

GIS applications to the study of seabird ecology around the Hawaiian Islands

Abstract

Seabird sightings were recorded along 28 strip transects, 300m wide, and a total survey effort of 484.17km. Species richness indices were derived from species density data, and used to analyse seabird diversity spatially and statistically, which was negatively correlated with distance from shore, $\tau = -.48$, p (one tailed) $< .01$. There was a much stronger pattern around the North Western Hawaiian Islands where the distributional gradient was greater, with higher species richness right offshore, and various species sighted at different distances past the 60km buffer, $\tau = .60$, p (one tailed) $< .01$. In contrast, most species sighted in the Main Hawaiian Islands were found within a 40km buffer from shore, and no sightings past 60km, $\tau = -.30$, p (one tailed) $< .01$. Distributions of Red Footed Booby (*Sula sula*) and Brown Booby (*Sula leucogaster*) were analysed too. These species are closely related, but *S. leucogaster* have higher mass and wing loading. The results show *S. sula* to be more significantly correlated with offshore distance, $\tau = -.31$, p (one tailed) $< .001$, than *S. leucogaster*, $\tau = -.33$, p (one-tailed) $< .05$, which was mostly seen right offshore, except for two sightings. Finally, point density analysis of *Pterodroma sandwichensis* and *Puffinus newelli* sightings showed a high-density hotspot around Northern Kauai with a radius of 35km, which could potentially be designated an IBA as it covers both species populations' main foraging grounds.