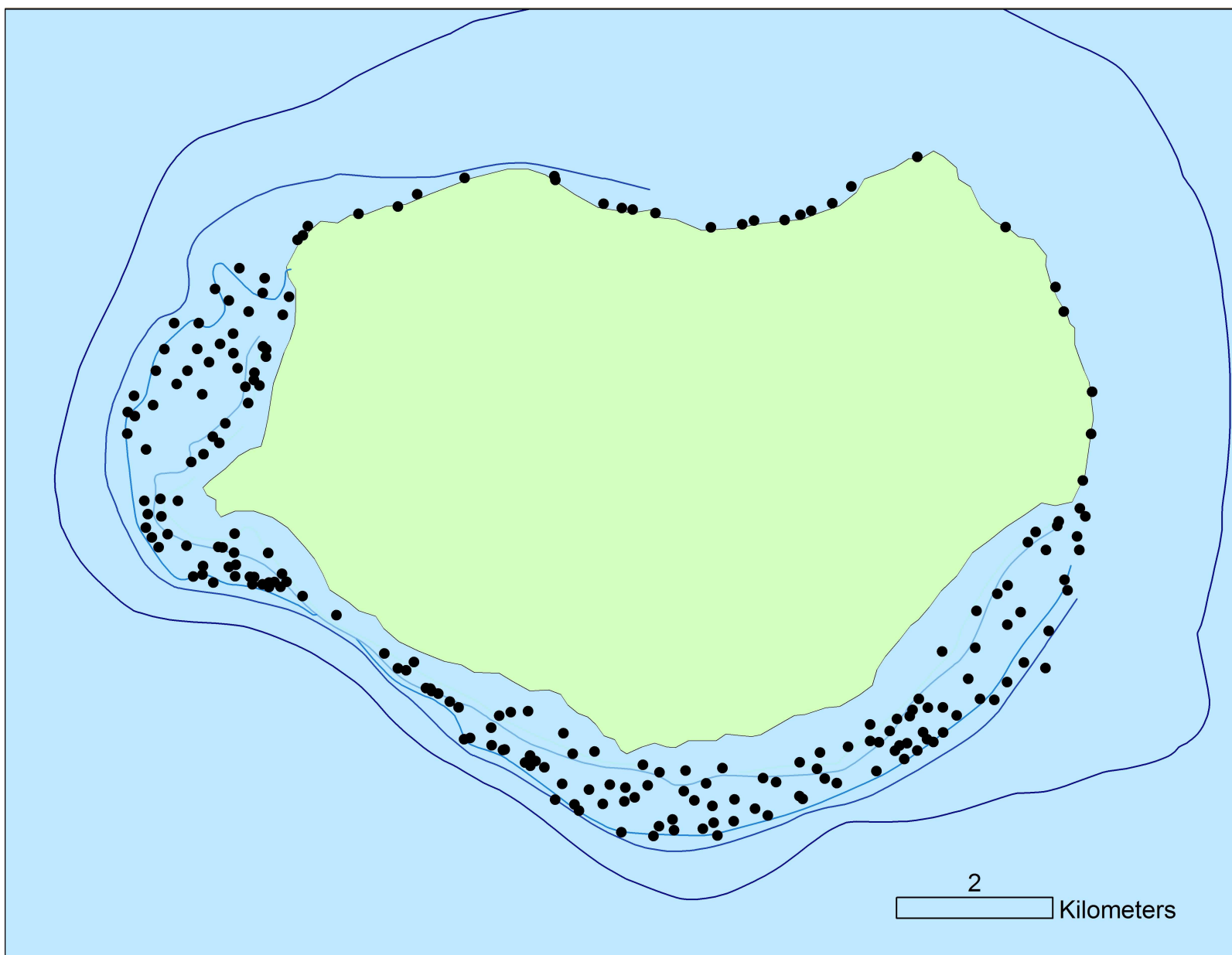


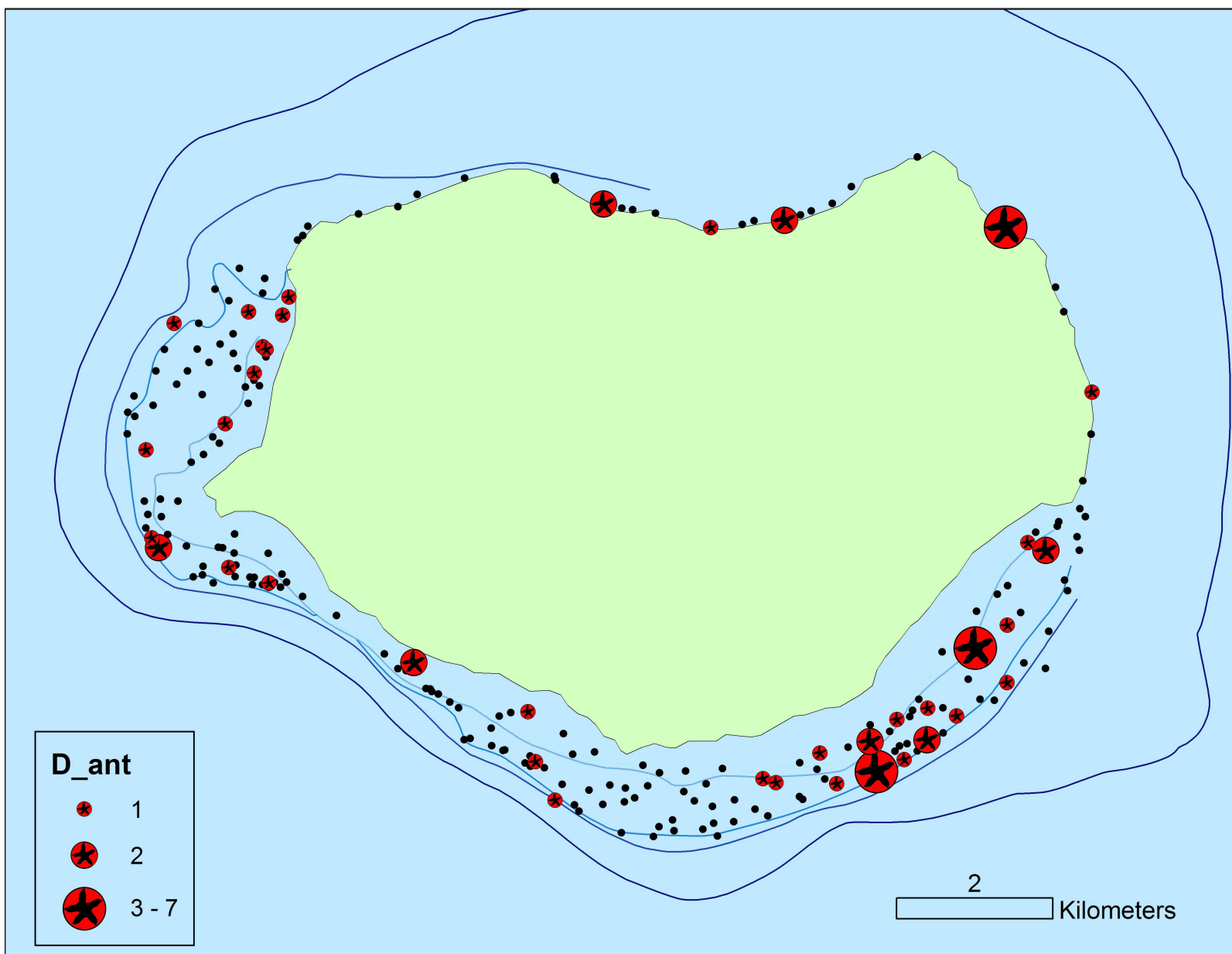


Number of transects per habitat type (N=215)

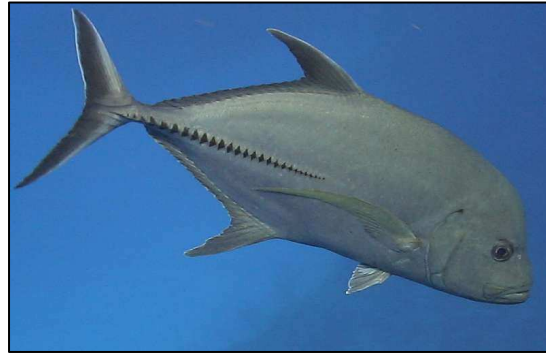








Predators



H. Ruiz



H. Ruiz



E. McLean





H. Ruiz



H. Ruiz



Summary

- Reef fish species have specific habitat requirements
- These requirements may be useful in determining important habitat connectivity patterns
- Fish and habitat distribution data will provide a framework for ecosystem management highlighting priority areas for conservation



A photograph of a research vessel on the ocean at sunset. The vessel is silhouetted against the bright orange and yellow sky. The water is dark blue with small waves. The sky has some clouds near the horizon.

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