USDA-CSREES 2006 National Water Quality Conference

Overview of Nitrogen and Coastal Waters

Nutrients are the largest pollution problem in the coastal waters of the United States, and increased inputs over the past several decades have resulted in the degradation of 2/3rds of the nation's coastal rivers and bays. Effects include hypoxia and anoxia, increased incidences of harmful algal blooms, degradation and alteration of habitat and food-web structure, and loss of biotic diversity. Although phosphorus can contribute to this degradation, the major culprit is nitrogen in most coastal marine ecosystems (in sharp contrast to freshwater lakes, where phosphorus pollution is of greater concern). Nitrogen is far more mobile in the environment than is phosphorus, and management practices that often were designed to control phosphorus pollution sometimes fail to recognize the greater mobility of nitrogen.

Human activity has roughly doubled the creation of reactive, biologically available nitrogen on the land masses of the Earth. Regional variation in this increase is great, and some regions of the Earth have seen little change, while in other areas, nitrogen fluxes through the atmosphere and through rivers have increased by 10- to 15-fold or more. Much of this increase has occurred over the past few decades. Increased use of synthetic nitrogen fertilizer and increased intensity of meat production have led the change globally and in many regions (including the Mississippi River basin), but atmospheric deposition of nitrogen from fossil-fuel combustion also contributes globally and is the largest single source of nitrogen pollution in some regions (such as much of the northeastern United States). Because of this regional variation in the sources of nitrogen pollution, management approaches need to be tailored to particular regions. Technical solutions for reducing nitrogen pollution from all sources exist, and generally at reasonable cost. However, effective implementation of solutions for non-point sources of nitrogen pollution has been spotty at best in most watersheds.

Author: Robert Howarth