

To be submitted to the Coastal and Estuarine Research Federation 2011 conference in Dayton Beach, FL, 6-10 November.

2. For oral presentation (note: EPA person is not the presenting author):

### The importance of allochthonous subsidies to an estuarine food web along a salinity gradient

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Estuarine food webs function within a heterogeneous mosaic and are supported by a mix of primary producers from both local and distant sources. Processes governing the exchange and consumption of organic matter (OM), however, are poorly understood. To study the contribution of autochthonous and allochthonous OM sources to primary consumers in the Minho River estuary (N-Portugal, Europe), we characterized the carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) stable isotope ratios of primary consumers (zooplankton and the invasive clam *Corbicula fluminea*) and their potential OM sources, as well as the concentration and stable isotope ratios of dissolved inorganic carbon (DIC) and particulate OM (POM) along the estuarine salinity gradient. The  $\delta^{13}\text{C}_{\text{DIC}}$  values were lowest in the tidal freshwater (TFW) portion and higher toward the river mouth, following the expected conservative mixing. In the TFW portion, particulate organic carbon (POC)  $\delta^{13}\text{C}_{\text{POC}}$  values (bottom: -28.5‰ to -25.5‰; surface: -29.3‰ to -26.3‰) and C:N (>10) of particulate samples indicated that terrestrial-derived sediment comprised a large portion of the bulk POM pool. In the polyhaline portion,  $\delta^{13}\text{C}_{\text{POC}}$  values (bottom: -20.5‰ to -18.8‰; surface: -25.5‰ to -23.2‰) indicated that the bulk POM pool was generally derived from phytoplankton. In the brackish estuary, zooplankton  $\delta^{13}\text{C}$  values were similar to bottom  $\delta^{13}\text{C}_{\text{POC}}$  values, suggesting that marine-derived OM provided a subsidy to the planktonic food web. In contrast, zooplankton  $\delta^{13}\text{C}$  values in the TFW were similar to surface and bottom  $\delta^{13}\text{C}_{\text{POC}}$  values, suggesting increasing importance of terrestrial-derived

OM. *Corbicula fluminea* presented a similar trend to the zooplankton in the TFW, suggesting that the benthic food web was also subsidized by terrestrial-derived OM. Our stable isotope data suggest that the Minho River estuary has a high degree of connectivity along the estuarine salinity gradient and that both marine and freshwater inputs provide a food web subsidy.