



Chesapeake Bay Program

A Watershed Partnership

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Sources of Phosphorus Loads to the Bay

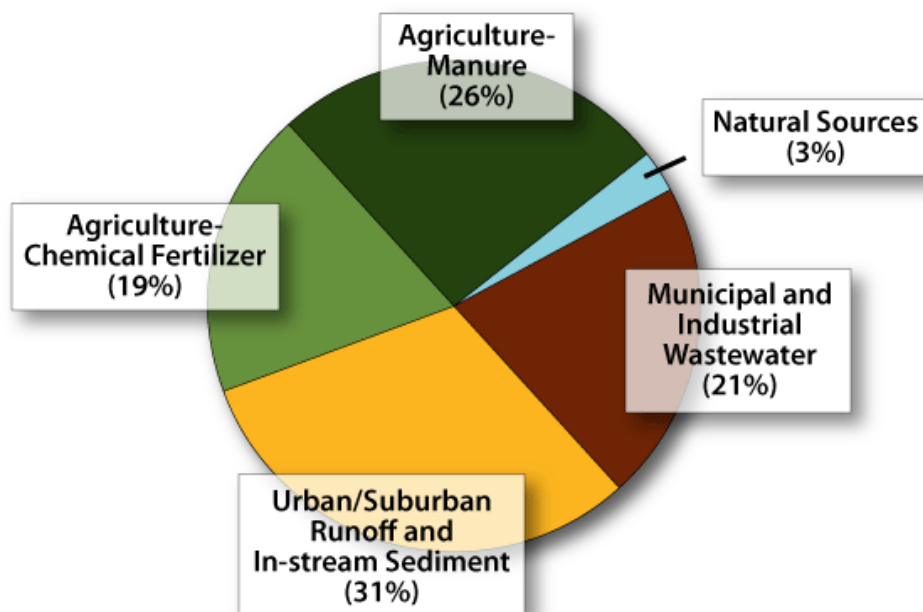
Assessment

By Chart

The main cause of the Bay's poor water quality and aquatic habitat loss is elevated levels of two nutrients, nitrogen and phosphorus. Phosphorus occurs naturally in soil, animal waste and plant material. However, most of the phosphorus delivered to the Bay comes from:

- excess chemical fertilizer and manure applied to agricultural, residential and urban areas;
- human waste treated and discharged from municipal wastewater treatment plants and wastewater discharged from industrial facilities;
- legacy sediment from stream channels.

Sources of Phosphorus to the Bay



Note: Does not include loads from the ocean or tidal shoreline erosion. Wastewater loads are based on measured discharges; other loads are based on an average-hydrology year using the Chesapeake Bay Program Watershed Model Phase 4.3 (Chesapeake Bay Program Office, 2009).

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Importance

The main cause of the Bay's poor water quality and aquatic [habitat](#) loss is elevated levels of two [nutrients](#): [nitrogen](#) and [phosphorous](#). Phosphorus occurs naturally in soil, animal waste and plant material. However, most of the phosphorus delivered to the Bay comes from:

- Excess chemical fertilizer and manure applied to [agricultural](#) and developed ([urban and suburban](#)) lands.
-

Human waste treated and discharged from municipal wastewater treatment plants and wastewater discharged from industrial facilities.

- Legacy [sediment](#) from stream channels.

Additional Information

Based on long-term average hydrology simulations, it is estimated that 18.2 million pounds of phosphorus were delivered to tidal waters of the Bay in 2007, compared to 26.2 million pounds in 1985.

Point source loads are monitored and non-point source loads are simulated based on reported implementation of best management practices (BMPs) that reduce nutrient pollution. The simulation removes annual hydrological variations to measure the effectiveness of BMP implementation and converts the numerous BMPs, which have various pollution reduction efficiencies depending on type and location in the watershed, to a common currency of phosphorus reduction.

Manure Applied to Agricultural Land

Approximately 4.8 million pounds, or 26 percent of the total phosphorus load to the Bay, is due to excess animal waste that runs off from agricultural areas.

These detrimental loads to the Bay could be reduced by using BMPs that:

- Ensure only the amount of manure needed for crop growth is applied to the land.
- Prevent any excess manure from reaching local waterways that lead to the Bay.

Chemical Fertilizer Applied to Agricultural Land

Approximately 3.5 million pounds, or 19 percent of the total phosphorus load to the Bay, is due to excess fertilizer that runs off from agricultural areas.

These detrimental loads to the Bay could be reduced by using BMPs that:

- Ensure only the amount of chemical fertilizer needed for crop growth is applied to the land.
- Prevent any excess phosphorus from reaching local waterways that lead to the Bay.

Urban/Suburban Runoff and Legacy Sediment

Approximately 5.6 million pounds, or 31 percent of the total phosphorus load to the Bay, is due to excess fertilizer and other sources (e.g., pet waste) that run off from urban and suburban areas.

These detrimental loads to the Bay could be reduced by using BMPs that:

- Ensure only the amount of chemical fertilizer needed for lawn growth is applied to the land.
- Prevent any excess phosphorus from urban and suburban areas from reaching local waterways that lead to the Bay.

Legacy sediment in stream channels (and the associated phosphorus) is from deposits that occurred during the conversion of [forest](#) land to agricultural and urban land uses.

Municipal and Industrial Wastewater

Approximately 3.8 million pounds, or 21 percent of the total phosphorus load to the Bay, is due to municipal sewage treatment plants and industrial facilities that discharge treated wastewater to waterways in the Bay watershed.

These detrimental loads to the Bay could be reduced by:

- Using state-of-the-art technology that reduces phosphorus concentrations in sewage treatment effluent.
- Changing industrial processes that result in wastewater containing less or no phosphorus.

Natural

Approximately 600,000 pounds, or 3 percent of the total phosphorus load to the Bay, is due to natural sources such as forests and wildlife.

Sources Not Accounted For in the Chart

The ocean is also a significant source of nutrients to the Bay, but is not accounted for in this chart. Contributions from tidal shoreline erosion are not included either.

Reporting Indicator

- [Phosphorus Loads and River Flow to the Bay](#)

Contact

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