

## **Projected changes in nutrient and sediment delivery to and carbon accumulation in coastal oceans of the Eastern United States**

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Land use and land cover distributions are primary determinants of terrestrial fluxes of sediments and nutrients to coastal oceans. Sediment and nutrient delivery to coastal waters have been significantly altered by historic changes in population and land use, resulting in changes to coastal production and carbon storage. Continued population growth and increasing agricultural areal extent and intensity are expected to accelerate these changes.

The USGS LandCarbon project developed prospective future land use and land cover projections based on IPCC scenarios A1, A1b, B1 to 2050 as the basis for a multitude of biogeochemical assessments. We assessed the impacts of changes in land use and land cover on delivery of nutrients and sediments to the coastal ocean and concomitant carbon storage. Annual fluxes were estimated using the SPARROW model, calibrated with long-term USGS water quality monitoring data.

Significantly greater annual loads of nutrients and sediments to coastal waters by 2050 are projected by the model. For example, for the Eastern United States, projected nitrate fluxes for 2050 are projected to be 16 to 52 percent higher than the baseline year, depending on scenario. As a consequence, an associated increase in the frequency and duration of coastal and estuarine hypoxia events and harmful algal blooms could be expected. Model estimates indicate that these prospective future nutrient and sediment fluxes will increase carbon storage rates in coastal waters by 18 to 56 percent in some regions.