

# USFWS Antillean Manatee Recovery Efforts in Puerto Rico



Caribbean Ecological Services Field Office

Aug. 7, 2013





# Antillean Manatee Action Plan



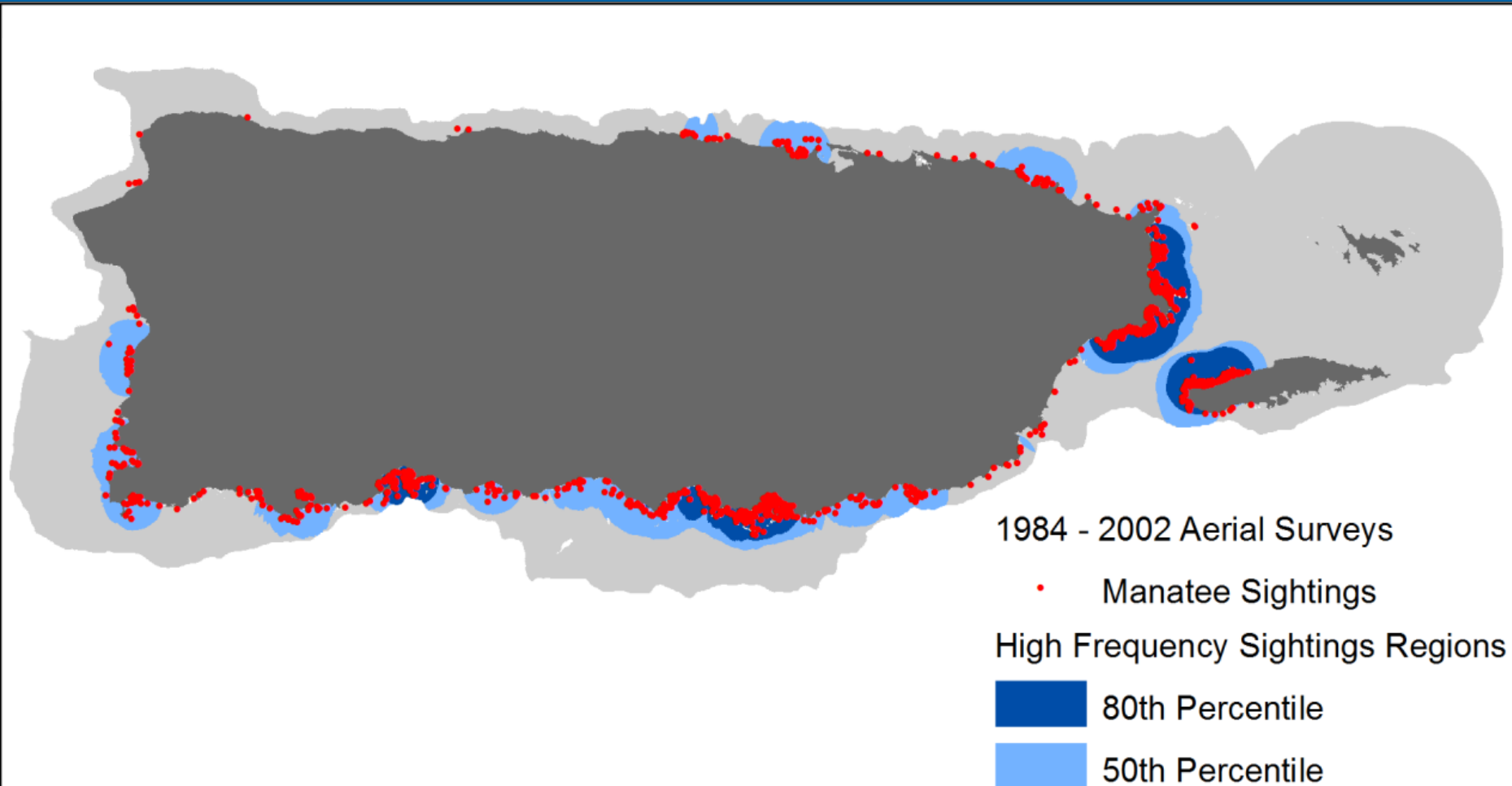
- Asses population status and trends through aerial surveys
- Update Antillean manatee Recovery Plan (1986)
- Identify and designate important manatee areas
- Implement the Rescue, Rehabilitation and Release Program
- Re-establish radio tracking study & health assessment
- Establish conservation programs to promote awareness within the boating and fishing community
- Develop outreach and education program
- Promote habitat restoration projects
- Continue monitoring threats and assess effects of climate change



# Manatee Aerial Surveys



- Data since the late 1970's
- Provide distribution and a minimum population count per survey





# Manatee Aerial Surveys



DATE	MANATEE COUNT	DATE	MANATEE COUNT
APR 1992	53	NOV 1997	66
SEP 1992	70	MAY 1998	78
NOV 1993	68	NOV 1998	45
MAR 1994	73	MAR 1999	70
MAY 1994	51	MAR 2000	68
JUL 1994	86	MAY 2000	51
SEP 1994	65	DEC 2000	35
NOV 1994	62	AUG 2001	22
DEC 1994	82	MAR 2002	79
MAR 1995	62	DEC 2002	112
MAY 1995	87	FEB 2003	106
OCT 1995	98	DEC 2003	64
MAY 1996	49	APR 2009	72
AUG 1996	73		

DATE	MANATEE COUNT
JUN 2010	120
OCT 2010	140
SEP 2011	178
JAN 2013	142



# Manatee Aerial Surveys



- New methods and data analysis for 2010-2013





# Manatee Issues in PR



- Small closed population size
- Principal anthropogenic mortality cause – boat collisions
- Harassment
- Limited biological and ecological information
  - need more specifics on patterns of movement, survival and longevity data, resolve some undetermined causes of death...





# ESA Section 7 Consultations



- Marinas and ports
- Piers and ramps
- Dredging activities
- Flood control projects
- Boat races
- Breakwater structures
- Oil spills
- Others...





# Manatee Protection Areas (MPA's)



- The USFWS has the discretion, by regulation (ESA & MMPA), to establish manatee protection areas whenever substantial evidence shows that the establishment of such an area is necessary to prevent the taking of one or more manatees (CFR, Title 50, Chapter 1, Part 17.100).





# Manatee Protection Areas



- FWS may establish two types of MPA's:
  - **Refuges** - A manatee refuge is defined as an area in which the FWS has determined certain waterborne activities would result in the taking of one or more manatees, or that certain waterborne activities must be restricted to prevent the taking of one or more manatees, including but not limited to, a taking by harassment.
  - **Sanctuaries** - A manatee sanctuary is defined as an area in which the FWS has determined any waterborne activities would result in the taking of one or more manatees, including but not limited to, a taking by harassment.



# *Science Summary in Support of Manatee Protection Area (MPA) Design in Puerto Rico.*

Louise Alexander<sup>1</sup>, C. Ashton Drew<sup>1</sup>, Jaime Collazo<sup>1</sup>, James P. Reid<sup>2</sup> & Dan H. Slone<sup>2</sup>

<sup>1</sup>North Carolina Cooperative Research Unit, Dept. of Biology, NC State University, Raleigh, NC

<sup>2</sup>USGS Sirenia Project, Gainesville, FL

## **Objectives**

1. Identify areas which include the specific ecological attributes necessary to support manatee populations
2. Identify areas where take can be reduced through the approved MPA regulatory framework.



# Manatee Protection Areas



- Key ecological attributes (KEA)— biological characteristics, resources or elements required by a conservation target for success (long-term survival)

## *Sea grass – Freshwater – Shelter*

- It was also hypothesized that manatees do not feed or rest in waters greater than 13 m (42.6 ft) depth and spend most of their time in waters less than 5 m (16.64 ft) deep



# Manatee Protection Areas



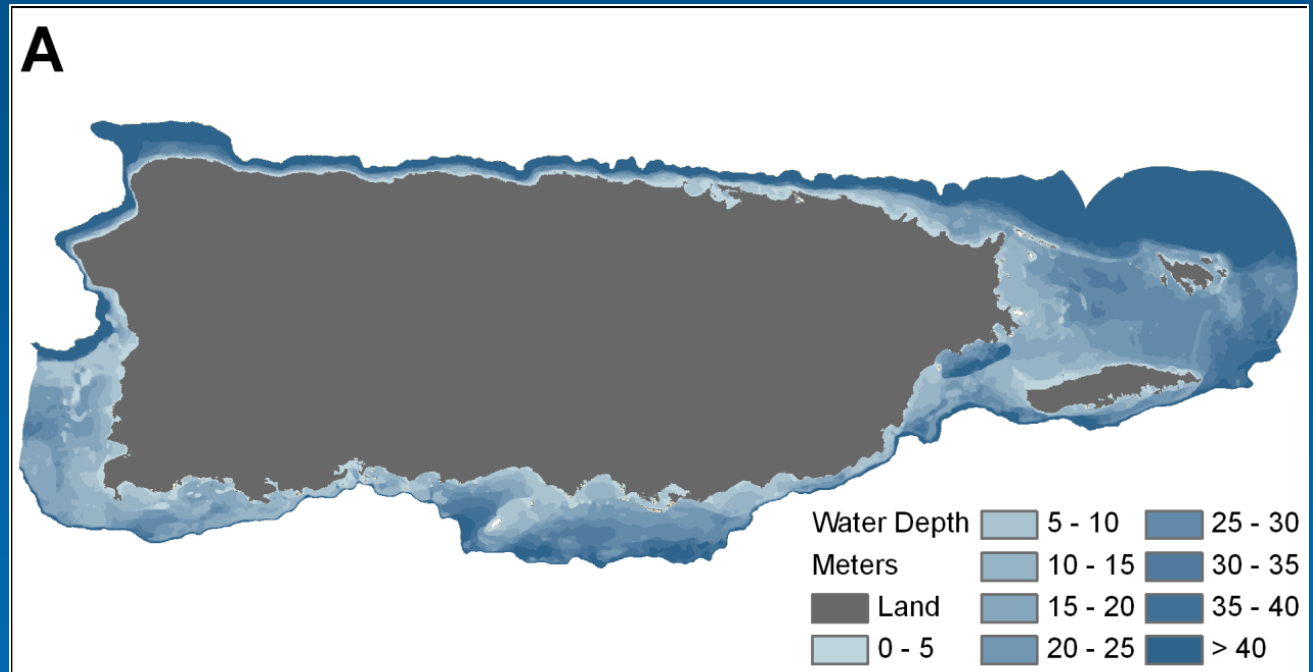
- Potential MPA sites include access to all KEA within 5 km (3.1 miles)
- To calculate the potential MPA value, the geometric mean of the 4 MPA variables was calculated

Combined resource values for potential MPAs are presented below.

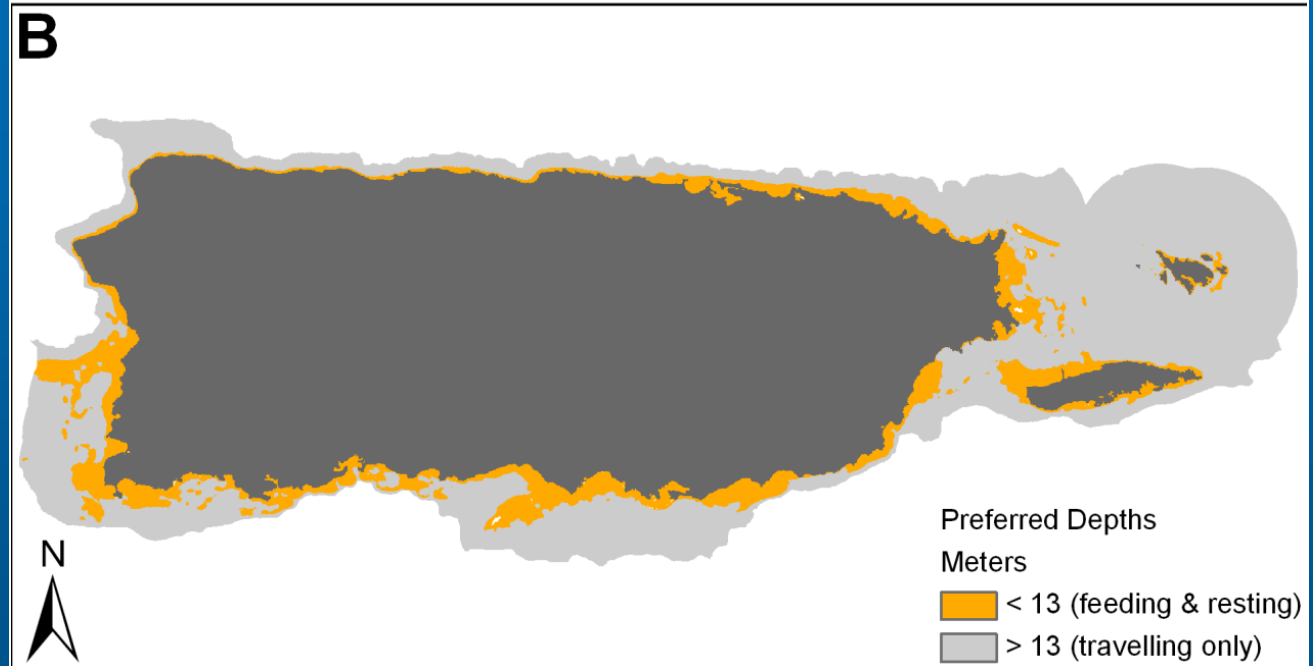
$$\text{MPA Value} = (\text{Sea grass} * \text{Freshwater} * \text{Shelter} * \text{Watercraft})^{1/4}$$

- Each variable was scaled relative to the maximum value for that variable within the project scope, such that values range from 0 to 1

(A) Bathymetry within the MPA project scope.

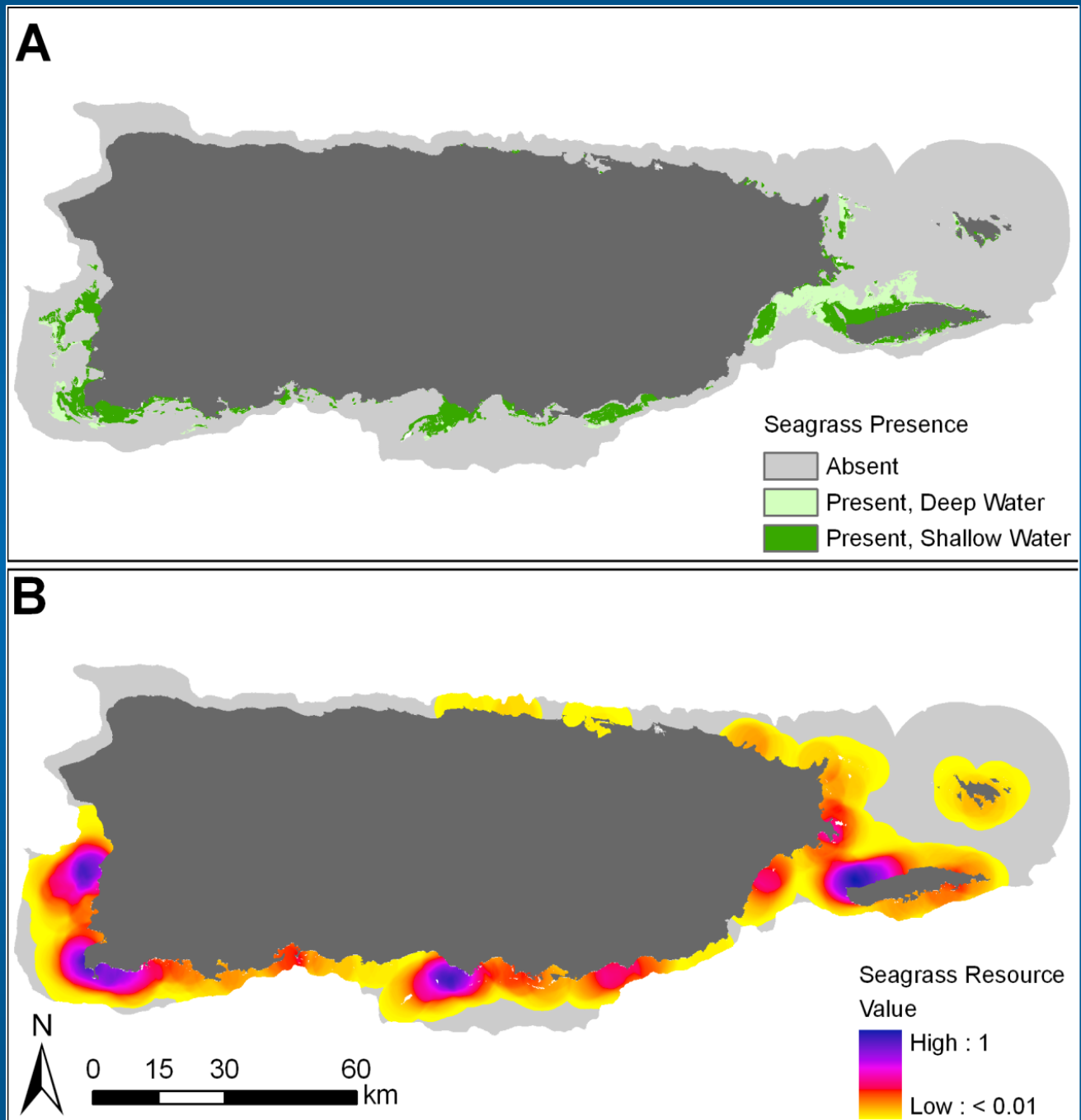


(B) Manatee foraging and resting was hypothesized to be restricted to shallow waters (<13 m depth) with deeper waters used for traveling between resources located in shallow waters.

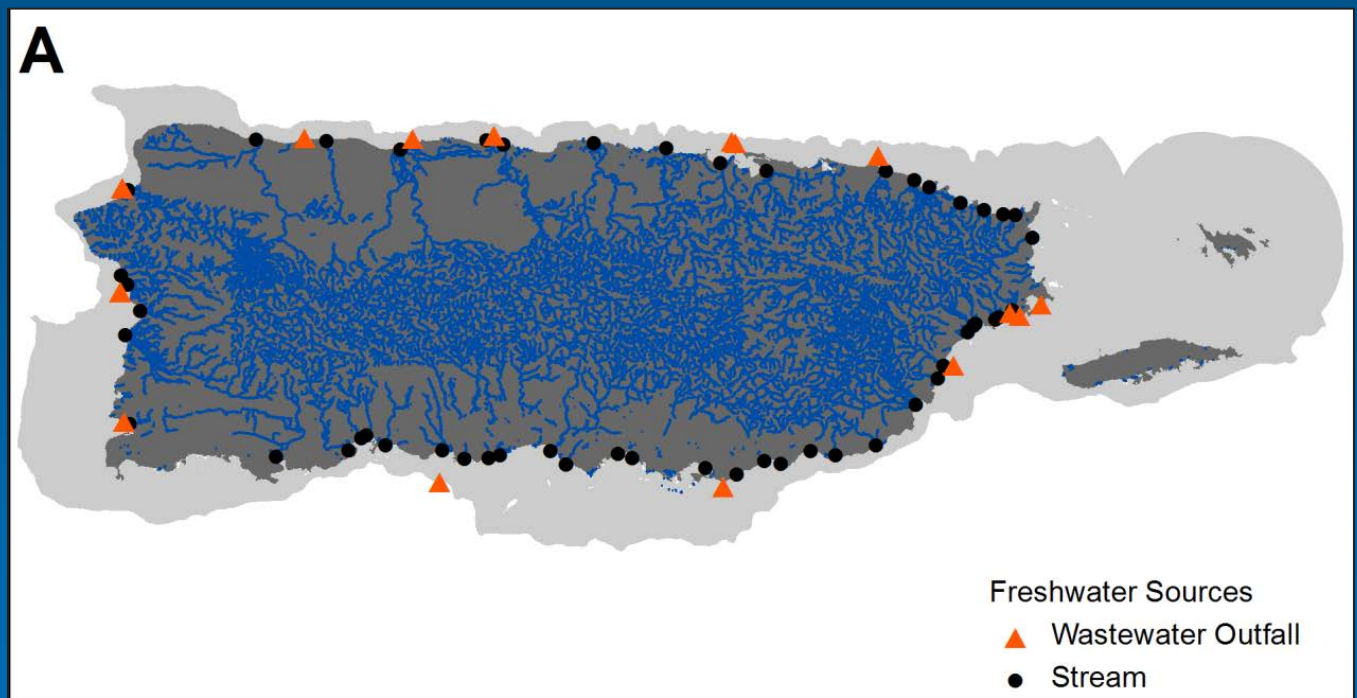


(A) Seagrass presence in deep (>13 m) and shallow (<13 m) water within the project scope. Only seagrass within shallow water was considered available to foraging manatees. Seagrass grid cells were assigned a decreasing linear value (1 to 0) from 1 m to 13 m depth (not shown).

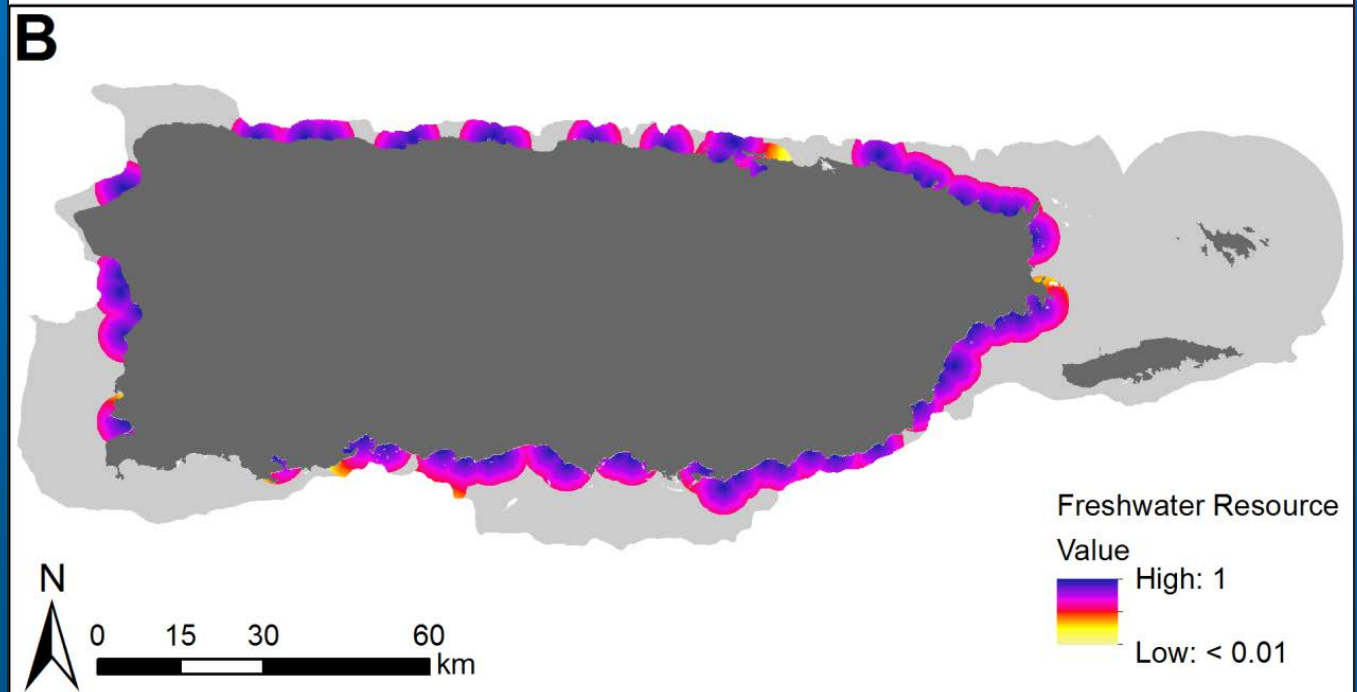
(B) The relative value of sites based on the summed value of seagrass habitat within a 5 km radius, scaled relative to the maximum.



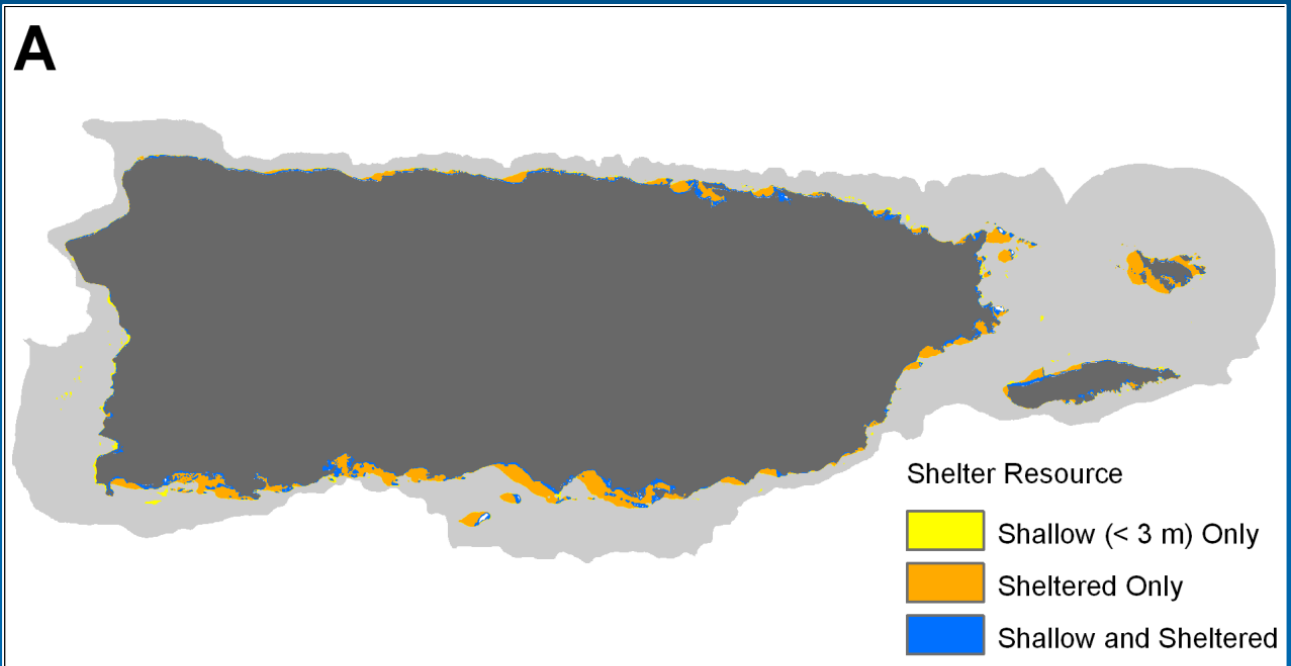
(A) Freshwater resources within the MPA project scope for which outflow coordinate data were available.



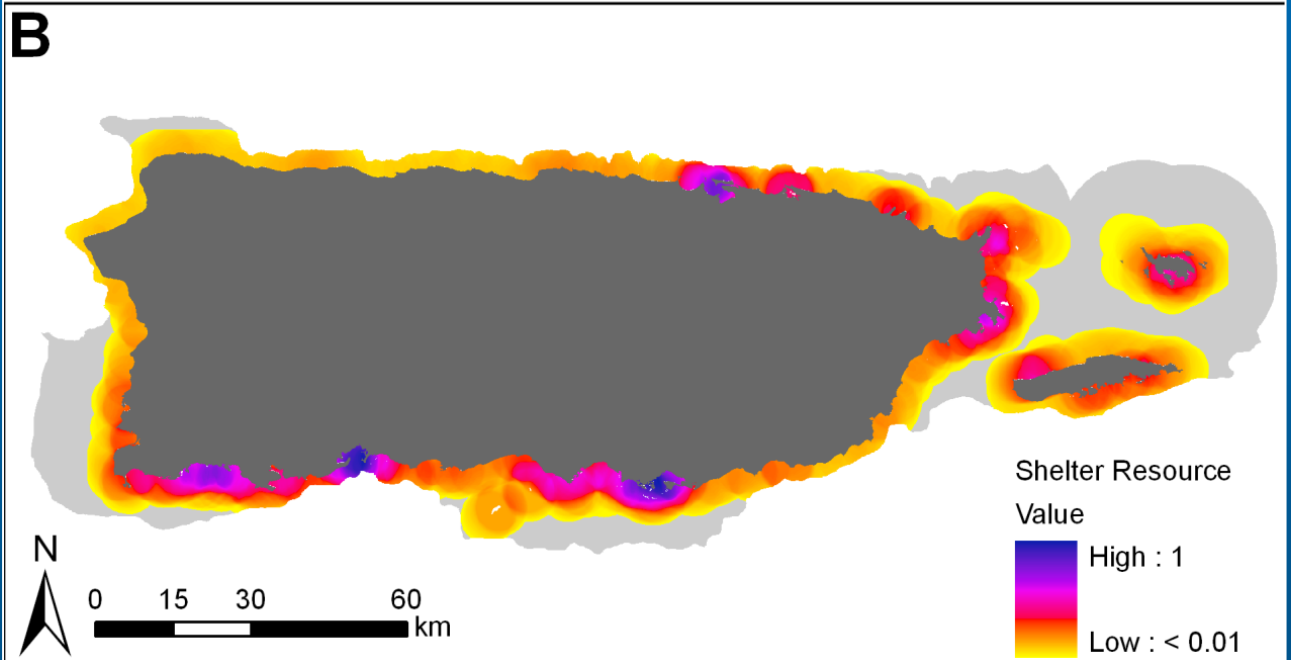
(B) The resource value is the total number of freshwater sources within a 5 km radius, summed and then rescaled relative to the maximum value of 16.



(A) Regions offering shallow, sheltered, or both shallow and sheltered waters to manatees based on a wave energy model and manatee movement patterns.

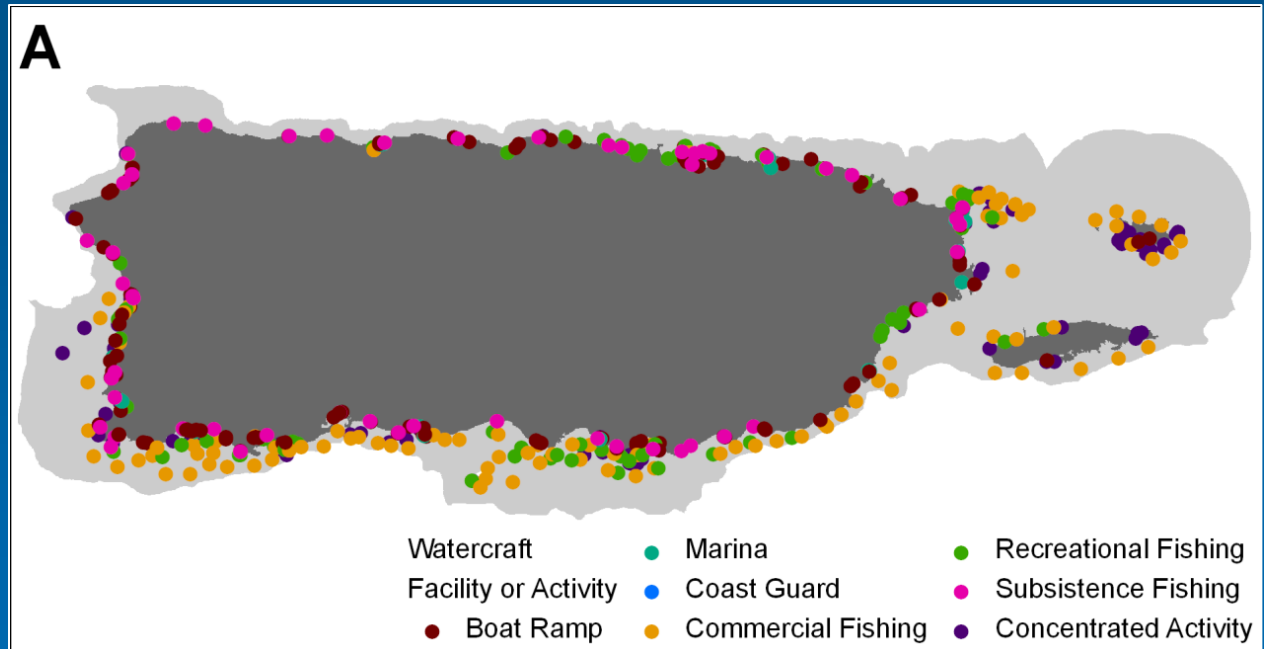


(B) Relative shelter value of coastal waters for manatees based on total area of shelter within 5 km radius (maximum = 1044 ha).

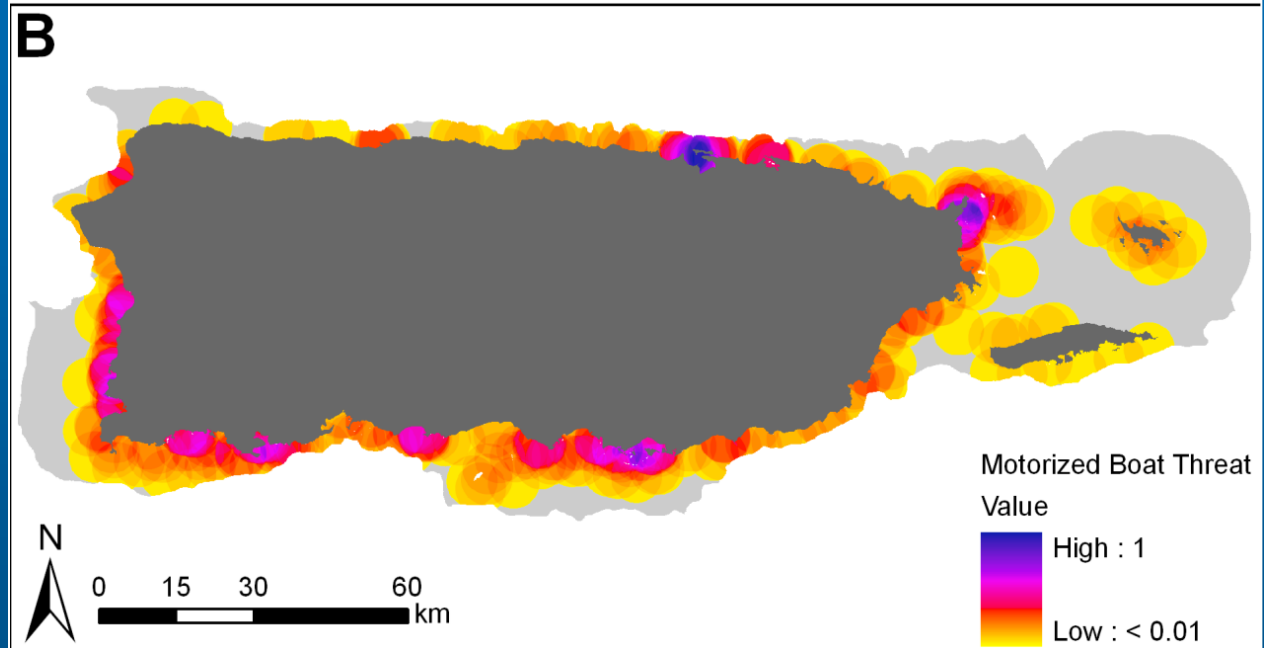


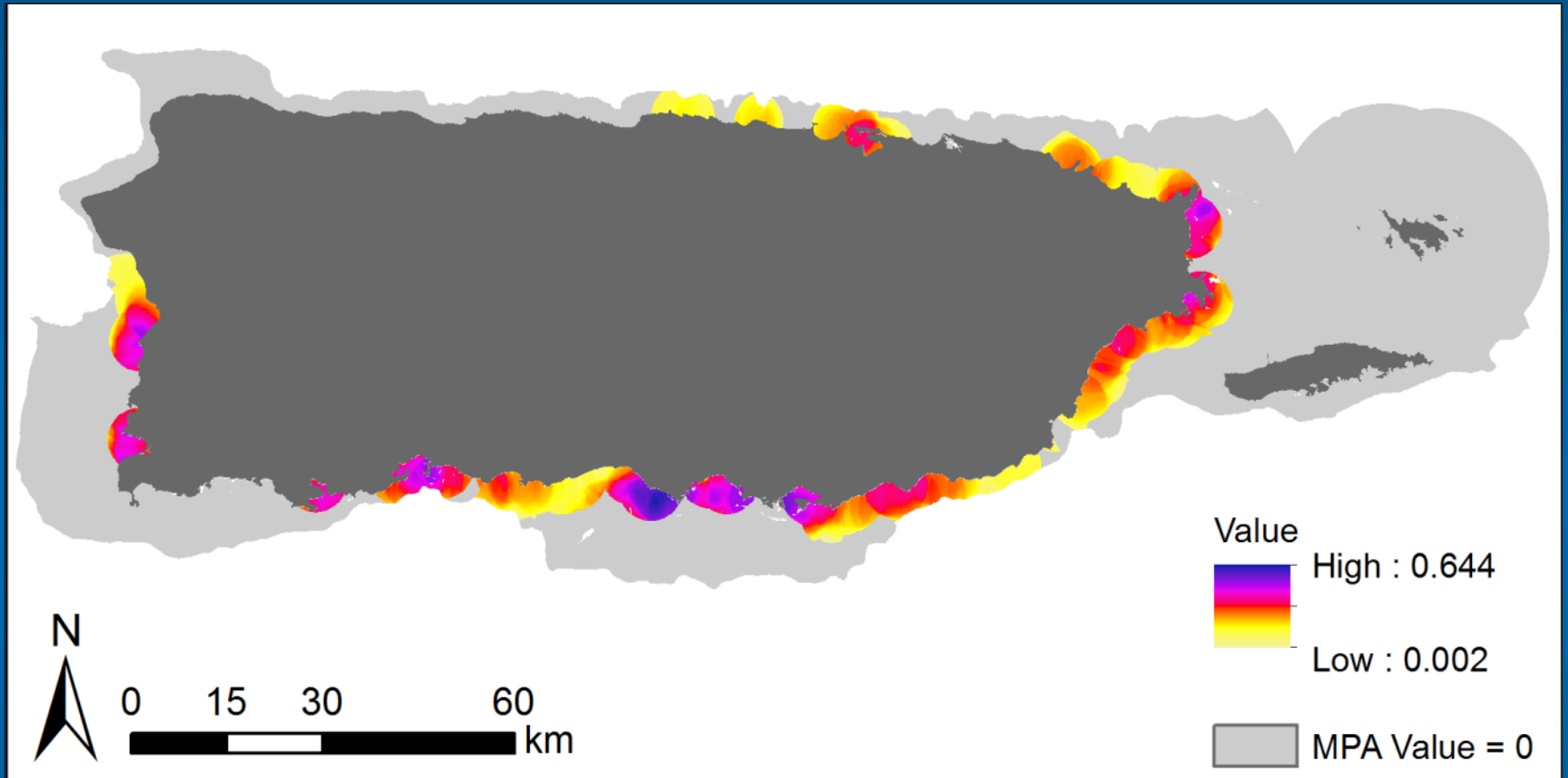


(A) Motorized watercraft infrastructure and activity within the MPA project scope.



(B) The threat risk is the total number of watercraft facility or activity records within a 5 km radius, summed and then rescaled relative to the maximum value of 36.





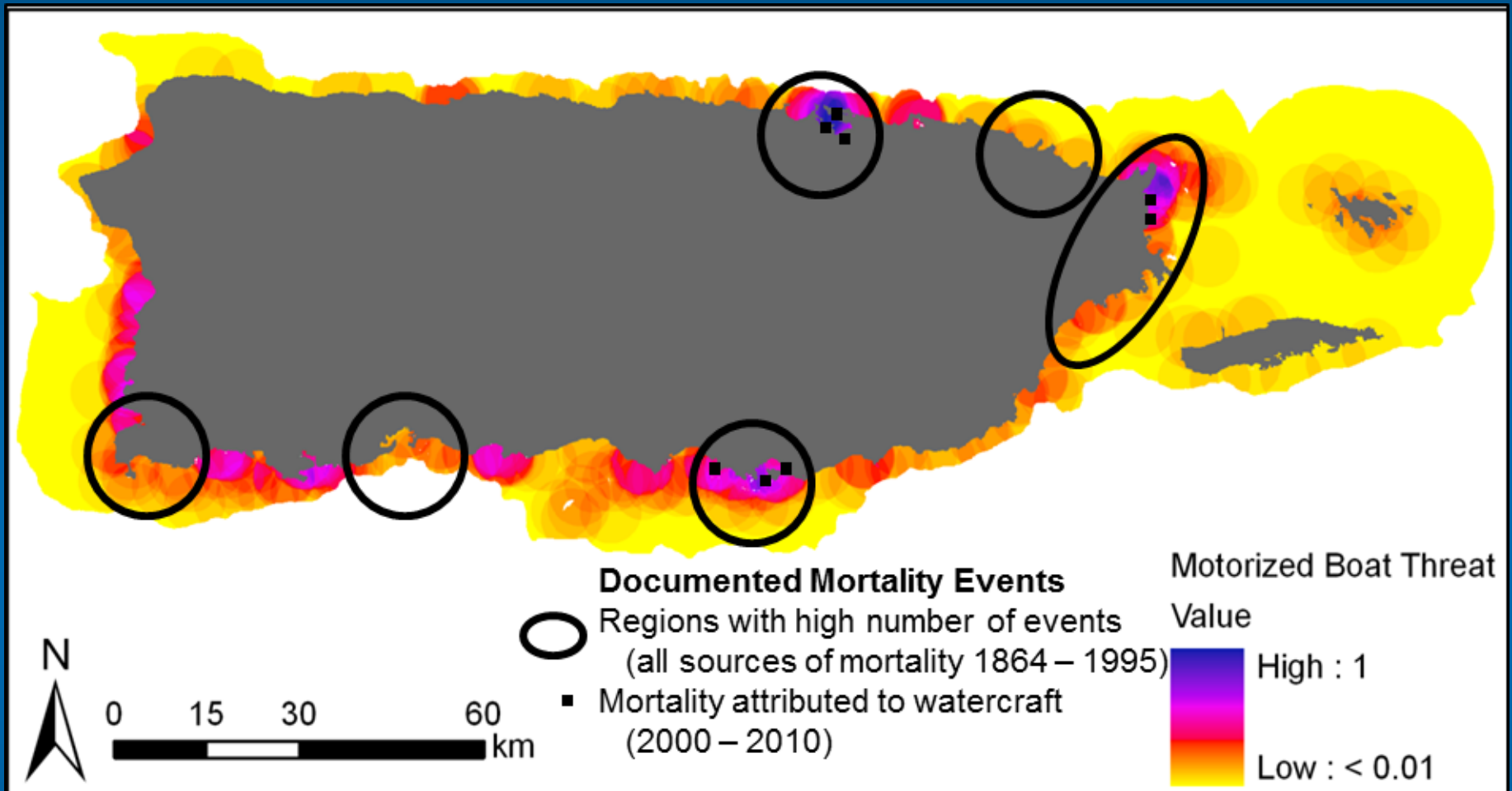
The calculated potential MPA value of coastal waters of Puerto Rico given the relative abundance (within a 5 km radius) of key ecological attributes (seagrass, freshwater, and shelter) and threats that can be mitigated through implementation of an MPA (motorized watercraft).



# Potential Focal Regions for Manatee Protection Areas




Potential MPA regions as delineated with an 80th percentile threshold value. Municipalities bordering potential MPA regions are named.




Comparison of regions historically reporting high number of mortality events (black circles, as shown in Mignucci-Gianonni et al. 2000), locations of recent watercraft related mortality events (black squares; PRDENR, unpublished data), and modeled watercraft threat. Light gray areas have zero reported mortality events.

# Potential Focal Regions for Manatee Protected Areas


## Potential MPA Focal Regions

 MPA Value in 80th Percentile

 MPA Value > Median


 5km Radius Boundary


## Freshwater Resources


 Perennial Streams

## Benthic Habitat Type

 Land


 Mangrove


 Seagrass


 Macroalgae


 Mud


 Sand


 Uncolonized Bedrock


 Colonized Bedrock and Pavement

 Spur and Groove Reef

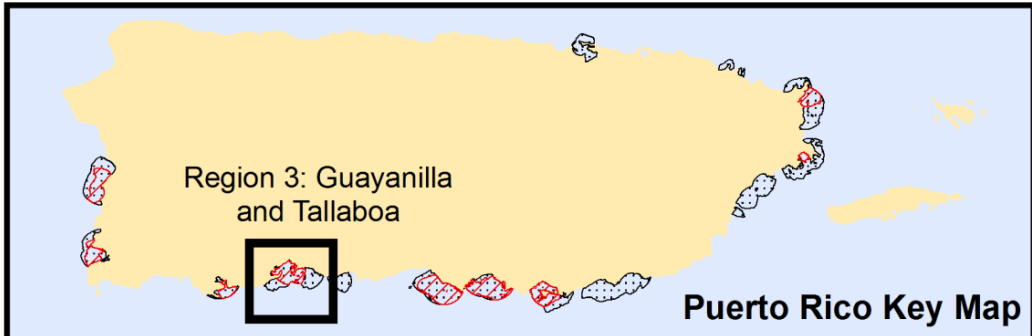
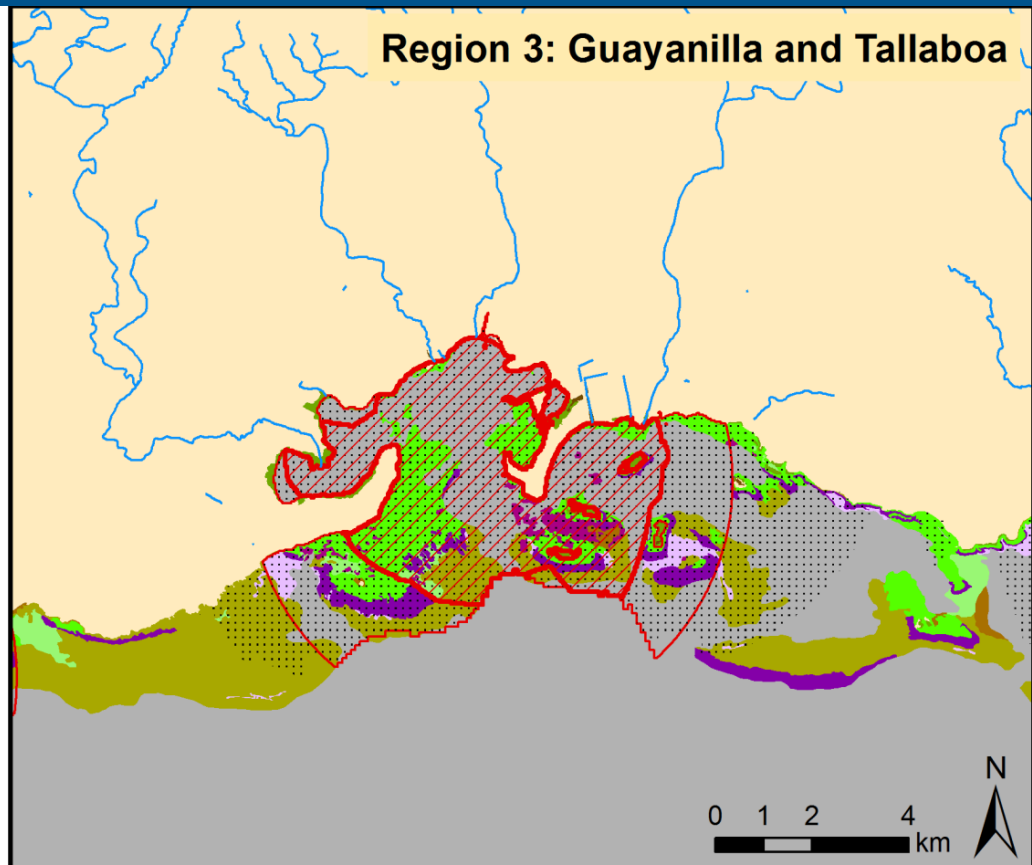
 Linear Reef

 Patch Reef

 Reef Rubble

 Scattered Coral/Rock

 Artificial or Unknown



Potential MPA region encompassing coastal waters of Guayanilla and Tallaboa. Landmarks named on map are features associated with published manatee observations.



# Goals of the RRR Program



- Effectively respond to manatee strandings in PR
- Provide high quality critical care
- Authorize appropriate rehabilitation facilities
- Successfully release manatees as soon as feasible to enhance the survival or recovery of the species



*Rescue*



*Rehabilitation*



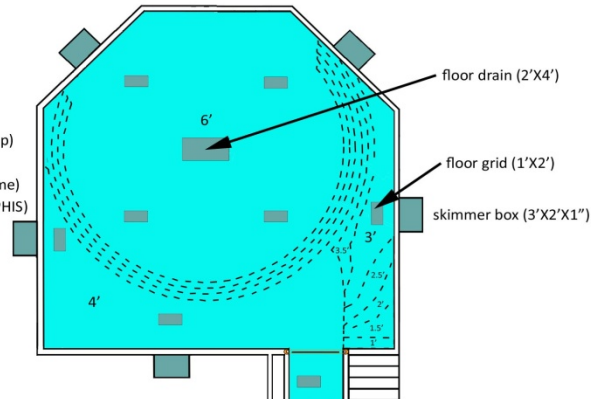
*Release*



## Manatee Critical Care and Long-term Tanks

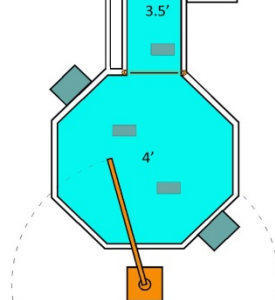


**Long-term tank (30'X30')**  
 (24' circle of 6' deep, the rest 3'-4' deep)  
 (30,000 gallons)  
 (772 sqft surface area, 3,992 cuft volume)  
 (holds 3 full grown manatees under APHIS)



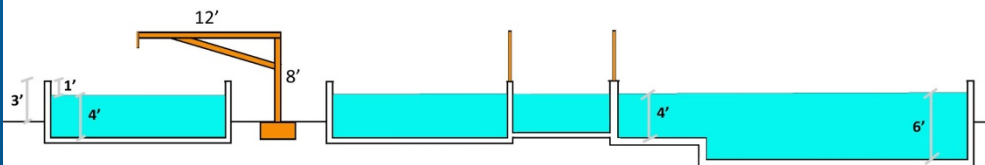
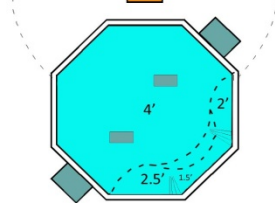
**Corridor (10'X4.5', 3.5' deep)**  
 (1,346 gallons)

**Medical examination tank (15' round, 4' deep)**  
 (5,287 gallons)



**360° weighing and moving crane**

**Calf/critical care tank (15' round, 4' deep, w/ 1.5'-2.5' steps)**  
 (5,287 gallons)



- CSN – now the PR Manatee Conservation Center within the Inter-American University in Bayamón
- capacity for approx. 4 calves and 4 juveniles/adults





## PR Zoo Marine Mammal Rehabilitation Center

- Has capacity for approximately 8 calves and 4 juveniles/adults







# Antillean Manatee Response Plan



- Annexes section of the SJ Area Contingency Plan
- Based on the Deepwater Response Plan
- Provides guidance on how to avoid/minimize effects on the manatee and how to assess possible effects from spills
- May include the need of observers, aerial surveys, captures, rehabilitation...





Caribbean Ecological  
Services Field Office

Jan P. Zegarra

jan\_zegarra@fws.gov

787-851-7297 ext. 220



***Science Summary in Support of Manatee Protection Area  
(MPA) Design in Puerto Rico.***

**DOWNLOAD @**

**<http://www.basic.ncsu.edu/eda/projects.html#ManateeMPA>**