



**UNIVERSITY OF THE PHILIPPINES**

**Master of Science in Environmental Science**

**Harry Casimir E. Merida**

***Assessing the Effectiveness of NIPAS in Conserving the Forests of Batanes***

Thesis Adviser:

**Gay Jane P. Perez, Ph.D.**

**Institute of Environmental Science and Meteorology**

**University of the Philippines Diliman**

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## ABSTRACT

The impact of protected area policy on Batanes in the Philippines was explored in this study. The province is composed of ten islands, and the study focuses on the forest cover of Batan, Sabtang, and Itbayat. Batanes was declared as a protected area to protect natural and sociocultural heritage on 1994 (Presidential Proclamation No. 335) and 2001 (Republic Act 8991). Portions of the island are defined as no-take zones, termed Strict Protection Zone (SPZ), while the rest are Multiple Use Zones. Landsat image composites from 1989, 1993, 2000, 2007, 2010, and 2016 were geometrically corrected, applied Relative Radiometric Normalization, and classified as Forests, Non-Forests, and Non-Vegetation. A land use map was created to classify agriculture and non-agriculture using phenology through Normalized Difference Vegetation Index. Support Vector Machine was used as the classifier. The final land cover/land use map was created by combining the two maps. Multivariate analysis through Canonical Correspondence Analysis was utilized with a change map (1989 & 2016) and selected anthropogenic and natural variables. Results show forests increased post-gazettement for all islands yet temporal trends show the covarying change between Forests and Non-Forests, indicating periods of forest gain and loss. The increasing forest cover at Batan is partially attributed to thickening agriculture hedgerows comprised of trees, particularly *Calophyllum inophyllum*. In Itbayat, Non-Forest and Forest showed inverse trends caused by indigenous swidden agriculture as the forests are the main farming resource of the island. Analysis at SPZs showed that Batan and Sabtang mainly experienced forest gain, implying conservation and even forest growth, while forest loss was encountered in Itbayat. Most of the remaining unchanged forests are at the mountains for Batan and Sabtang and within each island's SPZ. It is found that two SPZs in Batan may be oversized as the land use map showed that the zones contain areas dedicated for agriculture, which does not conform to the definition of an SPZ. Interestingly, a 1-km buffer zone analysis indicate high forest gain compared to forest loss for Batan and Sabtang, showing conservation of forest cover that extends beyond the zones. Canonical Correspondence Analysis indicates that the primary driver of forest change to all islands is accessibility due to natural barriers or anthropogenic use; high slope and elevation

help retain the forests of Batan and Sabtang while Itbayat's forests are mainly located at low elevations and are closely related to agriculture, thus forests are not retained and may be converted for farming. The analysis showed that forests in the province, at least in the SPZs of Batan and Sabtang, are conserved due to its inaccessibility and placing these areas under SPZ may help retain these forests. In Itbayat, the SPZ are located at the edges of the island and its impact as an SPZ for conservation is limited. Only the island of Batan and Sabtang are observed to have a large patch of undisturbed forests while Itbayat's forests are fragmented. Although additional policies that restrict accessibility may help reduce forest conversion, a common ground should be agreed as Philippine indigenous people law (RA 8371) lists the province as an ancestral domain thus allowing the indigenous community exercise rights that could be contrary to the context of conservation, particularly at the island of Itbayat which has a Certificate of Ancestral Domain Title and relies on forests for agriculture. Rules and regulations should be introduced to identify and resolve potential conflicts.