

Watershed Protection and Restoration

Effective watershed management includes developing a watershed management plan as well as implementing the recommendations within the plan. The plan recommendations should include a combination of measures – ranging from changes to local zoning, development regulations and programs, to installation of best management practices at specific priority locations – to **protect** sensitive watershed resources and to **restore** resources that have already been degraded by agriculture or urbanization. Highly urban watersheds with little remaining undeveloped land will likely focus more on restoration versus a rural watershed with many sensitive pristine areas, but most watershed plans include a combination of both protection and restoration measures. Although protecting natural resources from degradation is generally more successful and cost-effective than trying to restore them after the fact, unfortunately, efforts to protect watersheds are frequently only begun after significant impacts have already occurred.

The Center promotes an approach to watershed management that considers all stages in the land development process from land use planning through land development and post occupancy. Depending on the level of urbanization in a given watershed, the management plan may focus more or less on any one of these tools. This approach to watershed management was first advanced in the *Rapid Watershed Planning Handbook*. A series of guidance documents that provide more specific guidance on a restoration approach for managing small urban watersheds (~20-100 square miles) is also available from the Center below. Additional resources for watershed protection and restoration are provided below.

Resources

During 2003-2008, the Center developed an [Urban Subwatershed Restoration Manual Series](#) with funding from EPA. The series presents an integrated framework for urban watershed restoration, outlines methods for desktop and field assessment and stakeholder management to develop effective small watershed restoration plans, and describes seven major practices used to restore urban watersheds: stormwater retrofits, stream repair, riparian management, discharge prevention, pollution source controls, watershed forestry and municipal operations.

- An Integrated Framework to Restore Small Urban Watersheds
- Methods to Develop Restoration Plans for Small Urban Watersheds
- Urban Stormwater Retrofit Practices
- Urban Stream Repair Practices
- Pollution Prevention Practices
- Municipal Pollution Prevention/Good Housekeeping Practices
- Unified Stream Assessment: A User's Manual

- Unified Subwatershed and Site Reconnaissance: A User's Manual

To download more FREE Center resources on watershed management, including field assessment protocols, research studies, audits, models, example watershed plans and technical reports, go to our [Free Downloads](#) page.

Additional resources are provided below:

- EPA's [Water Quality Scorecard](#) was developed to help local governments identify opportunities to remove barriers, and revise and create codes, ordinances, and incentives for better water quality protection. It guides municipal staff through a review of relevant local codes and ordinances, across multiple municipal departments and at the three scales within the jurisdiction of a local government (municipality, neighborhood, and site), to ensure that these codes work together to protect water quality goals. The two main goals of this tool are to: (1) help communities protect water quality by identifying ways to reduce the amount of stormwater flows in a community and (2) educate stakeholders on the wide range of policies and regulations that have water quality implications.

- [Draft Handbook for Developing Watershed Plans to Restore and Protect Our Waters](#) . EPA's Office of Water has released a 415-page guidebook for communities, watershed groups, and local, state, tribal, and federal environmental agencies to be used as a tool in developing and implementing watershed plans. Intended to supplement existing watershed planning guides, this handbook provides specific guidance in quantifying existing pollutant loads, developing estimates of the load reductions required to meet water quality standards, developing effective management measures, and tracking progress once the plan is implemented.

- [Watershed Plan Builder](#) . An interactive, Web-based tool to improve efforts by states and local communities in protecting and restoring local water resources. EPA hosted a Webcast on the Watershed Plan Builder in May 2007.

- [Estimating Residential Development Capacity: A Guidebook for Analysis and Implementation in Maryland](#) . This document, produced by the Maryland Department of Planning, provides a methodology for estimating the total amount of development that may be built in an area under a certain set of assumptions, including applicable land use laws and policies (e.g., zoning), environmental constraints, and more.

- [Protecting Water Resources with Higher Density Development](#) . A recent EPA report examines the impacts of high- and low-density development on water resources by modeling three scenarios of different densities at three scales—one-acre level, lot level, and watershed level—and at three different time series build-out examples. It then examined storm water runoff from different development densities to determine the comparative difference between scenarios.

- [Stream Corridor Restoration](#) . This Natural Resources Conservation Service website provides technical and design resources for stream corridor restoration.
- [Riparian Forest Buffer Design and Maintenance](#) . This guide, from the Maryland Department of Natural Resources, has been prepared for those who wish to establish a forest buffer in the Chesapeake Bay Region efficiently, effectively, and with a minimum of maintenance.
 - The [Conservation Buffers](#) website offers resources for planning and designing buffers in rural and urban landscapes. Each guideline describes a specific way that a vegetative buffer can be applied to protect soil, improve air and water quality, enhance fish and wildlife habitat, produce economic products, provide recreation opportunities, or beautify the landscape.
- [Nonpoint Source Outreach Toolbox](#) . The Toolbox, released by the U.S. EPA, contains a comprehensive set of Web-based resources designed to assist communities across the U.S. conduct locally effective watershed education and outreach activities. It also includes a searchable catalog of nearly 800 print, radio, and TV ads and outreach materials in the following categories: lawn and garden care, motor vehicle care, pet care, septic system care, household chemicals and waste, and general stormwater and storm drain awareness.
- [National Management Measures to Control Nonpoint Source Pollution from Urban Areas](#) . (EPA Office of Wetlands, Oceans and Watersheds) Guidebook provides guidance to citizens and municipalities regarding management measures that can be used to reduce nonpoint source pollution from everyday urban activities. This guidance document also is intended to provide technical assistance to program managers on the best available, most economically achievable means reducing nonpoint source pollution.
- [Watershed Central](#) . A website that links users to watershed information resources, guidance documents and decision support tools offered by EPA and other organizations. It includes a collaborative application called the Watershed Central Wiki.