



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Puerto Rico

## Educating Citizens and Implementing Waste Management Plans Reduces Bacteria Levels

### Waterbodies Improved

Bacteria from livestock enterprises, communities without sanitary systems, urban runoff, landfills and wastewater discharges contaminated Puerto Rico's Río Grande de Manatí sub-basin PRNR8A2. As a result, the Environmental Quality Board (EQB) listed the Río Grande de Manatí's Assessment Units PRNR0056g, PRNR0056L01 and PRNR0056L02 (resegmented as PRNR8A2 in 2006) on Puerto Rico's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters. After several years of conducting outreach and ensuring that livestock enterprises developed and implemented waste management plans, EQB found that water quality had significantly improved. Therefore, EQB has determined that the Río Grande de Manatí sub-basin PRNR8A2 (comprised of three assessment units) has attained its secondary contact designated uses as of the 2010 assessment cycle.

### Problem

Río Grande de Manatí and its tributaries include 243.6 stream miles with a drainage area of 176.79 square miles, crossing the municipalities of Barceloneta, Florida, Manatí, Ciales, Morovis, Corozal, Orocovis, Naranjito and Barranquitas. The Río Grande de Manatí sub-basin is composed of two lakes (reservoirs), Guineo Lake and Matrullas Lake.

EQB included the 38.1-mile-long impaired PRNR8A2 sub-basin of the Río Grande de Manatí on the CWA section 303(d) list of impaired waters in 2002 for not meeting primary and secondary contact designated uses because of high fecal coliform levels. EQB identified the primary pollution sources as livestock enterprises (Figure 1), communities without sanitary systems, urban runoff, landfills and wastewater discharges.

Before 2004, all the facilities located in the sub-basin discharged animal waste to nearby waterbodies, causing adverse effects on water quality. In many cases, best management practices (BMPs) for controlling bacteria levels, such as cattle exclusion fencing, were absent or malfunctioning.



Figure 1. Livestock enterprises, such as the one in the distance, contributed pollutants to the Río Grande de Manatí sub-basin.

### Project Highlights

The Livestock Permit and Compliance Division (LPCD) of EQB's Water Quality Area operates a program to help ensure that owners of the sub-basin's four active livestock enterprises design, implement and operate a systematic approach to managing the fecal animal waste. The livestock enterprises, which have an average of 140 animal each, must submit an Animal Waste Management Plan that establishes BMPs for managing their fecal animal waste. The plan includes the methods for collecting, storing and adequately disposing of the fecal animal waste. The plan's main purpose is to focus on preventing water, air and land contamination and its consequences.

LPCD evaluates and approves the Animal Waste Management Plans submitted by livestock enterprises such as dairy facilities, poultry facilities and horse farms. It also performs inspections and ensures that the plans have been implemented. When a violation of an Animal Waste Management Plan occurs, LPCD issues a Notification of Violation to the livestock enterprise that specifies the reasons for citing the violation and lists the elements of the plan that are not being followed. If the deficiencies are not addressed within the allocated time frame, EQB issues an Order under the Environmental Public Policy Law (Law 416, September 22, 2004), as amended.

EQB has performed significant outreach activities in these communities during the past six years. The activities have included conferences, workshops and fairs in local schools presenting the following educational programs: Protection and Conservation of the Environment, Protection of Natural Resources, and Environment and Water Quality. After several years of EQB's performing both educational outreach and inspections, facilities in Río Grande de Manatí sub-basin are no longer discharging their waste directly to waterbodies. Data collected at sampling stations in the assessment unit show that water quality has significantly improved.

In addition to undertaking compliance efforts, EQB developed a management plan for the restoration of watersheds. The strategy includes actions for the following activities:

- (1) Increasing the number of monitoring stations to obtain additional water quality data
- (2) Promoting the implementation of BMPs, such as vegetation management techniques, that will reduce nutrients, pesticides, fertilizers and sediments in runoff
- (3) Excluding cattle from the river
- (4) Targeting educational efforts at farmers and landowners.

## Results

Río Grande de Manatí sub-basin monitoring data show that surface water quality has improved over the past six years. Figure 2 shows the fecal coliform geometric mean for the sub-basin during this time period. According to the Puerto Rico water quality standards for secondary contact recreation, the use support evaluation is based on the geometric mean of a series of representative samples (at least five) of fecal coliform bacteria. When the geometric mean is less than or equal to 2,000 colonies/100 milliliters (mL) and 20 percent of the individual samples do not exceed the value of 4,000 colonies/100 mL, the assessment unit is classified as supported. The segment met the above-mentioned criteria during the 2004, 2006, 2008 and 2010 cycles. As a result, the sub-basin has attained standards for secondary contact uses as of the 2010 assessment cycle.

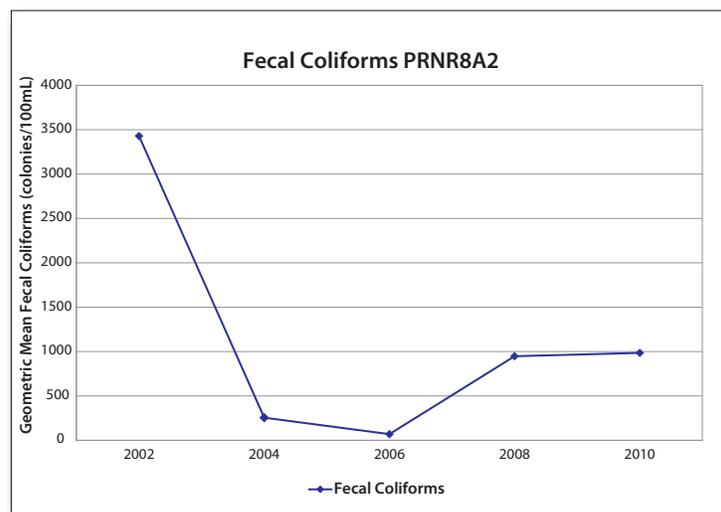


Figure 2. Fecal coliform geometric mean levels in the Río Grande de Manatí sub-basin from 2002 through 2010.

## Partners and Funding

The Puerto Rico EQB partnered with cattle farmers in the Río Grande de Manatí sub-basin. Approximately \$4 million in CWA section 319 funds supported compliance and restoration efforts. Additional funding came from Puerto Rico's Performance Partnership Agreement/Grant and CWA section 604(b) water funds.



U.S. Environmental Protection Agency  
Office of Water  
Washington, DC

EPA 841-F-10-001V  
September 2010

### For additional information contact:

Angel R. Meléndez Aguilar  
787-767-8181 Ext. 3543  
angelmelendez@jca.gobierno.pr