TRANSFORMING DRONE DATA INTO LANDSCAPE ASSESSMENT USING ARCGIS

Biajani Gonzalez[1], William J. Hernández[1,2]

[1]Environmental Mapping Consultants LLC, Aguadilla, PR 00603
[2]2Department of Marine Sciences, UPR-Mayagüez, Mayagüez, Puerto Rico. 00680

Corresponding author: biajanisarobei@gmail.com

Satellite remote sensing provides broad geographic coverage, but its spatial, spectral, and temporal resolution limit fine-scale multitemporal environmental mapping. Small unmanned aerial vehicles (drones) offer a flexible alternative, capturing sub-meter scale imagery on command. Because drones can be flown repeatedly at a site, they can provide the consistent, quantitative data that wetland restoration projects need to measure land cover change over time. Environmental Mapping Consultants (EMC) developed a reproducible ArcGIS Pro workflow that specifies recommended flight parameters for acquiring drone orthomosaics and digital elevation models (DEMs), using them to produce land cover classifications and multitemporal change assessments. Orthomosaics from seven restoration sites across Puerto Rico were classified using a Support Vector Machine (SVM) classifier trained on a shared wetland land cover schema of up to ten classes, adapted for each site. Elevation models helped separate tree canopy from shrub vegetation, while manual refinement and retraining addressed spectral mixing. Final rasters were converted to area, hectare, acre, and percent cover tables. For four sites, surveys were repeated after one year and independently classified using the same schema, enabling before-and-after comparison of land cover change. Differences in drone flight conditions between dates, particularly time of day and the resulting lighting, influenced classifier training and are discussed alongside recommendations for flight planning. Additional tools, such as inundation analysis using the digital elevation models, are also explored. Together, these steps show how drone surveys can support wetland restoration monitoring and offer practical lessons for making repeat drone classifications comparable over time.