

ABSTRACT

This study explores the soundscapes of two distinct landscapes in Luzon, Philippines: the Palanan Forest Dynamics Plot, representing a natural ecosystem, and urban green spaces within the National Science Complex (NSC) at the University of the Philippines, Diliman. Soundscape recordings were analyzed across 24-hour periods at each site, employing nine acoustic indices: Acoustic Complexity Index (ACI), Acoustic Diversity Index (ADI), Acoustic Evenness Index (AEI), Bioacoustic Index (BI), Acoustic Entropy Index (H), Median of the amplitude envelope, and Normalized Difference Soundscape Index (NDSI) to assess biotic and anthropogenic sound patterns. Acoustic index values were compared using Cosine Similarity and variant Normalized Mean Square Error (NMSE) formulas. Principal Component Analysis (PCA) reduced the dimensionality of the indices, identifying key components that differentiated natural from urban soundscapes. Generalized Additive Mixed Models (GAMMs) revealed significant diel variation, with natural soundscapes dominated by biophony during dawn and dusk, while urban sites exhibited anthrophony throughout the day. These findings demonstrate the utility of soundscape analysis as a non-invasive, scalable method for monitoring ecosystem health. The study contributes to baseline acoustic data for the Philippines, highlighting the potential for soundscapes to inform conservation strategies, urban planning, and environmental management. Recommendations from this study include expanding studies in different Philippine ecosystems, enhancing acoustic monitoring infrastructure, and implementing real-time long-term monitoring.