



## *History*

In 1994, Private investment in Graeme Hall Nature Sanctuary (“Sanctuary”) began with the acquisition of 34.25 acres of wetlands. Between 1998 and 2004, construction began to develop infrastructure for a visitor center, educational programs and tours. Further capital improvements continued to the property between 2006 and 2008.

Hundreds of Barbadians were involved in the development and construction of the Sanctuary as quoted by the Project Manager of the Sanctuary:

“The engineers, architects and project management people could not have functioned without the passionate contribution of rank and file Barbadians who created a work of art and beauty in the middle of the Graeme Hall Swamp.”

The following is the Sanctuary’s vision statement:

“Graeme Hall Sanctuary will be managed and maintained as a nature reserve to provide a high-quality natural experience for ecologically sustainable and safe nature tourism, environmental education and research suitable for residents and visitors of all ages.”

The Barbados Government contracted ARA Consulting Group in 1997 and 1998 to formulate an effective management strategy for the long-term protection, enhancement and maintenance of approximately 240 acres of green space. ARA prepared two reports in 1997 and 1998, titled: Graeme Hall Swamp Today; and the second report, Graeme Hall Swamp's Future. The second report included recommendations for sustaining and expanding biodiversity within the Sanctuary and the creation of an eco-tourist educational and scientific learning center. These reports can be found on our website under the section resources and reference center.

In 2003, Barbados designated the Sanctuary and a large area around it (approximately 300 acres in total) as a Natural Heritage Conservation Area under a 2003 Physical Development Plan. This designation is intended to protect the area by ensuring that very little development is permitted within the vicinity of the Sanctuary. In the same year, Barbados established the Graeme Hall Stewardship Committee, which served to coordinate the activities of the various government offices, agencies and stakeholders, commissioned crucial research and devised a Master Plan for the long-term protection of Graeme Hall ecosystem.

In 2005, the Sanctuary was designated as a Wetland of International Importance under the Ramsar Convention. Barbados ratified the Convention on April 12, 2006. The designation cited the coastal wetland’s unique features as a mangrove forest comprised of red and white mangroves, that were the largest healthy mangrove areas left on the island; a destination for more than 84 species of migratory birds; a 12-

acre artificially-created lake that constitutes the largest body of inland water on the island; habitat for more than 20 fresh and brackish and freshwater species, among the most interesting of which are those marine species that have become isolated from the sea and are breeding in the lake. Ecotourism and environmental education and research are cited as the chief human uses of the wetland. The designation gives the government access to small grants and enhanced international technical assistance.

In addition to the Ramsar designation, the Government of Barbados ratified the United Nations Convention on Biological Diversity in December of 1993 in Rio de Janeiro. The main objectives of this Convention are the conservation of biological diversity, the sustainable use of the components of biological diversity, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

In 2007, Barbadians organized a petition under the “Friends of Graeme Hall” which was signed by over 6,000 people in support of the creation of a 240-acre Graeme Hall National Park as Barbados’ first national park.

The sluice gate has been inoperable by the Government of Barbados since the acquisition of the Sanctuary property in 1994. The sluice gate was opened irregularly between 1997 and 2004, and on no more than a handful of occasions between 2005 and 2009.

The sluice gate was initially constructed in the 1920s, with three extensions in the following 50 years due to beach accretion. According to the Sanctuary owner, when the gates were maintained and functioning properly through the 1960s, water quality from the mangrove was visually clear, and the gates were operated to allow for tidal flow. The sluice gate, when raised, regulates outflow to the sea permitting mixing of ocean saltwater and Sanctuary lake freshwater and allowing for the natural biotic interchange in a mangrove setting, via natural connections through mangroves bordering the lake, to the bisecting canal.

In a statement to the Permanent Court of Arbitration, the Government of Barbados indicated before it invested in a new gate, a hydrological study including assessment of the geomorphology of the beach, should be performed so that the hydrology within the wetland could be optimized and the concerns of the stakeholders near the beach would be factored in. The Court did not allow the Sanctuary to adduce evidence of the most recent sewage dumps (at that time) occurring in late 2010.

The Sanctuary contracted Environmental Engineering Consultants from Florida in 2010, and again in 2018, to collect water samples, benthic samples, and fish samples and to assess the health of the wetlands within the Sanctuary. The Environmental Consultants concluded that the waters and sediment within the lake, bisecting canal and mangrove forest were exhibiting more freshwater characteristics over time, as opposed to saltwater or brackish characteristics, primarily due to the disrepair and infrequent, manual (backhoe required) operation of the sluice gate. There was also some evidence of industrial pollutants as well as elevated nutrient and bacteria levels in the water column and sediments.

A summary of the most recent laboratory results can be found below.

### ***Summary of Laboratory Results: June 2019 Report***

- Laboratory results confirm it is necessary to restrict public access to the lake, due to health concerns, making it impossible to operate the Sanctuary as an ecotourism destination.
- Failures of the South Coast Sewage Treatment system have resulted in the dumping of raw sewage into Graeme Hall Nature Sanctuary. The Sanctuary has been treated as a wastewater facultative lagoon.
- Impacts to the lake included high concentrations of bacteria, nitrogen, ammonia, nitrite, phosphorus and orthophosphate, over their respective Barbados Proposed Marine Water Standards (2004).
- Members of two bacteria groups, Coliforms and Fecal Streptococci, are used as indicators for sewage contamination because they are commonly found in human and animal feces. Very high concentrations of Fecal coliforms, Enterococci and E. coli bacteria were observed at all four sample locations.
- The highest concentrations were shown in the Source sample, indicating the discharge of sewage is the source of the very high bacteria concentrations in the lake.
- Fecal bacteria concentrations were up to two orders of magnitude greater than in 2010. Human contact with surface water should be avoided, due to the high concentrations of Fecal bacteria.
- The chemical oxygen demand concentration of 127 mg/l from the Source / bisecting canal sample, was approximately 4 times higher than in 2010.
- The chlorophyll and total suspended solids concentrations in the lake were approximately 3-4 times higher than they were in 2010, reflecting approximately four times greater algae in 2018.
- Total phosphorus concentrations were approximately 10 times greater than in 2010 and ammonia concentrations were approximately 40 times greater than in 2010.
- The most recent results indicate the lake is on the verge of falling within the freshwater classification of less than 1 ppt salinity which, if the trend continued and the lake becomes a freshwater body, and is likely to irreversibly destroy the mangroves by losing their competitive advantage to freshwater plants.
- Benthic results showed no macroinvertebrates in the sediments of the lake which is a clear indication that an extinction event has occurred for the few macroinvertebrates which were found in 2010.