

# Summary of La Gonave, Haiti - Geology and Hydrogeology

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## 1 Summary

The island of La Gonave is approximately 750 square kilometers in size and located off the coast of mainland Haiti. Approximately 115,000 people inhabit the island, about half of the island population resides in the towns of Anse-a-Galets and Pointe-a-Racquette. The remainder of the island is rural with small isolated communities.

Annual precipitation is estimated between 700 and 1,200 mm/year, with significantly higher precipitation on the eastern portion of the island. The dry season on La Gonave typically occurs from late October through April. La Gonave has little perennial surface water with the exception of several springs. In the eastern portion of the island, many springs are present due to stratigraphic and structural factors. The western portion of the island has no inland springs, but many coastal karst springs that often produce brackish water. A primary reason for the water scarcity on the western portion of the island is due to the thick Pliocene and Pleistocene-aged coral limestones, which infiltrate a majority of precipitation.

Figure 1 is a geologic map of La Gonave that was developed through the compilation of the work of many geologic investigators over the past century that have contributed to published or publicly available information. Some of these investigators include: J. Adamson, R. Bien, D. Boisson, J. Butterlin, S. Dykstra, A. Momplaisir, H. Spruijt and J. Troester.

The island is a complex northwest trending regional anticlinal feature, which exposes a core of middle Eocene-aged limestone in the southeastern portion of the island. This unit is the oldest rock found on La Gonave and blankets the highest portion of the island reaching an elevation of approximately 780 meters. This limestone is believed to exist beneath the entire island at variable depths; it is also the source rock for what is believed to be the largest aquifer of the island. This aquifer is referred to as the Chien Content Aquifer, named after the highest mountain on the island where the limestone is best exposed. This aquifer is only a proven resource on the eastern portion of the island, its presence in western La Gonave has not been verified scientifically.

Overlying the middle Eocene limestones are younger Eocene massive limestones that are less prominent, referred to as the Matenoir complex. These are only observed at the

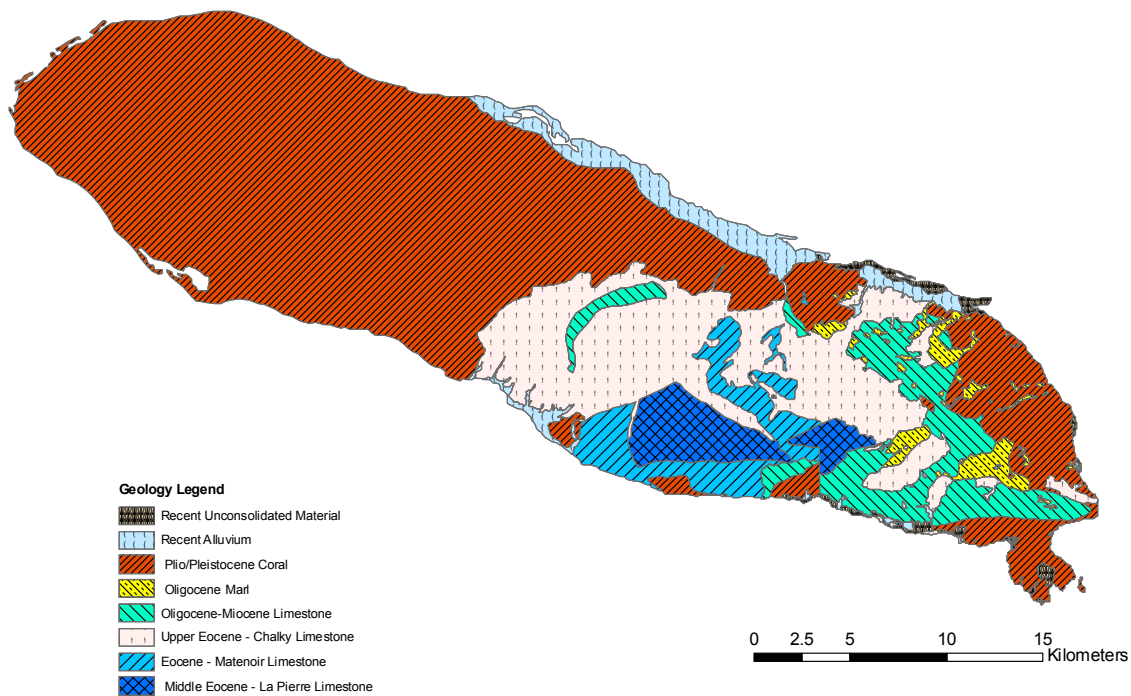


Figure 1: Geologic Map of La Gonave

surface in the Nan Cafe and Matenoir areas. The lower Eocene-aged chalky limestone is the next younger stratigraphic geologic sequence that covers a large portion of the island and is prevalent in the Plaisance and Pointe-a-Racquette areas. The carbonate is chalky with chert and is possibly over 1,200 meters thick in some areas of the island. Due to the fine-grained and hydrologically impermeable nature of this geology, it makes finding a viable groundwater supply very difficult in some areas. Overlying the Upper Eocene chalky limestone are Miocene and Oligocene-aged limestones and marls, which are exposed on the surface on the northeastern and eastern portions of the island. These units are typically good source rock for groundwater and house the La Palmiste and La Palma aquifers. During deposition of this geology, however, significant sea-cliff erosion of the Eocene chalky limestones occurred which re-deposited fine grained sediments. As a result, groundwater yields can be significantly variable in the Miocene and Oligocene strata.

The youngest and most prevalent rock on the island is Pliocene and Quaternary-aged coral limestone. These limestones cover over half of the island and almost the entire western portion. This limestone is believed to be up to 150 meters thick in some areas and exhibits karst topography. This limestone can be a good source rock for groundwater; however the karst nature of the rock promotes rapid seaward drainage so groundwater is stored only

where it is impounded, usually by hidden subsurface geologic structure and unconformities. In many coastal areas, sea-level acts as hydraulic control on the groundwater located within the coral limestone.

Western La Gonave is much different from a geology and hydrogeology perspective than most of Haiti. The only area of Haiti that is similar is the far northwest (Mole St. Nicholas, Bombardopolis, Mare Rouge, Baie de Henne). This geology is very complex from groundwater exploration and drilling standpoint because groundwater resources are restricted to preferential subsurface locations. The karst nature of the subsurface requires advanced and experienced exploration and drilling programs.

## **2 Closing**

There are several studies and work programs recently finished, or currently in progress that will allow for a more comprehensive and thorough characterization of the island's groundwater resources. These include geophysical studies, drilling programs, hydrogeologic analysis of existing wells and geologic field investigations. It is the hope of the author to contribute towards compiling this new and historical information to ultimately develop a comprehensive publication regarding the groundwater resources of La Gonave.