populations appear relatively tolerant of high incubation temperatures, winter-nesting populations may be especially vulnerable. Seasonal shifts in nesting to cooler periods could provide an adaptive buffer against warming, but opportunities for such shifts are limited in winter populations that already nest at the coolest time of year. This is of particular concern given that flatbacks are endemic to Australia, which is projected to experience warming above the global average. In this preliminary study, we quantified the relationship between nest temperature and hatching success, late-stage embryonic mortality, and hatchling performance metrics (self-righting, crawling, and swimming speeds) in a winter-nesting flatback population at Bare Sand Island, Northern Territory. Our findings define the thermal conditions that support optimal embryonic and hatchling survival, providing critical data to assess how this Data Deficient species may respond to continued global warming.

LONG-TERM MONITORING OF HONU'EA (*ERETMOCHELYS IMBRICATA*) NESTING ACTIVITY ON HAWAI'I ISLAND

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For over 35 years, the Hawai'i Island Hawksbill Project (HIHP) has been monitoring honu'ea (Hawaiian hawksbill turtles; *Eretmochelys imbricata*) nesting sites along the southern coast of Hawai'i Island, where approximately 85% of all honu'ea nesting within the Hawaiian archipelago has been recorded. There are four primary nesting beaches where the majority of nesting occurs, each requiring about 2 hours to access via hiking or rough 4WD roads. The HIHP consists of a small collaborative team of personnel from the National Park Service and Research Corporation of the University of Hawai'i. Monitoring includes overnight camps at nesting beaches to identify active nesters and visits to nesting sites during the day to document any signs of nesting activity that may have occurred since the team was last present. All nests are inventoried after hatching to record hatch and emergence success. Currently, the largest threats to the nesting population are predation (by mongoose, rats, and cats) and habitat degradation from erosion, which is expected to increase with climate change and sea level rise. Over the past 15 years, the HIHP has documented an average of 49 honu'ea nests year-1 on Hawai'i Island, a number that varies with personnel and monitoring effort. Anywhere from 4-25 females were observed each season. Average clutch size was 162 eggs nest-1, and average hatch success was 72.94% (n=544). A record of 82 nests was documented in the 2023 nesting season. In the 2025 nesting season, the project reached 200 turtles tagged. While primarily only honu'ea are observed nesting on Hawai'i, olive ridley (2010, 2021) and green (2011, 2024, 2025) turtle nests have occasionally been documented on the island. Notably, there were multiple nesting attempts by green turtles in the 2025 season that resulted in the partial excavation and damaging of honu'ea nests. These occasional nesting events represent a potential challenge that increased green nesting could pose for a population that already experiences intraspecific competition on small nesting beaches. They also highlight the value of continued monitoring of Hawai'i Island's beaches to track changes in species presence and nesting activity. In addition to continued regular monitoring, the HIHP is focusing efforts on answering important research questions. Dramatic variation has been observed in the false crawl rates and hatching success in honu'ea across top nesting beaches, which has seemingly corresponded with storm events and changes in vegetation cover, indicating that changes in beach characteristics could drive nesting success and clutch survival. Additionally, the beaches on Hawai'i Island are unique in composition, as some are primarily made of granular lava rock (black sand) and others coral (white sand). Because specific populations have different preferred nesting habitat characteristics (slope, vegetation cover, beach width, sand type, etc.), the HIHP is working to identify the most important habitat characteristics for this distinct population so that predictions can be made about habitat suitability in response to climate change and sea level rise, and therefore management efforts can be allocated accordingly in the future.

NEW SAND IN SOUTHWEST FLORIDA: CHARACTERIZATION AND IMPACTS ON *CARETTA CARETTA* NESTING

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Southwest Florida has been impacted by multiple hurricanes in the last few years. These storms and their resulting beach renourishment projects, intended to restore the region's shorelines, have significantly modified the nesting environment available to loggerhead (*Caretta caretta*) and other sea turtles in this region. Beach sand lost to storm erosion has been replaced by material sourced from both offshore and inland sources with differing characteristics, including grain size distribution, organic and carbonate content, and shape. These variables influence the stability, thermal profile, moisture retention, and gas exchange rates which drive nest construction, embryonic development, and hatchling emergence. Previous studies have often focused on sand characteristics in isolation; however, understanding them in combination is critical for ecologically sound coastal zone management. Thus, the purpose of this study is to evaluate how multiple sediment characteristics influence sea turtle hatchling production in southwest Florida. Morning surveys were conducted on two southwest Florida beaches – Bonita Beach and Estero Island – and a subset of identified loggerhead sea turtle nests were selected for sediment sampling. Two 1 L samples were collected 0.5 m adjacent to each nest – one from the surface (0 cm) and the other from an approximate nest chamber depth (40 cm). Samples were transported to Florida Gulf Coast University for processing and analysis. In the laboratory, samples were dried to calculate moisture content, sieved to determine relative contribution of multiple sediment size classes, burned at 550 °C to quantify organic matter content, and subsampled for a detailed particle size analysis of the sand and smaller fractions (i.e., <2 mm) using a Malvern Panalytical Masterizer. Grain morphology was visually categorized under a compound microscope. Following sediment sampling, nests were monitored throughout their incubation period and inventoried post-hatch to determine clutch size and hatching success rates. This inventory data was then compared to sediment characteristics in a generalized linear model framework to determine which variables had the greatest influence on nest productivity. Preliminary results from 15 nests suggest that Bonita Beach nests had a greater mean hatching success (78.3%) than Estero Island (59.7%) while having a lower median grain size (234.4 µm vs. 260.4 µm, respectively) and lower average organic content (0.7% vs 4.1%, respectively). Further analyses of size distribution, carbonate content, and grain shape are ongoing. Supplemental data from temperature loggers deployed adjacent to incubating clutches, as well as sediment collection and instrumentation deployments at nest-independent locations are also underway to place the nest-specific data in context with the wider available beach habitat.

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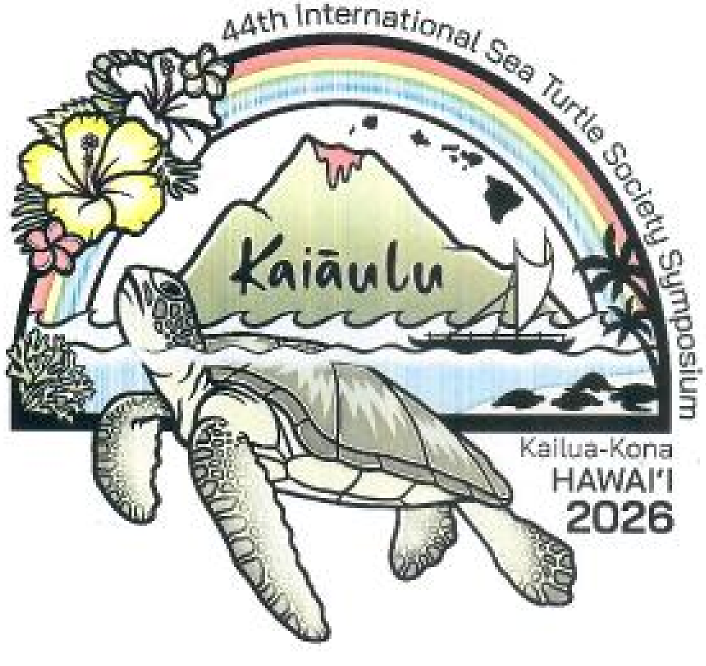

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