



Monitoring Sandy Beaches: Avifauna

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Introduction

Sandy beaches make up roughly three-quarters of the world's shorelines (Bascom, 1980). Exposed sandy beaches in California are inhabited by an abundant macrofauna community which are important food resources for vertebrate predators such as shorebirds. Sandy beaches are considered extremely valuable as recreational and scenic resources for humans, both residents and tourists (Leatherman, 1997).

To date, relatively limited data exists regarding the various regions of exposed sandy beaches and their inhabitants. Shorebirds, invertebrate macrofauna, and macrophyte wrack comprise a majority of the sandy beach community. While many birds utilize sandy beaches for roosting, feeding, and breeding, this study focuses on six species of shorebirds. The six focal species include Sanderlings, Willets, Marbled Godwits, Black-bellied Plovers, Snowy Plovers, and Whimbrels. Shorebirds have relatively high daily energy expenditures (Kerston and Piersma, 1987), making the presence of a rich and productive food source critical to the survival of breeding and nonbreeding shorebirds. These species are considered exceptional "ecological barometers" due to their extensive migration patterns, relatively long life, and their sensitivity to changes in ecological condition.

The purpose of this study is to gain a better understanding of the correlation between shorebird abundance and Macrophyte wrack with respect to seasonal variation and ecological and human induced stressors on sandy beaches.



Figure 1. CA. Least Turn.



Figure 2. Western Snowy Plover.

Method

- Survey team works in pairs and observes birds along a 1 km transect. Observers trained by faculty for 3 months
- Observers walked 1 km transect, recording shorebirds along the length
- Surveys conducted during low incoming tides for consistency and maximum sandy beach exposure
- Beaches sampled during weekdays to minimize the influence of human disturbance
- Data collected include date, observer, start and stop time, tide height, weather and sea conditions, # of species, abundance, and % of wrack cover

Study Site

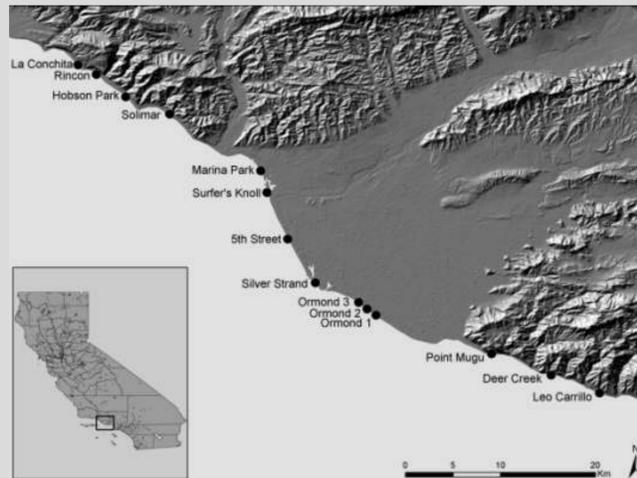


Figure 3. Diagram of study sites.

Monthly shorebird counts were completed on outer coast of Ventura County (Fig.3) from July 2007 to June 2010. The Ventura County coastline runs northwest to southeast along the Santa Barbara Channel of southern California and is about 62 km in length. Data for this analysis were from 14 randomly selected, 1-km beach segments (about 20% of the county shoreline) for their assessment.

↑ Wrack Abundance = ↑ Bird Richness

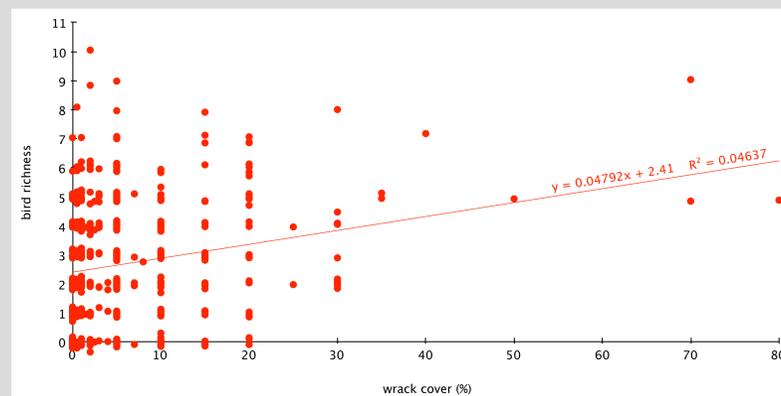


Figure 4. % wrack cover for study sites and shorebird species abundance.

Bird richness and percent wrack cover reflect aggregated counts for 14 beaches for 3 consecutive years. This graph reveals a positive correlation between species richness and percent wrack cover. This relationship is consistent with other research that reveals the importance of wrack in determining species abundance. High degree of bird richness with low wrack conditions may be a function of seasonal migratory activity. Wrack availability will attract a variety of land bird species contributing to high levels of species richness.

Comparing Bird Abundance and % Wrack Cover

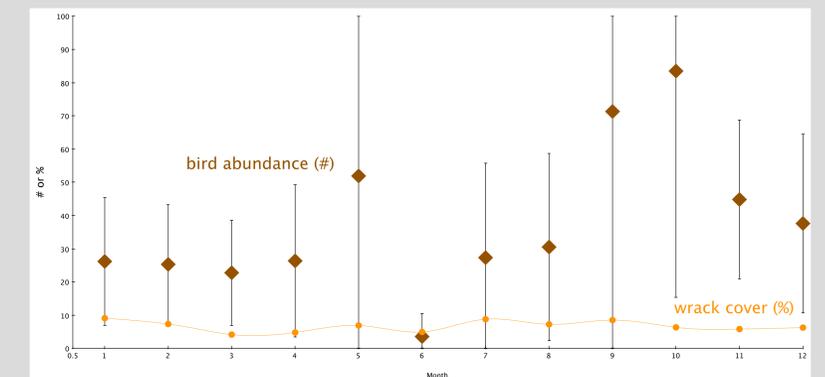


Figure 5. % wrack cover for study sites and species abundance for 3 years (2007-2010) on 14 Ventura County beaches.

Bird abundance and percent wrack cover reflect aggregated counts for 14 beaches for 3 consecutive years. This graph reveals the possible relationship between bird abundance and percent wrack cover. As bird abundance increases there seems to be a corresponding increase in percent wrack cover. While low bird abundance due to seasonal variation does not influence wrack cover, high bird abundance is often associated with high percent wrack cover.

Conclusion

Shorebird abundance along sandy beaches does not rely entirely upon the presence of wrack. Contributing factors include food sources, seasonal variation, ecological change, and human induced stressors. While the amount of wrack is not an accurate predictor of shorebird abundance it is an important factor in determining seasonal and spatial distribution patterns along the Ventura County coast. Macrophyte wrack is vital towards maintaining a thriving sustainable sandy beach community and provides abundant sources of carbon for macrofauna that provides a critical food source for shorebirds (Dugan 1999). The result of this study points to the need to consider the presence or absence of wrack as an important factor in future sandy beach monitoring efforts.

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