Nonmarine sources and loading of nitrogen to U.S. estuaries

Naomi Detenbeck[1], Dan Sobota[2], Jana Compton[3], and Todd Plessel[4]

[1]U.S. Environmental Protection Agency, Atlantic Ecology Division, Narragansett, RI 02882; [2]National Research Council Associate, US EPA Western Ecology Division, Corvallis, OR; [3]U.S. EPA Western Ecology Division, Corvallis, OR; [4]Lockheed-Martin at US EPA Environmental Modelling and Visualization Lab, Research Triangle Park, NC.

Previous assessments of land-based nitrogen loading and sources to U.S. estuaries have been limited to estimates for larger systems with watersheds at the scale of 8-digit HUCs and larger, in part due to the coarse resolution of available data, including estuarine watershed boundaries. We present a comprehensive assessment of nitrogen loading to estuaries and source partitioning linked to watersheds of 344 estuarine systems in the conterminous United States. Based on NHDPlus version 1 catchment data (http://www.horizon-systems.com/nhdplus/), watershed boundaries have been derived for 344 estuarine systems and are now publically available through the US EPA Estuary Data Mapper (EDM; http://ofmpub.epa.gov/rsig/rsigserver?edm/index.html). Loading and source estimates were derived from regional SPARROW models, supplemented by estimates of direct atmospheric deposition from the Community Multi-Scale Air Quality Model (CMAQ, http://www.cmaq-model.org/). The EDM application provides a user-friendly interface to CMAQ time series of loading data by estuary and estuarine watershed. USGS SPARROW model outputs are compared with more recent national data on the inputs of nitrogen by sources compiled by Sobota et al. (2013) at the HUC8 scale and updated to the HUC12 scale in 2013. This work will allow us to compare information on estuarine conditions with the magnitudes and sources of nitrogen inputs from upstream watersheds.