

Controlling Nonpoint Source Runoff Pollution from Roads, Highways and Bridges

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Roads, highways, and bridges are a source of significant contributions of pollutants to our nation's waters. Contaminants from vehicles and activities associated with road and highway construction and maintenance are washed from roads and roadsides when it rains or snow melts. A large amount of this runoff pollution is carried directly to water bodies.

Contaminants in Runoff Pollution

Runoff pollution is that associated with rainwater or melting snow that washes off roads, bridges, parking lots, rooftops, and other impermeable surfaces. As it flows over these surfaces, the water picks up dirt and dust, rubber and metal deposits from tire wear, antifreeze and engine oil that has dripped onto the pavement, pesticides and fertilizers, and discarded cups, plastic bags, cigarette butts, pet waste, and other litter. These contaminants are carried into our lakes, rivers, streams, and oceans.

Contaminants in runoff pollution from roads, highways, and bridges include:

Sediment: Sediment is produced when soil particles are eroded from the land and transported to surface waters. Natural erosion usually occurs gradually because vegetation protects the ground. When land is cleared or disturbed to build a road or bridge, however, the rate of erosion increases. The vegetation is removed and the soil is left exposed, to be quickly washed away in the next rain. Erosion around bridge structures, road pavements, and drainage ditches can damage and weaken these structures.

Soil particles settle out of the water in a lake, stream, or bay onto aquatic plants, rocks, and the bottom. This sediment prevents sunlight from reaching aquatic plants, clogs fish gills, chokes other organisms, and can smother fish spawning and nursery areas.

Other pollutants such as heavy metals and pesticides adhere to sediment and are transported with it by wind and water. These pollutants degrade water quality and can harm aquatic life by interfering with photosynthesis, respiration, growth, and reproduction.

Oils and Grease: Oils and grease are leaked onto road surfaces from car and truck engines, spilled at fueling stations, and discarded directly onto pavement or into storm sewers instead of being taken to recycling stations. Rain and snowmelt transport these pollutants directly to surface waters.

Heavy Metals: Heavy metals come from some "natural" sources such as minerals in rocks, vegetation, sand, and salt. But they also come from car and truck exhaust, worn tires and engine parts, brake

linings, weathered paint, and rust. Heavy metals are toxic to aquatic life and can potentially contaminate ground water.

Debris: Grass and shrub clippings, pet waste, food containers, and other household wastes and litter can lead to unsightly and polluted waters. Pet waste from urban areas can add enough nutrients to estuaries to cause premature aging, or "eutrophication."

Road Salts: In the snowbelt, road salts can be a major pollutant in both urban and rural areas. Snow runoff containing salt can produce high sodium and chloride concentrations in ponds, lakes, and bays. This can cause unnecessary fish kills and changes to water chemistry.

Fertilizers, Pesticides, and Herbicides: If these are applied excessively or improperly, fertilizers, pesticides, and herbicides can be carried by rain waters from the green parts of public rights-of-way. In rivers, streams, lakes, and bays, fertilizers contribute to algal blooms and excessive plant growth, and can lead to eutrophication. Pesticides and herbicides can be harmful to human and aquatic life.

Recognizing and Controlling Runoff Pollution

Erosion gullies on land cleared of vegetation at a road construction site are a sign of sediment runoff. Iridescence (rainbow colors) in runoff water is a sign of spilled petroleum products washing off roads. Other signs of runoff pollution during road construction include obvious changes in streams or rivers downstream from the construction, such as bank erosion and sloughing, muddy or oily water, and sandbar relocation. Clumps of mud on roads leaving a construction site can lead to sediment flows heading for drainage ditches and storm inlets that empty into nearby streams.

Rad projects should incorporate pollution prevention , preferably by reducing the amount of pollutants released, into an effective runoff pollution control plan.

Best management practices such as permanent storm water retention/detention ponds, slope protection, or grass strips, and temporary sediment traps, silt fences, diversion trenches, and provisions for washing vehicles before they leave the construction site are all means to reduce runoff pollution.

Pollution Prevention and Control Programs and Regulations

The need to protect our environment has resulted in a number of pollution control laws, regulations, and programs. The implementation of these programs takes place at all levels - federal, state, and local.

Clean Water Act

In 1987, Congress established the Nonpoint Source Management Program under section 319 of the Clean Water Act (CWA), to help states address nonpoint source, or runoff pollution by identifying waters affected by such pollution and adopting and implementing management programs to control it.

These programs recommend where and how to use best management practices (BMPs) to prevent runoff from becoming polluted, and where it is polluted, to reduce the amount that reaches surface waters.

Coastal Zone Management Act and Reauthorization

The Coastal Zone Management Act of 1972 established a program for states and territories to voluntarily develop comprehensive programs to protect and manage coastal water resource.

There are now 29 states and territories with federally approved coastal zone management programs.

The Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 specifically charged the coastal states and territories with developing upgraded programs to protect coastal waters from runoff pollution. This program is administered nationally by the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA). CZARA applies to construction sites in 29 states and territories where less than 5 acres is disturbed. CZARA also applies to storm water runoff from roads that is carried by municipal separate storm sewer systems that serve populations of less than 100,000.

National Pollution Discharge Elimination System

Construction sites where 5 or more acres are disturbed are considered point sources of pollution and require a National Pollutant Discharge Elimination System (NPDES) storm water permit under section 402 of the CWA. In addition, the following types of storm water discharges are regulated under the NPDES permit program: discharges from municipal separate sewer systems serving populations of 100,000 or more; discharges associated with industrial activities, including construction sites of 5 acres or more; and other discharges identified by EPA or a state as needing an NPDES permit because they contribute to a water quality violation.

EPA is developing regulations for other storm water discharges, which may include discharges from municipal separate storm sewer systems serving populations of less than 100,000 and discharges associated with commercial operations, light industries, and construction sites of less than 5 acres. If and when construction sites of less than 5 acres are regulated under the NPDES program, they will no longer be subject to the requirements of CZARA.

Intermodal Surface Transportation Efficiency Act

A major piece of legislation designed to expand and improve the quality and condition of our national highway and transportation systems is the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, better known as "ice tea." This act contains provision for the planning and developing of highway systems and a host of transportation enhancements activities including the mitigation of water pollution due to highway runoff.

Through ISTEA, states are able to use a portion of their federal funding allotment for runoff pollution control devices and other BMPs to prevent polluted runoff from reaching their lakes, rivers, and bays.

Other EPA Programs

Other EPA programs that help control roadway pollution include the National Estuary Program (NEP) established by the CWA and the pesticides program under the Federal Insecticide, Fungicide and Rodenticide Act. The NEP focuses on point sources and runoff pollution in targeted, high-priority estuaries. The pesticides program regulates pesticides that might threaten ground and surface waters.

Management Measures and Best Management Practices

CZARA established goals to be achieved in controlling the addition of pollutants to our coastal waters. EPA developed a Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. States with approved coastal zone management programs are required to incorporate the Guidance management measures, or more stringent management measures, into their Coastal Zone Nonpoint Source Control Programs. CWA section 319 programs assist states in the development of nonpoint source controls.

Key management measures for roads, highways, and bridges include the following:

- Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss.
- Limit land disturbance such as clearing and grading and cut fill to reduce erosion and sediment loss.
- Limit disturbance of natural drainage features and vegetation.
- Place bridge structures so that sensitive and valuable aquatic ecosystems are protected.
- Prepare and implement an approved erosion control plan.
- Ensure proper storage and disposal of toxic material.
- Incorporate pollution prevention into operation and maintenance procedures to reduce pollutant loadings to surface runoff.
- Develop and implement runoff pollution controls for existing road systems to reduce pollutant concentrations and volumes.

Consult the Guidance for detailed information on the management measures.

Management measures, as a practical matter, can often be achieved by applying best management practices appropriate to the source of runoff, runoff location, and climate. The Guidance suggests a number of best management practices that are options for states to use in successfully achieving management measures for bridges, road construction, road maintenance, and operation.

Examples of best management practices for roads, highways, and bridges include:

- Avoid highway locations that require numerous river or wetland crossings (to achieve the Management Measure for Bridges).
- Coordinate erosion and sediment controls with the Federal Highway Administration (FHWA), the American Association of State Transportation Officials (AASHTO), and state guidelines (to achieve the Management Measure for Construction Projects).

Collect and remove road debris and repair potholes (to achieve the Management Measure for Operation and Maintenance).

For More Information

To obtain more information on the Clean Water Act, runoff (nonpoint source) pollution control programs, CZARA, storm water regulations and control, ISTEPA, or management measures and BMPs for roads, highways, and bridges, contact the appropriate offices listed below.

United States Environmental Protection Agency Nonpoint Source and NPDES Storm Water

Coordinators:

U.S. EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont) NPS (617) 565-3513 NPDES Storm Water (617) 565-3580
U.S. EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands) NPS (212) 637-3701 NPDES Storm Water (212) 637-3724
U.S. EPA Region III (Delaware, Maryland, Pennsylvania, Virginia, West Virginia) NPS (215) 597-3429 NPDES Storm Water (215) 597-0547
U.S. EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee) NPS (404) 346-2126 NPDES Storm Water (404) 347-3012
U.S. EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin) NPS (312) 886-0209 NPDES Storm Water (312) 886-6100
U.S. EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas) NPS (214) 665-7140 NPDES Storm Water (214) 665-7175
U.S. EPA Region VII (Iowa, Kansas, Missouri, Nebraska) NPS (913) 551-7475 NPDES Storm Water (913) 551-7418
U.S. EPA Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming) NPS (303) 293-173 NPDES Storm Water (303) 293-1630
U.S. EPA Region IX (Arizona, California, Hawaii, Nevada) NPS (415) 744-2011 NPDES Storm Water (415) 744-1906
U.S. EPA Region X (Alaska, Idaho, Oregon, Washington) NPS (206) 553-4181 NPDES Storm Water (206) 553-8399
U.S. EPA Headquarters NPS (202) 260-7100 NPDES Storm Water (202) 260-9541
Chesapeake Bay Program (800) 968-7229
Gulf of Mexico Program (601) 688-7940

Federal Highway Administration Local Transportation Assistance Program (LTAP) Technology Transfer (T2) Centers:

The LTAP program provides training and technical assistance to local/tribal government transportation agencies on roads and bridges. For the location of the LTAP T2 center in your state, contact the T2 Clearinghouse at (202) 347-7267.

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