Predicting the Effects of Water Quality on the Growth of *Thalassia testudinum* in Tampa Bay with a Dynamic Simile-Based Model Tool.

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We describe a seagrass growth (SGG) model that is coupled to a water quality (WQ) model that includes the effects of phytoplankton (chlorophyll), colored dissolved organic matter (CDOM) and suspended solids (TSS) on water clarity. Phytoplankton growth was adjusted daily for PAR (integrated over depth) and temperature, and was bounded by cell death, nitrogen and phosphorus availability. The WQ model functions on a daily mixing cycle based on tidally averaged exchange coefficients for each of 10 bay segments. Nutrient (N and P), TSS and CDOM inputs were derived from fresh water flow from gauged and ungauged drainage basins. Ungauged flows were estimated from a hydrologic model that included rainfall and four land-use categories (urban, agriculture, wetlands and forest). Atmospheric inputs of nitrogen species were also included. In the SGG model changes in seagrass biomass were determined from daily rates of photosynthetic carbon fixation, loss of carbon from respiration, and plant mortality. Seagrass growth rate was adjusted daily for day length, photosynthetically active irradiance (PAR) levels, and temperature and was bounded by biomass carrying capacity. Irradiance at plant canopy depth was adjusted for water quality parameters (e.g. phytoplankton biomass, CDOM, and TSS). Day length and PAR levels just below the surface of the water were provided by a simple spectral solar irradiance model. Future versions of the model will include sub-models linking total seagrass biomass to commercial and recreational fishery production functions. Understanding this linkage will help in estimating the value of seagrass in supporting fisheries and how land use changes can impact fishery production through changes in seagrass communities.

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