

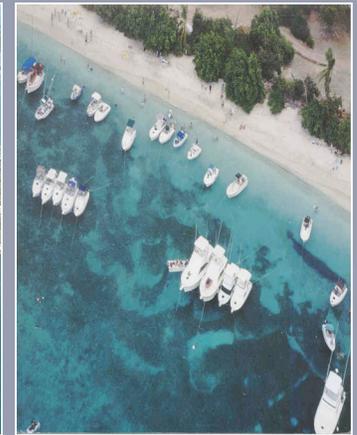


Land Based Sources and Coastal Nonpoint Pollution

Ernesto L. Diaz

Natural Resources Administration

Integrated Watershed Management



- **Water Resources Conservation and Management Plan**
- **Island-wide Land Use Plan**
- **Forest Legacy and Stewardship Programs**
- **Coral Reef Conservation and Management Program**
- **Coastal Zone Management Program**
- **Verdor 100 X 35**





CORAL REEF SYSTEMS MAJOR THREATS

- Land-based Sources of Pollution**
- Overfishing**
- Lack of Public Awareness**
- Recreational Overuse**
- Climate Change and Coral Bleaching**
- Disease**

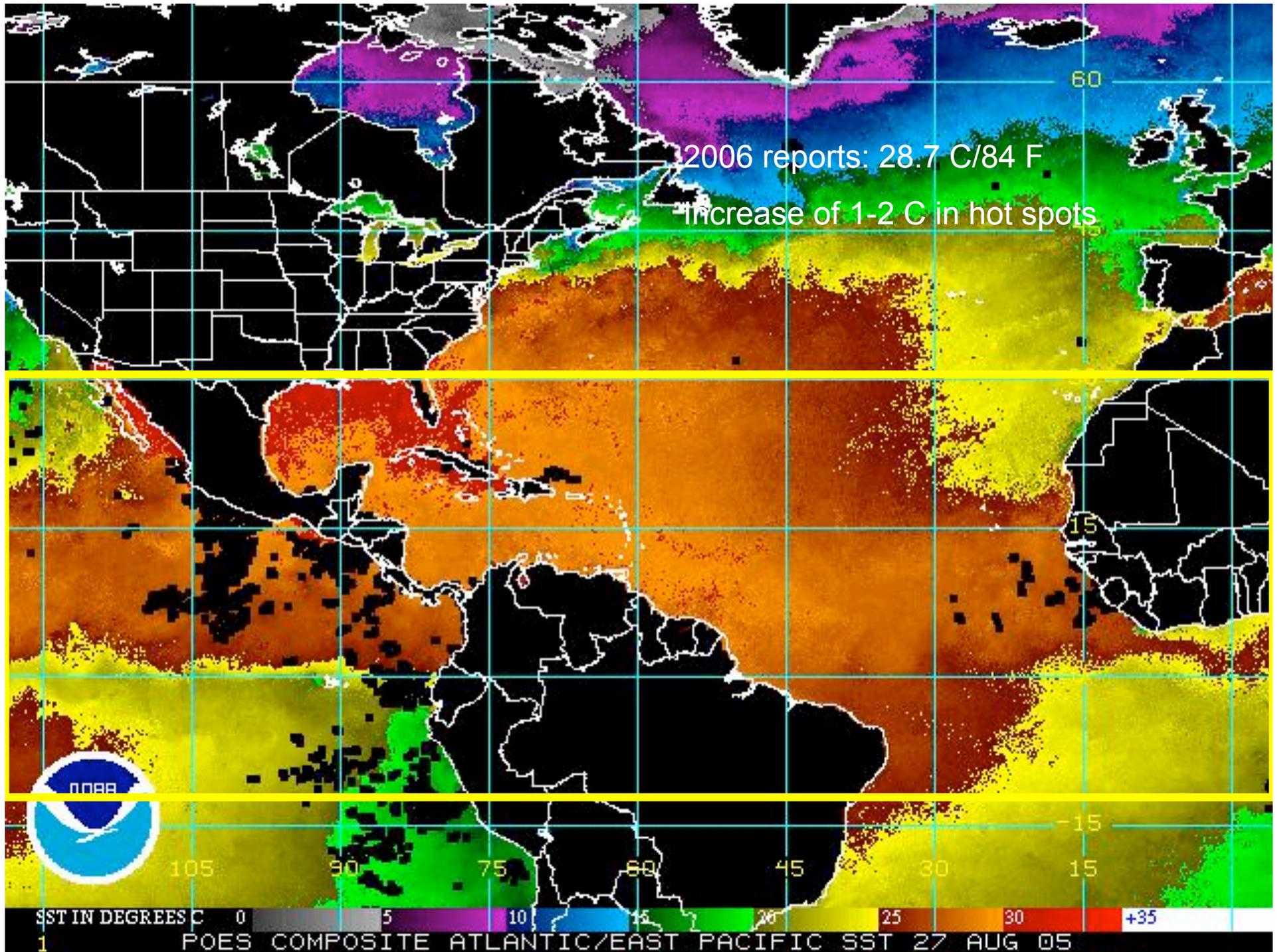
Coral Reefs



Coral reefs are massive deposits of CaCO_3 that have been produced primarily by corals (phylum Cnidaria, class Anthozoa, order Madreporaria/Scleractinia)

Reefs only develop in the tropics because of the presence of *hermatypic* corals. *Ahermatypic* corals occur in all oceans including polar, temperate and tropical regions. The main difference between the two types of corals is that most *hermatypic* corals have in their tissues small symbiotic plant cells called *zooxanthellae*.

Optimal reef development occur in waters where mean annual temperatures are 23-25 C. Some reefs can tolerate and develop in waters with mean annual temperatures of 18 C and other coral reefs can tolerate temperatures of 36-40 C.

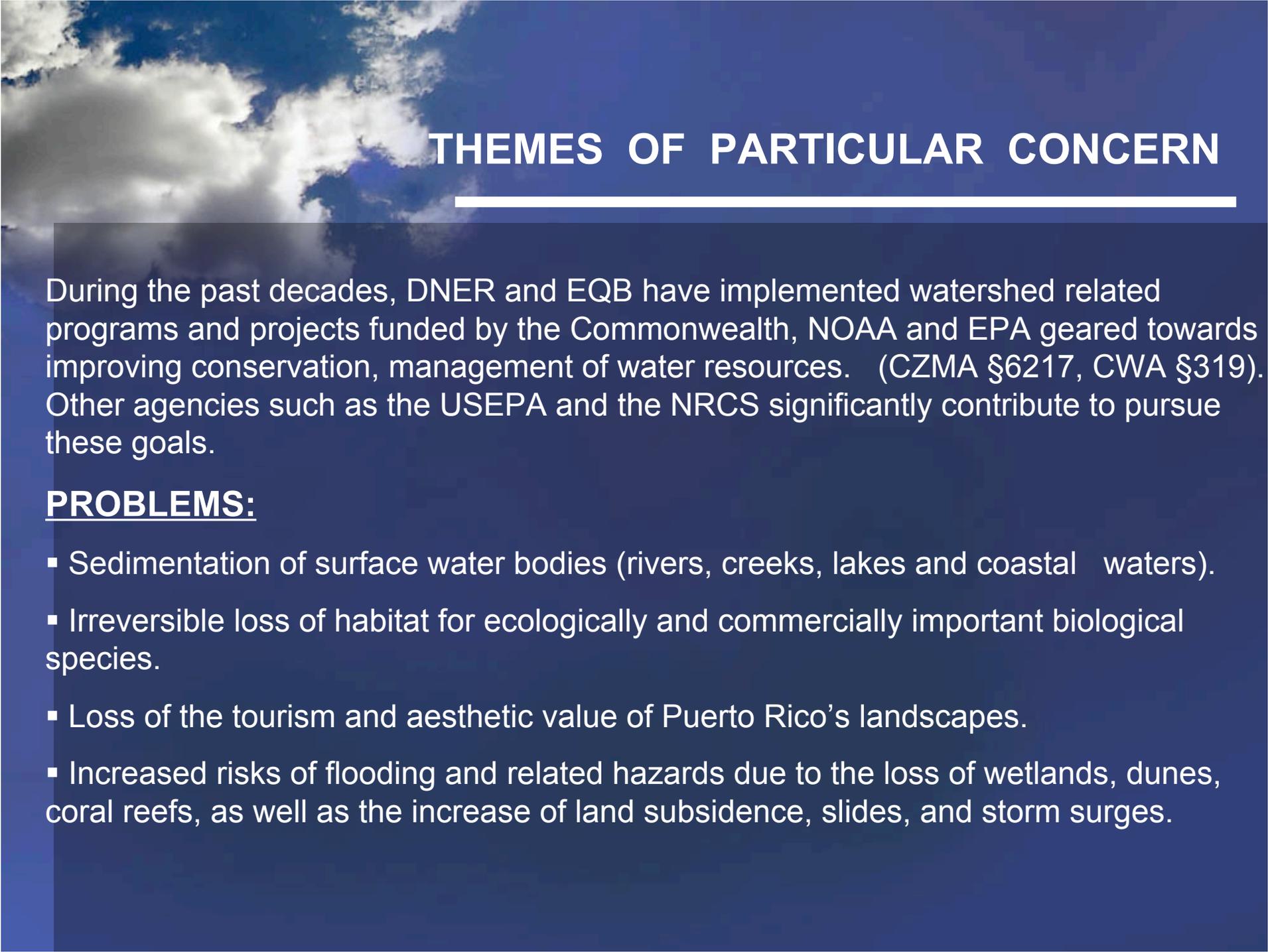




THEMES OF PARTICULAR CONCERN

- ❑ Coastal Nonpoint Pollution
- ❑ Storm water runoff management
- ❑ Storm water management within construction projects, lots, parcels
 - Water Injection in karst areas (sinkholes)
 - Poor design and maintenance of septic systems
- ❑ Inadequate selection of waste water disposal systems.
- ❑ Erosion and Sedimentation Control (CES) from **AG** and **URBAN** sources
- ❑ Best management practices implementation (BMP)

Self monitoring- Institutional Auditing system (...Is it a realistic option



THEMES OF PARTICULAR CONCERN

During the past decades, DNER and EQB have implemented watershed related programs and projects funded by the Commonwealth, NOAA and EPA geared towards improving conservation, management of water resources. (CZMA §6217, CWA §319). Other agencies such as the USEPA and the NRCS significantly contribute to pursue these goals.

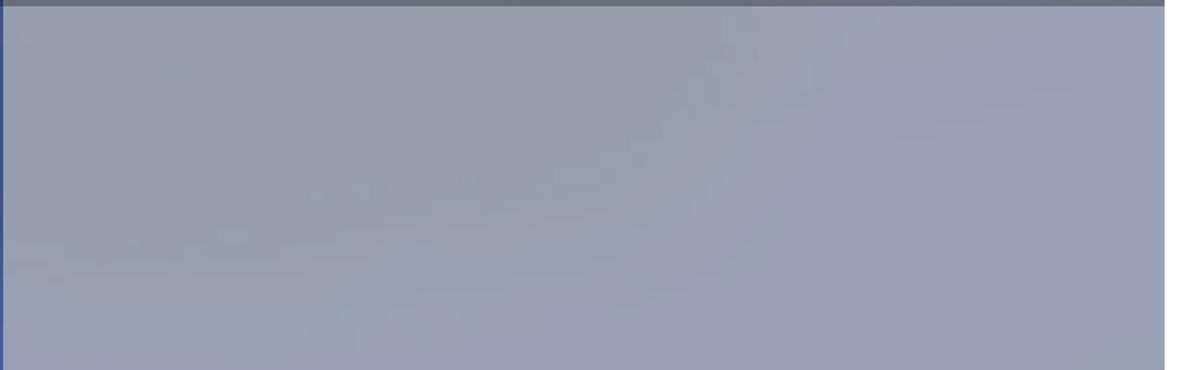
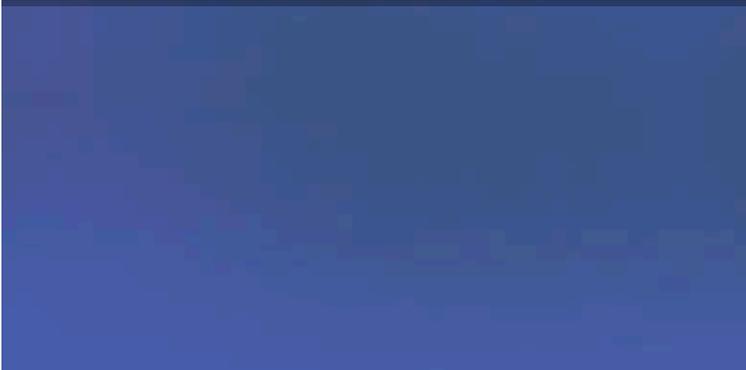
PROBLEMS:

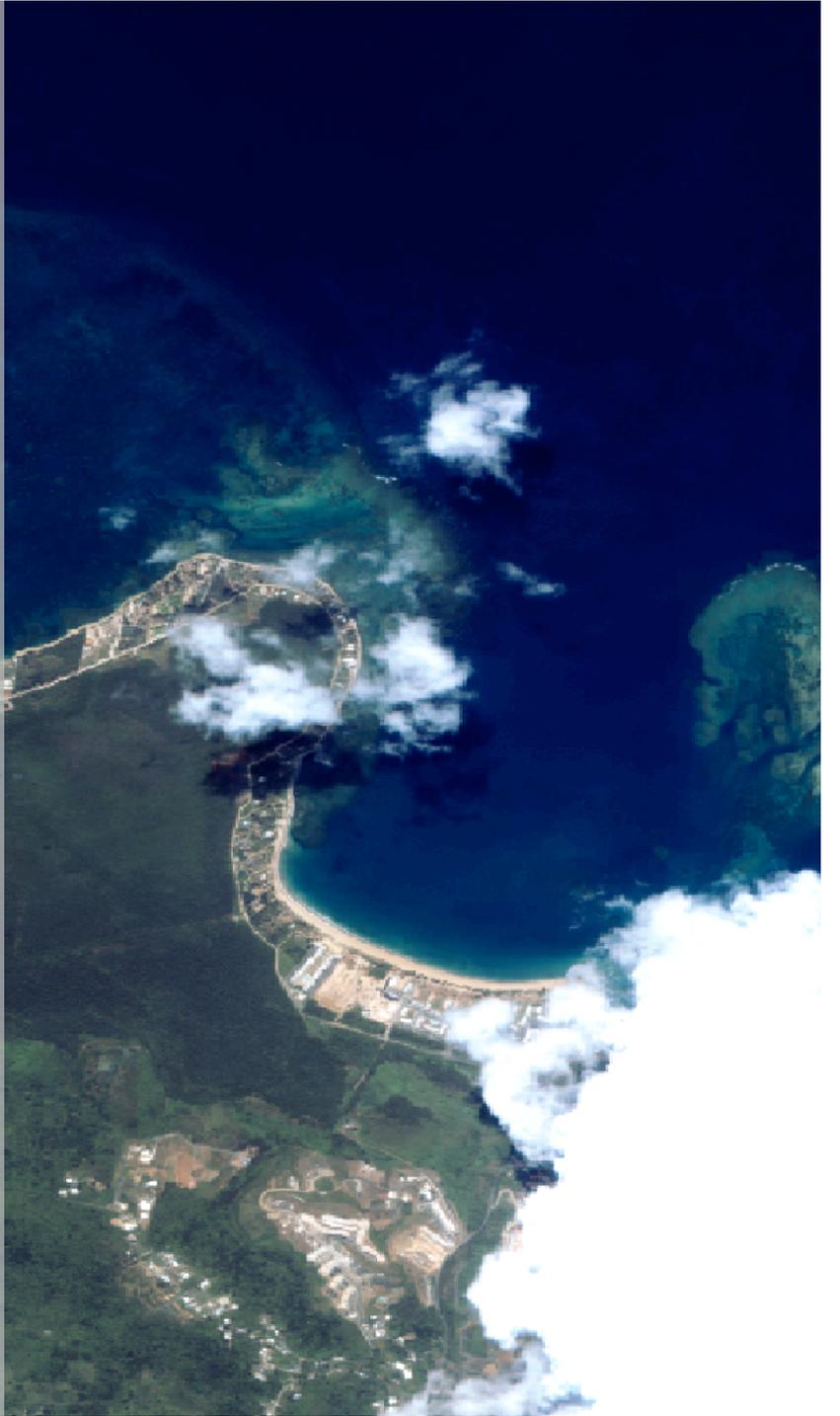
- Sedimentation of surface water bodies (rivers, creeks, lakes and coastal waters).
- Irreversible loss of habitat for ecologically and commercially important biological species.
- Loss of the tourism and aesthetic value of Puerto Rico's landscapes.
- Increased risks of flooding and related hazards due to the loss of wetlands, dunes, coral reefs, as well as the increase of land subsidence, slides, and storm surges.













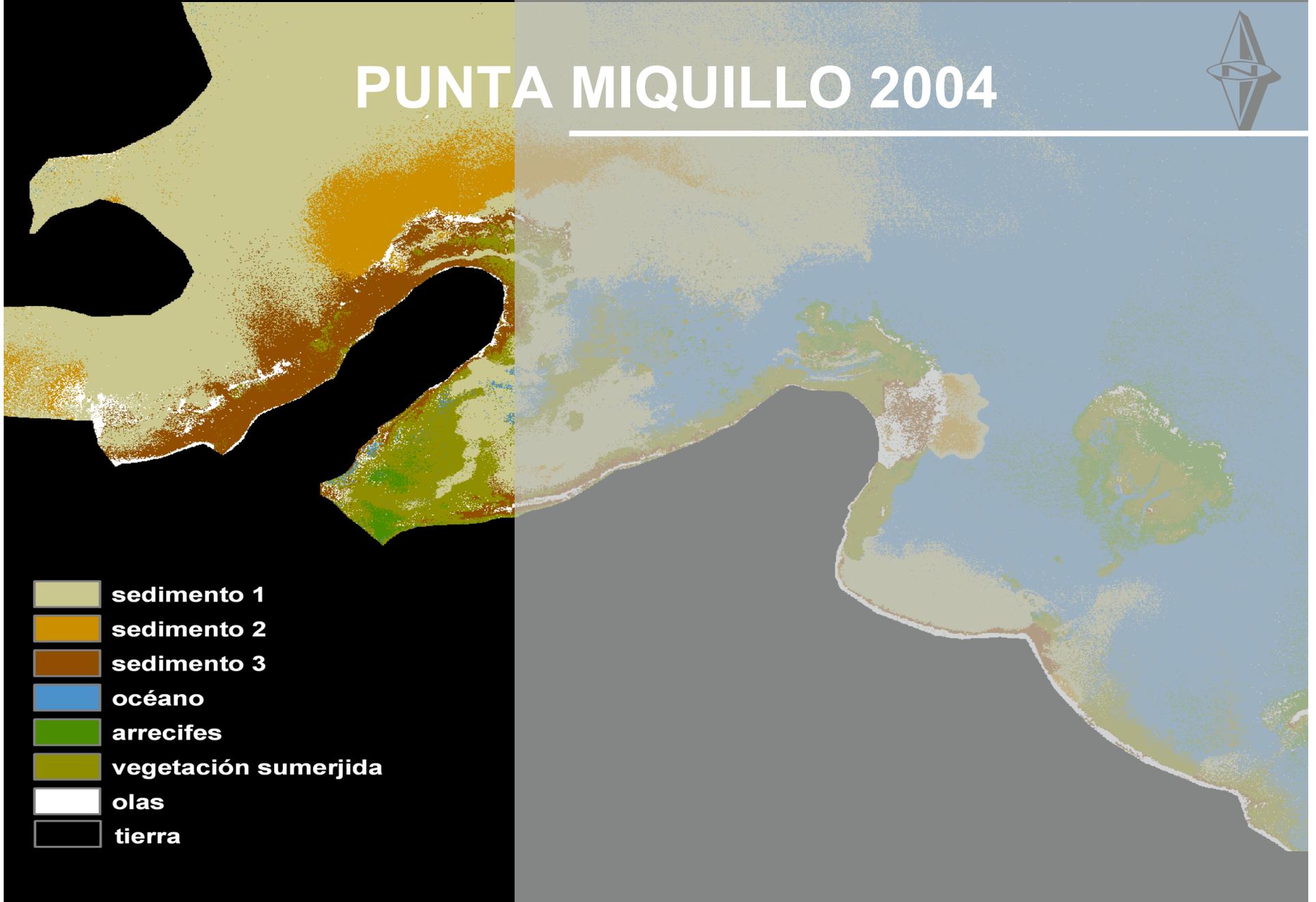


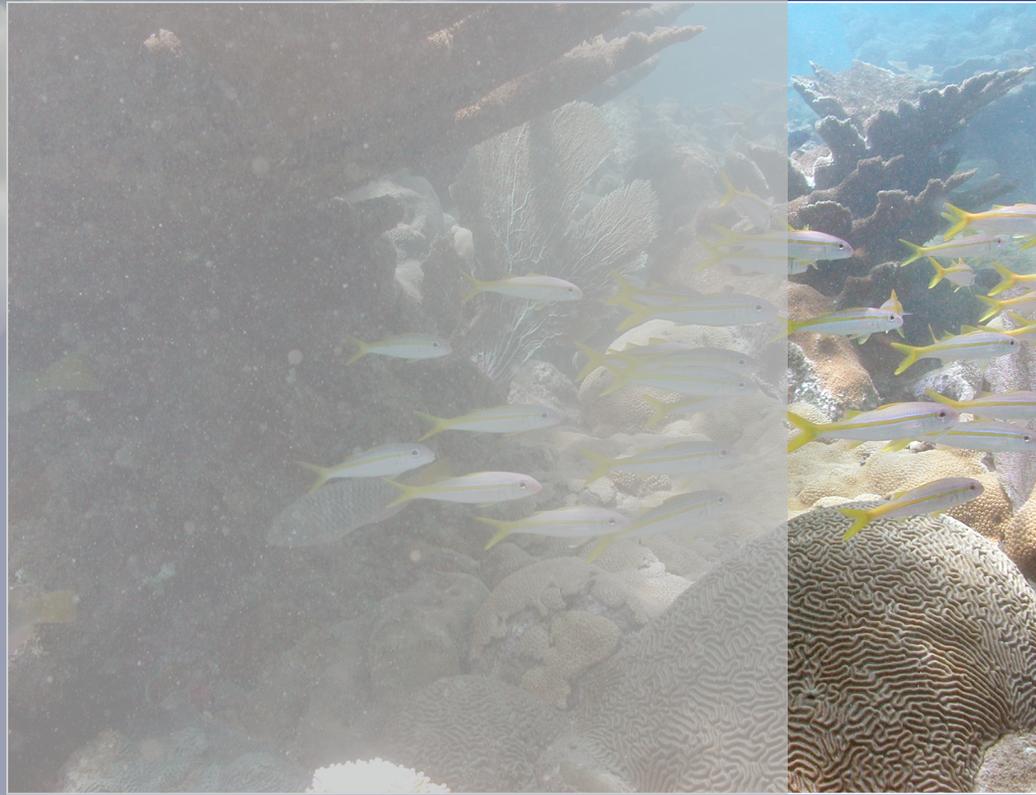


PUNTA MIQUILLO 2004



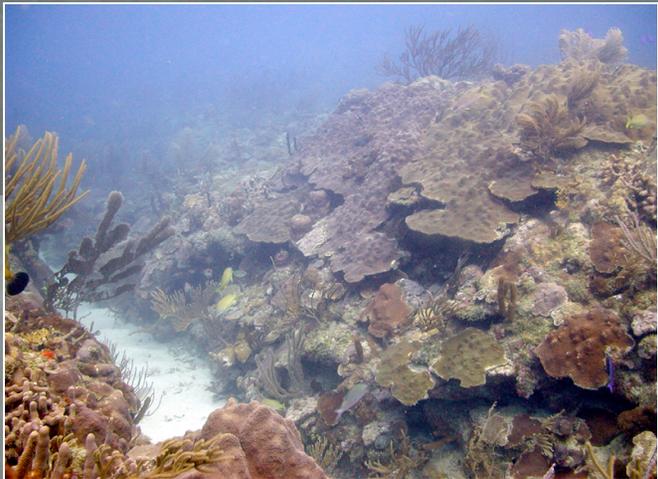
-  sedimento 1
-  sedimento 2
-  sedimento 3
-  océano
-  arrecifes
-  vegetación sumerjida
-  olas
-  tierra





WW2BW:

Land-water connection





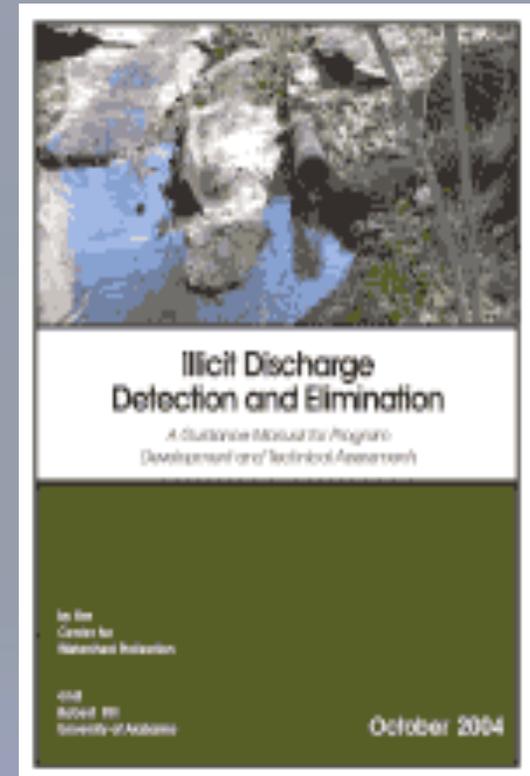
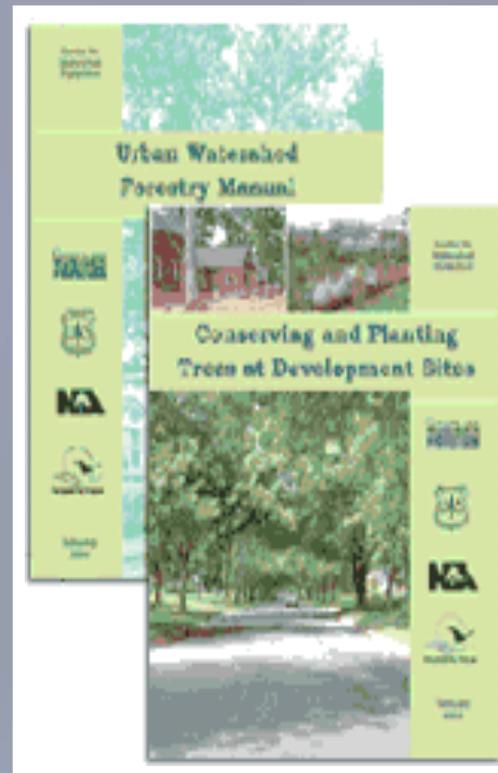
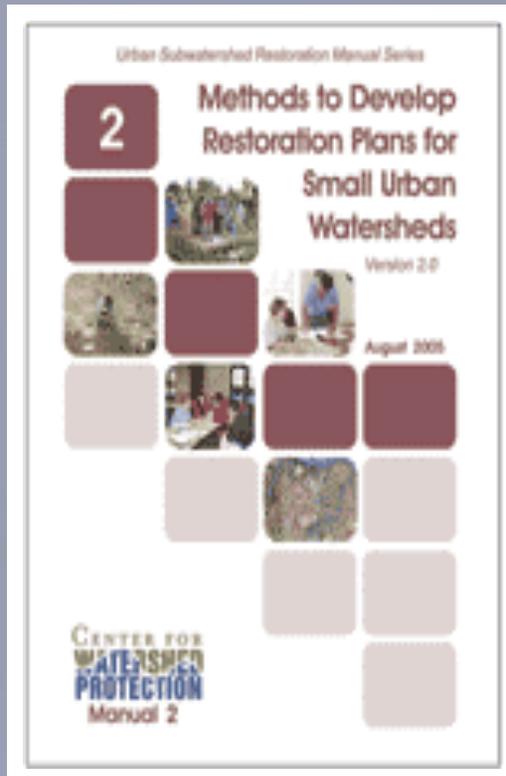


INTEGRATED WATERSHED MANAGEMENT

...an Interagency Approach



- **DNER** , **NOAA** and the **Center for Watershed Protection** developed a strategic alliance to provide advice and support to Federal, State and local governments, as well as to communities in order to protect **WATER RESOURCES**.
- Trainings and technical support include: Better Site Design, Urban Watershed Forestry Manual, Illicit Discharge Detection and Elimination, Methods to Develop Restoration Plans for Small Urban Watersheds, Conservation and Planting Trees at Development Sites.
- Watershed initiatives emphasize on the land-water connection and the effective implementation of the **BMPs** and **MMs**.
- New institutional arrangements regarding CES monitoring and enforcement are being formalized between EQB and DNER





EROSION & SEDIMENTATION CONTROL

- 📁👉 **Conservation of native or mature forests at development sites.**
- 📄👉 **Reduction of the development site preparation practice that eliminates ALL the vegetation previous to construction. This would improve stormwater management, control erosion, and reduce energy consumption.**
- 📄👉 **Optimize storm water management at development site.**
- 📄👉 **Use vegetative strips, filters, mats to control erosion and sedimentation wherever possible in stead of silt fences and hey packs.**
- 📄👉 **Increase incentives to protect mature vegetation at development sites and critical watershed areas.**

C/E analysis of Current implementation (Low-poor) vs.

C/E analysis of CES Self Compliance Monitoring, Auditing/Fines-Sanctions integrated process?

Can Self Monitoring be a reliable tool for water resources management?



The proposed Integrated CES SELF-MONITORING PROGRAM is based on:

1. Professional CES certification
2. Inspection by: EQB, DNER, PRPB, RPA & Federal agencies
3. Professional liability (Coordination with College Engineers & Surveyors and College of Architects)
4. Institutional Auditing processes by EQB-DNER); and
5. Rigorous and effective application of sanctions and fines.

STAKEHOLDERS: *Home Builders Association, Farmers Associations, Engineers, Architects, Contractors, Banks, Insurance cos.*



- **Environmental Management tools such as ISO 14000 and 14001 have proven to effective mechanisms to achieve environmental protection.**
- **Simplification of rules, reduction of the volume of legislation, and permit streamlining need to be combined with effective mechanisms of Public-Private regulation known as “co-regulation”**
- **For example in the Sixth Environment Programme, the European Commission declares *that...examining new methods of governance, including alternatives to traditional regulation such as voluntary commitments and agreements could improve the ability of enterprises to innovate and change...setting a regulatory framework establishing policy objectives and leaving the practical implementation measures to be defined by industry in a consensual manner, in support of the legal framework (“co-regulation”)***

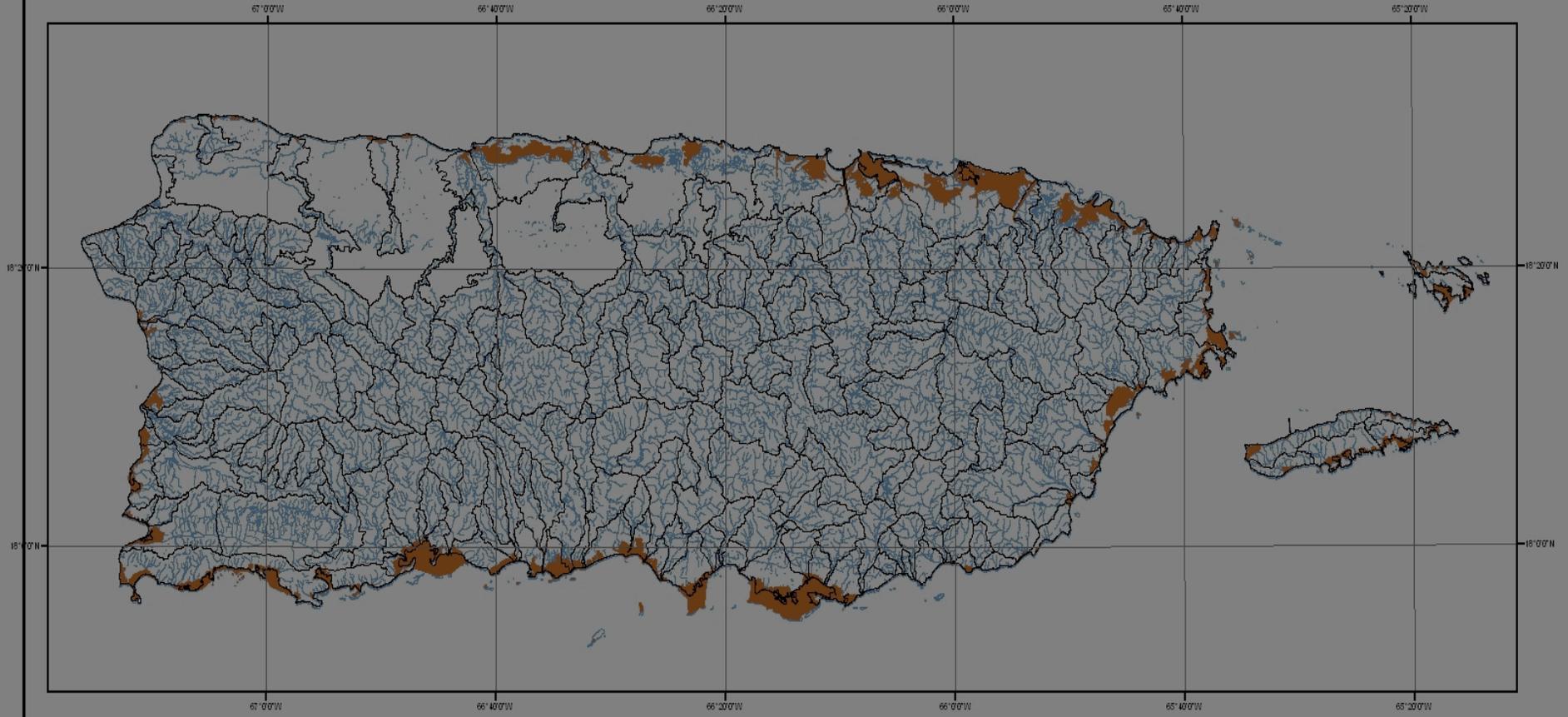


- **Environmental standards of excellence can be achieved if the system is developed with the participation of the Regulated community, government, professional associations such as the College of Engineers and Surveyors, and representative members of the population, the Academia, and NGOs.**
- **Government agencies will not delegate or abdicate regulatory responsibilities.**
- **Even if the regulated community proves to be willing to go beyond compliance, Regulatory agencies must continue to monitor and to perform unannounced audits and surveillance checks to verify that the system is working properly.**
- **The effective and exemplifying fines and sanctions established by Laws and Regulations are actions that complement the system and consequences include paralyzing the development or failure to receive the final “use permit” by RPA.**

Leyenda

- Cuencas hidrográficas
- Humedales estuarinos
- Hidrografía

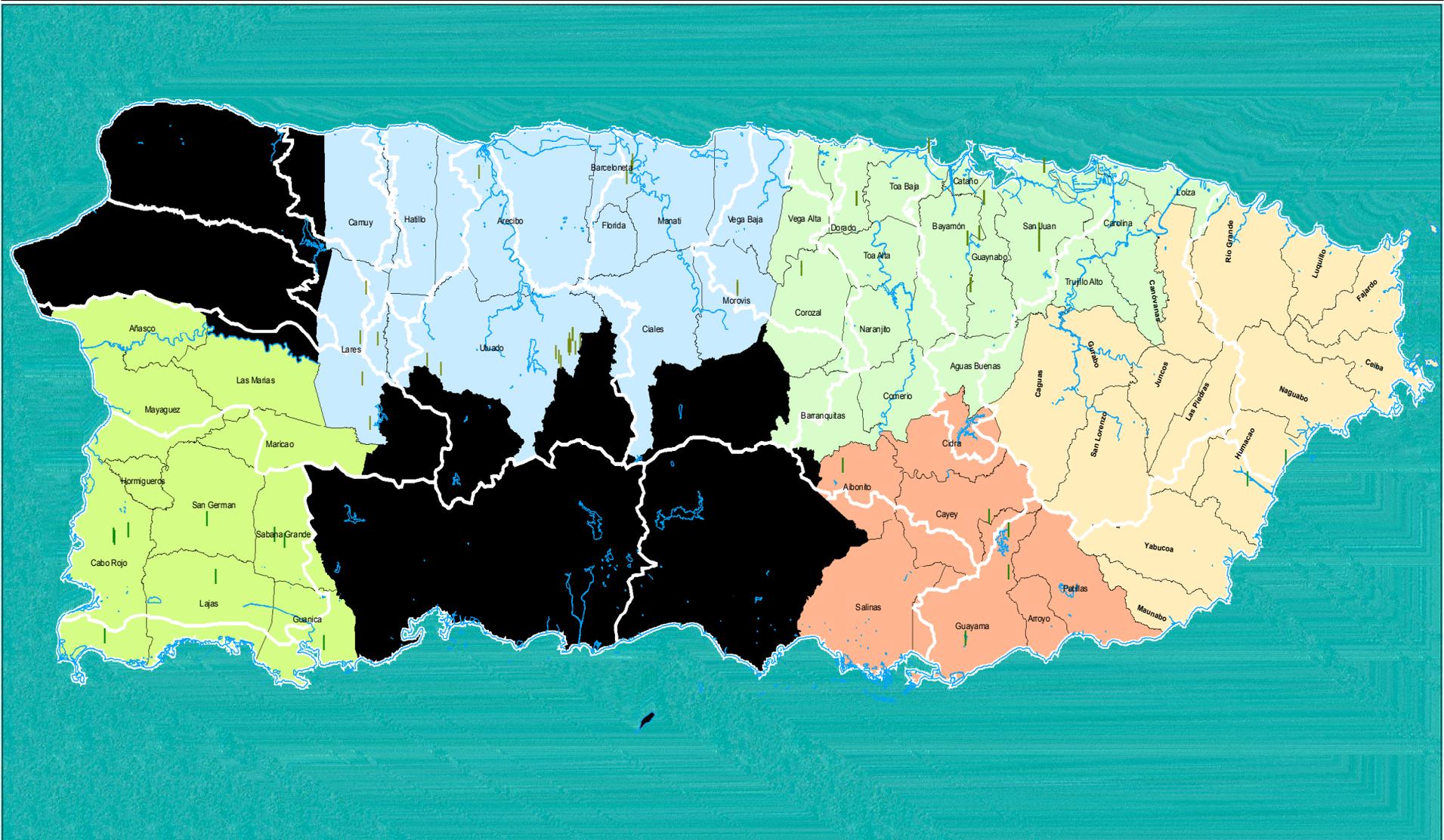
North arrow
Escala - Scale : 1:850,000



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



MAPA DE LAS REGIONES DEL DRNA DEFINIDAS POR SUS CUENCAS HIDROGRÁFICAS



Mapa: msued/DIF-NSF-DRNA, 2006



Regiones

- 1 región HUMACAO
- 2 región SAN JUAN
- 3 región ARECIBO
- 4 región AGUADILLA

- 5 región MAYAGUEZ
- 6 región PONCE
- 7 región GUAYAMA
- cuencas hidrograficas





- **Joint Federal, Commonwealth, Stakeholders summit: 2006-2007**

...Opportunity to discuss other relevant issues with the regulated community:

- *Submittal of Incomplete Environmental Impact documents and permit requests resulting in unnecessary delays of decisions.*
- *Documents containing contradictory information, data, maps and blueprints.*
- *Permit Streamlining and Self monitoring while assuring high quality decision making*

