Satellite-Based Benthic Habitat Mapping Using LANDSAT 8 in Nusa Lembongan and Nusa Ceningan Island, Bali.

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**ABSTRACT** — The Island of Nusa Lembongan and Nusa Ceningan are two of three islands in Nusa Penida waters, Bali Province, with 296 species of coral reefs biodiversity at depth less than 30 meter. LANDSAT 8, with 14 day temporal resolution and spatial resolution of 30x30 meter, has becoming an efective and sustainable alternative in satellite-based benthic habitat mapping activies in regional scale. Equipped with the 430-450 nm coastal blue band, the ​​first four channels on LANDSAT 8 now can be used to identify the objects in shallow water because of their penetration ability to reach the bottom of the water. This study will determine the most effective combinations used to create RGB composites to calculate the zonation area of benthic habitat. In order to be displayed as a thematic map, the satellite image should be geometrically corrected based on the Indonesia Coastal Environment map scale 1:50.000 provided by Geospatial Information Agency (BIG). Atmospheric correction method and water coloumn correction performed using (FLAASH) method and Lyzenga algoritm for reducing the atenuation effect. The combination used to create RGB composite with the best effectiveness is determined by comparing the results of the shallow water habitat map using a combination of bands of 123, 134, and 234 clustered into three classes of coral reef, vegetation, and benthic substrate (sand and dead corals) using the unsupervised ISODATA classification method. Analysis of the result conducted by qualitative approach based on the basic spectral characteristics of the benthic objects in shallow water, data of benthic habitat provided by Marine Research Institute and Observatory (BPOL), as well as several existing web-based Geographic Information System of coral reef’s databases. The band combination of 123 on LANDSAT 8 stated to be able to provide more effective area information of benthic habitat in the study area consists of 1.770.300 m2 of coral reefs, 1.525.500 m2 of vegetation such as seagrass or algae, and 733.500 m2 of benthic substrate, with total area of 4.029.300 m2.