



Photo courtesy of David Cooper.

# INTRODUCTION

**H**ow are zoning codes and building designs related to standards established by the Clean Water Act? How do transportation choices or the mix of uses in a district affect the quality and quantity of stormwater runoff? How are development patterns associated with protecting the nation's water resources, including lakes, rivers, streams, and aquifers?

As studies have shown, growth and development can have profound effects on our water resources.<sup>1</sup> Storm sewer overflows and polluted runoff from non-point sources are a major reason that some water bodies do not meet Clean Water Act (CWA) standards. One factor related to persistent water pollution problems is our development patterns, particularly patterns of highly dispersed development that have been common since the end of World War II. The more woodland, meadowland, and wetland

areas disappear under impermeable cover, and the more miles and vehicles we drive and park on impermeable roads and highway surfaces, the more difficult protecting the quality and quantity of our water supplies becomes.

In response to these current trends, local governments are developing smarter approaches to growth. They are looking for, and using, policies and tools that enhance existing neighborhoods, improve schools, protect drinking water, and provide solid housing and transportation choices. These communities are seeking smart growth—a development approach characterized by 10 smart growth principles (see Figure 1). These principles support economic development and jobs; create strong neighborhoods with a range of housing, commercial, and transportation options; and achieve healthy communities and a clean environment.<sup>2</sup>

## WANT MORE INFORMATION?

The Smart Growth Network and Smart Growth America have posted information, tools, and resources on all aspects of smart growth on their Web sites: <[www.smartgrowth.org](http://www.smartgrowth.org)> and <[www.smartgrowthamerica.org](http://www.smartgrowthamerica.org)>.

***Protecting Water Resources with Smart Growth*** is intended for audiences already familiar with smart growth, who now seek specific ideas on how techniques for smarter growth can be used to protect their water resources. This document is one in a series of publications on smart growth produced by the U.S. Environmental Protection Agency (EPA). Earlier publications, such as EPA's *Our Built and Natural Environments*, or the International City/County Management Association's *Getting to Smart Growth: 100 Policies for Implementation, Why Smart Growth, and Best Development Practices*, provide basic background on smart growth and a broad range of smart growth techniques.

Smart growth principles provide a foundation—a basic springboard—for the 75 policies described in this report. The majority of these policies (46) are oriented to the watershed, or regional level; the other 29 are targeted at the level of specific development sites.

Section I of this report describes how communities have used smart growth techniques at the regional level to minimize the impacts of new development on their water resources. Communities have been successful by implementing policies to preserve critical regional watershed areas, and strategically directing development to existing communities to minimize runoff from impervious surfaces such as roadways, driveways, and rooftops.

Section II discusses site-level techniques that local governments have used to further mitigate the impacts of development. When used in combination with regional techniques, these site-level techniques can prevent, treat, and store runoff and associated pollutants at the site. Many of these practices incorporate some elements of low-impact development techniques (e.g., rain gardens, biorention areas, and grass swales), although others go further to incorporate smart growth principles such as changing site design practices. Incorporating these techniques can help localities not only to meet their water quality goals, but also to create more interesting and livable communities.

## Figure 1: Smart Growth Principles

1. Mix land uses.
2. Take advantage of compact building design.
3. Create a range of housing opportunities and choices.
4. Create walkable neighborhoods.
5. Foster distinctive, attractive communities with a strong sense of place.
6. Preserve open space, farmland, natural beauty, and critical environmental areas.
7. Strengthen and direct development towards existing communities.
8. Provide a variety of transportation choices.
9. Make development decisions predictable, fair, and cost effective.
10. Encourage community and stakeholder collaboration in development decisions.

The examples provided in both sections are drawn from communities across the country. Many policies are supplemented by “practice tips” that illustrate their application or identify additional resources to aid communities with implementation. In addition, several policy descriptions include “issues to consider,” which highlight potential complications or other concerns associated with implementing a policy. The experience of local governments has shown that regional and site-specific policies will be most effective when implemented together; addressing the regional or site level alone might not be effective in achieving lasting changes in water quality.

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<sup>1</sup>*The National Water Quality Inventory: 2000 Report to Congress* identified urban runoff as one of the leading sources of water quality impairment in surface waters. Of the seven pollution source categories listed in the report, “urban runoff/storm sewers” was ranked as the fourth leading source of impairment in rivers, third in lakes, and second in estuaries. See U.S. EPA. *National Water Quality Inventory: 2000 Report to Congress*. <[www.epa.gov/305b](http://www.epa.gov/305b)>. In addition, see Beach, D. 2002. *Coastal Sprawl: The Effects of Urban Design on Aquatic Ecosystems in the United States*. Pew Oceans Commission, Arlington, VA.

<sup>2</sup>U.S. EPA. Development, Community, and Environment Division. April 2001. “What is Smart Growth?” EPA 231-F-01-001A.