Earth Gauge™ Boston – The Built Environment

Environmental Information for Broadcast Meteorologists

This fact sheet is part of a series on key weather-environment topics for the Boston area. The Earth Gauge™ Healthy Communities project is designed to provide basic background information on environmental impacts in major U.S. urban areas, as well as simple messages meteorologists can deliver to their viewers.

The Boston Metropolitan area experienced a population increase of 6.7 percent and a resulting land sprawl of 46.9 percent from 1982 to 1997. As urban landscapes grow, associated environmental impacts in the community are often observed, including changes in air quality, water quality, flooding, and temperature extremes.

What is the Relationship between the Weather and the Built Environment?

Air Quality: Areas where land uses are separated (such as residential and commercial properties sited in different areas) often have a higher number of vehicle miles traveled per person. Cars are a primary source of air pollutants, including key ingredients for ground-level ozone pollution, which is of particular concern in Boston during the warm, sunny summer months.

Water Quality: Pavement prevents rainwater and snowmelt from soaking into the ground. Instead, water runs over paved surfaces and into storm drains, picking up any pollutants it encounters along the way. It is generally accepted that when 10 percent of a watershed is paved, aquatic ecosystems begin to show stress; over 30 percent, they are considered impaired.

Flooding: Heavy rain events in urban areas can overload storm drains, gutters, and pipes. As water accumulates, it can overwhelm the capacity of sewer pipes and local rivers and streams, leading to flash flooding. Floodwater can damage property and contaminate drinking water supplies.

Temperature Extremes: Because pavement absorbs and traps heat, cities tend to be warmer than surrounding areas – a phenomenon known as the "urban heat island effect." The effect can be especially pronounced in areas that have lost significant amounts of tree canopy. Elevated city temperatures result in increased energy demand for air conditioning, increased air pollution, and heat-related illnesses and deaths.

Learn More about Weather and the Built Environment

Metro Area planning Council *is* addressing the way Boston grows by looking at the issues of housing, density, the preservation of natural areas, and transportation. ***www.mapc.org/regional_planning/MAPC_Smart_Growth.html***

EPA Smart Growth Program houses resources on many built environment topics. ***www.epa.gov/smartgrowth***

Smart Growth America works to support coordination of development, transportation, revitalization of older areas, and preservation of open space and the environment. ***www.smartgrowthamerica.org***

Flip this page over to find simple messages and tips about weather and the built environment you can use during your on-air weather report.

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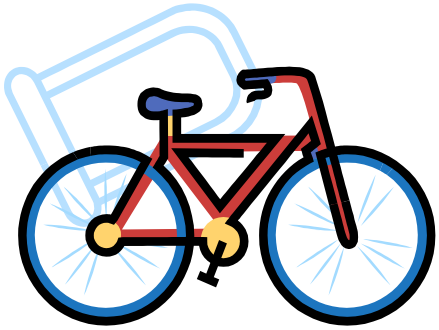
Making the Connection: What You Can Say On-Air
Here are some simple facts and tips you can provide to your viewers to help make the connection between weather and Boston's built environment. Help your viewers understand the environmental impacts of a changing landscape, and how they can reduce their own impact.

Trees – Nature's Air Conditioners
Loss of tree cover in urban areas can result in urban heat islands –where pavement and other hard surfaces absorb and trap heat, making the city feel three to ten degrees warmer than surrounding natural areas. Heat islands can result in higher energy demand for air conditioning and can contribute to heat-related illnesses and deaths.
Viewer Tip: Get planting! Planting on the east and west sides of your home can help to shade from heat during the mid-afternoon sun – walls that are shaded can be up to 36 degrees cooler than unshaded walls. Consider choosing deciduous trees (trees that lose their leaves in the winter), which will block sun during the summer, but allow warming sunlight through during the winter.

Take the bike!
During the 1990's, the Boston area saw a 4.9 percent population increase, and a 26 percent increase in the number of registered vehicles. With the increase in vehicle use, travel in the Boston area increased by 14 percent. Exhaust from cars emits pollutants like nitrous oxide and volatile organic compounds, which contribute to ground level ozone formation and can aggravate respiratory illnesses.
Viewer tip: Just one 12-mile bike trip per week can prevent half a ton of emissions per year. Instead of driving to the local shops, consider walking or biking. It is the perfect way to get the exercise you need to stay fit.



Nighttime Heat
Pavement and buildings in Boston absorb and trap heat in the city, and temperatures can be several degrees warmer in the city than surrounding natural areas. At night, these "hard" surfaces gradually release stored heat and raise night time temperatures, offering little relief during extreme heat events.
Viewer Tip: Asphalt, tar, and other dark pavement and roof surfaces absorb and hold heat, even after the sun sets. Thinking about adding or replacing a walkway at your home? Consider using materials that are less likely to absorb heat, such as gravel, grass, or mulch. Not only will these materials stay cool, but they'll also allow rain water to soak into the ground instead of running off into the street.

Transit Trek
One study of Americans using public transportation found that they spend about 19 minutes per day walking to and from transit stations. Not only does using public transportation reduce the number of cars on the road and decrease air pollution, but it may also help Americans fit in the recommended 30 minutes of exercise per day.
Viewer Tip: On nice days, consider walking to the bus stop, transit station, or all the way to your destination. You can learn more about Boston's transit system and map out a route by visiting www.mbta.com.