

Reduction of nitrogen inputs to estuaries can be achieved by the control of agricultural, atmospheric, and urban sources. We use the USGS MRB1 SPARROW model to estimate reductions necessary to reduce nitrogen loads to estuaries by 10%. If only agricultural inputs are reduced, the required reductions for a 10% change in estuarine loads range from 82% in New England to 19% in the Chesapeake drainage. Urban and atmospheric only reductions range from 15-31% and 47-64% for the same areas. This reflects major differences in land use and deposition across the region. Reduction strategies for estuaries also benefit upstream ecosystems such as lakes. In the northeast, lakes provide important recreation and amenity value. The value of these cultural ecosystem services are strongly affected by both perceived and actual water quality. We estimate the current aesthetic condition and expected changes for each estuarine reduction scenario for 18,000 northeastern US lakes from the 2007 National Lake Survey, the SPARROW model, and landscape metrics. Agriculture, urban, and air reductions strategies result in improvements in aesthetic condition for 1,208, 691, and 2,280 lakes respectively.