Since 1864 the island of Ni‘ihau has been held and maintained by the Robinson family, who operate a modest but productive ranch on the island. Except for helicopter tours, with limited and remote destinations such as, Kamakalepo Pt. on the north side, Nonopapa on the west side, and Keanahaki on the south side, Ni‘ihau is not open to the public. The Robinson’s closed-door policy has served to preserve the native Hawaiian lifestyle on the island where roughly 160 residents live and work without regular contact with the modern world and, where Hawaiian is the primary language spoken. Because of limited access, no significant geologic study of the island has been undertaken.

Ni‘ihau is a small elongate island (29 x 10 km) that stretches from southwest to northeast containing 145 km of general coastline. Ni‘ihau lies at the far northwest end of the main Hawaiian islands and is the low lying subaerial remains of a volcanic shield built ~4.89 Ma (Clague and Dalrymple 1987).

The summit of the volcano was originally northeast of the present day island, but was subsequently removed, along with much of the northeast side of the island, by erosion or possibly, downfaulting (Clague and Dalrymple 1987). The basaltic remains of the western outer slope of the shield’s caldera make up a significant proportion of the north portion of the east coast of modern Ni‘ihau.

A large tuff island less than 2 km off the north coast is visible from the northwest corner of Ni‘ihau, at Lehua landing. The horseshoe shaped Lehua Island is the product of rejuvenated volcanism and has been sculpted by marine erosion. The steep sea cliff on the south side of this relatively small island has been notched with sea caves at the waters edge. The island tapers to low-lying points that border a wide mouthed bay that opens to the north. Lehua Island functions as a part of the Hawai‘i State Seabird Sanctuary.
The north coast of Ni‘ihau, from Kaunuopou Pt. to Kikepa Pt., is composed of low volcanic cliffs that have been weathered and shaped by marine erosion. The shoreline is rocky and lined with boulder beaches and a few small pockets of calcareous sand that are tucked into the irregularities at the base of the cliffs.

The broad Keamano embayment lies west of Kikepa Pt., opening to the north with a crescent of calcareous sand over 1 km long along the shoreline. Keamanu marks the beginning of broadly embayed sandy beach systems that dominate the northwestern coast. These shorelines, including Ka‘aku‘u, Keawanui, and Kauwaha bays, are separated by rocky points and backed by extensive dune systems that reach up to 30 m in height.

The southwest portion of Keawanui Bay holds almost 5 km of uninterrupted sandy beach at the shoreline. The broad dune system along the north coast extends almost a kilometer inland. These largely unconsolidated coastal dunes are vegetated with endemic Hawaiian coastal plants and are mobilized along the coast by prevailing wind and sea conditions.

Powerful north swells reach this coast and are evidenced by large blocks and slabs of beachrock that lie broken along the shoreline of Keawanui Bay. However, the sand reservoirs and dunes of the north coast are extensive and they guard the coastal lands from erosion and long-term coastal retreat, despite the pounding of onshore surf. Thus, the dunes play an important role in the maintenance of this small, fully exposed island (Clark 1990).

The central-west shores of the island, from Kaununui Pt. to Nonopapa Beach, are very sandy, however the beaches here; Pu‘uwai, Ki‘eki‘e, and Nonopapa, are generally narrower than the beaches to the north, varying with
the season and attaining their greatest widths in the summer. These beaches are some of the longest on the island; with Puʻuwai stretching over 3 km, and Kiʻekiʻe over 2 km. Low vegetated dunes and a low-sloping interior back this section of coast.

The shoreline becomes increasingly rocky south of Nonopapa, transitioning to low sea cliffs that wrap the southern tip of the island at Kawaihoa Pt., a large tuff cone that stands almost 170 m high. Basalt and limestone inclusions incorporated into the cemented ash of Kawaihoa, are pieces of the shoreline and nearshore coral reef that were ripped up during the explosive formation of the cone. Kawaihoa forms a broad headland with embayments on both the leeward and windward sides. On the leeward side the deeper of the two bays, Kaumuhonu Bay is lined at the shoreline with a beach that sits atop a wave cut bench. Keananaki Bay on the eastern side is shallower and lined with large pockets of sand fronted by a rocky shelf (Clark 1990).

The east side of Niʻihau is thoroughly impacted by the northeast trade winds that together with associated waves and currents, drive natural and anthropogenic debris, such as fishing floats and drift wood, onto the shore in great quantities.

Less than 10 km north of Kawaihoa Pt. lays the long wide sandy shoreline at Poʻoneone, which runs nearly 4 km to the base of basalt sea cliffs to the north. The cliffs, reaching up to 360 m in height, and defining the shoreline for over 15 km of the central eastern coastline, are the remains of the old Niʻihau shield. Numerous dikes can be viewed in the shield, particularly in the walls of valleys cut deep into the southeastern exposure of the coast (Clague and Dalrymple 1987).