

The Use of Protected Area Management Effectiveness (PAME) Monitoring Through Visualization

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Important Observations/Concerns



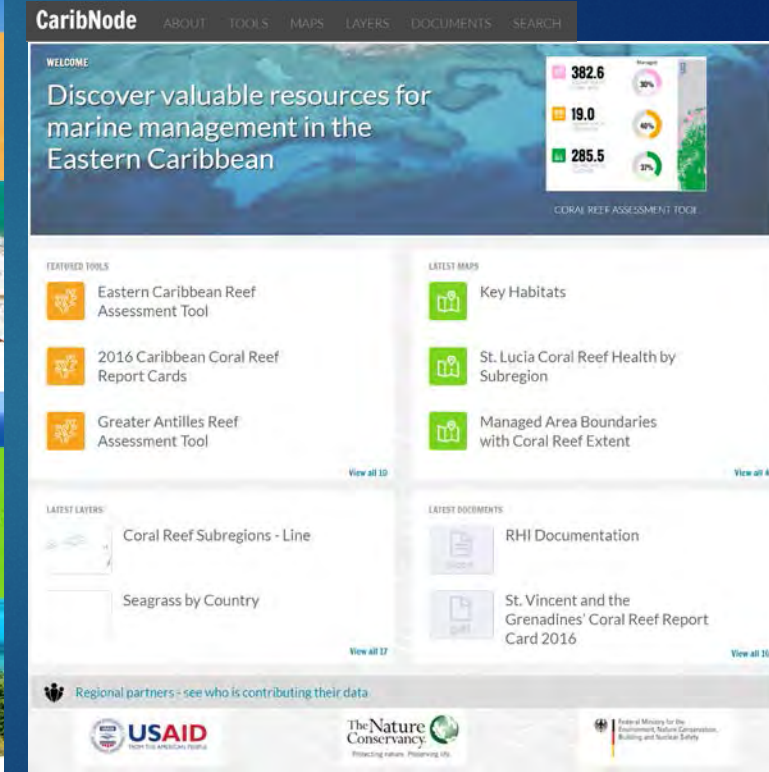
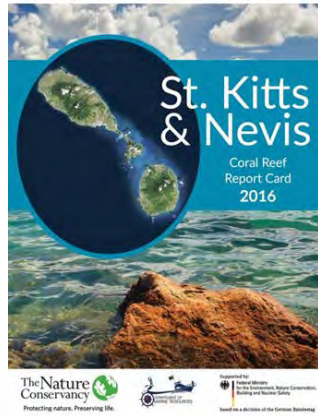
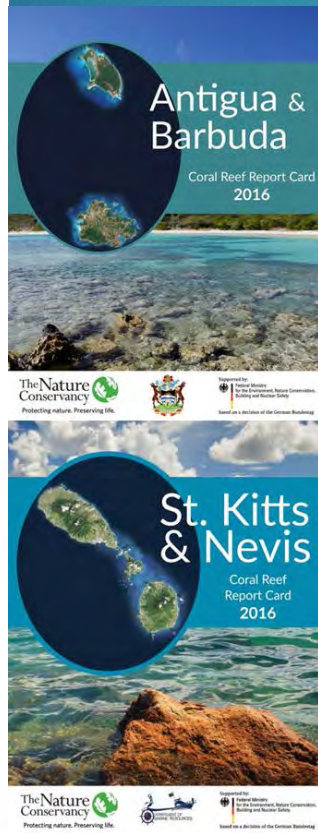
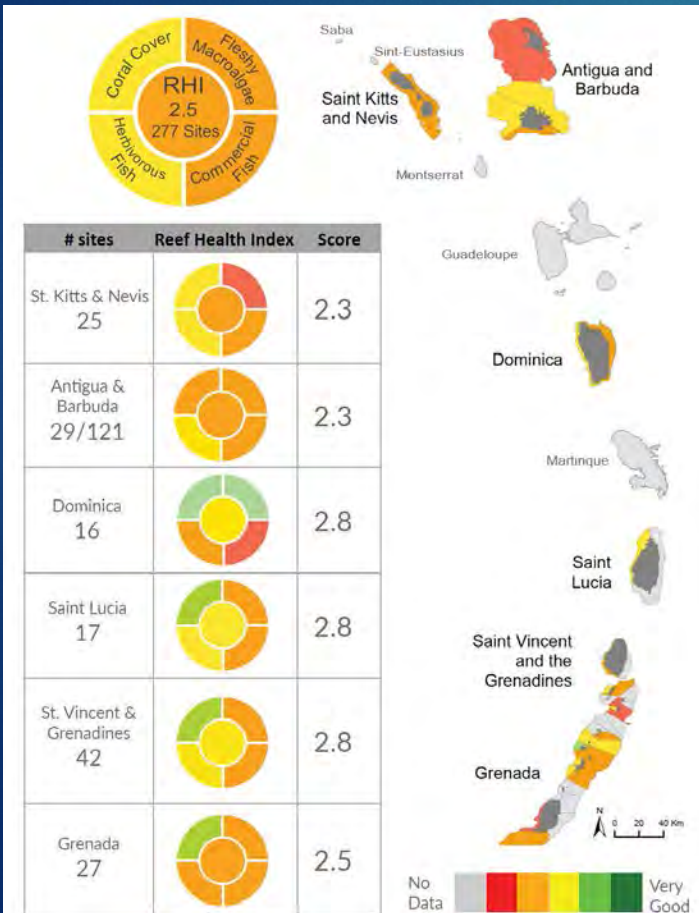
- ▶ Conservation goals **depend** on **effective management**
- ▶ Management effectiveness (ME) **surveys** have been **completed**
- ▶ **No coordination** or repository of ME information
- ▶ **Results** are **less understood** at the scale of the protected area (PA) network

Coral Reef Health Report Cards

Coral Health Index Maps
(using existing survey data)

Coral Reef Report Cards

All Accessible on an easy to understand online platform



<http://www.caribnode.org/>

Coral Reef Assessment Tool

CORAL REEF HEALTH

Coral reef health is measured using four indicators: coral cover, fleshy macroalgae, herbivorous fish and commercial fish. The Coral Reef Health Index (RHI) is the average of the four indicators. Each indicator is assessed at the country and regional level for a given year resulting in a score from 0 and 5 a grade ranging from Very Good to Critical. If an indicator has been assessed for at least two years then a trend is calculated for the two most recent years, otherwise it is listed as Not Available (N/A). The number of sites sampled and source dataset are also provided for each indicator.

INDICATORS

Reef Health Index (RHI)
 Contained index that averages the score of the 4 other biological indicators: coral cover, fleshy macroalgae, herbivorous fish, and commercial fish. [Learn More](#)

Grade	2017	Average	Score	Trend	Sites	Source
Fair	2017	-	2.25	N/A	76	

Coral Cover
 Measure of the average percentage of reef surface covered by live stony coral on average. [Learn More](#)

Grade	2017	Average	Score	Trend	Sites	Source
Fair	2017	16.0%	3	N/A	76	

Fleshy Macroalgae
 Measure of the average amount of large, soft, fleshy algae (sometimes called 'seaweed') on a reef. [Learn More](#)

Grade	2017	Average	Score	Trend	Sites	Source
Fair	2017	18.0%	2	N/A	76	

Herbivorous Fish
 Measure of the average biomass of fish species that feed on plants and macroalgae in grams/100m². Includes parrotfish greater than 20cm. [Learn More](#)

Grade	2017	Average	Score	Trend	Sites	Source
Fair	2017	2,380	3	N/A	76	

Commercial Fish
 Measure of the average biomass of commercial fish species on a reef in grams/100m². Includes grouper larger than 40cm. [Learn More](#)

Grade	2017	Average	Score	Trend	Sites	Source
Critical	2017	133	1	N/A	76	

Reef Health Charts allow you to see the grades assessed for all four indicators all at once. Each chart contains the Reef Health Index (RHI) in the middle and the 4 main indicators around the outside. The map below includes Reef Health Charts for the regional and national level. Reef Health Charts are based on data from comparable surveys. A summary of the data sources is available in the [RHI Documentation](#).

MARINE MANAGED AREAS

71 AREAS DESIGNATED SINCE 1970

52,097 SQUARE KM OF OCEAN

17 AREAS PROPOSED AND AWAITING DESIGNATION

344 SQUARE KM OF OCEAN

Ocean Managed **7%**

Shelf Managed **40%**

Goal - 10% of EEZ (Coastline for Biological Diversity). Only designated areas count towards goal.

Goal - 20% of marine shelf (Caribbean). Challenge - Only designated areas count towards goal.

SOCIOECONOMIC

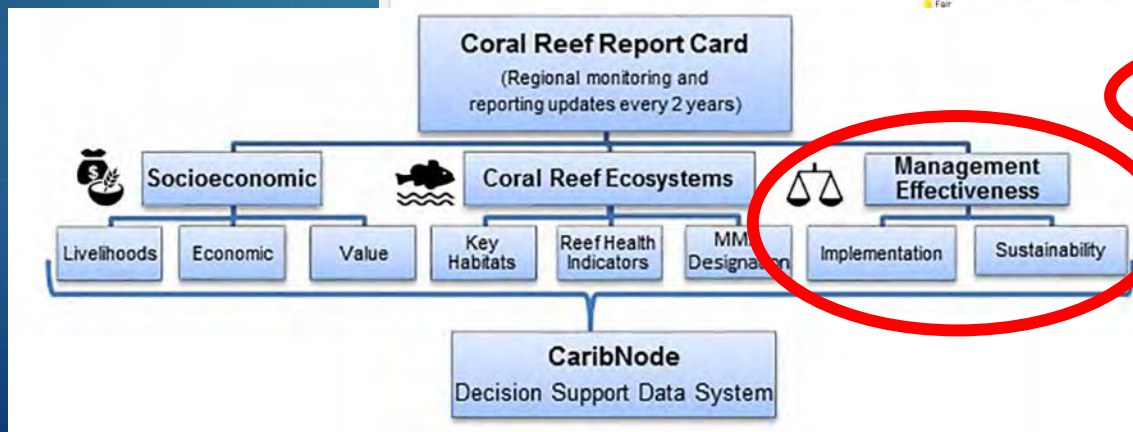
Socioeconomic indicators assess the economic and social aspects of fisheries and the interaction with the pursuit of sustainability.

THESE INDICATORS HAVE NOT YET BEEN COLLECTED.

MANAGEMENT EFFECTIVENESS

The declaration of a managed area does not always result in adequate protection. It is important to evaluate the effectiveness of management.

THESE INDICATORS HAVE NOT YET BEEN COLLECTED.



IMETT Visualization

BIOPAMA IMET MANAGEMENT EFFECTIVENESS

From Knowledge to Action for a Protected Planet

Sections

OVERALL IMET VALUES

- CONTEXT
- PLANNING
- INPUTS
- PROCESS
- OUTPUTS
- OUTCOMES

Imet Forms examples
[From ID: 105](#)
[From ID: 117](#)

Parc National de Campo-Ma'an | OVERALL RESULTS

Overall IMET values	
INDICATOR	VALUE
Context	58.9
Planning	83.8
Inputs	43
Process	51.7
Outputs	73.33
Outcomes	64.5



BIOPAMA IMET MANAGEMENT EFFECTIVENESS

From Knowledge to Action for a Protected Planet

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Imet Forms examples
[From ID: 105](#)
[From ID: 117](#)

Parc National de Campo-Ma'an | CONTEXT

Context IMET values (B)		
CODE	INDICATOR	VALUE
c1	Value and Importance	63.4
c2	Constraint or supporting factors from the external political and civil environment	25.93
c3	Threats	-49.78



Context IMET values

ARTICLE

doi:10.1038/nature21708

Capacity shortfalls hinder the performance of marine protected areas globally

David A. Gill^{1,2†}, Michael B. Mascia³, Gabby N. Ahmadi⁴, Louise Glew⁴, Sarah E. Lester⁵, Megan Barnes^{6,7}, Ian Craigie⁸, Emily S. Darling⁹, Christopher M. Free¹⁰, Jonas Geldmann^{11,12}, Susie Holst¹³, Olaf P. Jensen¹⁰, Alan T. White¹⁴, Xavier Basurto¹⁵, Lauren Coad^{16,17}, Ruth D. Gates¹⁸, Greg Guannel¹⁹, Peter J. Mumby²⁰, Hannah Thomas²¹, Sarah Whitmee²², Stephen Woodley²³ & Helen E. Fox^{4,24}

Marine protected areas (MPAs) are increasingly being used globally to conserve marine resources. However, whether many MPAs are being effectively and equitably managed, and how MPA management influences substantive outcomes remain unknown. We developed a global database of management and fish population data (433 and 218 MPAs, respectively) to assess: MPA management processes; the effects of MPAs on fish populations; and relationships between management processes and ecological effects. Here we report that many MPAs failed to meet thresholds for effective and equitable management processes, with widespread shortfalls in staff and financial resources. Although 71% of MPAs positively influenced fish populations, these conservation impacts were highly variable. Staff and budget capacity were the strongest predictors of conservation impact: MPAs with adequate staff capacity had ecological effects 2.9 times greater than MPAs with inadequate capacity. Thus, continued global expansion of MPAs without adequate investment in human and financial capacity is likely to lead to sub-optimal conservation outcomes.

Awareness of human impacts upon global marine biodiversity has spurred the largest expansion in the number and coverage of marine protected areas (MPAs) in history^{1,2}. As part of the 2011 Convention on Biological Diversity (CBD) Aichi Targets, 193 countries agreed to “effectively and equitably” manage 10% of coastal and marine areas within marine protected areas and “other effective area-based conservation measures” by 2020 (ref. 3). A 10% conservation target for MPAs has

Our dataset included MPAs from every tropical and temperate ocean basin, ranging in size from 0.006 to 989,836 km², and spans diverse social, political and biophysical contexts. First, to assess the efficacy and equity of MPA management processes, we drew on empirically supported governance and management theories^{10,15–17} (Supplementary Table 1 and Extended Data Fig. 1) to identify key management process indicators from 433 MPAs. We extracted data on these indicators

Gill, D. A., Mascia, M. B., Ahmadi, G. N. et al. 2017. Capacity shortfalls hinder the performance of marine protected areas globally. *Nature*, 543: 665–669.



Article Introduction



- ▶ 193 countries agreed to “**effectively and equitably**” manage 10% of coastal and marine areas by 2020
- ▶ But the efficacy and equity of many MPAs remain **uncertain**
- ▶ **Key management process indicators** were identified from empirically supported governance and management theories

Indicator Categories

- ▶ Legally gazette
- ▶ Appropriate MPA regulations in place
- ▶ Implementing management plans
- ▶ Acceptable budget capacity
- ▶ Clearly defined boundaries
- ▶ Monitoring informs management activities
- ▶ Adequate staff capacity
- ▶ Inclusive decision-making
- ▶ Share/non-state management



Data Extraction



- ▶ Key questions from
 - ▶ The Management Effectiveness Tracking Tool (METT)
 - ▶ The World Bank MPA Score Card
 - ▶ The NOAA Coral Reef Conservation Program's (CRCP) MPA Management Assessment Checklist.
- ▶ A thresholds (adequate/inadequate) defined effective management

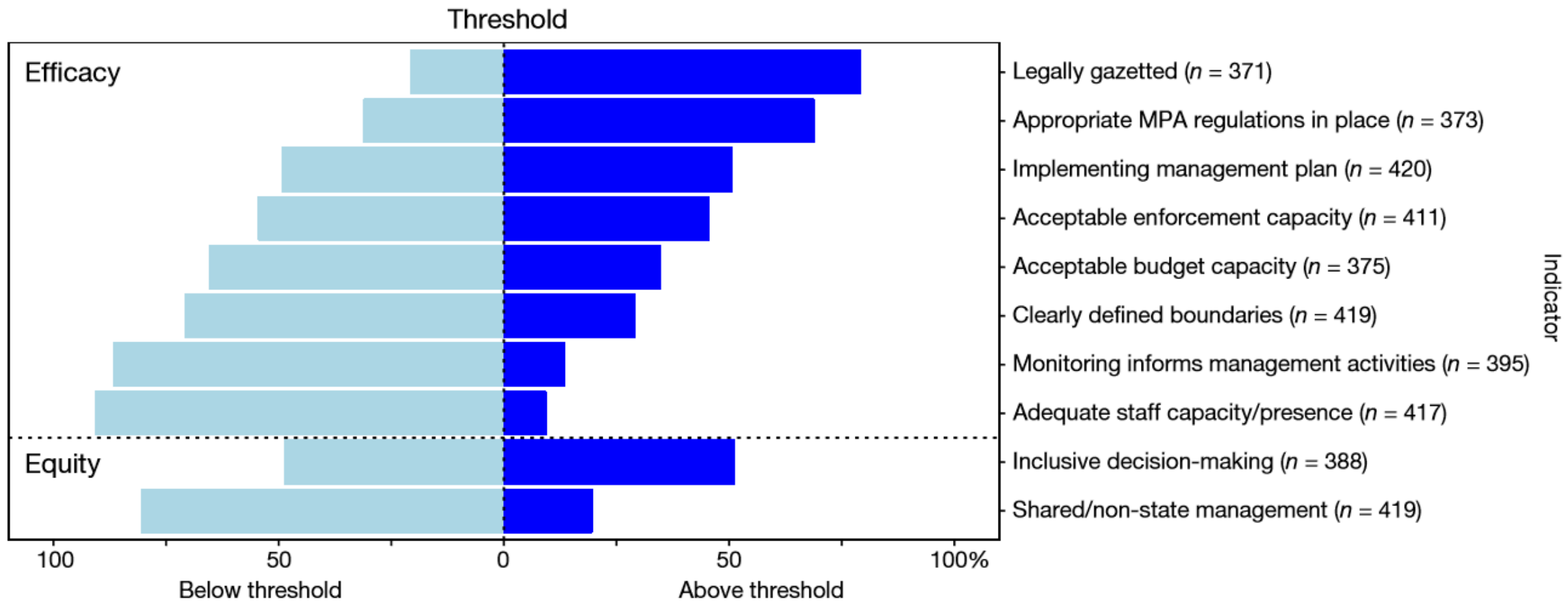


Figure 1 from Gill, D. A., Mascia, M. B., Ahmadi, G. N. et al. 2017. Capacity shortfalls hinder the performance of marine protected areas globally. *Nature*, 543: 665–669.

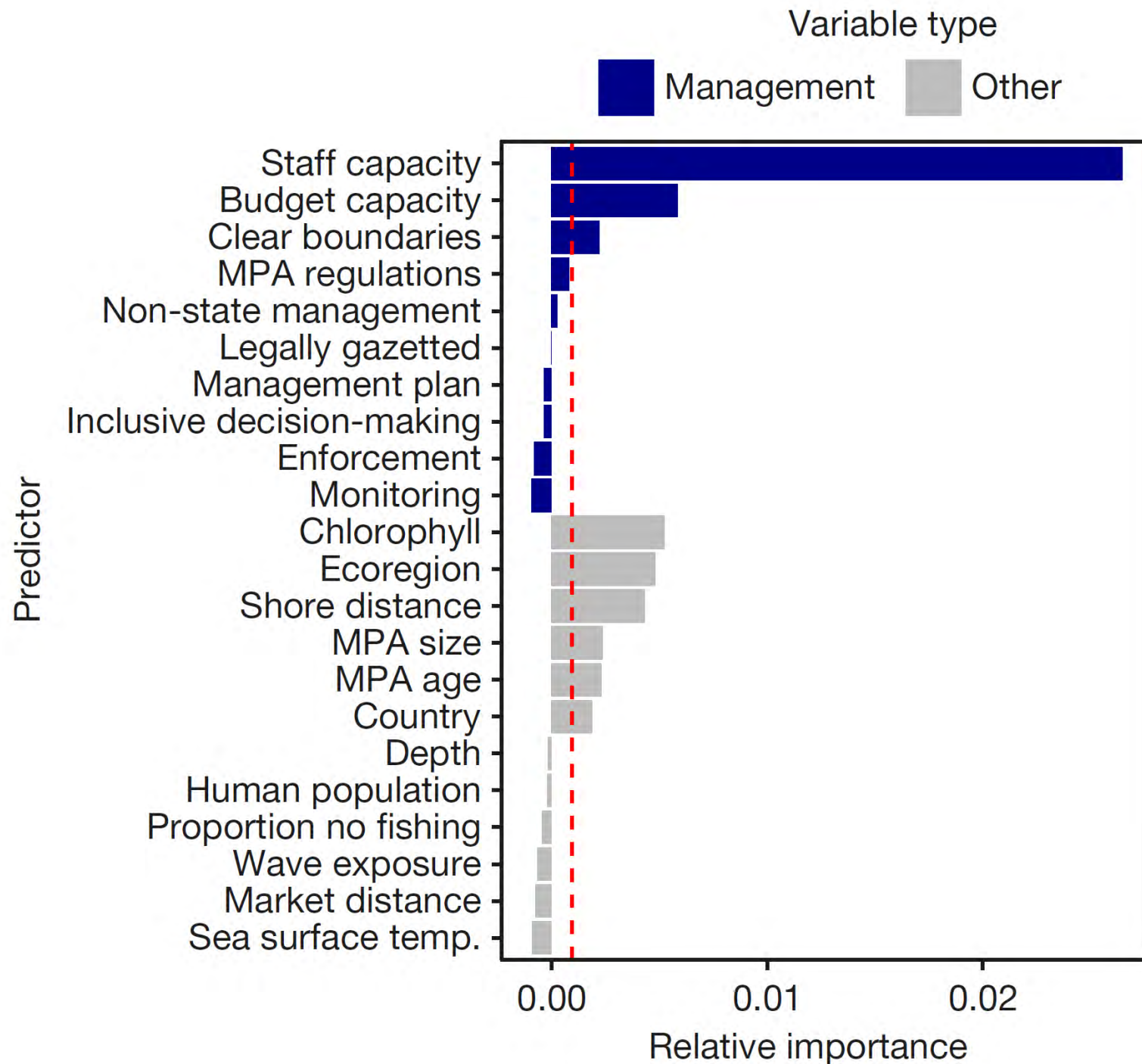
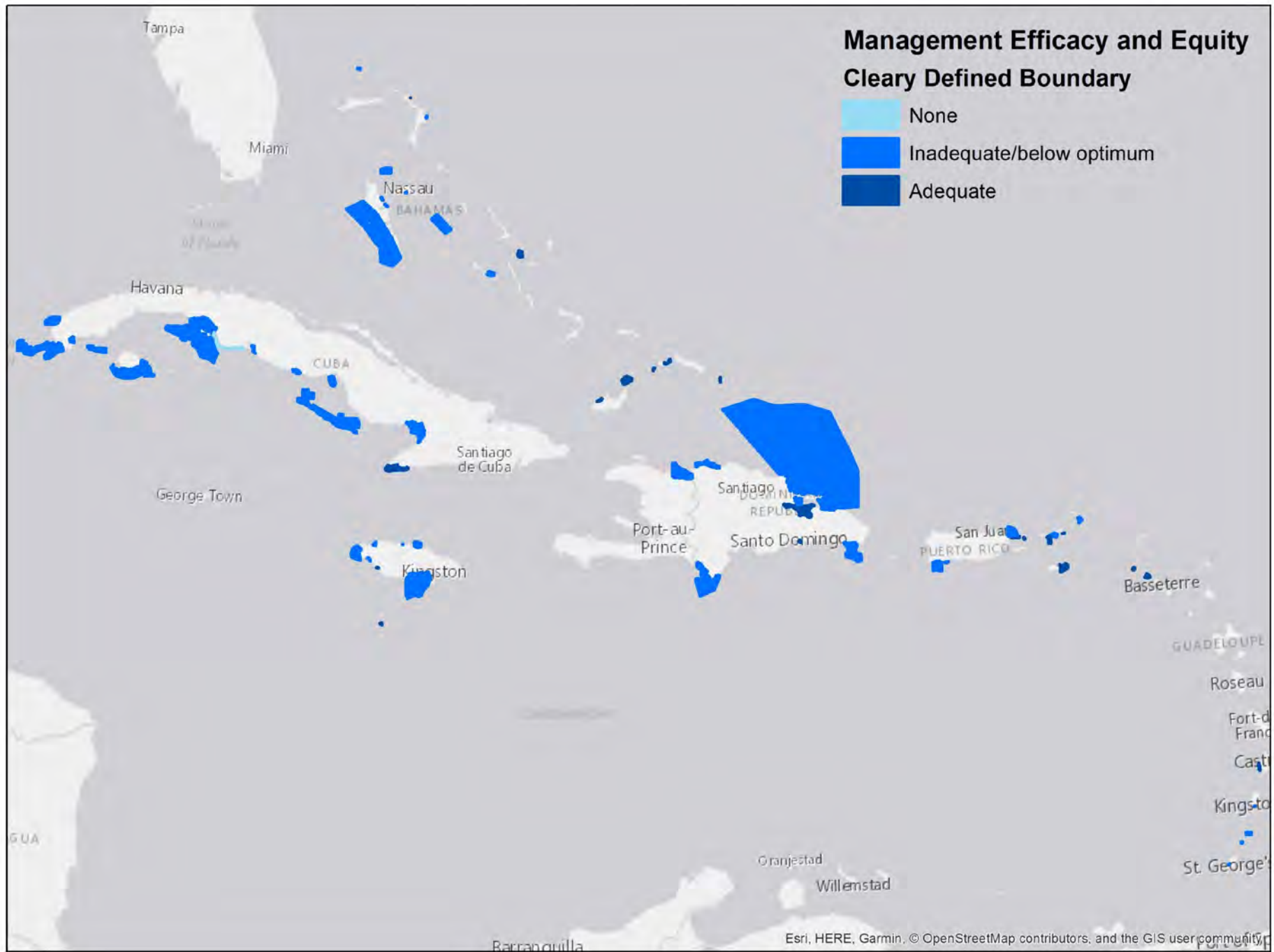
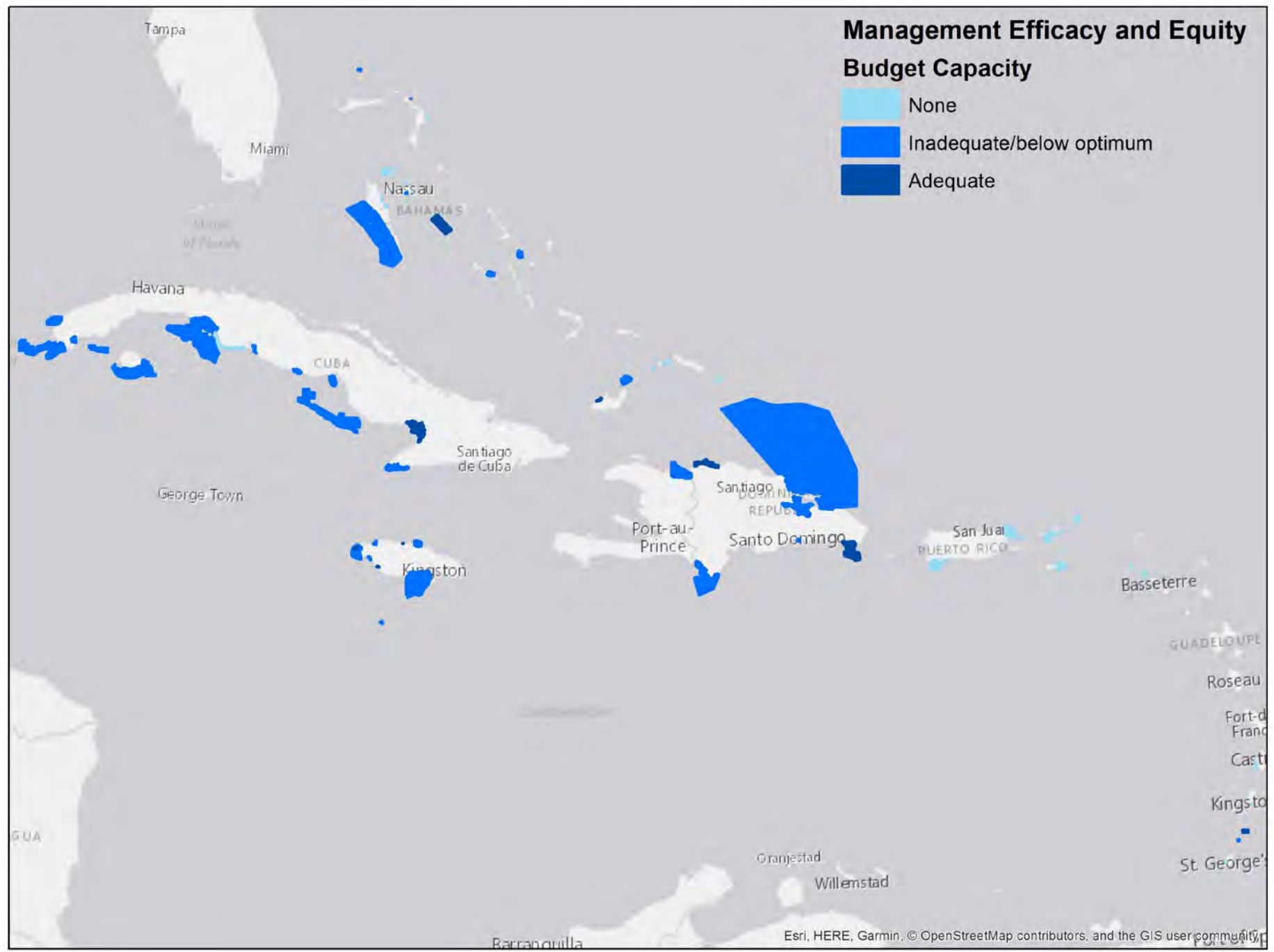
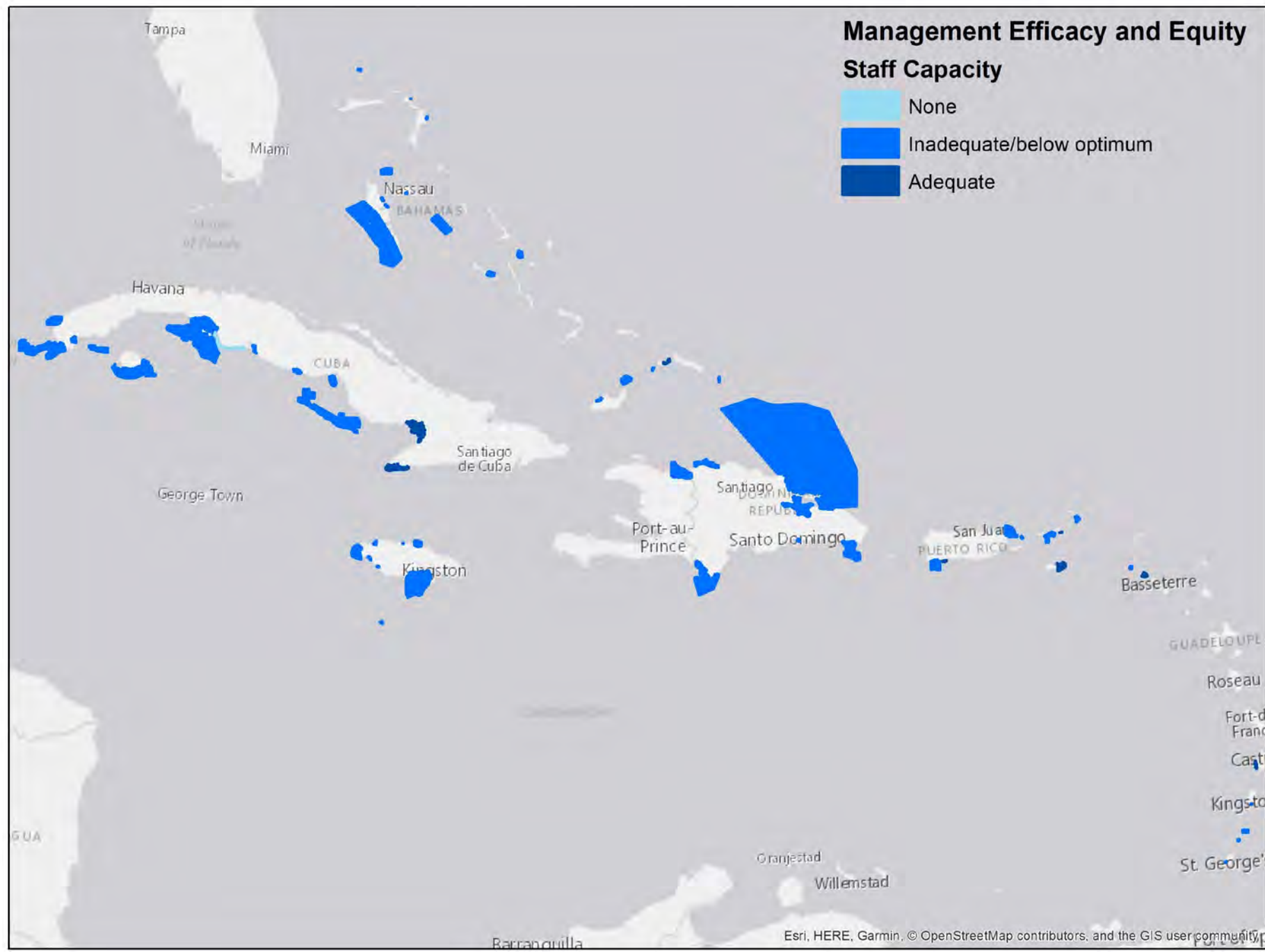


Figure 3 from Gill, D. A., Mascia, M. B., Ahmadi, G. N. et al. 2017. Capacity shortfalls hinder the performance of marine protected areas globally. *Nature*, 543: 665–669.







Next Steps

- ▶ What aspects of management effectiveness should be visualized?
 - ▶ Elements of the Management Cycle (IMETT) vs.
 - ▶ Management Process Indicators (Gill et. al.) vs.
 - ▶ A combination
- ▶ What is the best way to visualize the data?
 - ▶ Spider graphs vs.
 - ▶ Color-coded threshold vs.
 - ▶ Something else
- ▶ Structure database
- ▶ Extract and populate with currently available
- ▶ Review graphics and maps



Thank you!