

# GEOLOGY SUMMARY

Schooner Bay (and the entire Bahamas) rests on a calcium carbonate platform that was formed hundreds of thousands of years ago in relatively shallow water at the edge of the North American plate. Spherical-shaped calcium carbonate sediments (sand) were formed as a result of high levels of calcium dissolved in seawater mixing with carbon dioxide in the air. Repetition of this process created a large bank of same-sized sediments, which were buried and lithified as new sediment was created. Reefs grew around the edges of this platform where conditions were favorable.

The geology at Schooner Bay is dominated by two major landforms – the relic reef and the ridge. These two were formed approximately 150,000 years ago during eustatic (global) sea level changes brought about by elevated glacial activity, at which time sea levels rose above and fell below the current sea level of today.

“Normal” sea level conditions allowed for coralline growth at the edges of the carbonate platform to within a few feet of the sea surface. However, when sea level was elevated, the coral was able to grow several more feet vertically. As sea levels returned to normal, this coral was exposed above water to the open air – forming a relic reef.

While sea levels were depressed, prevailing winds shifted the loose sediments found on the platform into elongated dunes, which became lithified over time as other sediments accumulated on top. This is how the ridge at Schooner Bay was formed. As sea levels rose back to normal levels, the area was once again inundated with water – save the ridge – one of these elongated dunes which remained above sea level, and the relic reef.

Wave action shifted sediments in the area around, moving them from areas of high energy (rough water) to areas of low energy (calm water) – such as in the sheltered lee of the relic reef. Sediments accumulated here, soon forming a tombolo. This process was repeated and the tombolo eventually joined the relic reef to the main ridge. Further accumulations of sand onto the edges of the tombolo caused it to increase in size horizontally and vertically, while pioneer species of plants colonized this new land – giving it nutrients and creating new habitat for other organisms.

Continuous accumulations of sand around the edges of the tombolo caused them to build up in successive dunes, leaving the interior at a lower elevation than the perimeters. This interior became a sink for organic plant matter. As successive species of plants colonized the area, the canopy grew in size and density, covering much of the ground from direct sunlight. Organic matter that fell to the ground was now able to rot in a moist, shaded environment. Leaves, branches, and fruits were broken down into a nutrient rich organic “muck” that was much better at retaining water than the surrounding sandy soil, on top of being far more nutritious.

The edges of the tombolo (beaches), as mentioned, were and still are subject to continuous accumulation and removal of sediments. During “normal energy” periods, the beach moves seaward as sand continues to accumulate. Wind blows sand up the beach, which is trapped by plants. Growing vertically as a result of this continual accumulation, a dune is formed. During “elevated energy” periods such as storm events, wave and wind action erodes the beach, causing it to retreat landward. The erosive action may also cut into the dune, which acts like a sand reservoir. This reserve sand slumps down onto the beach and protects the coastline from further erosion. Once the storm has passed and conditions return to normal, the beach and dune system will be rebuilt as before. The beach and dune system is usually vegetated by sea oats, railroad vine, and scaevola, and is used by sea turtles for nesting during summer months and by birds for nesting and roosting year-round.