Puerto Rico Water Resource and Environmental Research Institute

University of Puerto Rico, Mayagüez

The PRWRERI is...

The Puerto Rico Water Resources and Environmental Research Institute (PRWRERI) is one of 54 similar research centers in the 50 States of U.S., DC, Puerto Rico, Virgin Islands, and Guam/Federated States of Micronesia. Established in 1964 by the Water Resources Research Act, the institute conducts basic and applied research to solve water and environmental problems unique to Puerto Rico, the Caribbean, and Latin America. Its main objectives are to plan, conduct and otherwise arrange for competent research that fosters: the entry of new research scientists into water resources fields, the education and training of future water scientists, engineers, and technicians, the exploration of new ideas that address water problems or expand understanding of water and water-related phenomena, and the dissemination of research results to water managers, professionals, and the public. The Water Resources Research Act requires the Secretary of Interior to conduct a "careful and detailed evaluation" of the PRWRERI at least once every five years. The most recent review was carried out in 2003. The PRWRERI passed satisfactorily.

Our Motivations is: Exploring, Encouraging, Educating and Finding Solutions

Encouraging – We promote people to investigate and lead them to publish their research result as an initiative to be part of the solution. We are a multidisciplinary teamwork. New researchers are incorporated to our projects from different areas likes: Biology, Agriculture, Engineering, Chemistry, Social sciences and others. Our goal is that our research and work becomes standard to future generations.

Exploring – We conduct research to finding solutions to different problems related to water resources and the environment that affect us in Puerto Rico and other regions.

Educating – We involves students and engineers in projects, applied curses and seminars.

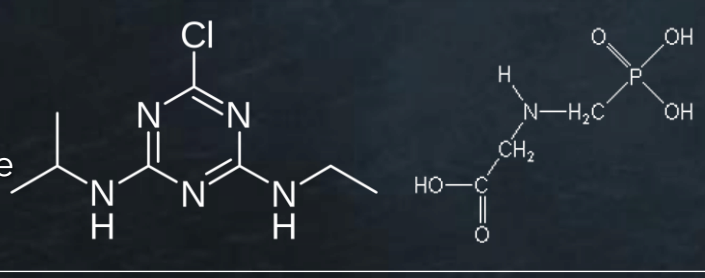
Finding Solutions – We work to find solutions to different environmental and water recourses issues.

Ongoing Projects

Atrazine and glyphosate monitoring in surface water bodies in the Western Region of Puerto Rico

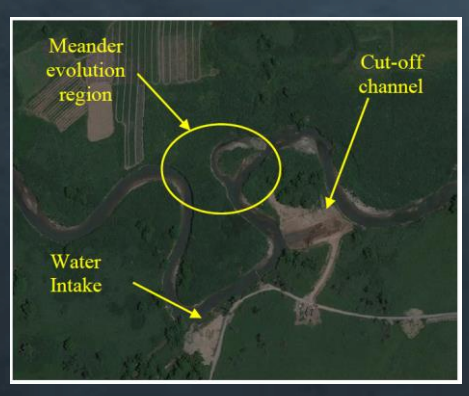
Pesticides are toxic substances released intentionally into the environment to kill living things. The increase in the use of pesticides for agriculture activities has resulted in the presence of a variety of persistent contaminants in surface and ground waters, which compromise the water quality of these sources. This project aimed to create a database for atrazine and glyphosate (pesticide residue), in different streams close to crop sites along the Western region of PR.

The study served as a tool to encourage more awareness of water quality impairment for the farmers, the scientific community, government/ regulatory agencies and the public.



Geomorphic evolution of the Río Grande de Añasco Lower Valley and its impact on water resources

Erosion and sedimentation due to meander evolution in the Río Grande de Añasco Lower Valley impact water resources. The bank material is easily removed by the river velocities promoting meander migration and erosion. Agricultural zones are affected, and sediment deposition occurs downstream. The river morpho-dynamics changes rapidly creating oxbows. Contaminants move in sediment particles and discharge in the Mayaguez Bay, causing pollution in coastal areas and affecting coral reefs.

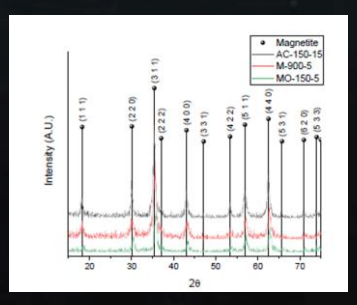


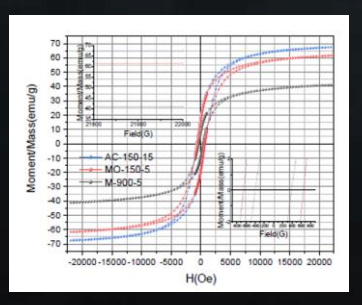
The river has a long history of meander migration and changes in horizontal alignment. This proposal quantified meander migration in the lower valley of Río Grande de Añasco by using the International River Interface Cooperative (iRIC) state-of-the-art movable boundary models.

Nanotechnology-based wastewater treatment for reuse

The priority in water reuse processes is the reduction of the risk of the potential spread of diseases, especially if sanitary water is used. The novelty of the present research relies on the use of bio-polymeric nanocomposites bearing magnetic ferrites as a bi-functional and environmentally friendly bacterium removal agent. As a bonus, the polymeric matrix (porous Calcium alginates beads or cellulose electro-spun fibers, for instance) have also exhibited adsorption capacity for different types of inorganic and organic pollutants, commonly found in sanitary waters. The first phase of the research was focused on the nanocomposite synthesis and preliminary evaluation as a bacterium removal agent.

The second part of the project addressed the optimization of bacteria removal capacity of the selected nanocomposite and fabrication of a lab-scale prototype involving all stages to be considered in real operation.





Contacts: prwreri@uprm.edu / 787-833-0300 / 787-832-4040 x.3781