BIRD COUNTS IN CALIFORNIA'S CENTRAL VALLEY WETLANDS USING OBJECT BASED IMAGE ANALYSIS

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Abstract

Recent advancements in small unmanned aerial systems (sUAS) have proved useful in monitoring and counting aquatic birds in wetlands flying over flocks without disturbing them. The objective of the study is to use a semi-automated workflow to extract waterfowl species and counts from a managed wetland in Colusa County, California. Over 560 UAV images were obtained using a DJI Mavic 2 PRO in a series of parallel flight lines at an average Ground Sample Distance (GSD) of approximately 3 cm/px. A rule-based feature extraction workflow in ENVI was used to extract waterfowl objects, using the Edge algorithm at a scale of 75% and the Full Schedule Lambda Merge algorithm at a level of 95%. An extent of waterfowl presence (6.8 ha) and waterfowl absence (1.4 ha) imagery were used for an object-based image analysis (OBIA) and we counted approximately 2,259 birds. The overall classification accuracy for identifying birds was 57.3%. The user's accuracy for birds and non-birds was 93.9% and 51.5% and producer's accuracy for birds and non-birds was 23.6% and 98.1% respectively. The unique characteristics in our study site presents challenges for conducting bird counts, which may require conducting both automated and manual counts in defined subsets of habitat.

Keywords: *waterfowl, central valley, sUAS*