

The Georgia Coastal Nonpoint Source Pollution Management Program

What Is Nonpoint Source Pollution?

Nonpoint source pollution, or polluted stormwater runoff, is pollution that does not originate from the “end of a pipe” but that washes off of pavement, lawns and right-of-ways, and construction sites during rainstorms. Nonpoint source pollution also includes undetected underground seepages of pollution, such as leaking underground storage tanks, failing septic systems, leaking sewer lines, and illicit sewer-storm drain connections. This unseen pollution that washes into waterways is now considered the number one source of water pollution in the nation, accounting for at least 60% of all water pollution.

What Are the Common Sources of Nonpoint Source Pollution in Coastal Georgia?

Impervious Surfaces

Impervious surfaces refer to anything that prevents water from soaking into the ground. Common examples include roofs, driveways, sidewalks, streets, and parking lots. Pollutants such as sediments and motor vehicle fluids collect on impervious surfaces and are washed into nearby waterways during rainfall events.

Residential and Commercial Lawns

Pesticides, such as fire ant killer, fungicides, herbicides, and fertilizers are applied in ever-increasing amount to lawns and golf courses. It is suspected that a significant proportion of these chemicals is washed off of the lawn into the nearest waterway during irrigation or rainfall events.

Maintenance of Drainage Ditches and Utility Right-of-Ways

It is increasingly common for municipalities, roadwork contractors, and electrical/utility workers to maintain ditches and right-of-ways by spraying herbicides to control vegetation. In many cases, excessive amounts of chemicals are applied, and these pollutants are subsequently washed into nearby waterways.

Construction Sites

Insufficient erosion control at a construction site is a common occurrence, and it results in the loss of literally tons of topsoil into waterways each year. In addition, construction debris and fertilizers are carried into waterways with the eroded topsoil.

Septic Systems

Coastal Georgia’s sandy soil often does not provide adequate filtration of septic system leachate before it reaches the shallow groundwater. Contaminates in the groundwater soon make their way to the nearest surface waterbody.

Illicit Dumping

Whether due to ignorance or carelessness, citizens and commercial operations often dump unwanted debris, paint, solvents, domestic waste and chemicals down storm drains. Drains often form a direct conduit to nearby waterways.

What is the Georgia Coastal Nonpoint Source Management Program?

The Georgia Coastal Nonpoint Source Management Program is part of the Georgia Coastal Management Program and focuses directly on water quality. The Program is a direct mandate to all coastal states by Section 310 of the Coastal Zone Management Act, and is administered at the federal level by the National Oceanic and Atmospheric Administration (NOAA). It is a non-regulatory program that seeks to reduce nonpoint source pollution by providing funding, program development, and technical assistance for a range of activities that implement 56 nonpoint source “management measures” or best management practices (BMP). The goal of the Georgia Coastal Nonpoint Source Pollution Management Program is to facilitate the development of any program that reduces nonpoint source pollution by use of BMPs.

The Georgia Coastal Nonpoint Source Pollution Management Program service area extends from the counties immediately adjacent to the Atlantic Ocean, inland to Clinch, Atkinson, Coffee, Jeff Davis, Toombs, Tatnall, Candler, Bulloch, and Screven Counties.

Georgia Coastal Nonpoint Source Pollution Management Program Management Measures

The Georgia Green Developer Program and “Green Growth Guidelines” serves to address a number of the management measures of the Georgia Coastal Nonpoint Source Pollution Management Program.

Urban

Watershed Protection and Existing Development Management Measures

1. Develop a watershed protection program to:
 - a. Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota
 - b. Protect to the extent practicable the natural integrity of water bodies and natural drainage systems
2. Develop and implement a watershed management program that limits destruction of natural conveyance systems in development areas and roads and bridges
3. Develop and implement watershed management programs that, where appropriate, preserve, enhance or establish buffers along surface water bodies or their tributaries
4. Identify priority local and/or regional watershed pollutant reduction opportunities
5. Develop and implement a schedule for implementing appropriate controls

Site Development Management Measure

1. Plan, design, and develop sites to limit increases of impervious areas, except where necessary.

2. Plan, design, and develop sites to limit disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sedimentation.
3. Plan, design, and develop sites to limit disturbance of natural drainage features and vegetation.

On-Site Disposal Systems (OSDS) Management Measures

1. Ensure that new OSDS are located, designed, installed, operated, inspected and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters.
2. Where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, require the installation of OSDS that reduce total nitrogen loadings by 50 percent to ground water that closely hydrologically connected to surface water.
3. Establish and implement policies and systems to ensure that existing OSDS are operated and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives, reduce total phosphorous loadings to the OSDS by 15 percent (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users).
4. Establish and implement policies that require an OSDS to be repaired, replaced, or modified where the OSDS fails, or threatens or impairs surface waters.
5. Inspect OSDS at a frequency adequate to ascertain whether OSDS are failing.

Planning, Siting, and Development of Roads and Highways Management Measures

- Plan, site and develop roads and highways to protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss.

Bridges Management Measures

- Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.

Operation and Maintenance of Roads, Highways, and Bridges Management Measures

- Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant to surface waters.

Road, Highway, and Bridge Runoff Systems Management Measures

1. Develop and implement runoff management systems for existing roads, highways,

and bridges to reduce runoff pollutant concentrations and volumes entering surface waters

2. Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing runoff control structures)
3. Establish schedules for implementing appropriate controls.

Hydromodification – Channel Modification

Physical and Chemical Characteristics of Surface Waters Management Measure

- Develop an operations and maintenance program with specific timetables for existing modified channels that includes identification of opportunities to restore instream and riparian habitat in those channels.

Hydromodification – Dams (includes tide gates)

Chemical and Pollutant Control Management Measures

- Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

Protection of Surface Water Quality and Instream Riparian Habitat

- Develop and implement a program to manage the operation of dams in coastal areas that include an assessment of: surface water quality and instream riparian habitat and potential for improvement; and significant nonpoint source pollution problems that result from excessive surface water withdrawals.

Streambank and Shoreline Erosion Management Measure

1. Where streambank or shoreline erosion is a nonpoint sources pollution problem, streambanks and shorelines should be stabilized.
2. Protect streambank and shoreline features with the potential to reduce nonpoint source pollution.
3. Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.

Geographic Information Systems Data Libraries

National Data

The National Geospatial Data Clearinghouse is a collection of over 250 spatial data servers that have digital geographic data that can be searched through a single interface based on data descriptions or metadata. (<http://clearinghouse1.fgdc.gov>)

The GIS Data Depot offers a wealth of data for the entire nation. The library can be searched for data layers by state and county. (<http://data.geocomm.com>) Available layers include:

- ◆ Digital Elevation Models,
- ◆ Digital Line Graphs and Raster Graphics (Topographic Maps),
- ◆ Orthrophotography (Aerial Photos),
- ◆ Environmental/Natural Resources,
- ◆ Floodplain,
- ◆ Land use / Landover,
- ◆ National Wetlands Inventory Maps,
- ◆ Hydrography,
- ◆ Transportation / Infrastructure,
- ◆ U.S. Census Bureau (TIGER), and
- ◆ Utilities.

The U.S. Bureau of Census maintains a database known as TIGER, “Topographically Integrated Geographic Encoding and Referencing System,” which offers census data for most U.S. cities and counties. This information can be used to project urban growth, traffic patterns, and zoning designations. (www.census.gov/geo/www/tiger/index.html)

The “Geospatial One-Stop E-Gov Initiative” provides access to geospatial data and information. (www.geodata.gov/gos) Various data categories can be queried including:

- ◆ Administrative and political boundaries,
- ◆ Agriculture and farming,
- ◆ Atmosphere and climatic,

- ◆ Biology and ecology,
- ◆ Amphibians and reptiles,
- ◆ Business and economy,
- ◆ Cadastral,
- ◆ Cultural, society, and demographic,
- ◆ Elevation and derived products,
- ◆ Derived elevation data and products,
- ◆ Environment and conservation,
- ◆ Land cover, natural resources, and watersheds,
- ◆ Geological and geophysical,
- ◆ Human health and disease,
- ◆ Imagery and base maps,
- ◆ Major water databases,
- ◆ Inland water resources,
- ◆ Drainage networks,
- ◆ Locations and geodetic networks,
- ◆ Oceans and estuaries,
- ◆ Transportation networks, and
- ◆ Utilities and communication.

The U.S. Geologic Survey's (<http://edcwww.cr.usgs.gov> and <http://edc.usgs.gov/geodata>) data libraries offers paper and digital maps such as:

- ◆ Geographic references, atlases & gazetteers,
- ◆ USGS topographic maps,
- ◆ Aerial photos,
- ◆ Biodiversity & ecological maps,
- ◆ Coastal & marine,
- ◆ Data & imagery products,
- ◆ Earthquakes,
- ◆ Flood maps,
- ◆ Geologic & mineral maps,
- ◆ Geomagnetism,
- ◆ Historical maps,
- ◆ Map projections,
- ◆ Surveying, benchmarks, coordinate systems,

- ◆ Tools: calculators and coordinate converters,
- ◆ Water resources maps, and
- ◆ Wetlands.

The U.S. Department of Transportation TRANSTAT database provides updated transportation and infrastructure layers including streets, highways, rails, pipelines, sidewalks and bike paths. (www.transtats.bts.gov)

National Atlas.gov is a database of printed, interactive, and GIS data layers that show mapped natural and socio-cultural landscapes of the United States. (www-atlas.usgs.gov/)

The Federal Emergency Management Agency is responsible for the emergency data collection and production of Flood Insurance Rate Maps. (www.fema.gov) There are three major data products by FEMA:

- ◆ Digital Flood Insurance Rate Maps (“DFIRM”)—Digital Flood Insurance Rate Maps show the areas of potential risk of flooding,
- ◆ Digital Q3—Flood Data developed for assessment of flood risks in designated flood zones, and
- ◆ Coastal Barrier Resource Area (“CBRA”) Q3—the mainland’s first defense to the impact of coastal storms and erosion are coastal barriers islands and hammocks. These unique landforms protect diverse aquatic habitats and serve as flood protection features.

The U.S. Fish & Wildlife Service (www.fws.gov/data) maintains a digital library of printed, interactive, and digital maps including:

- ◆ National Wetlands Inventory (NWI) —shows the location and boundaries of wetlands and deepwater habitats.
- ◆ Migratory Bird Conservation Data Center—provides access to bird population and habitat information relevant to population management, conservation planning, and evaluation. It includes an interactive mapping application, data query capabilities on the biological databases, and spatial data download options.
- ◆ USFWS Regional Ecosystem Coverage’s—illustrates the location of different ecosystems by region.

The National Geodetic Survey (NGS), under the National Oceanic and Atmospheric Agency (NOAA), defines and manages the National Spatial Reference System (NSRS); this is the framework for latitude, longitude, height, scale, gravity, orientation and shoreline throughout the United States. NSRS provides the foundation for transportation, communication, boundary and property surveys, land records systems, mapping and charting, and a multitude of scientific and engineering applications. NGS also conducts research to improve the collection, distribution, and use of spatial data. A variety of aeronautical data, CORS GPS data, and other data are retrievable at its main site. (www.ngs.noaa.gov)

The National Park Service operates the National Register of Historic Places (www.cr.nps.gov/nr/research/nris.htm) and the National Archeological Databases (www.cr.nps.gov/aad/TOOLS/nadb.htm). These databases can be searched for the location and description of historic structures or archeological resources.

The U.S. Environmental Protection Agency recently established BASINS (“Better Assessment Science Integrating point and Non-point Sources”), a tool for watershed and water quality-based assessment and integrated analysis of point and non-point source pollution. This system integrates GIS, national watershed and meteorological data, and state-of-the-art environmental assessment and modeling tools into one convenient package (www.epa.gov/OST/BASIN).

BASINS’ supports the development of total maximum daily loads (TMDL), which require a watershed-based approach that integrates both point and non-point sources. It can support the analysis of a variety of pollutants at multiple scales, using tools that range from simple to sophisticated.

In addition to BASINS’ primary role in creating TMDL analysis, it has been useful in identifying impaired surface waters from point and non-point pollution, wet weather combined sewer overflows, stormwater management issues, and drinking water source protection. BASINS can also be used in urban/rural land use evaluations and habitat management practices.

The U.S. Natural Resources Conservation Service (NRCS) maintains the National Resources Inventory database, which contains soil, water and climate, and plant maps and information. In addition, aerial imagery can be purchased and downloaded. (www.nrcs.usda.gov/technical/maps.html)

Georgia Data

The Georgia GIS Data Clearinghouse maintains current GIS layers and attributes for the state categorized by county (<http://gis.state.ga.us>). Available data layers include:

- ◆ Agriculture/forestry,
- ◆ Elevation,
- ◆ Environmental,
- ◆ Flood,
- ◆ Geology,
- ◆ Hydrography,
- ◆ Orthophotography,
- ◆ Parcels,
- ◆ Soils,
- ◆ Topography,
- ◆ Transportation,
- ◆ Utilities, and
- ◆ Wetlands and streams.

The USGS Center for Spatial Analysis Technologies (CSAT) and the Georgia Tech Center for Geographic Information Systems maintains a database where various GIS data sets can be found. (<http://csat.er.usgs.gov>) Multiple data layers are available for download:

- ◆ Topography,
- ◆ Elevation,
- ◆ Slope,
- ◆ Geology,
- ◆ Hydrography,
- ◆ River reach,
- ◆ Hydrologic units,
- ◆ Surface water monitoring sites,
- ◆ Conservation lands,
- ◆ State soil surveys,
- ◆ State parks and historic sites,
- ◆ Trails and greenways,
- ◆ Land use/land cover,
- ◆ Highways and roads,

- ◆ Railroads,
- ◆ Pipelines and transmission lines,
- ◆ Public airports,
- ◆ Significant groundwater recharge areas,
- ◆ Rivers with mean flow >400 cfs, and
- ◆ Groundwater pollution susceptibility.

The Georgia Department of Natural Resources maintains an updated map of all shellfish harvest areas that are open to public recreational and commercial harvesting. For public health reasons, these areas have strict water quality standards imposed by the U.S. Food and Drug Administration. All Georgia waters except those specifically designated and contained in this database are considered closed for shellfish harvesting. (<http://crd.dnr.state.ga.us/content/displaycontent.asp?txtDocument=468>)

The GDNR is currently compiling layers of coastal marsh hammocks and public swimming beaches. These areas are vital resources that require special consideration and often protection from development due to public recreational and commercial uses including shellfish and crab harvesting, fishing, and swimming. These layers will be available to the public soon.

The GDNR Wildlife Division also offers GIS layers for rare species and natural communities as well as specialized GIS extensions that can be used to analyze this data. (crd.dnr.state.ga.us/content/displaycontent.asp?txtDocument=468)

Georgia County Data

Parcel layers (digital property card information) for many coastal counties of Georgia can be purchased and downloaded or obtained on CD-ROM. The following coastal counties have established on-line interactive sites where this information can be viewed, queried, or downloaded for use in a GIS:

- ◆ Chatham County (www.sagis.org),
- ◆ Camden County (www.co.camden.ga.us/departments/departments.h),
- ◆ Effingham County (www.effinghamcounty.org/pages/gis.html),
- ◆ Glynn County (www.glynncounty.org), and
- ◆ Bryan County - Parcels are available by contacting the county tax assessor (www.bryan-county.org/tax-assessor).

South Carolina Data

The South Carolina Department of Natural Resources (SCDNR) maintains a database (www.dnr.state.sc.us/water/nrima/gisdata) that provides:

- ◆ Soils data,
- ◆ Wetlands/land use data,
- ◆ Digital line graphs data,
- ◆ Digital elevation model data, and
- ◆ Color infrared photography.

Florida Data

The Florida Geographic Data Library is a mechanism for distributing satellite imagery, aerial photographs and spatial (GIS) data throughout the state of Florida. The data is organized by county, state, and coastal areas. (www.fgdl.org)

The Florida Department of Environmental Protection created LABINS (Land Boundary Information System). (<http://data.labins.org/2003/index.cfm>) This is an interactive database of conventional survey information and GIS layers including:

- ◆ Land and water boundaries,
- ◆ Vertical and horizontal control monuments,
- ◆ Parcel information,
- ◆ Orthophotography,
- ◆ Raster and line graphics, and
- ◆ Elevation models.

References Cited

- Adams, L. 1994. *Urban Wildlife Habitats – A Landscape Perspective*. University of Minneapolis Press. Minneapolis, MN. 175 pp.
- Anderson, L.M. and Cordell, H.K., “Residential Property Values Improved by Landscaping with Trees.” *Southern Journal of Applied Forestry* pp. 162-166.
- Arendt, Randall, et. al. 1994. *Rural by Design*. American Planning Association, Chicago, IL.
- Arendt, Randall. 1996. *Creating Open Space Networks in Environmental and Development* (May/June 1996 Issue). American Planning Association, Chicago, IL.
- Arendt, Randall. 1994 and 1997. *Designing Open Space Subdivisions*. Natural Lands Trust, Media, PA.
- Atlanta Regional Commission. *Georgia Stormwater Management Manual, Volumes 1-2: Technical Handbook*. First Edition – August 2001.
- Asous, A.L. and R.R. Horner, Editors. 1997. *Wetlands and Urbanization: Implications for the Future*. Washington State Department of Ecology, Olympia, WA, University of Washington, Seattle, WA.
- Baker, David M.; Yousef A Yousef., 1998 *Metal Accumulation and Impacts on Benthic Organisms in Detention Pond Sediments*.
- Bentrup, Gary; Hoag, J. Chris. *The Practical Streambank Bioengineering Guide*, U.S. Department of Agriculture, May 1998.
- Blain, Thomas; Schear Peggy. *Ohio State University Land Use Series*. 1999.
- Center for Watershed Protection. 1998. *Better Site Design: A Handbook for Changing Development Rules in Your Community*.
- Flink, C., and R. Searns. 1993. *Greenways – A Guide to Planning, Design, and Development*. The Conservation Fund. Island Press. Washington, D.C. 338 pp.
- Georgia Manual for Erosion and Control, 5th Edition. Soil and Water Conservation Commission. 2000.
- Hanson, S. and R. Rountree. 1988. *Influence of Urban Forest Cover on Radiation, Temperature, and Runoff*. Pp. 412-15.

- Hartigan, J.P. 1988. "Basis for Design of Wet Detention Basin BMPs," in Design of Urban Runoff Quality Control. American Society of Engineers.
- Hollis H. Allen; James R. Leech. Biomonitoring for Streambank Erosion Control Manual, U.S. Army Corps of Engineers, Waterways Experiment Station Technical Report EL-97-8. April 1997.
- Hunt, William F. Surface Infiltration Rates of 30 Permeable Pavement Applications in NC and the Mid-Atlantic. February 2004.
- Hunt, William F. and Doll, Barbra A. Urban Waterways: Designing Stormwater Wetlands for Small Watersheds. North Carolina Cooperative Extension Service.
- Institute of Transportation Engineers. 1987. Parking Generation, 2nd Edition. Washington, D.C.
- Jones, Norris W. 1998. Laboratory Manual for Physical Geology. WCB/McGraw-Hill.
- Keller, Edward A. 1992. Environmental Geology. MacMillan Publishing Company.
- Kirby, K. 1993. "Wetlands Not Wastelands." Scenic America Technical Information Series 1(5): 1-8.
- Markowitz, L. 1996. Shared Parking Planning Guidelines. Institute of Transportation Engineers, Washington, D.C.
- Maryland Office of Planning. 1989. Environmental and Economic Impacts of Lot Size and Other Development Standards. Baltimore, MD. 18 pp.
- Morales, D.J. 1980. "The Contribution of Trees to Residential Property Values." Journal of Arboriculture 6(11): 301-302.
- National Association of Homebuilders (NAHB). 1986. Cost-Effective Site Planning – Single Family Development. Washington, D.C. 124 pp.
- Nichols, Gary/ 1999. Sedimentology and Stratigraphy. Blackwell Sciences, Ltd.
- North Inlet – Winyah Bay NERR Coastal Training Program. 2002. Article 30. Economics of Protection. Watershed Protection Techniques.
- Pipkin, Bernard W. 1994. Geology and the Environment. West Publishing Company.
- Plummer, McGeary, Carlson. 1999. Physical Geology. WCB/McGraw-Hill.

- Prince George's County, Maryland, Department of Environmental Resources, Programs and Planning Division. Low Impact Development and Design Strategies, An Integrated Design Approach. June 1999. Source: www.lowimpactdevelopment.org.
- Scholz-Barth, Katrin. 2001. Green Roofs: Stormwater Management From the Top Down. Source: Environmental Design and Construction Feature Article. January/February 2001.
- Schueler, T. 2000. The Compaction of Urban Soil. Techniques for Watershed Protection. Center for Watershed Protection, Ellicott City, MD.
- Schueler, T. 1995. Site Planning for Urban Stream Protection. Center for Watershed Protection. Metropolitan Washington Council of Governments. Silver Spring, MD. 222 pp.
- Schueler, T. The Practice of Watershed Protection: Techniques for Protecting and Restoring Urban Watersheds.
- Schueler, T.; Brown, Whitney. 1997. National Pollutant Removal Performance Database for Stormwater Best Management Practices. Center for Watershed Protection.
- Smith, Thomas. 1984. Flexible Parking Requirements. Planning Advisory Service Report No. 377. American Planning Association. Chicago, IL. 40pp.
- U.S. Department of Agriculture, Understanding Soil Risks and Hazards. Gary B. Muckel, NRCS, National Soil Survey Center. Lincoln, NB.
- U.S. EPA. 1995. Economic Benefits of Runoff Controls. Office of Wetlands, Oceans and Watersheds. Washington, D.C. EPA 841-5-95-002. 19pp.
- U.S. EPA Chesapeake Bay Program. 1996. Clean Water Partnership. Wetlands, Water Quality, and Property Values. Annapolis, MD. 168pp.
- Wells, C. 1994. Impervious Surface Reduction Technical Study. Draft Report. City of Olympia Public Works Department. Washington Department of Ecology. 182pp.
- Wildlife Habitat Enhancement Council. 1992. The Economic Benefits of Wildlife Habitat Enhancement on Corporate Lands. Silver Spring, MD. 22pp.
- Witten, Jon and Scott Horsley. 1995. A Guide to Wellhead Protection. American Planning Association, Chicago, IL.
- Woodworth, James, et. al. 2002. Our of the Gutter: Reducing Polluted Runoff in the District of Columbia. NRDC: Washington, D.C.