Nitrogen Pollution in the Northeastern U.S.:
Linking Upland Watersheds and Coastal Ecosystems

October 29, 2003

Abstract

Elevated N inputs can result in a loss of biodiversity and a degradation of ecosystem health in both forest and coastal systems. The Hubbard Brook Research Foundation has organized a study through their Science Links ™ program, entitled "Status and Effects of Nitrogen Pollution in the Northeastern United States". The Science Links program seeks to synthesize existing ecological data in the context of societal policy and management needs in order to bridge the existing gap between science and policy. In this study we present a synthesis of inputs, effects and management options for nitrogen (N) in the northeastern U.S. For this analysis we utilized many data sets compiled from across the region. In general, the northeastern U.S. receives anthropogenically elevated inputs of N largely from net imports of food and atmospheric deposition. Other inputs of N such as net feed imports, N-fixation associated with legumous crops and fertilization are generally lower for the region. Elevated inputs of N from net food import is readily transported to surface waters via wastewater discharge, and exported from northeastern watersheds. Consequences of elevated N inputs to the Northeast include: disruption of forest nutrient cycling, decreased forest productivity, increased tropospheric ozone production, elevated leaching losses of nitrate in streams and rivers, and eutrophication of coastal areas. Symptoms of estuarine eutrophication include: SAV loss, algal blooms of the harmful/toxic variety, shifts in algal community composition and hypoxic events. The WATERSN (Watershed Assessment Tool for Evaluating Reduction Strategies for Nitrogen) model was used to evaluate options for N management.   Model results suggest that integrated management options which target a variety of sources will be the most effective at reducing the impact of anthropogenic N to natural systems.