

## **Algal Blooms and the Social Cost of Fertilizer**

Charles Taylor and Geoffrey Heal

Fertilizer is critical to agricultural productivity, but its use results in negative externalities downstream in the form of aquatic hypoxic zones and harmful algal blooms. The full economic cost of fertilizer has yet to be quantified at a large scale, partly because most farm pollution is unregulated under the Clean Water Act in the United States, and partly due to the lack of a temporally consistent, administrative-level dataset on water quality. This study utilizes a novel satellite-derived measure of algal bloom intensity that spans 30-plus years and encompasses lakes, riparian, and coastal aquatic resources. We document a positive relationship between nitrogen fertilizer use and algal blooms. We then find a significant negative economic impact in places downstream from agricultural areas, as well as in water-reliant regions (e.g., coastal areas) and economic sectors (e.g., fishing, tourism, recreation). From these results, we estimate the social cost of nitrogen fertilizer.