

Focal Area: Land Based Sources of Pollution

The core group that developed the strategy for addressing issues on land based sources of pollution concluded that in order to reduce sediment and pollutant loadings to coastal waters Federal and Commonwealth agencies must require and enforce best management practices (BMP's) and preventive management measurements (MM's) per land use and activities. BMP's and MMs have been developed and implemented for different levels and categories of non-point sources of pollution as part of the Coastal Management Program. The projects identified by the LBS Strategy are important for all the watersheds in Puerto Rico, however pilot projects are being implemented at the Jobos Bay National Estuarine Research Reserve (JBNERR) watershed.

These strategies address the impacts to coral reefs caused by erosion and sedimentation transported by runoff, rivers and creeks. The land-based sources of pollution (LBS) planning group based their workplan on the Puerto Rico's Coastal Nonpoint Source Pollution Plan. This document was developed by DNER in coordination with 15 commonwealth agencies and 6 federal advisory agencies and includes information provided by local scientists. This plan considers fine sediments transported by ocean currents (which depend on local patterns of water circulation near the coastal zone) as main pollutants and stressors affecting coral reefs. Agricultural compounds and nutrients were also identified as major stressors to wetlands and coral reefs within the watersheds. In order to address problems affecting corals, key projects were identified that entail the BMP's and MM's by: 1) category type of non point source pollution which include agricultural, urban, marinas, wetlands, etc. 2) inventory of all the non point sources of pollution and 3) training for agronomists and marina operators.

The proposed projects are being implemented in watersheds that are affected by: intensive agricultural activities, urban areas, high number of septic tanks and areas with large land cover removal. These pilot projects are being implemented in the JBNERR watershed and will be subsequently replicated at important watersheds on the island municipality of Culebra, Arrecifes de la Cordillera, Añasco, La Parguera, Guánica and Cabo Rojo as identified by the Coastal Nonpoint Source Pollution– Coral Reef Committee. The group of people working on this strategy includes representatives from state and federal agencies that manage or regulate activities that may impact coral reef ecosystems in close coordination with university and local community representatives.

Focal Area: Land Based Sources of Pollution

Goal 1: To reduce the loss of live coral reef cover through the promotion and implementation of integrated watershed and land-use management

Objective 1.1:

To reduce sediment and nutrient loading in coastal waters by implementing nutrient management plans in 500 acres of agricultural land.

Project 1.1.1: Establish priority conservation areas for the implementation of vegetative conservation practices.

Description: Identify priority conservation areas using the NRCS and Puerto Rico Department of Agriculture (PRDA) database in order to recommend the best management practices for the selected sites/farms.

Lead Group: NRCS

Proposed Partners: PRDA, UPR Cooperative Extension Service and JOBANERR.

Timeline: 7/30/03 to 6/30/06

Products and Outputs: GIS database on priority areas for the implementation of vegetative conservation practices.

Expected Costs: \$6,000

Proposed Funding Source: NRCS, JOBANERR

Project 1.1.2: Establish vegetative conservation practices in priority areas.

Description: After identifying priority conservation areas, encourage farmers/land owners to preserve vegetation within selected areas.

Lead Group: NRCS

Proposed Partners: PRDA, UPR Cooperative Extension Service, JOBANERR

Timeline: 7/1/02 to 6/30/03

Products and Outputs: More farms using vegetative conservation practices.

Expected Costs: \$15,000

Proposed Funding Source: EQIP, CRP, CTP, CNP

New Staff, Training & Technical expertise needs: Train PRDA agronomists that prepare conservation plans.

Update: a one day training was provided to a group of agricultural producers of the Jobos Bay Estuary Watershed, training included conservation practices and USDA program applicable to agricultural enterprises within the watershed. A fact sheet in Spanish was distributed to make farmers aware of farming operations impact to coral reefs and the Farm Bill program opportunities to reduce nutrients, pesticides, erosion and sedimentation at Jobos Bay Estuary. Another one day workshop was provided to state agency agronomists working in the Jobos watershed. The main topic of this workshop was conservation planning for

erosion control and water quality in the watershed. There's a need to identify new watersheds for project implementation. NRCS is available and can provide training to agronomists, however new funding as well as other agency or group has to be identified to develop project logistics.

Project 1.1.3: Characterization of Star Grass efficiency for soil retention and nutrients absorption.

Description: Star grass is recommended for vegetative conservation practices. However, additional research is needed to identify its soil retention and nutrient absorption capabilities.

Lead Group: NRCS

Proposed Partners: land owners, PRDA, UPR Cooperative Extension Service

Timeline: 10/1/05 to 9/30/06

Products and Outputs: research report

Expected Costs: \$ 40,000

Proposed Funding Source: NRCS

Project 1.1.4: Pilot project for coffee sowing using "Media Luna" practices.

Description: A new coffee sowing method is under research to improve water, fertilizer and soil retention. The technique is being developed to be used on individual trees and will be implemented on coffee plantations in western Puerto Rico.

Lead Group: NRCS

Proposed Partners: land owners, PRDA, UPR Cooperative Extension Service

Timeline: 10/1/05 to 9/30/06

Products and Outputs: Research report on the efficiency of the technique.

Expected Costs: \$ 40,000

Proposed Funding Source: NRCS

Objective 1.2:

To implement use of the cumulative impact assessment method for conducting project permit reviews on projects within watersheds.

Project 1.2.1: Provide workshops on land use and cumulative impacts assessments to agencies' technical staff (state and municipal).

Description: Organize workshop logistics and provide presentation handouts of procedures and regulations regarding cumulative impacts.

Lead Group: To be announced

Proposed Partners: Planning Board, DNER, EQB, UPRSGCP

Timeline: 7/1/06 to 6/30/07

Products and Outputs: workshop materials, number of trained personnel

Expected Costs: \$20,000

Proposed Funding Source: NOAA - CRI

Objective 1.3:

Apply the best management practices and management measures for the prevention of coastal non-point and point sources pollution in Puerto Rico

Project 1.3.1: Perform inventory of septic tanks and groundwater wells in critical communities within the Jobos Bay watershed.

Description: The inventory will start as a pilot project in land adjacent to Jobos Bay.

Lead Group: PRDNER-CZM

Proposed Partners: PRASA, JOBANERR, University of Puerto Rico

Timeline: 10/1/04 to 9/30/05

Products and Outputs: GIS database for septic tanks and groundwater wells within the Jobos Bay watershed.

Expected Costs: \$38,000

Proposed Funding Source: NOAA – CRI

Project 1.3.2: Inventory of septic tanks as a source of pollution in groundwater and coral reefs in the Belvedere Natural Reserve in western Puerto Rico.

Description: This project will include an inventory of septic tanks and groundwater wells within communities of the Belvedere watershed and will develop an educational and demonstration project to improve the construction quality of septic tanks in the communities. A second phase of the project will sample and analyze the quality of underground and coastal waters that impact coral reef areas.

Lead Group: University of Puerto Rico-School of Public Health

Proposed Partners: PRDNER

Timeline: 8/30/05 to 7/30/07

Products and Outputs: GIS database for septic tanks and groundwater wells in addition to underground and coastal water quality database for the Belvedere watershed.

Expected Costs: \$56,000

Proposed Funding Source: NOAA - CRI

Project 1.3.3: Convene appropriate agencies to evaluate septic tanks inventory results and develop a strategy to apply Best Management Practices.

Description: Present septic tanks inventory results through meetings and workshops to foster discussion and information exchange among agencies and other pertinent entities, such as municipalities, in order to evaluate and develop strategies to apply best management practices for septic systems.

Lead Group: To be announced

Proposed Partners: PRASA, DNER, EQB, Department of Health, municipalities

Timeline: 10/1/06 to 9/30/07

Products and Outputs: reports from meetings and workshops; ideas on strategies for implementation of best management practices for septic systems.

Expected Costs: \$40,000

Proposed Funding Source: NOAA - CRI

Project 1.3.4: Develop a sediment and erosion control handbook for areas that are being developed.

Description: Provide proper specifications of Best Management Practices including construction standards to engineers and technicians who will work with earth crust extractions.

Lead Group: EQB

Proposed Partners: Natural Resources Conservation Service, PR Environmental Quality Board (EQB), PR Planning Board, US Environmental Protection Agency

Timeline: 10/1/04 to 9/30/05

Products and Outputs: Handbook

Expected Costs: \$50,000

Proposed Funding Source: 319(h), USDA

New Staff, Training & Technical expertise needs:

Update: Project completed, on March 2005 NRCS submitted handbook to the Environmental Quality Board.

Project 1.3.5: Distribute the handbook on sediment and erosion control.

Description: Once the handbook is developed, it is important to share it with pertinent agencies and users, such as engineers and technicians who work with earth crust extractions. This tool will be valuable for agencies staff in evaluating permit applications and in monitoring conditions for project approval. Hard copies of the document will be distributed among interested groups. The handbook will be posted on internet and will also be presented to interested groups through a series of workshops.

Lead Group: EQB

Proposed Partners: Natural Resources Conservation Service, PREQB, PR Planning Board, US Environmental Protection Agency, DNER

Timeline: 06/1/05 to 9/30/05

Products and Outputs: Handbook

Project 1.3.6: Prepare a Spanish summary of the handbook on sediment and erosion control.

Description: In order to facilitate the use of the handbook and improve procedural knowledge of technicians and other users a summary will be prepared in Spanish.

Lead Group: EQB

Proposed Partners: Natural Resources Conservation Service, PREQB, PR Planning Board, US Environmental Protection Agency, DNER

Timeline: 06/1/05 to 9/30/05

Products and Outputs:

Expected Costs: \$50,000

Proposed Funding Source:

New Staff, Training & Technical expertise needs:

Update:

Project 1.3.7: Impact of the Culebra municipal landfill to the eastern side of the Canal Luis Peña Natural Reserve.

Description: Analysis of the potential effect of soil erosion of the Culebra landfill to the Natural Reserve will be carried out through the use of Remote Sensing, Geographical Information Systems techniques and field observations.

Lead Group: University of PR- School of Health

Proposed Partners: Natural Resources Conservation Service, PREQB, PR Planning Board, US Environmental Protection Agency, DNER

Timeline: 04/1/06 to 9/30/08

Products and Outputs:

Expected Costs: \$50,000

Proposed Funding Source: NOAA-CRI

New Staff, Training & Technical expertise needs:

Project 1.3.8: Reach the non-scientific community in an easy to understand format on ways to prevent non-point sources of pollution.

Description: Develop educational campaigns for students and the general public on alternatives to prevent non- point source pollution.

Lead Group: To be announced.

Proposed Partners: DNER, Department of Education, Natural Resources Conservation Service, PREQB, EPA

Timeline: 06/1/06 to 9/30/08

Products and Outputs: educational materials, people reached

Expected Costs: \$70,000

Proposed Funding Source: To be determined.

Under this goal, the Commonwealth of Puerto Rico recommends to carry out development of applied marine research projects to be carried out by the new Coral Reef Institute under the leadership of the University of Puerto Rico Mayaguez Campus, Marine Sciences Department. Identified priorities are the following:

1. Continue monitoring priority coral reef areas including sites previously established by PRDNER.
2. Characterization and monitoring of suspended sediments and analysis of their impact on Puerto Rican coral reefs.
3. Develop research to assess effectiveness of erosion control measures.

4. Analysis of data on coral cover and fisheries population around Natural Reserves.
5. Regional workshop to develop indicators and protocols to assess coral reef health and threats from land-based sources of pollution.
6. Development of a Coral Reef Symposium to present results of current efforts.
7. Impact of suspended sediment on light attenuation and coral physiology.
8. Cost-benefit analysis of different management and financing regimes of marine managed areas.
9. Assessment of anthropogenic impacts on highly visited coral reef sites.

Goal 2: To improve compliance and enforcement of laws, rules and regulations related to construction and land development permits

Objective 2.1:

To increase enforcement capabilities of agencies that issue permits and administer regulations related to coastal wetlands.

Project 2.1.1: Train DNER rangers and EQB technicians to effectively monitor compliance of laws, rules and regulations related to construction and land development permits.

Description: Deliver workshops with updated information on rules and regulations related to construction and land development permits, including the use of tools such as GPS.

Lead Group: To be announced

Proposed Partners: PRDNER, EQB

Timeline: 10/10/07 to 9/30/08

Products and Outputs: workshop materials and number of trained DNER rangers.

Expected Costs: \$40,000

Proposed Funding Source: NOAA – CRI

Project 2.1.1: Provide appropriate tools and equipment to DNER Rangers, DNER and EQB technicians to effectively monitor compliance of laws, rules and regulations related to construction and land development permits.

Description: To acquire appropriate equipment such as GPS and cameras for DNER Rangers and technicians from DNER and EQB, to effectively and efficiently enforce laws and regulations related to earth crust extraction, and other construction activities.

Lead Group: To be announced

Proposed Partners: PRDNER, EQB

Timeline: 10/01/06 to 9/30/07

Products and Outputs: GPS, cameras and other needed tools.

Expected Costs: \$100,000

Proposed Funding Source: NOAA, EPA

Goal 3: *To reduce the loss of coral reefs due to the loss of coastal wetlands, estuaries, and beaches.*

Objective 3.1: Improve distribution of freshwater, both surface and ground water.

Project 3.1.1: Construct ponds to obtain freshwater from the Aguirre Power Plant

Description: Construction of artificial ponds is necessary to recover freshwater that can be routed to increase freshwater supply for JOBANERR wetlands.

Lead Group: DNER-JOBANEER

Proposed Partners: PREPA, JOBANERR, DNER

Timeline: ongoing effort

Products and Outputs: new ponds and drainage channels constructed for fresh water distribution.

Expected Costs: to be announced

Proposed Funding Source: to be announced

Project 3.1.2: Perform jurisdictional determination of wetlands, maritime zone and reserve limits in the JOBANERR watershed.

Description:

Indicator:

Lead Group: DNER (RFP)

Proposed Partners: PRDA, NRCS, COE, EPA

Timeline: 10/1/05 to 9/30/06

Products and Outputs: JD Map

Expected Costs: \$75,000

Proposed Funding Source: NOAA- CRI

New Staff, Training & Technical expertise needs: Train DNER staff on jurisdictional determination of wetlands.

Update: reserve limits have been already identified.

Objective 3.2:
Implement Land Acquisition Plans

Project 3.2.1: Acquire already identified priority areas within DNER for watershed protection.

Description: DNER has a list of priorities among ecologically sensitive areas that need to be acquired by the agency to ensure their conservation. Many of these areas are important for watershed and/or coastal protection. It is recommended to request matching funds to the Legislature for the acquisition of coastal wetlands. The agency will initiate the acquisition process once the Legislature appropriates the funding.

Lead Group: DNER

Proposed Partners: state legislators, Institute of Tropical Forestry (ITF)

Timeline: ongoing activity

Products and Outputs: 200 acres of land on the Jobos Bay area (Rafael Vargas parcel (Lot D)) have been acquired for the Jobos Bay National Estuarine Research Reserve.

Expected Costs: \$5,000,000

Proposed Funding Source: State funds, USFW, NOAA, USDA