

New Web Tool for Understanding Bioluminescent Bays

Fernando Gilbes Santaella¹ and William J. Hernandez²

¹*Department of Geology, University of Puerto Rico at Mayaguez, fgilbes@uprm.edu*

²*Department of Marine Sciences, University of Puerto Rico at Mayaguez, williamhernan@gmail.com*

The rapid development of web-based tools is allowing worldwide scientists to publish, visualize, process, and interpret complete databases. Here a new internet database is described and used to demonstrate the power of having these tools open to any researcher. The database is being called GERSVIEW and it is a Web Mapping Interface using ESRI® ArcIMS 9.1. Data from two well-recognized bioluminescence bays (biobays) in Puerto Rico have been developed and used to prove the concept; they are La Parguera Bay in Lajas and Puerto Mosquito Bay in Vieques. A web server was configured with supporting software (OS Windows Server® 2003, Java™ 2 SDK 1.42.06, Jakarta® Tomcat 5.028 and the activation of the Internet Information Services 6.0) for the installation of ArcIMS 9.1. A website was established as the launch site for the Web Mapping Interfaces (<http://gersview.uprm.edu>). The database of multiple parameters was developed using ESRI®ArcMap 9.2. The interface provides access to the users via the internet to different parameters, including concentrations of heavy metals (in sediments, mangroves, and water column), benthic habitats, topography, soils, geology, surface hydrology, land-use, satellite imagery, and aerial photography. These layers of information were exported to ArcIMS to create the HTML Viewer for the biobays. The created interactive Web Mapping Interface allows the user to customize the map displays, layers, and to create queries and measurements of the data. Also the map products could be printed or saved as a web copy by the user. After GERSVIEW was created, a testing phase was performed in order to prove its potential as on-line scientific analysis tool. This GIS database interface provided a good analytical comparison of the physiographic distribution of the different layered features between the two biobays. Major differences in the coastal morphology between them were measured from base map imagery and, although the geological sediments in the drainage basin were the same in the two bays, their distribution was different. Soil type distribution and major urban infrastructure differences were not significant between the two bays. Drainage basins extension was larger, and the slope was smaller, consequently affecting the surface hydrology in Puerto Mosquito Bay basin area by reducing the runoff. The developed tool has proven successful in providing the users a web based GIS application to interact, query and obtain vector and imagery data from these important ecosystems. It also provides researchers with the necessary information for further analyses and therefore new conclusions of two important bioluminescence bays in the world. Currently other coastal databases are being prepared and will be added very soon, including oceanographic and bio-optical data from an open bay affected by rivers discharge and from Caribbean coral reefs. GERSVIEW is definitely another example of the rapid and global movement called open research.