Impervious Area per Capita

This EnviroAtlas community map illustrates the square meters of total land per person within each census block group that are covered by impervious surfaces. Impervious surfaces are materials that do not allow the penetration of water and include buildings, roads, and sidewalks.

Why is impervious area important?

Impervious surface prevents rainwater from entering the soil and forces it to flow on the surface until it finds a place to drain. Allowing rain to penetrate the earth recharges groundwater sources, regulates the volume of water in streams and rivers, and filters pollutants. As impervious surface increases, rainwater runoff increases in quantity, speed, temperature, and pollutant load. This runoff can increase the potential for flooding and the transportation of sediment, nutrients, and pollutants. It can also raise the temperature of the receiving waterbody.

These factors can significantly reduce water quality downstream, affecting neighboring towns and communities, as well as aquatic wildlife that depend on upstream water sources. Reduced water quality creates public health concerns and can generate additional water treatment expenses for the community. Poor water quality can also affect biodiversity, recreational opportunities, and potential development of certain industries that depend on water quality, such as agriculture, tourism, or fishing.

Studies have linked 10 percent or greater impervious land cover in any given watershed with decreased water quality and watershed impairment. As impervious surfaces increase to 10–20% of local watershed area, surface runoff doubles and continues to increase until, at 100% impervious surface coverage, runoff is five times that of a forested watershed.[1] In response, many communities have adopted policies that prescribe low-density development by restricting the percentage of land in a residential district that can be covered by impervious surfaces. Most of these districts experiencing new development are on urban fringes, where rural land is covered by forests, meadows, and pastures. Limiting the density of development in these areas appears to preserve its natural character.

However, research indicates that conventional construction practices result in soil disturbance and compaction, causing even porous surfaces such as lawns to contribute to excess runoff and reduce water quality. Low-density development

often requires construction of additional impervious surfaces off the development site, such as roads and parking lots. Even if they are exempt from impervious area restrictions, these surfaces contribute to the total impervious area of their watersheds and may further harm water quality through related activities, such as construction and extension of infrastructure.

Low-density development does not prevent metropolitan growth from happening; rather, it spreads the growth over a larger area, resulting in more impervious surface area per person. On the other hand, higher-density development requires less resource and land use per resident while preserving undeveloped areas where natural water dispersion can occur. Impervious area per capita can thus serve as an indicator of regions undergoing low-density urbanization which could spread and endanger the surrounding watershed.

How can I use this information?

This map provides a baseline for the impervious area per capita in any given block group in the greater community. It can be used by citizens, planners, and public health professionals to identify neighborhoods with high levels of impervious land cover per capita. Interventions can then be targeted to these locations, including the selective replacement of existing impervious surface with natural vegetation, semi-permeable pavement, or reflective construction material.

By increasing the transparency of this map layer on the interactive map, users can view this information along with

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an aerial imagery base map and additional layers, such as the NHDPlus stream network (under the Boundaries icon), to identify possible sources of upstream or downstream impairments and remediation needs. It could also be combined with layers on recreation or domestic water consumption to show how impairments relate to water use.

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 includes roads, buildings, and all paved surfaces; it excludes all vegetated land, barren land, and water. This calculation was summarized by 2010 U.S. Census block group boundaries.

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 are expected to improve accuracy as data and classification methods improve. Block-group population data for per-capita estimates derive from 2010 U.S. Census data. 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 available from EPA's Office of Water. For additional information on the data creation process, access the corresponding metadata found in the drop-down menu for each community map layer listed in the EnviroAtlas 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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