

Laguna Cartagena Lake Site Lajas Valley, Puerto Rico 18.01288N 67.10039W

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History: Laguna Cartagena, which has been part of the Caribbean Wildlife Refuge since 1989, is the only natural freshwater lake left in Puerto Rico. Hydrologic and water level data has been recorded since 1926. The “lagoon” dries out periodically, even before human intervention. In 1955, the principal canal of the Lajas Valley Irrigation System initiated operations which changed the hydrology of most of the southwest portion of Puerto Rico, including Laguna Cartagena. While nearby lakes were drained in 1953; Laguna Cartagena was not drained because of its high ecological value and because it would have been difficult to dry the area completely. In 1956, a floodgate was built at the western end of the lagoon to maintain a constant water level; nevertheless, this structure actually decreased the water level of the lagoon. Sedimentation, drought and vegetation changes have severely affected fish and some sensitive species of insects; both essential to waterfowl diet.

Key Contribution to Domain and Continental issues: This site is proposed as part of the lakes and rivers efforts within NEON. As a shallow lake in a dry climate, it will be very sensitive to climate change. The lake has a long history of species invasions and human intervention, which have altered natural systems. As the last major water body between the most important agricultural area of Puerto Rico and the ocean, this lake is critical in filtering out nutrients before they reach the ocean and damage reef systems. Migratory waterfowl have the potential to import pathogens such as bird flu, which could spread to backyard and commercial poultry producers nearby.

Key Characteristics: Laguna Cartagena Refuge, with 1,039 acres, provides habitat to many endangered species and since the 1920's the lagoon (lake) has been considered an important breeding ground for resident waterfowl and migrant water birds in Puerto Rico. The Bird Checklist of the United States indicates approximately 120 species of birds have used Laguna Cartagena. The Refuge has a very rich flora with approximately 26 species used as food for waterfowl. Bird censuses, plant surveys, water level data, aerial photographs, land use maps and nutrient (N + P) determinations are available for several decades on a regular basis. Surveys on microbial (algae, bacteria, fungi) and faunal (birds, fish, aquatic insects) diversity are currently occurring. The lagoon and its feeding irrigation system have a long and diverse history of natural and anthropogenic hydrologic disturbances, plus an interesting record of introductions of exotic plants (i.e. *Eichhornia*, *Typha*, *Pistia*, *Melaleuca*, *Mimosa*), fish (*Tilapia*, *Gambusia*, *Liposarcus*), amphibians (*Bufo*, *Rana*), crustaceans (*Cherax*), and mammals (*Erythrocebus*, *Macaca*, *Herpestes*, *Bos*, *Equus*). Soils belong to the Fraternidad-Aguirre-Cartagena and Guayama-Aguilita-Amelia associations (USDA). The soils range from reasonably well drained, highly fertile and neutral to calcareous to poorly drained, with a clay surface layer, medium fertility and highly calcareous. It is close to Guanica Forest, and shares many biological, climatic and edaphic characteristics with it.

Existing Infrastructure: An observation tower and a deck is present from where sensor systems can be deployed. There is a fixed and protected weather station and a rain gauge on the south side. A solar powered pump is present to provide irrigation to upland reforestation projects. The Lajas Experimental Station's weather station is about 5 km away. A weir is located at the sole outflow allows controlling water levels for modeling purposes. Water levels are gauged.

Facilities: The USFWS main office is less than 20 minutes drive and provides housing, storage, transportation and logistic support. Year around gated road access to the four cardinal points of the main lagoon. An on-site storage building with electric power and internet connections (CECIA Program, Interamerican University) is planned and a plant breeding facility is under construction.

