Benthic Habitat-Based Framework for Ecological Production Functions: Case Study for Utilization by Estuarine Birds in a Northeast Pacific Estuary

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Habitat-based frameworks have been proposed for developing Ecological Production Functions (EPFs) to describe the spatial distribution of ecosystem services. As proof of concept, we generated EPFs that compared bird use patterns among intertidal benthic habitats for Yaquina estuary, Oregon, USA. Visual censuses quantified abundance of bird groups and general species richness in: *Zostera marina* (eelgrass), *Upogebia* (mud shrimp)/mudflat, *Neotrypaea* (ghost shrimp)/sandflat, *Zostera japonica* (Japanese eelgrass), and low marsh estuarine habitats. Also assessed were (1) spatial variation within a habitat along the estuary gradient, and, (2) temporal variation based on bi-monthly samples over a year at five tidal ranges. *Z. marina* was an important estuarine habitat based on nearly all metrics of bird use, except for shorebird densities. This suggests that reductions in native eelgrass habitat may reduce the abundance and diversity of birds in Yaquina estuary. A benthic habitat based assessment appears generally feasible for developing relative EPFs related to the presence of birds within estuarine systems.

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