Habitat-specific nutrient removal and release in Oregon salt marshes

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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) measured during 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 (PO4), though there was substantial variability among marshes. In general, channel habitat had the greatest uptake of N+N and PO4, high marsh had the greatest efflux of both nutrients, while low marsh took up N+N and released PO4 but at lower rates. Nutrient efflux in high marsh habitat was correlated with abundance of Grindelia integrifola, a native forb. We speculate that this may be due to salt excretion by these plants. We will also compare these fluxes to below-ground nutrient transformation and fluxes, the latter based on preliminary estimates of denitrification rate and sub-surface movement of tidal waters.