

# **Southern and Caribbean Regional Meeting**

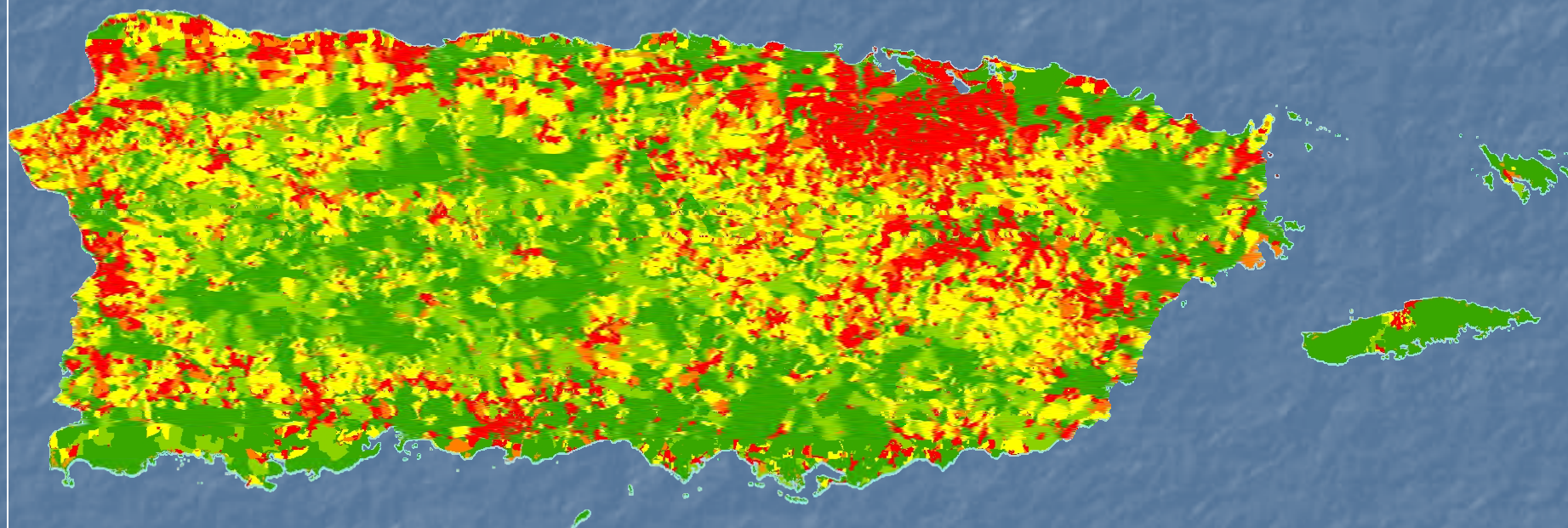
**Lafayette, LA**

**November 5-8**

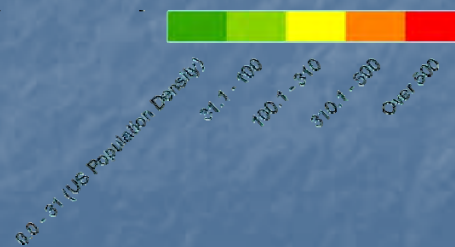


# POPULATION

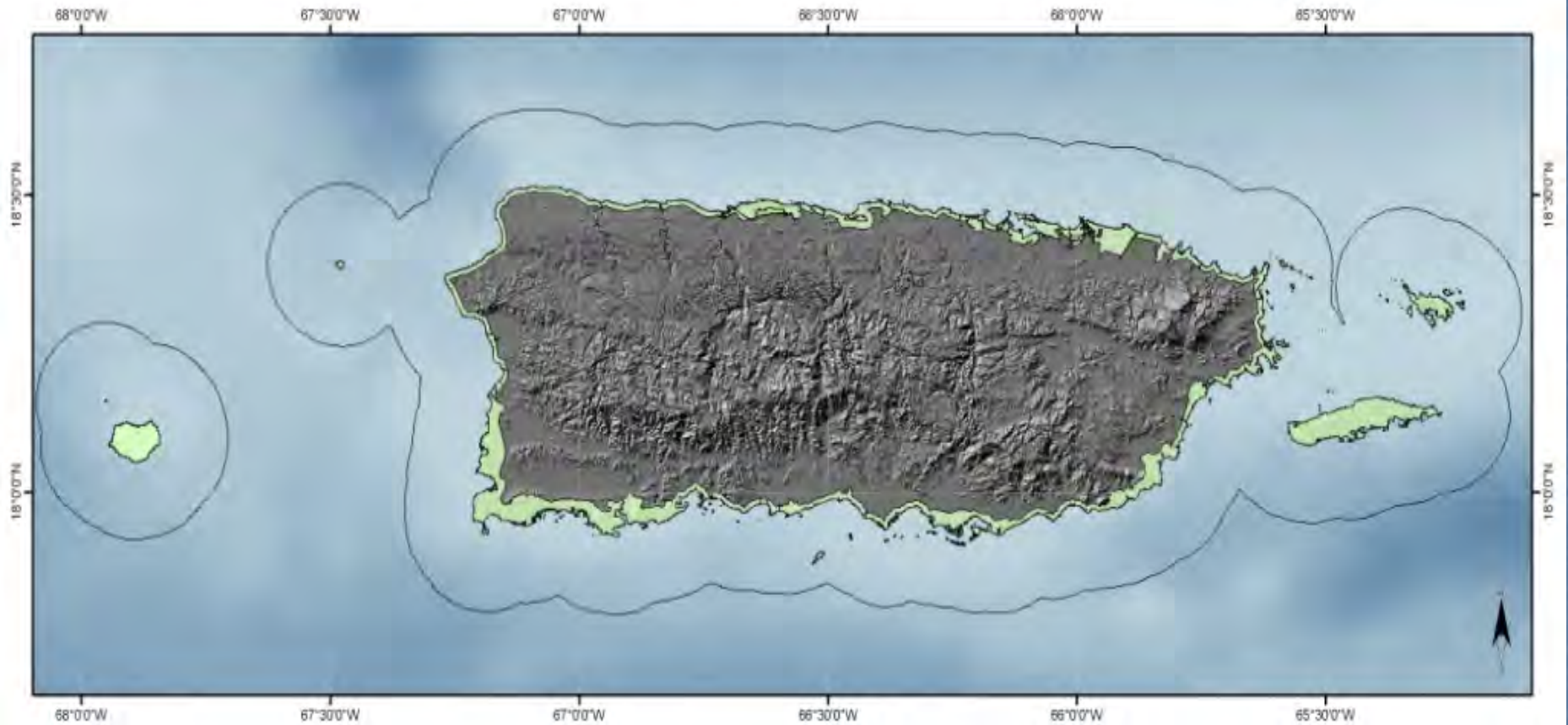
~3.9 million





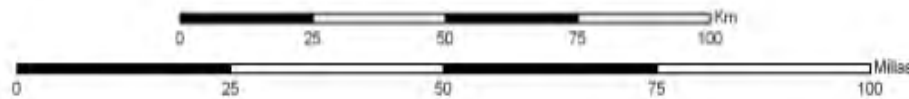
- *Aprox. 1,100 people/mi<sup>2</sup>*
- *Increased 8% over last decade*



# Ámbito de aplicación del Programa de Manejo de la Zona Costanera de Puerto Rico

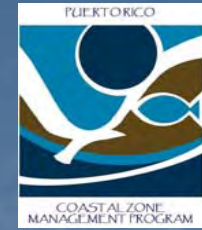


-  Limite Marino
-  Limite Terrestre



# Puerto Rico

## RELEVANT STATISTICS



Emerged land area:	9,497 km <sup>2</sup> (3,508 mi <sup>2</sup> )
Territorial waters:	9 nm (10.35 stat. mi)
Population:	3,927,776 millon
Coastal Zone Population:	2.73 millon (70%)
Urbanized land area:	40%

GDP:	~\$ 56.5 billion/yr
Construction value:	~\$ 6.4 billion/ yr
Housing:	~2.4 billion/yr
Roads, schools:	~1.8 billion/yr
Industrial/commercial buildings:	~3.2 billion/yr

Source: PRPB 2006

















# Coastal habitat Stressors and Use Conflicts



- Urban sprawl
- Loss of biodiversity and reforested areas
- Increasing pressure on coastal wetlands, estuaries, and coral reef systems:
  - 1) Habitat loss and fragmentation
  - 2) Erosion and sedimentation
  - 3) Pollution (eutrophication, hypoxia, oils spills)
  - 4) Climate change (H<sub>2</sub>O, human health, food supply, SST, SLR, and biodiversity)



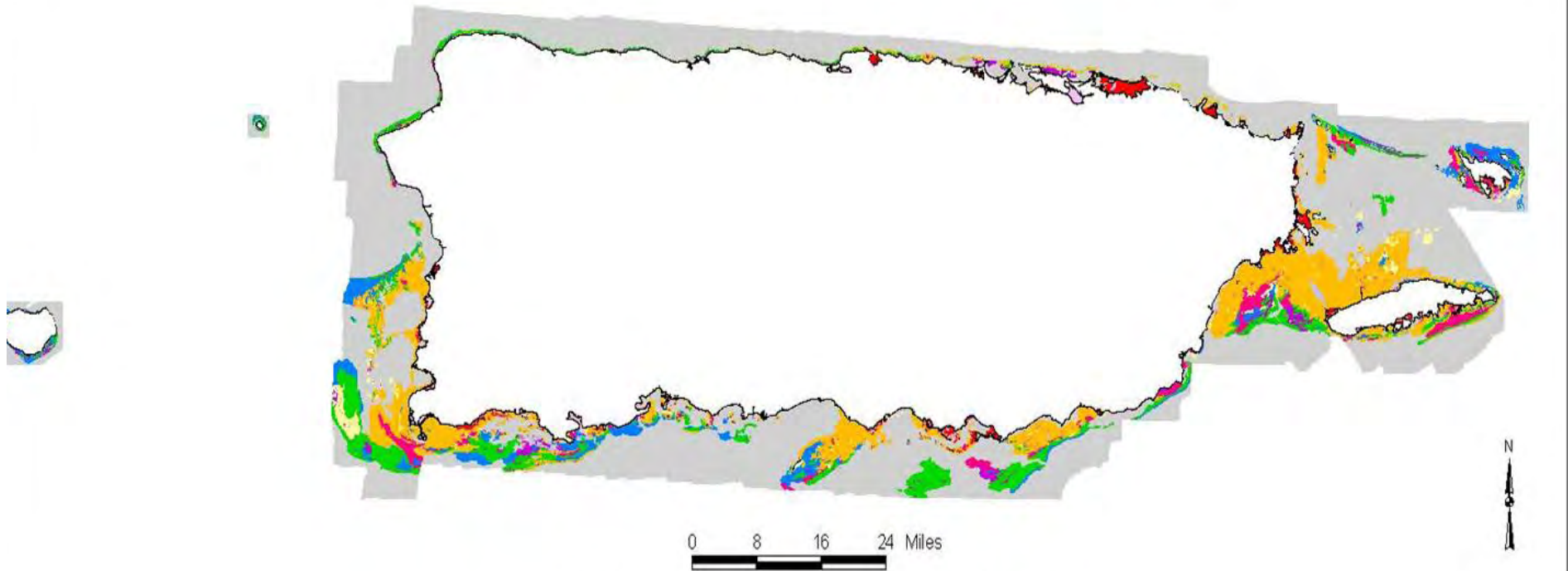












Distribución de Arrecifes de Coral(1)

MEstades/03






Leyenda:

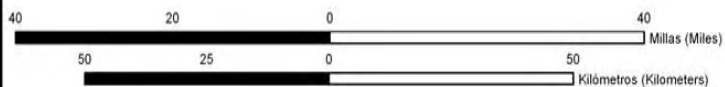
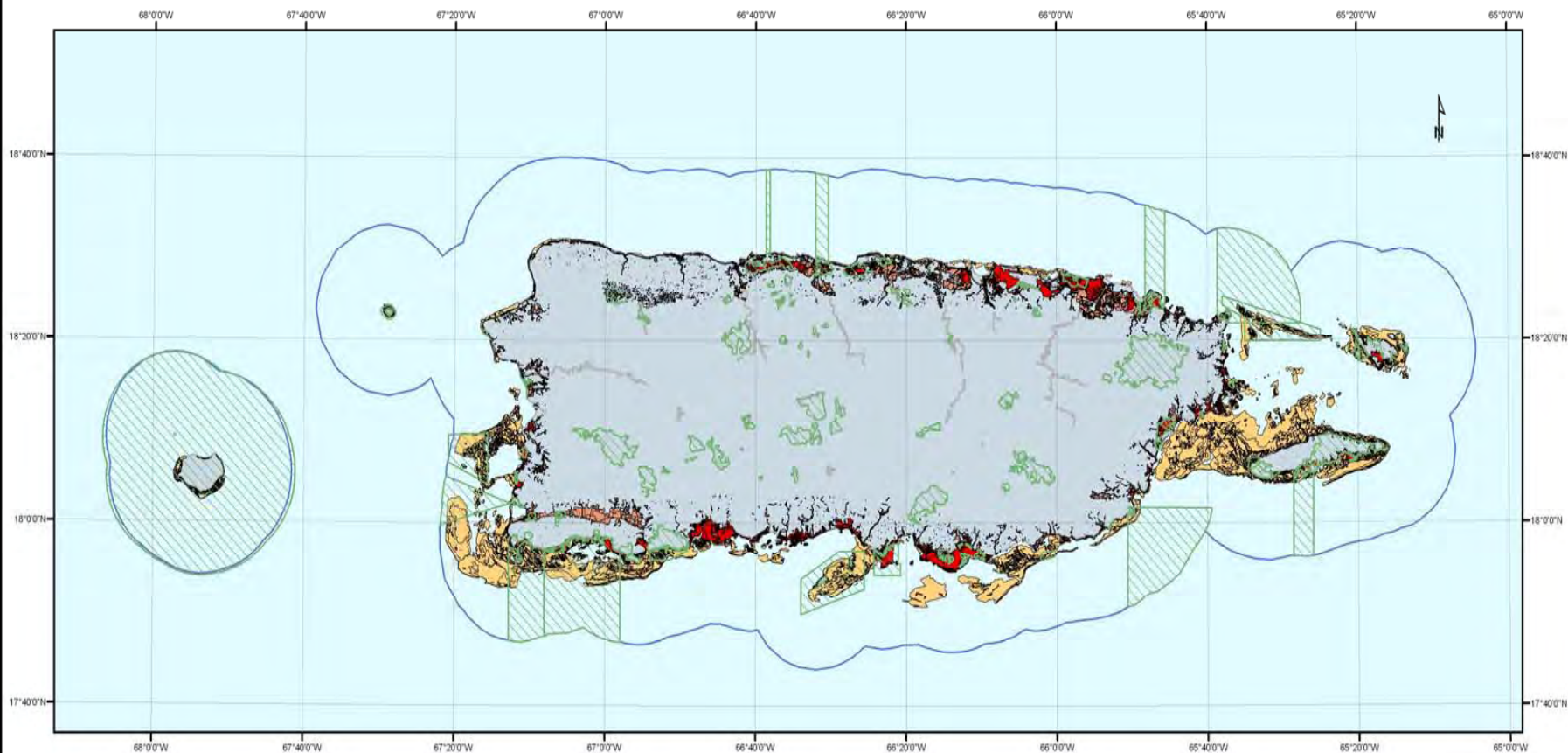
- Artificial
- Colonized Bedrock
- Colonized Pavement
- Colonized Pavement with Sand Channels
- Land
- Linear Reef
- Macroalgae
- Mangrove
- Mud

- Patch Reef (Aggregated)
- Patch Reef (Individual)
- Reef Rubble
- Sand
- Scattered Coral/Rock in Unconsolidated Sediment
- Seagrass
- Spur and Groove Reef
- Uncolonized Bedrock
- Unknown

(1)Fuente: NOAA/NOS

Leyenda - Map key:

- |  |  |  |
|--|--|--|
|  Humedales palustres - Palustrine wetland             |  Humedales estuarinos - Estuarine wetland |  Limite de las aguas territoriales de Puerto Rico (9 millas náuticas) - Coastal zone maritime boundary (9 nautical miles) |
|  Areas Naturales Protegidas - Natural Protected Areas |  Humedales marinos - Marine wetland       |  |

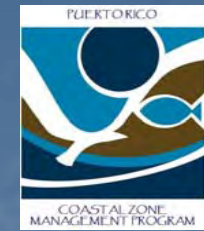


Fuente de información - Source:  
 Departamento de Recursos Naturales y Ambientales  
 Wetlands Inventory  
 NOAA Benthic Mapping

## Humedales protegidos de Puerto Rico Protected wetlands of Puerto Rico



Departamento de Recursos Naturales y Ambientales  
 Programa de Manejo de la Zona Costanera



# Natural Protected Areas statistics

Management category	AREA (m <sup>2</sup> )
Reservas Naturales	2,154,253,578.0
Bosques Estatales	253,931,519.9
Caribbean National Forest	115,629,430.0
Propiedades del Fideicomiso	62,715,819.8
Extensiones Marinas	2,734,792,182.0
Reservas Marinas	6,923,716.2
Propiedades Ciudadanos del Karso	3,392,169.2
Refugios de Vida Silvestre Estatal	12,334,446.3
Refugios de Vida Silvestre Federal	95,119,816.1
JBNERR	5,571,825.0
CESJ	2,378,612.1
Area de Veda Pesca en Mona	32,213,666.9
Area terrestre emergida	8,938,149,691.0
Aguas territoriales	13,160,141,328.0

**TOTAL PROTECTED AREAS      8.24% (LAND)**

# WETLANDS PROTECTION STATISTICS



Estuarine NPA/ Total	31.80%
Lacustrine NPA/Total	13.34%
Marine NPA/Total	17.81%
Palustrine NPA/Total	5.43%
Riverine NPA/Total	1.08%

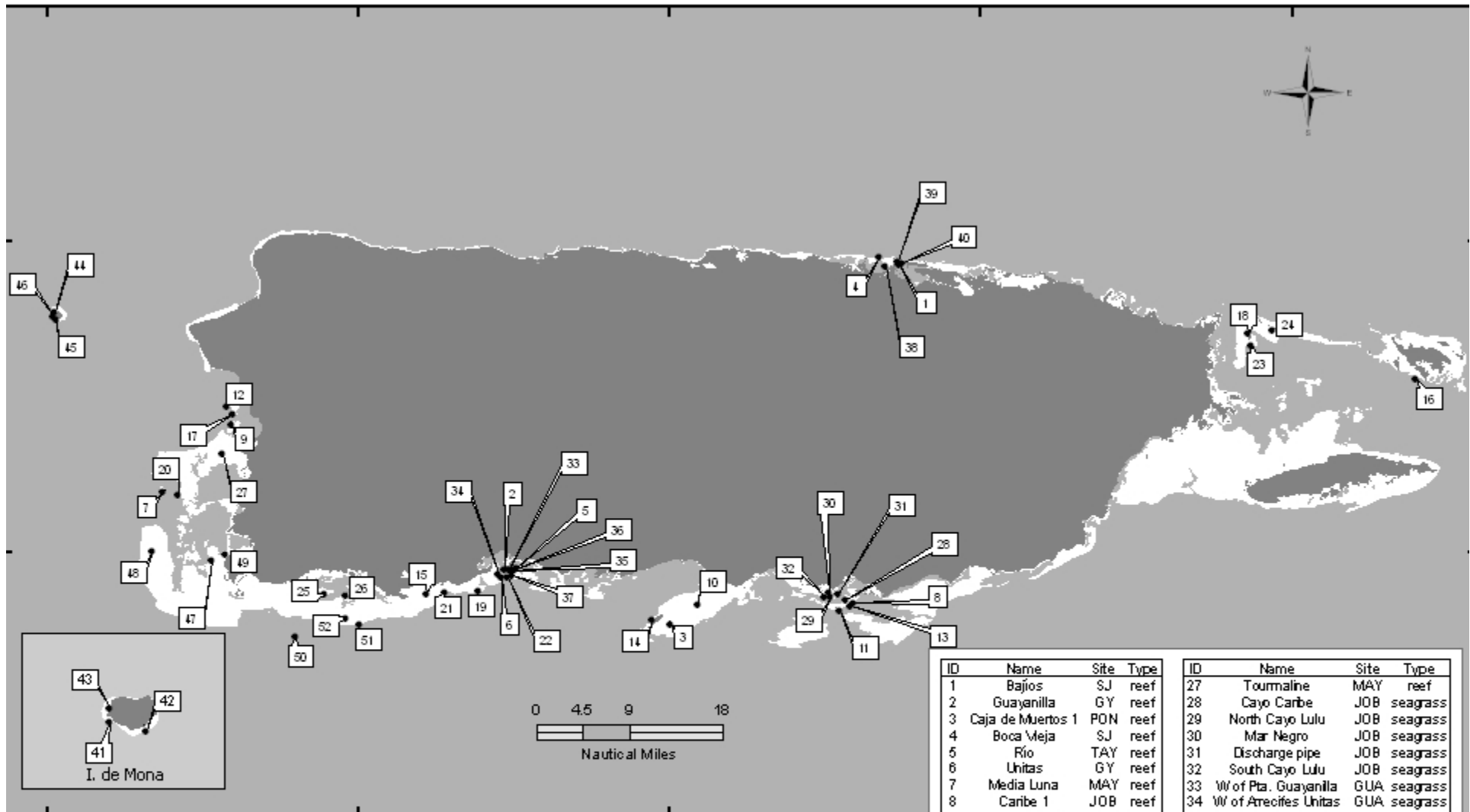
Sources: NWI (USDOI - FWS), NOAA, DNER and PRCMP

# MPA STATISTICS



<b>MPA / PR Jurisdictional waters</b>	<b>22.87%</b>
<b>Reefs within MPA/ Total PR Reefs</b>	<b>51.49%</b>
<b>Sea Grasses within MPA/ Total PR Seagrasses</b>	<b>49.24%</b>
<b>Macroalgae en AMP/ Total PR macroalgae</b>	<b>22.53%</b>
<b>SAV within MPA/ Total PR SAV</b>	<b>22.28%</b>
<b>Matthew S. Kendall, Curtis R. Kruer, Ken R. Buja, John D. Christensen, Ernesto Diaz, Robert A. Warner, and Mark E. Monaco</b>	<b>Alvarez N. and E. Diaz PRCMP 2006</b>

67°30'0"W      67°0'0"W      66°30'0"W      66°0'0"W      65°30'0"W



J. Alvarez 2004



Estado Libre Asociado Puerto Rico  
 Departamento de Recursos Naturales y Ambientales  
 Programa de Manejo de la Zona Costera

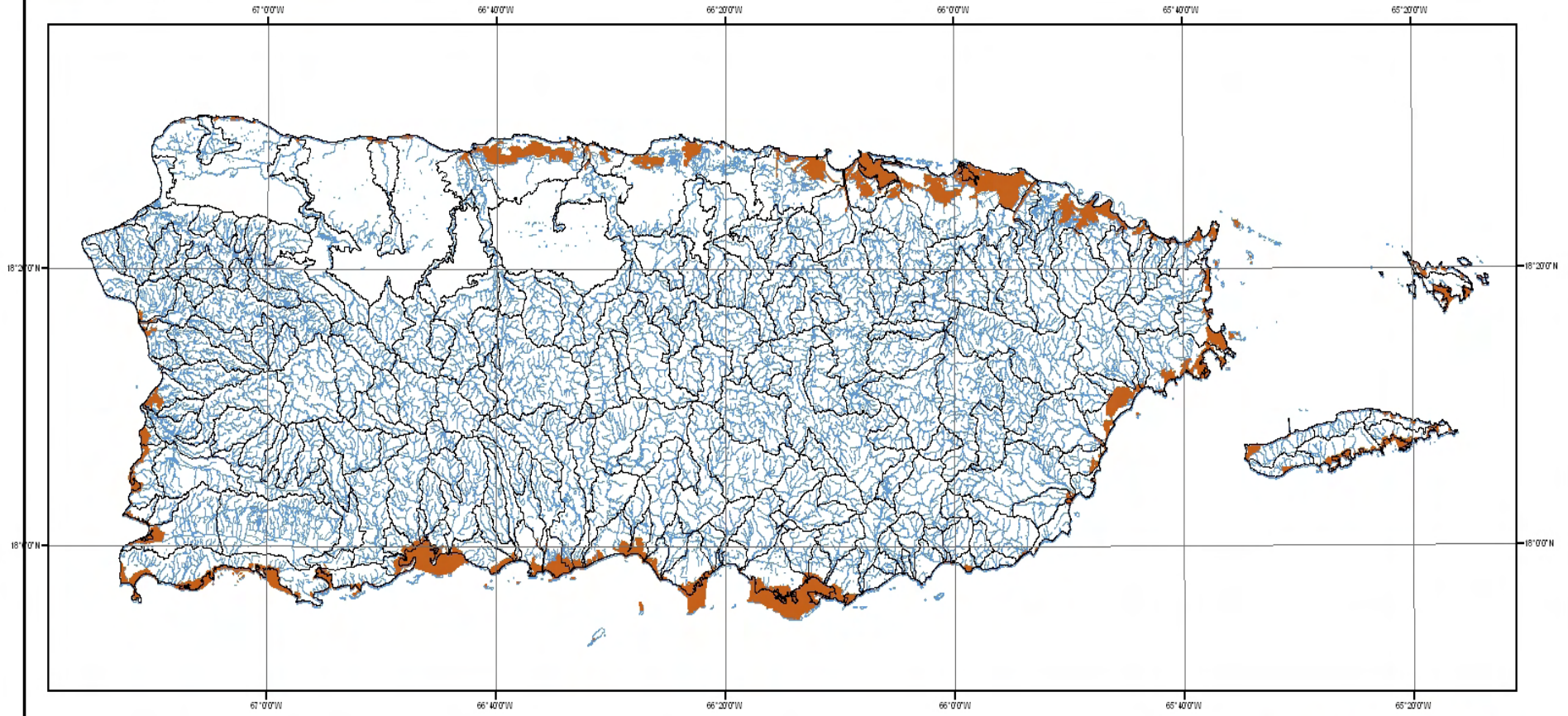
ID	Name	Site	Type	ID	Name	Site	Type
1	Bajios	SJ	reef	27	Tourmaline	MAY	reef
2	Guayanilla	GY	reef	28	Cayo Caribe	JOB	seagrass
3	Caja de Muertos 1	PON	reef	29	North Cayo Lulu	JOB	seagrass
4	Boca Meja	SJ	reef	30	Mar Negro	JOB	seagrass
5	Río	TAY	reef	31	Discharge pipe	JOB	seagrass
6	Uhtas	GY	reef	32	South Cayo Lulu	JOB	seagrass
7	Media Luna	MAY	reef	33	W of Pta. Guayanilla	GUA	seagrass
8	Caribe 1	JOB	reef	34	W of Atrecifes Uhtas	GUA	seagrass
9	Manchas Grandes	MAY	reef	35	SW Cayo Palomas	GUA	seagrass
10	Berbeña	PON	reef	36	W of Cayo Palomas	GUA	seagrass
11	La Barca	JOB	reef	37	N of Maria Langa	GUA	seagrass
12	Manchas Ext 2	MAY	reef	38	Ensenada Boca Meja	SJ	seagrass
13	Caribe 2	JOB	reef	39	W Bajo Colnas	SJ	seagrass
14	Caja de Muertos 2	PON	reef	40	Bajo Santa Bena	SJ	seagrass
15	Cayo Coral	GUA	reef	41	Playa Mujeres	MON	reef
16	Rta. Maguay	CUL	reef	42	Playa Pajaros	MON	reef
17	Manchas Int 2	MAY	reef	43	Carmelitas	MON	reef
18	Isla Palomino	FAJ	reef	44	North Reef	DES	reef
19	Pta. Ventana 2	GY	reef	45	Puerto Canoas	DES	reef
20	Las Coronas	MAY	reef	46	Puerto Botes	DES	reef
21	Rta. Ballena	GUA	reef	47	Resuellos	BOQ	reef
22	Fanduco	GY	reef	48	Gallardo	BOQ	reef
23	Isla Palominos	FAJ	reef	49	El Palo	BOQ	reef



# Leyenda

- Cuencas hidrográficas
- Humedales estuarinos
- Hidrografía

North Arrow  
Escala - Scale: 1:850,000



Departamento de Recursos Naturales y Ambientales  
Programa de Manejo de la Zona Costanera

## Cuencas hidrográficas e hidrografía de Puerto Rico

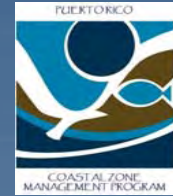
Fuente de información - Source:  
Departamento de Recursos Naturales y Ambientales

PUERTORICO



COASTAL ZONE  
MANAGEMENT PROGRAM

2007-2008



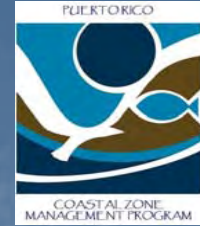
## PRCMP MISSION

*...is a partnership led by the Puerto Rico Department of Natural and Environmental Resources to promote the protection, conservation, sustainable use and socioeconomic development of Puerto Rico's coastal zone and natural resources.*

## PRCMP GOALS AND OBJECTIVES

- **Guidance of public and private coastal development;**
- **Conduct active management of coastal resources;**
- **Foster scientific research; and**
- **Promote education, as well as stakeholder and resource user participation as means of promoting sustainable development.**

Task	Project Name	Task Manager	Contact Information	
Section 306			Email	Phone Number
1.1	SPA's Management Planning	Clarimar Díaz Rivera	<a href="mailto:cdiaz@drna.gobierno.pr">cdiaz@drna.gobierno.pr</a>	x. 2555
1.2	Natural Protected Areas Strategy	Nora Álvarez Berríos	<a href="mailto:nalvarez@drna.gobierno.pr">nalvarez@drna.gobierno.pr</a>	x.2732
1.5	NR Designations and Planning	Clarimar Díaz Rivera	<a href="mailto:cdiaz@drna.gobierno.pr">cdiaz@drna.gobierno.pr</a>	x.2555
1.6	Coral Reef Management Support	Ernesto L. Díaz Velázquez	<a href="mailto:ediaz@drna.gobierno.pr">ediaz@drna.gobierno.pr</a>	x.2636
3.1	Development Review	Giovanna Fuentes	<a href="mailto:gfuentes@drna.gobierno.pr">gfuentes@drna.gobierno.pr</a>	x2786
3.1 (A)	GIS Support to PRCMP	Nora L. Álvarez Berríos	<a href="mailto:nalvarez@drna.gobierno.pr">nalvarez@drna.gobierno.pr</a>	x.2732
3.2	Federal Consistency	Junta de Planificación	<a href="mailto:ortiz_r@jp.gobierno.pr">ortiz_r@jp.gobierno.pr</a>	(787) 726-0289
3.4	Legal Support	Lcdo. Francisco de Jesús Lcda. Claribel Díaz Cortés	<a href="mailto:fdejesus@drna.gobierno.pr">fdejesus@drna.gobierno.pr</a> <a href="mailto:cladiaz@drna.gobierno.pr">cladiaz@drna.gobierno.pr</a>	x.2169 x.2172
3.6 (B)	<a href="#">Public Domain Uses</a>	José L. Padilla Báez	<a href="mailto:jpadilla@drna.gobierno.pr">jpadilla@drna.gobierno.pr</a>	x.2832
4.0	NR Active Management	Robert Matos Morales	<a href="mailto:rmatos@drna.gobierno.pr">rmatos@drna.gobierno.pr</a>	x.2718
4.4	Personnel for Field Staff	Cptn. Harold Busigó Borrás	<a href="mailto:hbusigo@drna.gobierno.pr">hbusigo@drna.gobierno.pr</a>	(787) 725-1202
4.5	Technical and Operational Support	Jinnie L. Nieves Reyes	<a href="mailto:jnieves@drna.gobierno.pr">jnieves@drna.gobierno.pr</a>	x.2726
5.1	Environmental Education	Astrid Green Cáseres	<a href="mailto:agreen@drna.gobierno.pr">agreen@drna.gobierno.pr</a>	x.5417
6.1	Administration and Program Monitoring	Ernesto L. Díaz Velázquez	<a href="mailto:ediaz@drna.gobierno.pr">ediaz@drna.gobierno.pr</a>	x.2636
6.2	Financial Management	Leonardo González	<a href="mailto:leogonzalez@drna.gobierno.pr">leogonzalez@drna.gobierno.pr</a>	x.2200
6.6	Document Review	Ernesto L. Díaz Velázquez	<a href="mailto:ediaz@drna.gobierno.pr">ediaz@drna.gobierno.pr</a>	x.2636
Section 309				
309	Program Enhancement Strategy	Ernesto L. Díaz Velázquez Francisco J. Quintana Álamo	<a href="mailto:ediaz@drna.gobierno.pr">ediaz@drna.gobierno.pr</a> <a href="mailto:fquintana@drna.gobierno.pr">fquintana@drna.gobierno.pr</a>	x.2636 x.2720
309 / 14.1	Wetlands Strategies	Ernesto L. Díaz Velázquez Coralys Ortiz Maldonado	<a href="mailto:ediaz@drna.gobierno.pr">ediaz@drna.gobierno.pr</a> <a href="mailto:cortiz@drna.gobierno.pr">cortiz@drna.gobierno.pr</a>	x.2636 x.2727
309 / 14.2	Costal Hazards Mitigation	Ernesto L. Díaz Velázquez Coralys Ortiz Maldonado	<a href="mailto:ediaz@drna.gobierno.pr">ediaz@drna.gobierno.pr</a> <a href="mailto:cortiz@drna.gobierno.pr">cortiz@drna.gobierno.pr</a>	x.2636 x.2727
309 / 14.4	Public Access	Francisco J. Quintana Álamo Jinnie L. Nieves Reyes	<a href="mailto:fquintana@drna.gobierno.pr">fquintana@drna.gobierno.pr</a> <a href="mailto:jnieves@drna.gobierno.pr">jnieves@drna.gobierno.pr</a>	x. 2720 x.2726
Section 310				
CNP	<a href="#">Coastal Non-point Program</a>	Raúl Santini Rivera	<a href="mailto:rsantini@drna.gobierno.pr">rsantini@drna.gobierno.pr</a>	x.2721



# PRCMP FUNDING

**TOTAL BUDGET: \$4,149,000**

**Federal: \$2,182,000**

**Non-Federal: \$1,967,000**

**Section 306 - \$3,934,000**

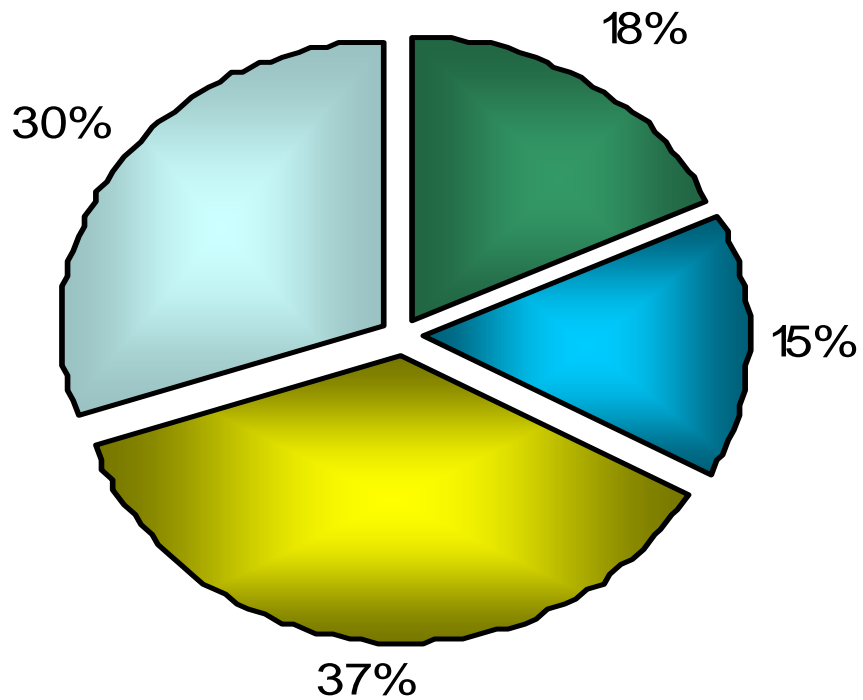
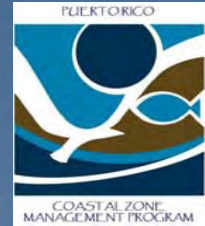
**Section 309 - \$ 215,000**



# §306 FUNDS DISTRIBUTION: \$3,934,000

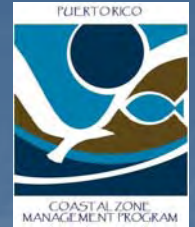
SPA Management Planning	2.2%	Public Trust and MTZ Uses	1.6%
Natural Protected Areas Strategy	1.2%	NR Active Management	10.1%
NR Designation and Planning	2.2%	Coastal Forests Community Outreach	1.5%
Coral Reef: Land Based Use Sources	2.4%	Personnel for Field Staff	34.4%
Development Review	5.7%	Technical and Operational Supports	1.4%
GIS Support to PRCMP	1.2%	Environmental Education	6.2%
Federal Consistency	2%	Administration and Program Monitoring	7.6%
Legal Support	6.3%	Financial Management	2.8%
Maritime Zone Delineation	8%	Document Review	3.1%

# §309 FUNDS DISTRIBUTION



- Coastal Zone Performance Indicators
- Wetlands and Estuaries
- Coastal Hazards
- Public Access

**\$ 215,000**



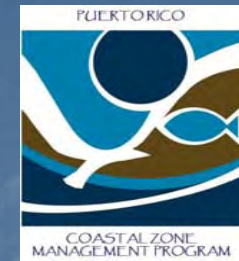
# KEY ACCOMPLISHMENTS

- Update of the PRCMP management plan.
- Update of Island-wide land use change analysis (1936, 1977, 2004 and 2007).
- Statistical analysis of the Marine Protected Areas System resources.
- Completion of the construction of four boardwalks and dune restoration projects.
- Installation of signage of MPA, public access and coastal resource use orientation.
- Publication of the Natural Protected Areas User Guide.
- Coordination of the Coral Reef Land-based Sources of Pollution Local Action Strategy.
- Participation in the reforestation of watersheds and coastal areas. Over 2.5 million trees planted.
- Wetland restoration projects at La Esperanza, Humacao and Parguera Natural Reserves.
- Completion of the wetlands inventory of areas identified as candidates for natural reserve designation.
- Training to municipal governments on alternative wastewater treatment designs and erosion
- Training to municipal governments on Erosion and Sedimentation Control and BMPs implementation.



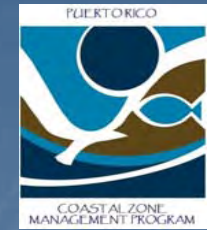
# Problems?

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**YES!!!**

- Staffing
- Funding
- Need for increasing public participation and awareness



## COMMONWEALTH PARTNERS

- PR Planning Board
- PR Environmental Quality Board
- Department of Agriculture
- Cultural Heritage Institute
- Puerto Rico's Tourism Company
- University of Puerto Rico
- Puerto Rico Commonwealth Forest and Natural Reserves Systems
- 43 coastal municipalities
- Puerto Rico Conservation Trust
- Sea Grant

## Other partners:

- University of Puerto Rico – Marine Sciences Department
- University of Puerto Rico – Health Sciences Department
- Puerto Rico Water Resources Institute
- Puerto Rico Forest and Natural Reserves Systems
- Community based organizations and NGOs
- Other Universities and Research Institutions

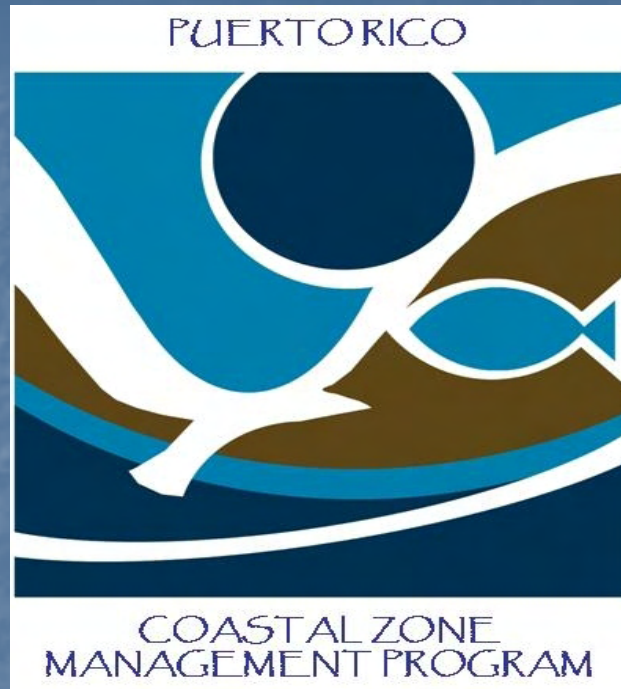
## FEDERAL PARTNERS

- NOAA OCRM
- NOAA NOS
- NOAA National Geodetic Survey
- US Geological Survey
- US Environmental Protection Agency
- Caribbean Fisheries Management Council
- International Institute of Tropical Forestry
- Natural Resources Conservation Service

## Technology:

**GIS**

**Remote sensing**



[www.drna.gobierno.pr](http://www.drna.gobierno.pr)

Southern and Caribbean Regional Meeting

Lafayette, LA

November 5-8