



Environmental and Energy Study Institute

122 C Street, NW
Suite 700
Washington, D.C. 20001
Phone: 202-628-1400
Fax: 202-628-1825
E-mail: eesi@eesi.org
Website: www.eesi.org

Carol Werner
Executive Director

SPRAWL LEAVES ITS FOOTPRINT IN WATER

MAY 2001

The Environmental and Energy Study Institute held a Congressional briefing on water pollution resulting from increased motor vehicle traffic associated with urban sprawl. The briefing featured information from recent studies by the National Water Quality Assessment Program (NAWQA) of the U.S. Geological Survey. Their studies show a consistently positive correlation between increases in vehicular traffic associated with urban sprawl and the buildup of polycyclic aromatic hydrocarbons (PAHs) in the bottom sediments of 23 lakes and reservoirs in 14 metropolitan areas around the country. NAWQA found that regulations banning or restricting substances such as DDT, lead and PCBs (polychlorinated biphenyls) has resulted in dramatic reductions of their occurrence in sediments, but the buildup of PAHs, which are not regulated, has continued to increase.

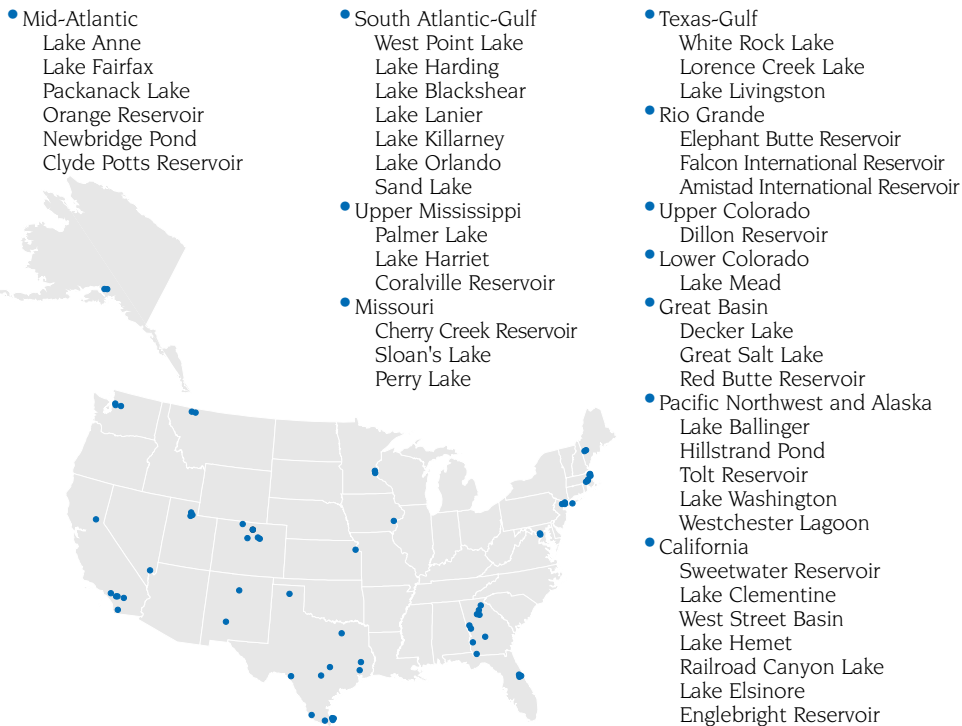
PAHs were number nine on the Priority List of the Top 20 Hazardous Substances compiled by the Agency for Toxic Substances and Disease Registry and the U.S. Environmental Protection Agency for 1999. PAHs are mixtures of two or more of over 100 different chemicals, some of which are known to be toxic, carcinogenic or mutagenic to aquatic species and possible human carcinogens. Most are formed from the incomplete combustion of fossil fuels or other organic substances, as in soot. They may be deposited in water from the air or as direct discharges from surface runoff, where they quickly sink to the bottom and adhere to sediment particles. They may be ingested by microscopic or larger aquatic organisms, including

fish, and humans could be exposed either directly or indirectly.

The NAWQA results were presented by **Peter C. Van Metre, chief of the Reconstructed Trends Program**, which has tracked and dated PAHs in sediment cores over several decades. (See Figure 1) The results show that PAH concentrations increased over the last three decades in all of the lakes and reservoirs studied, although previous studies had shown PAH concentrations to be decreasing from their highs in the 1950s. PAH contamination of the most recently deposited sediments at all study sites exceeded guidelines established by Environment Canada, in some cases by several orders of magnitude. Changes in the makeup of the mixtures indicate the increases were driven by combustion sources and closely tracked increases in vehicle miles traveled in the study areas. PAH sources related to motor vehicle use include exhaust and soot, tire wear, roadway wear and crankcase oil releases. The fact that PAH concentrations increased even in cities where urban land use had not increased significantly suggests that urban sprawl in outlying areas may affect traffic patterns and water quality in the inner city.

According to Van Metre, the most rapid increases of PAHs in sediments – 10 to 100 times – were found in watersheds experiencing urban sprawl and increased motor vehicle traffic. From 1982 to 1996, PAH concentrations in sediment cores from one test site, Town Lake in Austin, Texas, increased by about 2.5 times, matching the increase in total miles driven on

USGS Map of Sediment Coring Sites (Figure 1)



This map and corresponding publications can be found at <http://tx.usgs.gov/coring/maps/sitemap.html>

Austin roads. The relationship between PAH concentrations and motor vehicle traffic is evidence of the importance of non-industrial sources, such as vehicle emissions, road and tire wear and engine oil leaks.

Although PAHs present a significant health risk as fine particles of soot in urban air, in streams and lakes they do not generally pose a great drinking water risk for people because they attach to sediment rather than dissolving in water. Also, they do not build up in the food chain to the same extent as substances such as PCBs, DDT and lead. But fish and other aquatic life may be at great risk from PAHs in water. More than 60 percent of the 23 urban lakes tested had concentrations greater than called for by guidelines for protection of aquatic life.

In response to a question, Van Metre said that the Administration's proposed budget for fiscal year 2002 calls for a cut of \$20 million in NAWQA's \$60 million program, and planned studies could not be accomplished with the reduced funding. As a result, the number of study units may have to be reduced and new sampling may not be undertaken.

For further information, please contact:

Peter Van Metre or Barbara Mahler
 U.S. Geological Survey
 8027 Exchange Drive
 Austin, Texas 78754-4733
 Phone: (512) 927-3506
 Fax: (512) 927-3590

Writer: Ron Grandon

For more information,
 please contact Carol Werner
 at (202) 662-1881 or
cwerner@eesi.org.

Please visit us at:
www.eesi.org

Special thanks to the
 Surdna Foundation, Inc.
 for their support
 of this briefing.

