

# MODELLING ECOSYSTEM METABOLISM IN COASTAL ESTUARIES

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Concentrations of dissolved oxygen (DO) result from the combined effects of photosynthetic production, respiration, and air-water gas exchange, and time series of DO can be used to calculate ecosystem metabolism. We are adapting a nonlinear inverse model to estimate spatially explicit ecosystem metabolism in the Sapelo Island Estuary (Duplin River, GA) using DO measurements from high-speed transects along the river. This work in progress modifies a model developed to measure gross primary production (GPP), community respiration (CR), and net ecosystem production (NEP) in the Plum Island Estuary, MA. We are also using harmonic analysis of long-term DO time series from stationary sondes to calculate temporal estimates of GPP, CR, and NEP. These long-term studies can examine the effects of nutrient loading, sediment loading, river discharge, sea level rise, and temperature on estuarine community metabolism.

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