



## Stream Length Impaired by Nutrients

This EnviroAtlas national map displays the length of streams, coasts, canals, and other linear hydrographic features from the 303(d) list of impaired waters within each 12-digit hydrological unit (HUC) that are impaired by nutrients, such as excess nitrogen or phosphorus.

### Why are impaired streams important?

Stream impairments can be due to a wide variety of causes, including chemical pollutants, physical conditions such as siltation, or biological contaminants such as bacteria. This map shows waters that are impaired by nutrients, namely excesses in nitrogen and phosphorus. This process of fertilization ([eutrophication](#)) creates high productivity of aquatic plants and algae in aquatic ecosystems. Eutrophication can have serious impacts on ecosystems, human health, and the economy.

Nitrogen and phosphorus can enter waterways from several sources. The fertilizer used on lawns and farms can be carried into streams by runoff and stormwater. Waste from leaking septic tanks, animal feedlots, boats, and combined sewer overflows can also contribute to [nutrient loading](#).

Though nitrogen and phosphorus are a natural part of stream ecosystems, high concentrations of these nutrients can have adverse effects. Excessive algal growth as a result of eutrophication, warmer water temperatures, and reduced water flow can reduce the oxygen levels in aquatic environments, clog fish gills, and literally smother the plant and animal life in streams and lakes.<sup>1</sup> Some algal blooms even produce chemicals that are toxic to humans and animals, known as [biotoxins](#) or cyanotoxins. The problems caused by excess nutrients can reduce opportunities for tourism and recreation, harm fishing industries and the supply of seafood, and make drinking water more expensive to treat.

Section 303(d) of the Clean Water Act requires states to identify water bodies that do not support state designated

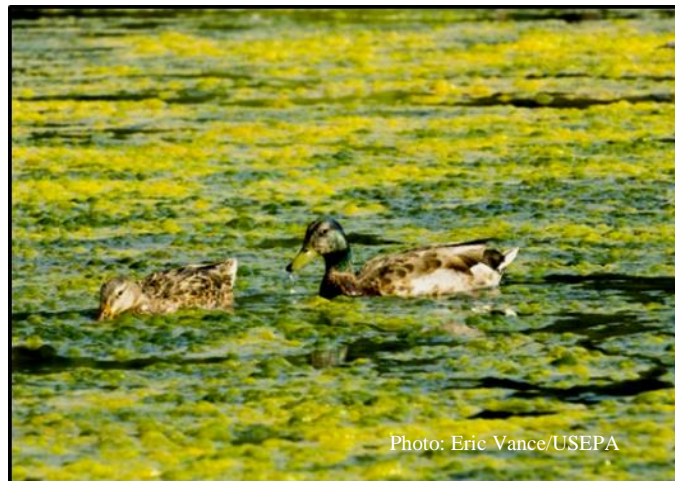


Photo: Eric Vance/USEPA

clean water uses, such as fishing, irrigation, industrial uses, or drinking water supply, due to pollution or other impairments. The states must then establish [Total Maximum Daily Loads](#) (TMDLs), which cap the amount of each pollutant allowed in the water body based on its use. The TMDL sets a target for the total load that the water body is expected to assimilate and then divides the load into allowable contributions from [point](#) and [nonpoint](#) sources.

### How can I use this information?

The map, Stream Length Impaired by Nutrients, provides information about the length of streams and other waters with impairments in a 12-digit HUC. It can be used to identify HUCs that have impairments caused by nutrients. Information about the extent and causes of impairments could guide projects for improving water quality or inform decisions about how to protect water resources.

Users can view this information along with other EnviroAtlas map layers, such as impervious surface and riparian buffers, to identify possible sources of impairments and potential remediation strategies. The map can be combined with layers on recreation or domestic water consumption to show how nutrient impairments relate to water use. This map can be viewed in conjunction with the stream length layer to find what percent of stream length in a HUC is impaired by nutrients. Because the total length of streams in a HUC can vary, supplementing information on impairments with information on stream length can give a clearer picture of the extent of the impairments.



## How was the data for this map created?

The January 2, 2013 [303\(d\) Listed Impaired Waters NHD Indexed Dataset](#) was used to create this map layer. This dataset includes a table listing impaired streams, rivers, and other linear features such as canals, pipelines, and coastlines. The impairment causes were summarized into broad categories.

Because some streams cross 12-digit HUC boundaries, the features were split where they crossed the boundaries. The lengths of all waters impaired by nutrients were summed for each 12-digit HUC. For detailed information on the processes through which this data was generated, see the metadata.

## What are the limitations of these data?

All national data layers, such as the 303(d) Listed Impaired Waters National Hydrography Dataset (NHD) Indexed Dataset, are by their nature inherently imperfect; they are an estimation of the truth based on the best available science. Calculations based on these data are therefore also estimations. The user needs to be aware that the mapped data should be used to inform further investigation. Periodic updates to EnviroAtlas will reflect improvements to nationally available data.

This layer only represents waters on a state's approved 303(d) list, rather than all impaired waterbodies. Therefore, some impaired waterbodies are not included in this layer. The extent of monitoring and the methods used also vary from state to state. The dataset may include false positives resulting from data that is incorrect or inadequate for determining the exact location, or false negatives resulting from missing information. Because the total length of

streams within a 12-digit HUC may vary, this information should be considered in conjunction with data on stream density and total lengths of streams and coastlines to better understand the extent of impairment in a 12-digit HUC. Accuracy information for the source data sets can be found on their respective web sites.

## How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The dataset used to calculate the impairment counts, which provides greater detail on specific water bodies and the causes and sources of impairment, can be found on EPA's [WATERS Geospatial Data Downloads](#) website.

## Where can I get more information?

There are numerous resources on water quality and impairment; a selection of these resources is listed below. The EPA Office of Water provides information on [Section 303\(d\)](#) of the Clean Water Act. For additional information on how the data were created, access the metadata for the data layer from the drop down menu on the interactive map table of contents and click again on metadata at the bottom of the metadata summary page for more details. To ask specific questions about this data layer, please contact the [EnviroAtlas Team](#).

## Acknowledgments

The data for this map were generated by Megan Culler, EPA Student Services Contractor. This fact sheet was created by Megan Culler, EPA Student Services Contractor.

## Selected Publications

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