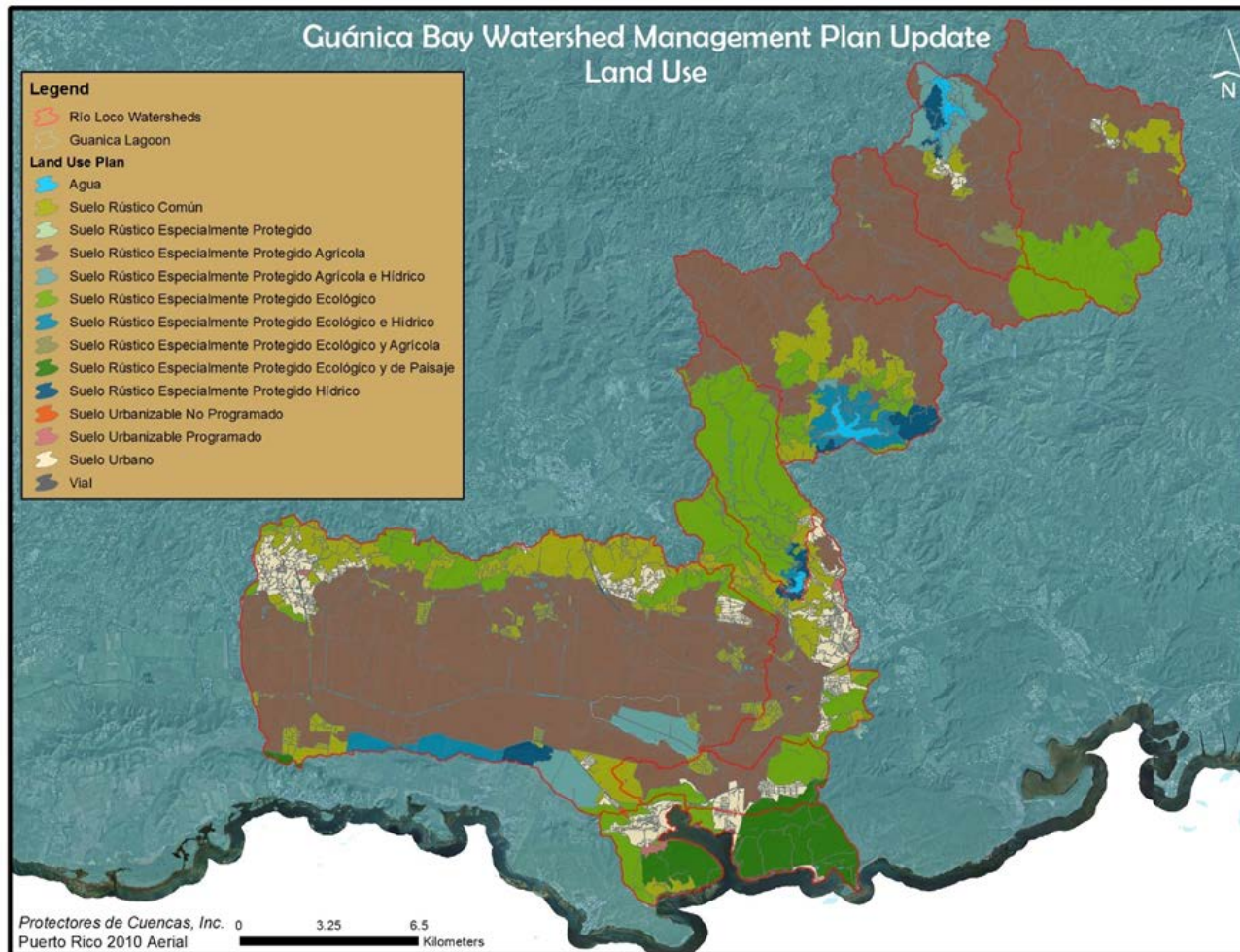




# The Guanica Bay Watershed Management Plan: A Pilot Project for Watershed Planning in Puerto Rico

- The ***Guanica Bay Watershed Management Plan*** was Completed in 2008.
- Coordination Efforts 2010-Present
- Implementation 2012-Present
- Update 2015-Present



## UPDATE:

- Address the EPA's nine elements of a watershed management plan
- To date, 65% of the updated document has been drafted.
- Updating a watershed characterization based on new develop land use information provided by the Puerto Rico Planning Board (2015)
- Updates from the restoration activities that has been developed.
- Update estimated pollutant loads applying the Watershed Treatment Model.
- Final updated draft of the Plan is expected to be completed by August of 2017.



# Guánica Lagoon

- From 2010-2013 **major improvements** had been achieved.
  - Strong Commitment from the Puerto Rico Government in General
  - Soil Salinity Study
  - H & H Study
  - Farm Inventory
  - Socioeconomic Study
  - 65% engineering Design
  - Environmental compliance
- An **important drawback** in the restoration efforts raised (2013)
  - Intentions of the DA to regain farming activities inside the historic footprint of the Guanica Lagoon.
  - PRLA started **clearing wetland** areas for farming without any environmental compliance process and public engagement.
  - Most of our **efforts** were dedicated to **protect** the Lagoon
  - **Legal action** was taken with the USACE and EPA
- PRLA was **fined** and a precedent was established for wetland protection
- **No clearings** for the past 3 years
- Current Administration stepping back
- NRCS has approved **funding** to implement conservation practices in the subwatershed of the Lajas Valley.



## **Next Steps:**

- A series of meetings are being coordinated that will take place in the following months with new Government officials to present the project and gain support from the new Government administration.
- Another set of meetings will be coordinated with the farming community to ensure their participation in the process and to reopen the possibility of an agreement of the difference in public policy towards the land in the Lagoon area.
- An outreach and education campaign

# Río Loco River Restoration

- NRCS implementation of 3 major restoration projects on the Río Loco river to restore river banks with bioengineering strategies that included the implementation of a collaborative effort to apply hydroseeding on the restored areas by Protectores de Cuencas, Inc.
- During this process, most of the old abandoned irrigation infrastructure inside the river that was identified in the Watershed Management Plan as priority to be removed were taken out of the river.
- 2 sites remaining that we have secure funding from the DNER to remove them in the following year

## **Next Steps:**

- Currently working on Enviromental Compliance
- Debris removal for next year



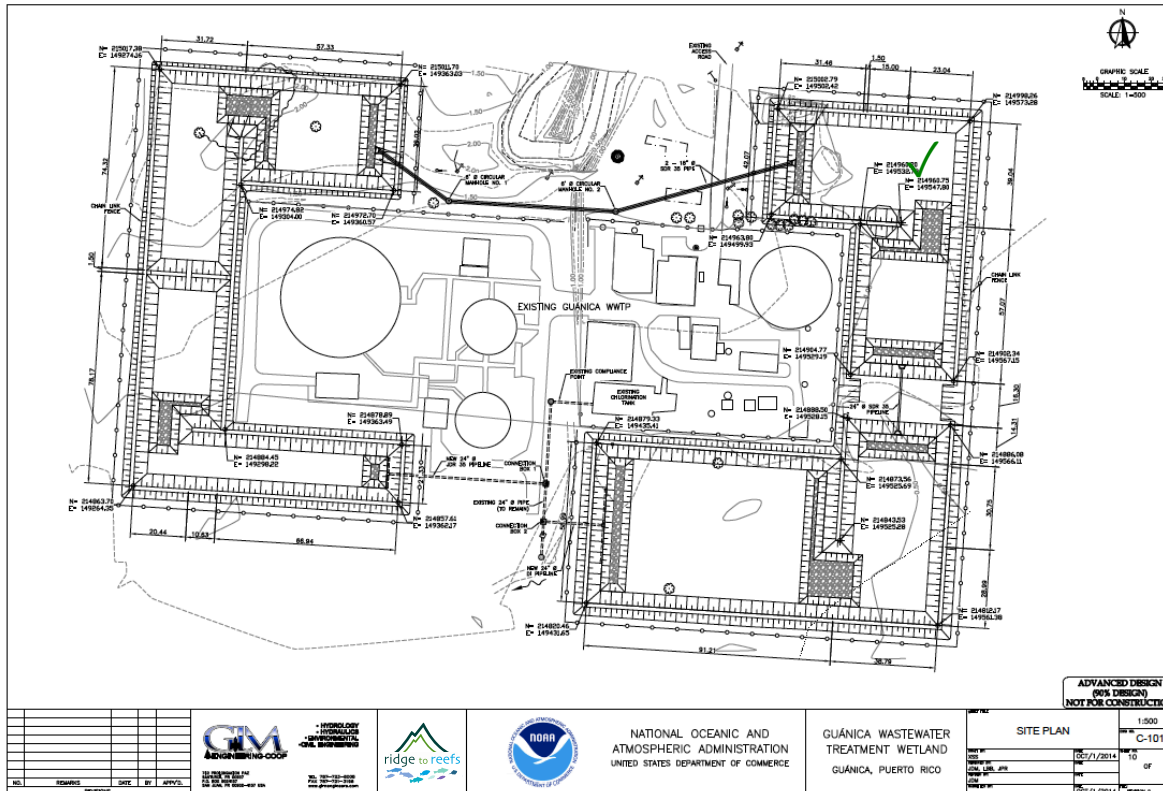


# GUÁNICA TREATMENT WETLANDS

- 100% engineering designed
- 100% of permit process completed
- Close to final MOU with PRASA
- NPDS Permit Issue Resolved

## Next Steps:

- Coordinate with community and Municipality
- Start Construction



NATIONAL OCEANIC AND  
ATMOSPHERIC ADMINISTRATION  
UNITED STATES DEPARTMENT OF COMMERCE

GUÁNICA WASTEWATER  
TREATMENT WETLAND  
GUÁNICA, PUERTO RICO

DATE	02/1/2014
BY	01/01/2014
REVISED	

# REDUCING SEDIMENT TRANSPORT/ UPPER AREA

## *Shade Coffee Roundtable Initiative*

- Instigated by Protectores de Cuencas in March 2011.
- Farmers, Academia, NGO's, State and Federal Agencies.
- To develop criteria for shade coffee certification for Puerto Rico
- Identify incentives for motivating coffee producers to continue to use historical agricultural practices that are sustainable and environmentally friendly
- Help create economic niches for the coffee produced in the shade that can be marketed separately and that results in greater profits for producers.
- Continue working towards the institutionalization of these practices and programs
- PDC identified and enrolled 10 farmers interested in obtaining the shade coffee certification.

### *Next Steps:*

- Finalize Certification Process.
- Foundation of a Certification Entity.
- Certify 10 farmers and include Certification Logo in 3 Coffee Brands.



## *Expanding Conservation/Sediment Control Practices*

- Implementation of Hydroseeding Techniques
- Collaboration on a sedimentation assessment Dr. Ramos.
- 95% of sediments come out from dirt roads in coffee farms
- NOAA Domestic Grant
- 3 Farms engaged
- 8 Different BMP implemented, tested and evaluated for effectiveness
- New Proposal submitted to expand Efforts to Sea Grant Program

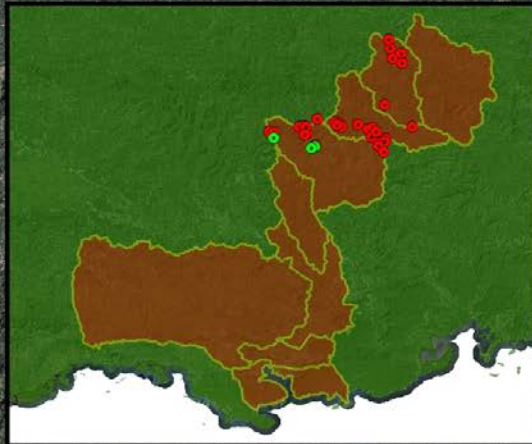
### *Next Steps:*

- New Proposals submitted to expand Efforts to NFWF and NRCS
- Certified conservation practices on NRCS programs








# Guánica Bay Watershed Coffee Farms Dirt Road Stabilization



Lago Prieto

Lago Luchetti

## Legend

-  Implemented Sites
-  Potential Farm Sites
-  Río Loco Watersheds

Protectores de Cuencas, Inc. 0 1.5 3  
Puerto Rico 2010 Aerial Kilometers



# SOURCE AREA POLLUTION

## *Pollution Tracking IDDE*

- Proposal to NFWF for IDDE and Demonstrative Project in the Río Loco Main Tributaries
- First round in pollution targeting

### *Next Steps:*

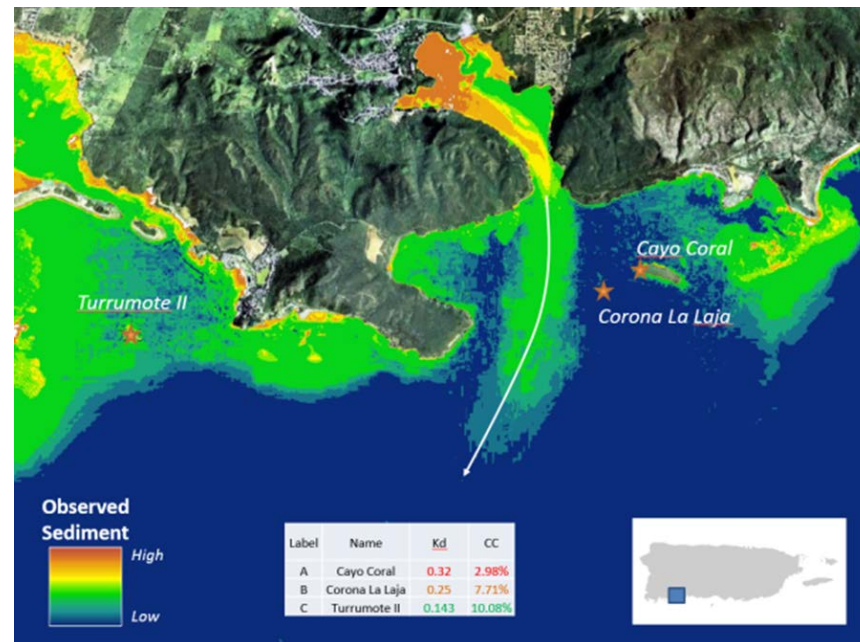
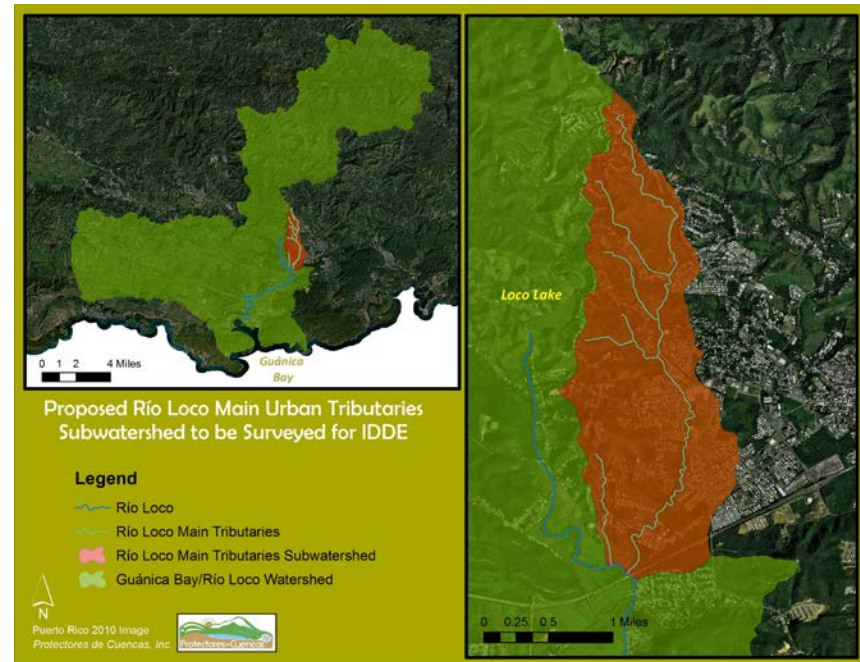
- Data analysis and projection
- Next round of samplings
- Submit Interim report
- Design of Pilot SWP project
- Implement Demonstrative project
- Conduct Additional EDDE in other areas of the coastal communities in Guánica
- Meeting and field visit with EPA and PRASA

## *Monitoring*

- Meeting with all partners conducting Monitoring
- Identification of Monitoring sites
- Proposal submitted to NOAA Domestic (UPR and NASA) for Baseline Remote Sensing Water Quality Assessment and characterization
- Proposal submitted to Sea Grant to continue with NASA monitoring.

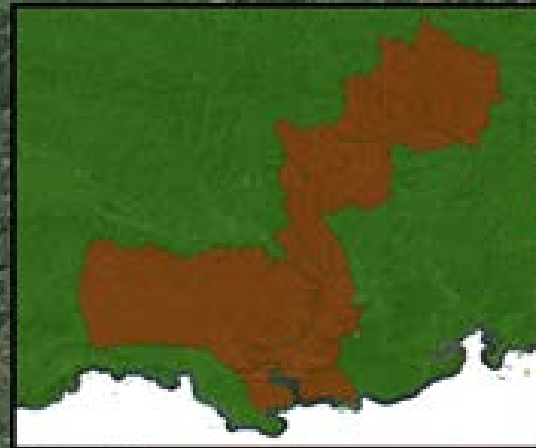
### *Next Steps:*

- Identify additional funding sources to continue monitoring
- Monitor Implementation SWP project in Malecón area



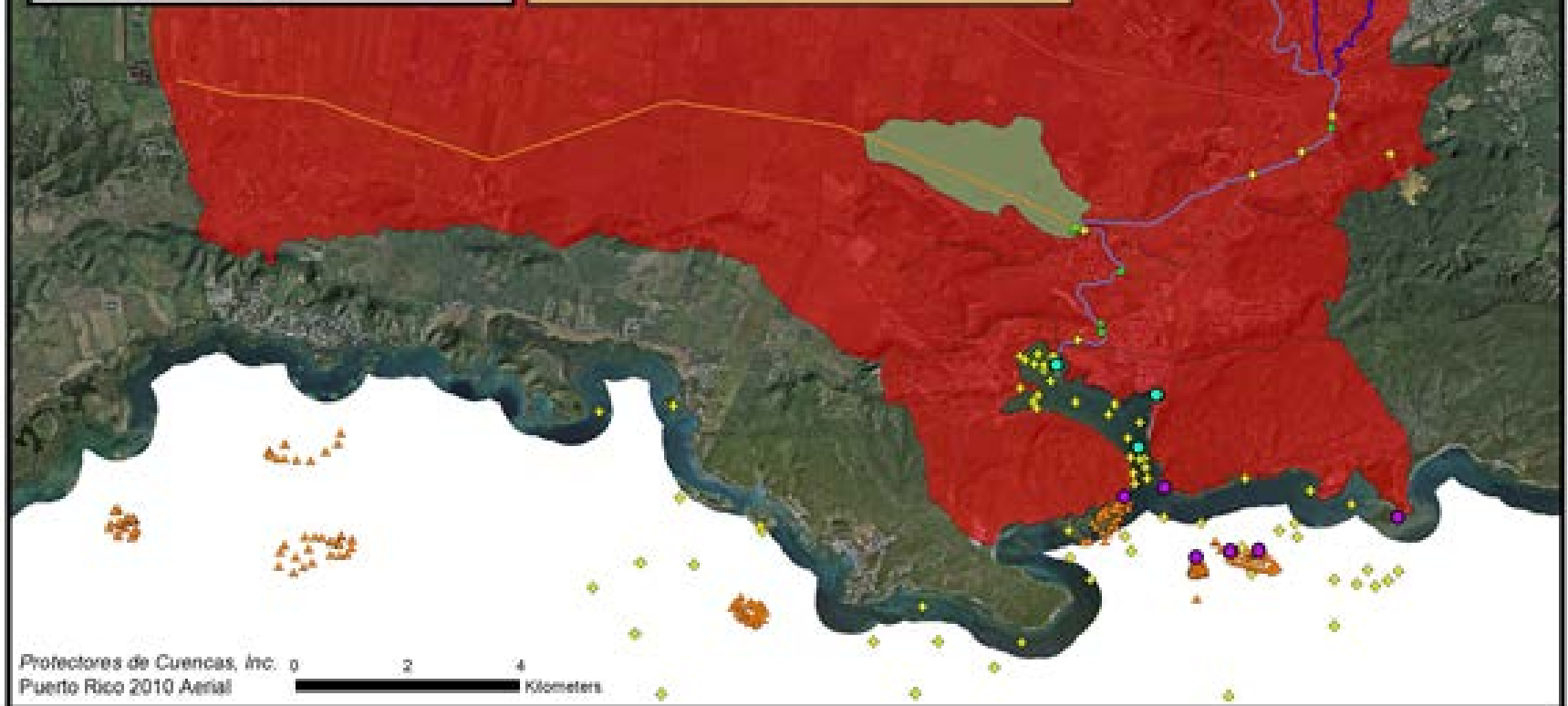


# Guánica Bay Watershed Monitoring Sites



## Legend

- Rio Loco Watersheds
- Rio Loco
- Lajas Valley Drainage Channel
- Guanica Lagoon
- Rio Loco Main Tributaries PDC IDDE Survey Area
- Villa Nova Water Sites
- Villa Nova Reef Sites
- UPR-RP/NASA Reef Transect Sites
- UPR-RP/NASA Sample Sites
- NOAA Whittall/UPR-M Sites



# POSSIBLE APPLICATION AND NEEDS FOR PUERTO RICO AND BEYOND

1. Helping to demonstrate the benefits of restoration efforts (land/boat based water quality measurements are limited by time and funding) – Guánica WWTP
2. Helping to reinforce the identification of significant pollution sources
3. Further resolving nearshore and shallow site measurements
4. Ability to report parameter measurements with estimated error
5. Efforts in Lakes
6. Support for higher resolution DEMs or Lidar type products
7. Encouraged by user-friendly products in development
8. Cognizant of challenges with sediment and limited magnitude of change









# Sustained Watershed Management

- Building Sustainable sources of Funding
- Co-management Guánica Dry Forest
- Ecotourism
- Puerto Rico Tourism Company

## *Next Steps:*

- Coordination Efforts Summarized Report
- List of all funding sources and partners
- WMP Update
- Private Funders
- Conversations with Puerto Rico Government and NOAA for long term coordination efforts funding





# INSTITUTIONAL CAPACITY BUILDING

## *Native Plants Nursery*

- NFWF Funds
- More than 60,000 plants produced
- Restoration Projects across the Island
- Expected to produce over 100,000 plants by the end of the year
- Additional 2 acres of land From Yauco Municipality to expand maturing area



## *Monitoring Equipment*

- HACH 2100Q Portable Turbidimeter
- HACH SL1000 Portable Nutrient Multiparameter
- YSI Multiparameter
- HANA Ammonia Medium Range Portable Photometer - HI96715
- IDEXX Quanti-Tray System for bacteria



## *Restoration Equipment*

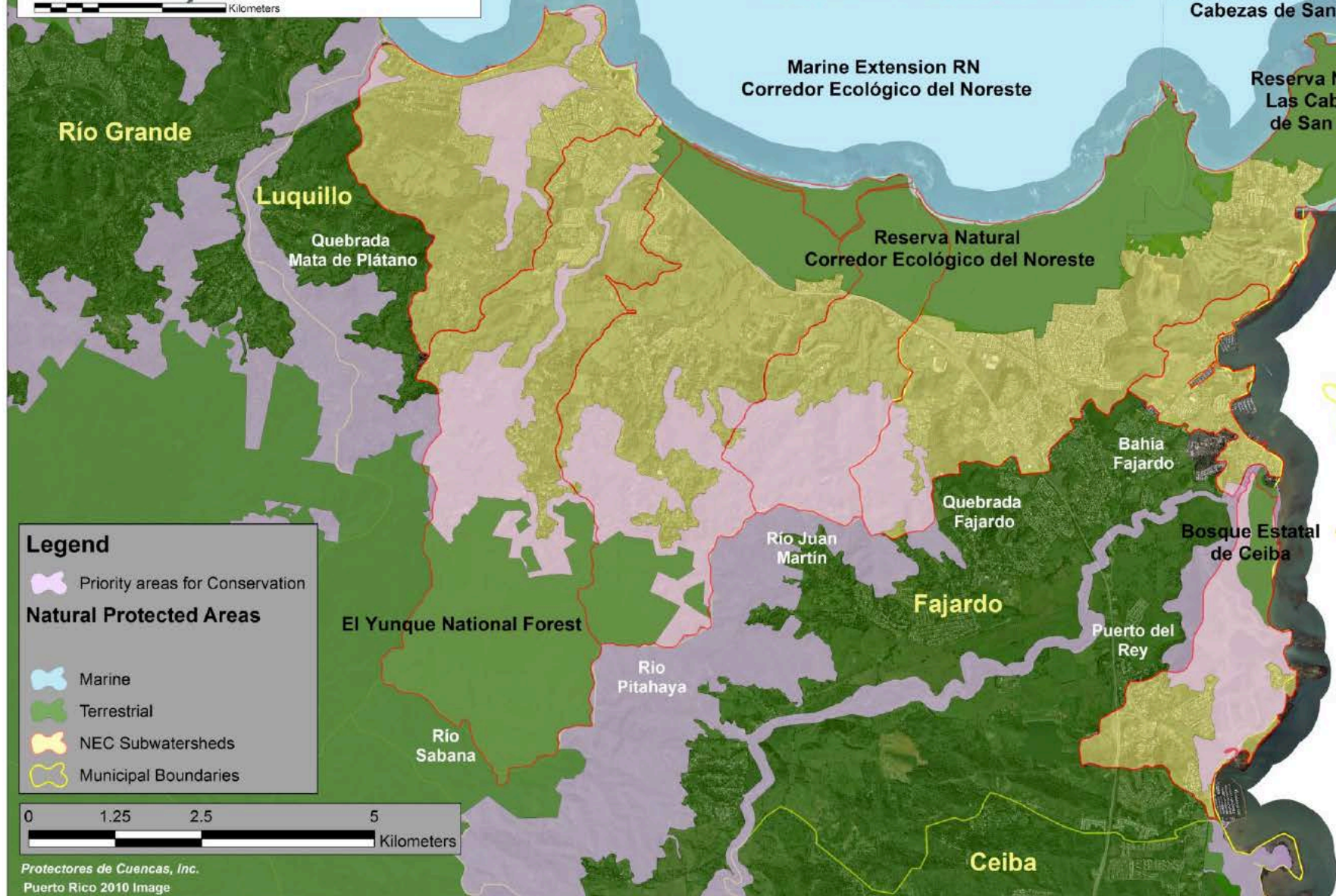
- 5 4x4 Pick up trucks
- 1 6m Dump Truck
- 1 Backhoe
- 1 Bulldozer
- 1 Compacting Roller
- 1 Skid Steer
- 3 water truck
- 6 trailers
- Hydromulcher



## *Staff:*

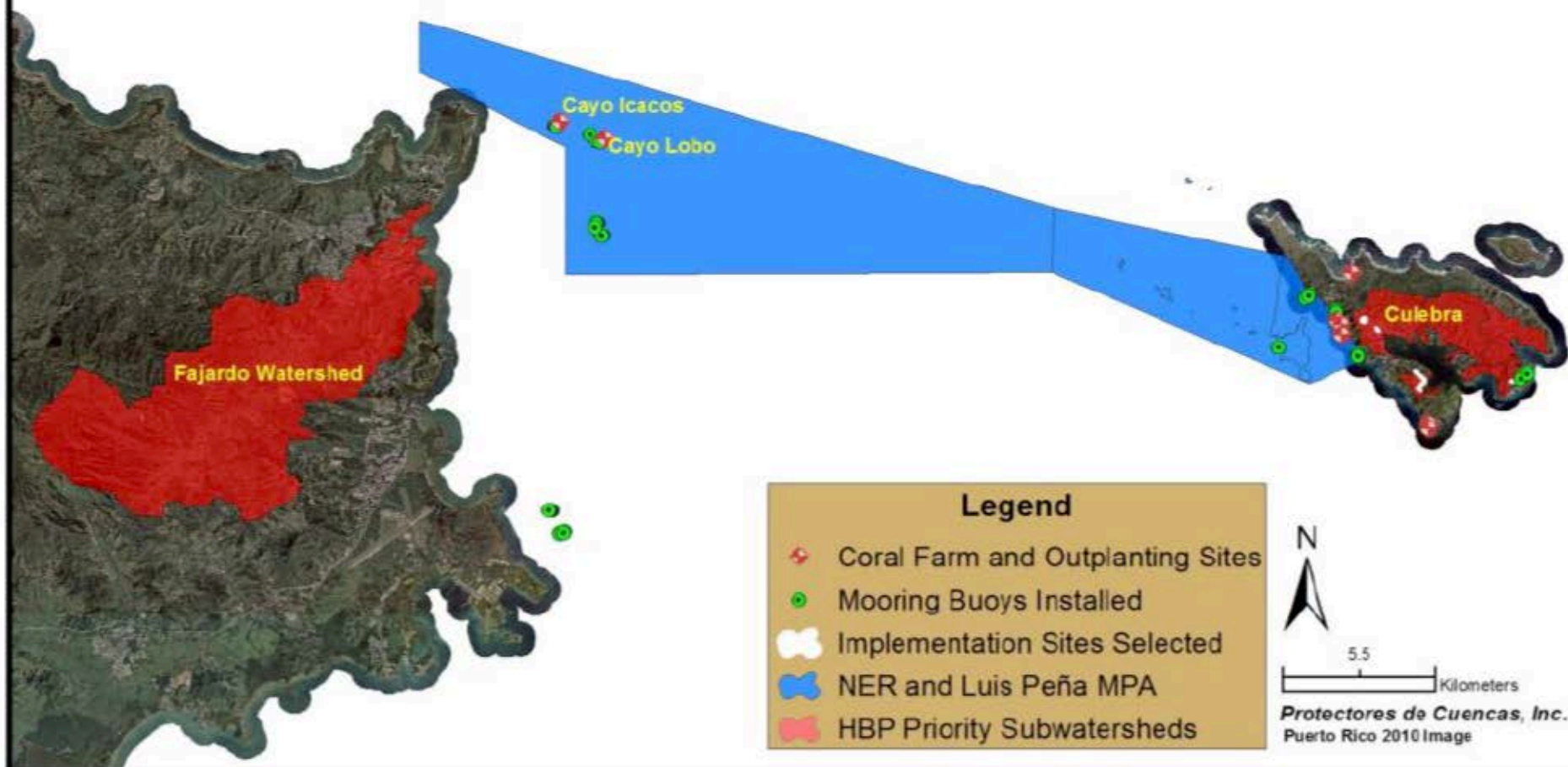
- 5 Technical Personnel
- 20 General Labor experts in BMP and Green Infrastructure Implementation







# NER Cordillera and Culebra LBSP Reduction and Coral Population Enhancement Selected Sites









# Partners



Yauco



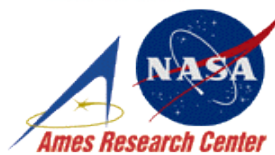
Guánica



Guayanilla



Lajas



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The University of Texas at Austin  
Teresa Lozano Long Institute  
of Latin American Studies





# THANK YOU!



Paul Sturm

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