



United States  
Environmental  
Protection Agency

# Growth & Water Resources

## The Link Between Land Use and Water Resources

Thoughtful community land use planning and development are critical components in maintaining and restoring water quality in America's streams, lakes, wetlands, estuaries and aquifers. If not carefully planned, land development projects can adversely impact water quality and supply.

- Impervious surfaces created by the construction of roads, parking lots, rooftops and driveways can decrease groundwater infiltration of runoff and increase runoff volumes and rates. Reduced recharge of ground waters can negatively affect drinking water supplies and stream baseflows. Changes in runoff volumes and rates can increase flooding, streambed erosion and sedimentation.
- Development activities typically increase pollutant loadings, e.g., pathogens, household chemicals, metals, fertilizers, pesticides, oil and grease. These increases in pollutant concentrations may impair surface and ground waters.
- Construction activities disturb soil and may release sediment and other pollutants to local streams. EPA estimates that conversion of land produces 40 million tons per year of new sediment during construction. States have identified sediment as the leading cause of impairment to America's rivers.
- Increases in surface runoff, loss of vegetative buffers along streams, and physical alteration of waterways due to development activities can change the natural form and function of a stream. Runoff from unshaded impervious surfaces can increase stream temperatures, often crossing the threshold at which sensitive biota can survive and reproduce.



Photo courtesy of Stephen Delaney

### Role of the EPA

EPA recognizes that land use decisions occur at the state and local level, and that inter-jurisdictional coordination at the watershed or regional level results in more effective protection of water resources. EPA is a resource for state and local decision makers — our role is to provide tools to help identify and assess risks to water quality, and to maintain, protect or restore watershed health.

## A FEW GUIDELINES for Building Communities that Protect Water Resources

- ★ Establish community goals for water resources in the watershed
- ★ Direct development where most appropriate for watershed health
- ★ Minimize adverse impacts of development on watershed health
- ★ Promote opportunities for restoration
- ★ Assess and prevent unintended consequences of federal, state or local decisions affecting watershed health
- ★ Plan for safe, adequate and affordable water supplies as an integral part of growth
- ★ Consider the cumulative impacts of growth management decisions on the watershed
- ★ Monitor and evaluate success of initiatives

For additional principles see <http://www.smartgrowth.org/about/principles/default.asp>



Images courtesy of Hopewell Twp., NJ and Dodson Associates, Ashfield, MA

## EPA Websites

### Office of Wetlands, Oceans, Watersheds Web Module

[www.epa.gov/watertrain/smartgrowth](http://www.epa.gov/watertrain/smartgrowth)

### Development, Community, and Environment Division's Smart Growth Site

<http://www.epa.gov/smartgrowth>

### Nonpoint Sources (NPS) of Pollution

<http://www.epa.gov/owow/nps/>

### Low Impact Development

<http://www.epa.gov/owow/nps/lid/>

### National Pollutant Discharge Elimination System (NPDES) Storm Water Program

<http://www.epa.gov/npdes/menuofbmps>

## Partner Websites

### Center for Watershed Protection

[www.cwp.org](http://www.cwp.org)

### Local Government Environmental Assistance Network (LGEAN)

<http://www.lgean.org>

### Nonpoint Education for Municipal (NEMO)

<http://nemo.uconn.edu>

### Smart Growth Network

<http://www.smartgrowth.org>

## In Print

**Protecting Water Resources With Smart Growth.** US EPA, Development, Community and Environment Division. 2004. 116 pages. EPA-231-R-04-002. (To obtain copies of these EPA publications, call (513) 891-6561 or visit [www.epa.gov/smartgrowth/publications.htm](http://www.epa.gov/smartgrowth/publications.htm))

**Our Built and Natural Environments: A Technical Review of the Interactions between Land Use, Transportation, and Environmental Quality.** US EPA, Development, Community and Environment Division. 2001. 93 pages. EPA 231-R-01-002.

**Potential Roles for Clean Water State Revolving Fund Programs in Smart Growth Initiatives.** US EPA, Development, Community and Environment Division. 13 pages. 2000. EPA 832-R-00-010.

**Getting to Smart Growth: 100 Policies for Implementation.** Smart Growth Network and International City/County Management Organization. January 2002. Visit [smartgrowth.org](http://smartgrowth.org) for ordering information.

**Smart Growth for CleanWater: Helping Communities Address the Water Quality Impacts of Sprawl.** June 2003. Call (202) 638-6254 to request a copy or visit [www.nalgep.org/publications](http://www.nalgep.org/publications) to download a copy.

**Smart Growth Strategies: Protecting Water Resources. Local Government Roles and Options for the Rocky Mountains and Northern Great Plains.** December 2001. Call NACo at (202)393-6226 or visit [www.naco.org](http://www.naco.org). Visit the GIS land use and water decision support tools page.

**Coastal Sprawl: The Effects of Urban Design on Aquatic Ecosystems in the United States.** Pew Oceans Commission. April 2002. Only available on the internet at [www.pewtrusts.org/pdf/env\\_pew\\_oceans\\_sprawl.pdf](http://www.pewtrusts.org/pdf/env_pew_oceans_sprawl.pdf)

## Resources & Tools

This educational web module illustrates how trends in growth patterns have become the most significant challenge for preserving water quality and meeting future water resource goals. Contains links to many tools and resources.

Information on "smart growth" policies, funding sources, networking opportunities, technical tools and resources. Included are case studies that demonstrate how such approaches can have clear environmental benefits.

Details on funding opportunities, partnerships, model ordinances, outreach and education, Clean Water Act Section 319 and Coastal Zone Act Reauthorization Amendments Section 6217 programs, and other tools to manage NPS pollution.

Literature review and fact sheets that discuss technologies that use the natural landscape of a development site to detain, absorb and treat surface runoff.

Guidance on developing a Phase II storm water program along with a list of best management practices to mitigate pollution from storm water runoff.

The Center provides scientifically sound information and techniques to protect and restore watersheds. It also conducts training seminars and workshops for planners, engineers, landscape architects and municipal officials across the country.

LGEAN provides environmental management, planning, and federal and state regulatory information for local government officials, managers and staff. This site also links to a free Long-Term Hydrologic Impact Assessment Model (L-Thia).

NEMO is an educational program for local land use officials that addresses the officials relationship between land use and natural resource protection.

A growing coalition of developers, planners, government officials, lending institutions, community groups, architects and other stakeholders. The website contains a large library of documents on "smart growth" and offers many other links.