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TITLE: A Geospatial Appraisal of Ecological and Geomorphic Change on Diego Garcia Atoll, Chagos Islands (British Indian OceanTerritory)

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ABSTRACT:

This study compiled a wide range of modern and historic geospatial datasets to examine ecological and geomorphic change at Diego Garcia Atoll across a 38-year period (1967?2005). This remarkable collection of spatially referenced information offered an opportunity to advance our understanding of the nature and extent of environmental change that has taken place with the construction of the military airbase at Diego Garcia. Changes assessed included movements of the lagoon rim shorelines, changes in the terrestrial vegetation on the lagoon rim and amendments to the bathymetry of the lagoon basin through dredging activities. Data compiled included detailed shoreline and vegetation maps produced as part of the H.M.S. Vidal Indian Ocean Expedition (1967), three Ikonos satellite images acquired in 2005 that collectively covered the complete Atoll area, a ground truthing field dataset collected in the northern section of the lagoon for the purpose of seafloor mapping (2005), observational evidence of shoreline erosion including photographs and descriptions of seawater inundations and bathymetric soundings from five independent surveys of the lagoon floor (1967, 1985, 1987, 1988 and 1997). Results indicated that much of the change along the lagoon rim is associated with the expansion of the inner lagoon shoreline as a result of the construction of the military airbase, with an estimated increase in land area of 3.01 km2 in this portion of the atoll rim. Comparisons of 69 rim width transects measured from 1967 and 2005 indicated that shorelines are both eroding (26 transects) and accreting (43 transects). Within a total vegetated area of 24 km2, there was a notable transition from Cocos Woodland to Broadleaf Woodland for a land area of 5.6 km2. From the hydrographic surveys, it was estimated that approximately 0.55 km3 of carbonate sediment material has been removed from the northwest quadrant of the lagoon, particularly in the vicinity of the Main Passage. As no previous record of benthic character exists, a complete benthic habitat map of the atoll was derived through classification of the three IKONOS satellite images. Management implications arising from this overall appraisal of geomorphic and ecological change at Diego Garcia included the need for ongoing monitoring of shoreline change at a representative set of sites around the atoll rim, monitoring of the water flow regime through the northern channels between the open ocean and the lagoon basin and an ongoing mapping campaign to record periodic changes in the character of the benthic surface ecology.

SOURCE: Remote sensing

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