MANAGING NITROGEN POLLUTION IN CHESAPEAKE BAY

Country: United States
Tags: Acidification | Eutrophication | Modelling | Nitrogen | Subnational
Themes: Climate change | Pollution

Zero hunger Climate action Life below water

Policy in practice

Impact-Pathway Analysis (IPA) recognises that nitrogen can move between environmental media (air, water, soil and biota) as it travels along a pathway from one or more sources to a receptor. Nitrogen management policies often focus on a specific impact without consideration of such biogeochemical pathways. IPA can help manage nutrient impacts more cost-effectively by fostering evidence-informed policy making. In the Chesapeake Bay Watershed illustrates the role of IPA in managing marine eutrophication and ocean dead zones.

In the Chesapeake Bay region, significant efforts have been made to join air and water management. The Chesapeake Bay Watershed covers 90 000 square miles (23 million hectares) across six U.S. States (Delaware, Maryland, Pennsylvania, New York, Virginia, West Virginia) and Washington D.C. Nitrogen, phosphorus and sediment loads delivered from the watershed to the tidal waters of the Bay are the primary concern. They translate into low to no dissolved oxygen (DO) in Chesapeake Bay and tidal rivers every summer. Required DO levels have been established for the different species living in the Bay as a function of the depth of the water.

In December 2010, a total maximum daily load (TMDL) of nitrogen and phosphorus allowed to enter the tidal Bay has been set to comply with DO standards. The TMDL covers major land-based sources of nutrients in the watershed (agriculture, sewage) and atmospheric deposition of nitrogen in the watershed. It is the first TMDL scheme in the United States that takes into account atmospheric deposition of nitrogen. The projected reduction in nitrogen oxide (NOx) emissions at the national level (pursuant to the Clean Air Act) is deducted from the TMDL, thereby reducing the nutrient reduction effort required from land-based sources. Another TMDL has been established for direct atmospheric deposition of nitrogen in tidal waters.

The combined management of atmospheric and land-based nitrogen inputs in Chesapeake Bay reflects the reality of the nitrogen cycle. Such an IPA makes the risk management of hypoxia in the bay more cost effective. The Chesapeake Bay Programme has been effective as a whole since the TMDL was introduced, although progress remains to be made to meet the nitrogen load target of 2025. Estimated nitrogen loads in the Bay watershed decreased by 9% between 2009 and 2016. Agriculture accounts for 42% of the remaining nitrogen loads, followed by discharges from urban runoff and sewage (33%) and atmospheric deposition (25%).

Source report

OECD (2018), Human Acceleration of the Nitrogen Cycle: Managing Risks and Uncertainty, OECD Publishing, Paris.

Key policy message

Impact-Pathway Analysis (IPA) can help manage nutrient impacts more cost effectively by fostering evidence-informed policy making.

Last updated: 04-06-2020