

McCrackin, Michelle L., John A. Harrison, and Jana E. Compton. Future riverine nitrogen export to US coastal regions: Prospects for improving water quality amid population growth. Invited presentation at A Conference on Ecosystem Services, December 2012.

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ABSTRACT: Excess nitrogen (N) in the environment degrades ecosystems and adversely affects human health. Here we examine predictions of contemporary (2000) and future (2030) coastal N loading in the continental US by the **Nutrient Export from WaterSheds (NEWS)** model. Future scenarios were based on storylines from the Millennium Assessment (MA) and assume a number of actions are taken to reduce environmental N losses. Modeled TN export was largely unchanged between 2000 (2.5 Tg N y⁻¹) and 2030 (2.4 - 2.6 Tg N y⁻¹, depending on scenario) because population growth drives increased food and energy consumption that offset measures that reduce environmental N losses. Agriculture is the largest source of N delivered to the coastal zone in both 2000 and 2030, (30-35%, depending on year and scenario), followed by atmospheric deposition (12-14%), and sewage (8-11%). Our analysis suggests that achieving substantial reductions in coastal N loading over the present day will require aggressive management actions. We estimate that coastal N export could be reduced 28-32% between 2000 and 2030 to 1.7 - 1.8 Tg N y⁻¹ if currently available practices and technologies are fully implemented to control N originating in agriculture, smokestack emissions, and wastewater effluent.