Percent Impervious Area in 15 Meter Stream and Lake Buffer

This EnviroAtlas community map illustrates the percent of impervious area within 15 meters of streams, rivers, and other hydrologically connected waterbodies (e.g., lakes and ponds) within each census block group. Impervious surfaces are materials that do not allow the penetration of water, including buildings, roads, and sidewalks.

Why is impervious area important?

Impervious surfaces prevent rainwater from entering the soil. Pollutants from aerial and terrestrial sources accumulate on urban roads and parking lots until runoff from a precipitation event carries sediment, nutrients, metals, and pesticides into stormwater drains and directly to local waterbodies. As impervious surfaces increase, stormwater runoff increases in quantity, speed, temperature, and pollutant load. Stormwater runoff can increase the potential for flooding and raise the temperature of receiving water bodies.

These factors can significantly reduce water quality downstream, affecting neighboring communities as well as aquatic wildlife. Excess nitrogen in urban runoff contributes excess nutrients to waterbodies creating algal blooms and abundant aquatic plant growth (eutrophication). The breakdown of decomposing aquatic plants can create an oxygen deficit that negatively affects the health and productivity of aquatic animal species. Sediment and suspended solids reduce water clarity and light penetration, smother or retard the growth of beneficial aquatic plant life, and bury gravel or cobble habitats in stream beds essential for the sustainability of aquatic insects and fish spawning sites. Reduced water quality creates public health concerns and can generate additional water treatment expenses for the community. Besides degrading water quality, polluted stormwater runoff affects recreational opportunities, community aesthetics, and sense of well-being for local residents.[1]

Impervious surfaces affect the quantity, as well as the quality, of water supply resources. Normally, rainwater entering the soil recharges groundwater aquifers. Water percolates slowly through the soil to enter streams and rivers, contributing to base flows and regulating stream flow after precipitation events. Impervious surfaces greatly increase peak runoff magnitude following precipitation.[2] Increased pollutant concentrations in urban streams often occur soon after major storms because of this pulse of pollutants into streams.[3] Impervious surfaces greatly reduce rainwater percolation and groundwater recharge, thus contributing to potential shortages in water supply for both surface and ground water.

Urban tree cover can benefit communities by slowing surface water runoff and reducing the influx of pollutants into local waterbodies. Trees planted along roadways, in parking lots, retention basins, or riparian buffers are capable of filtering significant quantities of pollutants from stormwater runoff. Using surface water runoff information, planners and other interested users can readily identify the community neighborhoods and block groups with the highest proportion of impervious surfaces where additional tree planting might improve the retention and filtration of runoff following heavy precipitation.

Green infrastructure is a term used to describe a network of interconnected natural areas that integrate natural systems with urban communities.[4]An important role of local land use planning in urban areas is to conserve surrounding green spaces through land trust purchase or conservation easement. Natural parcels help to maintain upland-lowland and riparian connections. Creating connections among core areas with natural corridors is critical for retaining biodiversity and allowing passage of wildlife through and around communities.

How can I use this information?

This map, Percent Impervious Area in 15 Meter Stream and Lake Buffer, can be used by citizens, planners, and public health professionals to identify block groups that are more vulnerable to the problems associated with impervious

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surfaces. Interventions can then be targeted, including the selective replacement of existing impervious surfaces with natural vegetation, semi-permeable pavement, or construction material that reflects rather than stores heat.

By increasing the transparency of this map layer in the interactive map, users can view this information on an aerial imagery base map along with additional layers, such as riparian buffers and streams and waterbodies (NHDPlus, found under the boundaries icon), to identify possible sources of upstream or downstream impairments and remediation needs. Sets of maps illustrating land area, tree cover, and vegetated cover for 15 and 50 meter stream and lake buffers and estimates of annual removal of pollutants by trees from air and water are available for each community.

How were the data for this map created?

This map is based on the land cover data derived for each EnviroAtlas community. The land cover data was created from one-meter aerial photography through remote-sensing methods. Land cover considered impervious surface includes roads, buildings, and all paved surfaces; it excludes all vegetated land, barren land, and water. The percent area of impervious cover in the 15 meter buffer was calculated and summarized by census block group.

What are the limitations of these data?

All of the EnviroAtlas community maps that are based on land cover use remotely-sensed data. Remotely-sensed data in EnviroAtlas have been derived from imagery and have not been verified. These data are estimates and are inherently imperfect. The land cover maps used in the community component of EnviroAtlas typically have an overall accuracy of between 80 and 90 percent. This level of accuracy means that there is a probability of at least 80 percent that the land cover reported at any given point on the map is correct. The land cover maps will be updated over time; updates may improve accuracy as data and classification methods improve. This map is not meant to be used for inferring numbers or types of residents that are at risk for developing specific health conditions.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. To find the EnviroAtlas 1-meter land cover grids created for each community, enter *land cover community* in the interactive map search box.

Where can I get more information?

A selection of resources on water quality and impairment is listed below. Information on section 303(d) of the Clean Water Act is provided online by EPA's Office of Water. For additional information on the data creation process, access the metadata found in the layer list drop-down menu for map layers in the EnviroAtlas interactive map. To ask specific questions about these data, please contact the EnviroAtlas Team.

Acknowledgments

EnviroAtlas is a collaborative effort by the US EPA, its contractors, and project partners. Alexandra Sears, Student Services Contractor, developed this map. The fact sheet was created by Anne Neale and Donald Ebert, EPA, Alexandra Sears and Jessica Jahre, Student Services Contractors, and Sandra Bryce, Innovate!, Inc.

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