Stream Length

This EnviroAtlas national map displays the total length in kilometers of streams, canals, and other linear hydrographic features from the National Hydrography Dataset (NHD) for each 12-digit hydrologic unit (HUC).

Why is stream length important?

Streams provide a variety of ecosystem services. They are often the source of water that is used by households, industries, and agriculture. Stream length is an indicator of potential water supply. About 60% of publicly supplied drinking water, most water withdrawn for thermoelectric power, and about half of the water used for irrigation in the U.S. comes from surface water sources like streams or lakes.[1] This water is consumed for household uses, such as drinking, cooking, and hygiene; industrial uses, including chemical, food, paper, wood, and metal production; agricultural uses, and energy production.

Streams can also contribute to the economy by providing opportunities for tourism and recreational activities such as birding, boating, fishing, hunting, swimming, and sightseeing. Nationally, there are an estimated 46.7 million birdwatchers, and waterfowl are the most highly viewed group of birds. In total, wildlife viewing contributed almost $55 billion to the U.S. economy in 2011. Over 27 million Amercans participated in freshwater fishing in 2011, spending more than $25 billion. [2]

The fishing industry depends on streams to help reduce pollution that would otherwise accumulate in lakes and coastal waters. Altering the flow of water through activities such as dam construction and irrigation can interrupt the overall functionality of water systems by slowing water flow, trapping sediments, changing temperature, and promoting the presence of non-native and invasive species.

Photo: Bureau of Land Management, Montana

Streams serve as a source of food and water, providing habitat for many animals and plants. Streams provide a place for fish to spawn, and stream riparian areas serve as travel corridors for semiaquatic and terrestrial wildlife.

How can I use this information?

The map, Stream Length, provides information about the total lengths of streams in a 12-digit HUC. Stream length can vary greatly depending on the size of the watershed and factors such as geology, rainfall, and topography (see the *Stream Density* fact sheet for more information).

This map can be used to complement the maps showing stream impairments. By comparing total stream length to impaired length, users can better assess the extent of impairments in local watersheds. For example, this map could be used to determine whether a watershed with a higher than average length of impaired streams is especially polluted.

This map can also be used in conjunction with other EnviroAtlas map layers. By comparing the information in this map to maps about industrial, household, thermoelectric, and agricultural water demand, users can assess the relationship between supply and demand and look for potential imbalances. This map can be viewed in conjunction with land cover maps to find watersheds where there are many streams exposed to urban and agricultural runoff or used with protected area maps to identify opportunities for outdoor recreation or stream restoration.

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How were the data for this map created?

These data were created using the high-resolution National Hydrography Dataset (NHD) flowlines and the NHDPlusV2 Watershed Boundary Dataset (WBD) snapshot. The NHD is a dataset produced by the U.S. Geological Survey showing surface waters for the United States. The NHD flowlines include streams as well as other linear features. Feature types included in this metric are streams/rivers, canals/ditches, connectors (lines that establish a known connection between two flowlines), and artificial paths that represent flow through area features like lakes or the centerlines of wide streams and rivers. Coastlines, pipelines, and underground conduits were excluded. The flowline features were split where they crossed cross 12-digit HUC boundaries. Then, the total length of all streams in kilometers was calculated for each 12-digit HUC. For detailed information on the processes through which these data were generated, see the metadata.

What are the limitations of these data?

All national data layers, such as the NHD, 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.

Stream length varies along artificial lines in some regions due to differences in how streams were recorded. This can result in rectangular patches with higher or lower stream length than surrounding areas. The calculated stream length only includes streams recorded in the high-resolution NHD flowlines. Not all intermittent streams are recorded, and streams can migrate or dry up over time. A stream's perennial status may change during drought cycles or the direction of flow of streams may be recorded in error because of water diversions. Therefore, stream length might be different than reported in some watersheds. 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 NHD dataset used to calculate stream lengths can be downloaded from the USGS's website.

Where can I get more information?

There are numerous resources on streams; a selection of these resources is below. Additional information on streams and why they are important can be found on the EPA's National Rivers and Streams Assessment website or Water Topics website. 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.

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Selected Publications

1. Maupin, M.A., J.F. Kenny, S.S. Hutson, J.K. Lovelace, N.L. Barber, and K.S. Linsey. 2014. Estimated use of water in the United States in 2010. United States Geological Survey Circular 1405, U.S. Geological Survey, Reston, Virginia. 56 p.

2. U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2013. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, FHW/11-NAT (RV), Washington, D.C.

Hjerpe, E.E., and Y.-S. Kim. 2007. Regional economic impacts of Grand Canyon river runners. *Journal of Environmental Management* 85:137–149.

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