

Comparison of Habitat-Specific Nutrient Removal and Release in Pacific NW Salt Marshes at Multiple Spatial Scales

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Wetlands can be sources, sinks and transformers of nutrients, although it is their role in nutrient removal that is valued as a water purification ecosystem service. In order to quantify that service for any wetland, it is important to understand the drivers of nutrient removal within the system of interest and its variability among systems of the same type. We compared short-term exchanges of inorganic N and P between surface water and salt marsh habitats (high marsh, low marsh, and tidal channel) at three spatial scales, including: within-marsh, within-estuary, and among-estuary. The study was conducted in summer 2012 at 20 salt marshes distributed among 8 Oregon estuaries. Nutrient fluxes were estimated using open-topped chambers deployed at low tide into which nutrient-amended artificial seawater was added. Patterns of nutrient exchange among habitats were consistent across all spatial scales for nitrite+nitrate (N+N) and phosphate (PO_4), though there was substantial variability among marshes. In general, channel habitat had the greatest uptake of N+N and PO_4 , high marsh had the greatest efflux of both nutrients, while low marsh took up N+N and released PO_4 but at lower rates. Nutrient efflux in high marsh habitat was correlated with abundance of *Grindelia integrifolia*, a native forb. Net short-term nutrient retention or release for salt marshes in this region can be estimated from these results, marsh habitat area, and duration of inundation for each habitat type.