
Understanding Nonpoint Source Pollution

Overview: In partnership with Texas Watch, we are pleased to feature a TEKS-aligned unit on “Nonpoint Source Pollution”. This unit is designed to help students discover and describe the interacting natural and human systems that lead to nonpoint source pollution concerns. Students will build their understanding as they explore the sources, impacts, and consequences of nonpoint source pollution.

Teacher Background Information

Nonpoint Source Pollution Texas Essential Knowledge and Skills Alignment

Key Terms

Unit Outline:

Lesson One: The Movement of Water

Lesson Two: The Consequences of Water Movement

Lesson Three: The Impact of Nonpoint Source Pollution

Lesson Four: Nonpoint Source Pollution Within Your Own Home

Lesson Five: Best Management Practices for Nonpoint Source Pollution

Lesson Six: Decision Making: How Will You Protect Your Watershed from Nonpoint Source Pollution

Objectives:

- To identify a watershed and understand its processes
- To relate water movement in a watershed to local topography
- To understand the threats to water quantity within a watershed by human activities
- To define nonpoint source pollution and recognize common activities leading to nonpoint source pollution
- To understand the impact of nonpoint source pollution on surface water
- To identify household hazardous wastes and ways these wastes can contribute to nonpoint source pollution
- To research and assess different agricultural and urban management strategies to reduce nonpoint source pollution
- To evaluate and determine best nonpoint source pollution management strategies for local watersheds
- To participate in nonpoint source pollution prevention

Understanding Nonpoint Source Pollution Teacher Background Information

Water quality within a watershed is largely linked to the action of the people who live, work, and recreate within its boundaries. Water quality problems can be a result of either point source pollution or nonpoint source pollution. This unit explores nonpoint source pollution, its source, impacts, and consequences.

What is a Watershed?

Everyone lives in a watershed or drainage basin. A watershed is defined as a geographic area in which water, sediments, nonpoint source pollutants, and dissolved materials drain into a common body of water. The body of water in a watershed could be a stream, lake, playa, estuary, aquifer, or ocean. A watershed can be as large or as small as you want to define it. In a city, the gutters that run along the curb on your street are the drainage outlets for your street's watershed. The water in your gutters, which drain the small watershed of your neighborhood, flow into the storm drain system and empties into a nearby stream. These storm drain systems also drain several neighborhoods in a larger watershed. That stream, in turn, flows into a larger stream or river. Another example is the watershed of the upper and lower Colorado River, which is one of the largest watersheds in Texas, and contains thousands of smaller watersheds. All of these smaller watersheds and their corresponding streams flow downhill and converge with each other, forming a tree-like network with the Colorado River as the trunk. All of the streams, from the smallest branch of Bee Creek to large tributaries such as the Llano River, constitute the river system for the Colorado River watershed.

What is Point and Nonpoint Source Pollution?

A point source of pollution is a single, identifiable source of pollution, such as discharge from a municipal or industrial wastewater treatment plant. Point sources are regulated under the Clean Water Act and Texas law and are subject to permit requirements that focus on water quality protection. Point source pollution permits specify effluent (released water) limits, monitoring requirement, and enforcement mechanisms. Even though effluent discharges are permitted and regulated, many of these point sources degrade water quality.

Nonpoint sources of pollution are largely unregulated and have not been evaluated in the same vigorous manner as point sources of pollution. Nonpoint source pollution originates from many different locations. We've all seen trash in our waterways following storm. Other contaminants, not so easily seen, enter our waters in much the same way. It occurs when rainfall runoff transports contaminants on the surface of the land into adjacent water bodies. Contaminated storm water can cause impairment to the beneficial uses of streams, reservoirs, estuaries, and oceans. Pollutants carried by water percolating through the soil and aquifer recharge features can contaminate groundwater. Agriculture, forestry, and residential and urban development can increase nonpoint sources of pollutants.

Common Sources of Waterway Pollutants:

Sediments: Sediments from cropland, deforestation, construction site, and stream bank erosion can reduce clarity and sun penetration in bodies of water, harming aquatic plant life and fish.

Nutrients: Nutrients from croplands, lawn and gardens, livestock operations, septic systems, decaying leaves and lawn clippings, and land waste application are a large source of nonpoint source pollution. Nutrients, usually carried by runoff, can cause excess plant and bacteria growth, resulting in eutrophication (from more information on eutrophication see next section) and fish kills.

Bacteria: Bacteria from livestock, seepage from improperly maintained septic systems, leaking sewer lines, wildlife, and urban runoff could invade aquatic systems and upset the natural balance of that system.

Chemicals: Human-made chemicals have a wide-ranging impact. These chemicals include:

- pesticides from roadways, croplands, lawns, gardens, and forestry operations; and
- toxic materials, such as improperly applied pesticides or automotive products such as motor oil, engine degreasers and antifreeze.

Surface Trash: Surface trash, such as plastic containers or cigarette butts, is not only aesthetically unappealing but residue from discarded containers is washed into the water system.

What is the Impact of Nonpoint Source Pollution on Aquatic Systems?

When bodies of water become contaminated with nonpoint source pollution there many impacts to the life that depends on the source of water for drinking or as a habitat. Three main impacts are sedimentation, bioaccumulation, and eutrophication.

Sedimentation is the process of depositing insoluble particles of soil and other solids (referred to as sediments) into a body of water. Sediments are generally carried by runoff. These sediments become suspended in water, cloud the water, and reduce photosynthesis. Some sediment settles to the bottom of the body of water, destroys feeding and spawning grounds, and clogs and fills lakes and rivers.

Bioaccumulation is the process in which a nonbiodegradable or slowly degradable chemical is retained and accumulated in the body and moved through the biological food chain by being passed from one organism to another as the contaminated organism is preyed upon by another organism.

Eutrophication is the natural process in which a body of water is enriched by nutrients such as phosphates and nitrates that are washed in through runoff. These nutrients provide nourishment for plants in the water, which in turn become food for fish and other aquatic life. The term, eutrophic, means well nourished. Eutrophication has come to mean, however, a condition in which a body of water receives an excess of nutrients from agricultural runoff or sewage and the natural process is accelerated and impacts oxygen levels in the water.

Oxygen concentrations in water fluctuate under natural conditions, but severe depletion may be the result of human activity that introduces large quantities of biodegradable organic materials into surface waters. Biodegradable organic materials include lawn clippings, raw and treated sewage, manure, food processing wastes, rice field drainage,

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and pulp paper wastes are some examples of oxygen depleting organic materials that enter surface waters—and are considered nonpoint sources of pollution. As these wastes decompose and break down into essential nutrient enriched building blocks, many chemical and biological processes are directly affected. Nutrients are fundamental building blocks for healthy aquatic communities, but excess nutrients (especially nitrogen and phosphorus compounds) may over stimulate the growth of aquatic weeds and algae. Excessive growth of these plants, in turn can clog waterways and interfere with boating and swimming. In addition, these plants will out compete native submerged aquatic vegetation, and with excessive decomposition lead to dissolved oxygen depletion. Dissolved oxygen concentrations often fluctuate widely, increasing during the day as algae conduct photosynthesis (produces oxygen) and falling at night as algae continue to respire, which consumes oxygen.

Dissolved oxygen is a basic requirement for a healthy aquatic ecosystem. Most fish and beneficial insects “breathe” oxygen dissolved in water. Some fish and aquatic organisms (such a gar and sludge worms) are adapted to low dissolved oxygen concentrations, but most desirable fish species (such as largemouth bass and darters) suffer if dissolved oxygen concentrations are depressed below 3 to 4 mg/L. Inset larvae and juvenile fish are more sensitive and require even higher concentrations of dissolved oxygen to function in a healthy way.

Fertilizers used on crops and lawns, detergents and organic materials in treated sewage, and manure in agricultural runoff are some examples of sources that contain nutrients and are often responsible for water quality degradation. Rural areas are susceptible to groundwater contamination from nitrates found in fertilizer and manure. Nutrients are difficult to control because they typically recycle among the water column, algae, and bottom sediments. For example, algae may temporarily greatly reduce phosphorus from the water column, but the nutrient will return to the water column when the algae die and are decomposed by bacteria. Gradual inputs of nutrients tend to accumulate over time rather than leave the system.

How Can You Track Nonpoint Source Pollution?

Nonpoint source pollution is episodic. This means it enters our rivers and lakes only during episodes of rainfall or during isolated events of illegal dumping or in a random fashion, such as when a sanitary sewer line overflows. It is difficult and expensive to monitor nonpoint source pollution using a fixed monitoring schedule and employing tests for only a few chemical variables.

Running chemical tests on water quality is like taking a snapshot of the river or lake at that moment. However, due to the sporadic nature of nonpoint pollution, a snapshot does not tell the whole story. Looking at the living organisms in a stream or lake can tell you a lot about what has happened there over time because pollutant can bioaccumulate within the organism and across the food chain.

If you monitor a stream that has good habitat and good chemical water quality but no living organisms, something may have happened there prior to your sampling to account for this lack of critters. Perhaps a heavy rainstorm washed a lot of water through your site and dislodged all the organisms. Perhaps an episode of nonpoint source pollution lowered the dissolved oxygen level, causing the organisms to die or move downstream. There are many possible explanations, but by looking at the biological community of the

stream over time, the monitor knows more about the long-term conditions of the stream than if they performed only chemical tests.

Water pollution problems from nonpoint sources are less obvious than those from point sources, and are not as easy to control through traditional treatment strategies. The variability of rainfall events and the complexity of the landscapes and geologic strata lead to nonpoint source pollution phenomena that are highly variable and intricate. The lack of a single identifiable source of pollution makes it difficult to establish specific cause-and-effect relationships.

SOURCES FOR ADDITIONAL INFORMATION

This list includes resources pertaining to pollution prevention information.

Household Hazardous Waste Reduction

Department of Toxic Substance Control
Public Education and Information
400 P Street
P.O. Box 806
Sacramento, CA 95812-0806
Telephone No. 916-255-3545
Fax No. 916-255-3595

Household Hazardous Waste Project
Southwest Missouri State University
1031 East Battlefield
Suite 214
Springfield, MO 65807
Telephone No. 417-889-5000

Pesticides Reduction

U.S. Environmental Protection Agency
Field Operations Division
Office of Pesticide Program
401 M Street, SW
Washington, DC 20460
Telephone No. 202-260-5922
Fax No. 202-260-6257

Pesticide Action Network
North America Regional Center
965 Mission Street
Suite 514
San Francisco, CA 94130
Telephone No. 415-541-9140
Fax No. 415-541-9253

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Pollution Prevention

U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 606604
Telephone No. 312-886-5864
Fax No. 312-353-1879
Web site for address for software for environmental awareness
<http://www.epa.gov/grtlakes/seahome>

Water Pollution Prevention and Conservation

Air and Waste Management Association
Public Education Program
One Gateway Center, Third Floor
Pittsburgh, PA 15222
Telephone No. 412-232-3444
Fax No. 412-232-3450

U.S. Geological Survey
Branch of Information Services
Box 25286
Denver Federal Center, MS 306
Denver, CO 80225
Telephone No. 303-447-1443

National Drinking Water Week Headquarters
American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235
Telephone No. 303-794-7711

Nonpoint Source Pollution Texas Essential Knowledge and Skills (TEKS) Alignment

Science

§112.22. Science, Grade 6.

- (6.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.
- (6.2) Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations.
- (6.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.
- (6.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.

§112.23. Science, Grade 7

- (7.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.
- (7.2) Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations.
- (7.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.
- (7.4) Scientific processes. The student knows how to use tools and methods to conduct science inquiry.
- (7.8) Science concepts. The student knows that complex interactions occur between matter and energy.
- (7.12) Science concepts. The student knows that there is a relationship between organisms and the environment.

§112.24. Science, Grade 8

- (8.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.
- (8.2) Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations.
- (8.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.
- (8.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.

§112.43. Biology.

- (b) (1) Students conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical-thinking and scientific problem-solving. Students in Biology study a variety of topics that include: structures and functions of cells and viruses; growth and development of organisms; cells, tissues, and organs; nucleic acids and genetics; biological evolution; taxonomy; metabolism and energy transfers in living organisms; living systems; homeostasis; ecosystems; and plants and the environment.

(12) Science concepts. The student knows that interdependence and interactions occur within an ecosystem. The student is expected to:

- (D) identify and illustrate that long-term survival of species is dependent on a resource base that may be limited

§112.46. Aquatic Science

(b)(1) Students conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study a variety of topics that include: components of an aquatic ecosystem; relationships among aquatic habitats and ecosystems; roles of cycles within an aquatic environment; adaptations of aquatic organisms; changes within aquatic environments; geological phenomena and fluid dynamics effects; and origin and use of water in a watershed.

(4) Science concepts. The student knows the components of aquatic ecosystems.

- (B) research and identify biological, chemical, geological, and physical components of an aquatic ecosystem

(7) Science concepts. The student knows environmental adaptations of aquatic organisms.

- (B) compare and describe how adaptations allow an organism to exist within an aquatic environment;
- (C) predict adaptations of an organism prompted by environmental changes

(8) Science concepts. The student knows that aquatic environments change.

- (C) identify and describe a local or global issue affecting an aquatic system; and
- (D) analyze and discuss human influences on an aquatic environment including fishing, transportation, and recreation

§112.44. Environmental Systems.

(b)(1) Students conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study a variety of topics that include: biotic and abiotic factors in habitats; ecosystems and biomes; interrelationships among resources and an environmental system; sources and flow of energy through an environmental system; relationship between carrying capacity and changes in populations and ecosystems; and changes in environments.

(5) Science concepts. The student knows the interrelationships among the resources within the local environmental system. The student is expected to:

- (A) summarize methods of land use and management;
- (B) identify source, use, quality, and conservation of water;
- (C) document the use and conservation of both renewable and non-renewable resources;
- (E) analyze and evaluate the economic significance and interdependence of components of the environmental system; and
- (F) evaluate the impact of human activity and technology on land fertility and aquatic viability.

Geology, Meteorology, and Oceanography.

(10) Science concepts. The student knows the interactions that occur in a watershed.

The student is expected to:

(C) describe the importance and sources of surface and subsurface water.

Mathematics

§111.22. Mathematics, Grade 6

(6.1) Number, operation, and quantitative reasoning. The student represents and uses rational numbers in a variety of equivalent forms.

(6.8) Measurement. The student solves application problems involving estimation and measurement of length, area, time, temperature, capacity, weight, and angles.

(6.11) Underlying processes and mathematical tools. The student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.

(6.12) Underlying processes and mathematical tools. The student communicates about Grade 6 mathematics through informal and mathematical language, representations, and models.

(6.13) Underlying processes and mathematical tools. The student uses logical reasoning to make conjectures and verify conclusions.

§111.23. Mathematics, Grade 7

(7.3) Patterns, relationships, and algebraic thinking. The student solves problems involving proportional relationships.

(7.4) Patterns, relationships, and algebraic thinking. The student represents a relationship in numerical, geometric, verbal, and symbolic form.

(7.9) Measurement. The student solves application problems involving estimation and measurement. The student is expected to estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume.

(7.13) Underlying processes and mathematical tools. The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.

(7.14) Underlying processes and mathematical tools. The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models.

(7.15) Underlying processes and mathematical tools. The student uses logical reasoning to make conjectures and verify conclusions.

§111.24. Mathematics, Grade 8

(8.5) Patterns, relationships, and algebraic thinking. The student uses graphs, tables, and algebraic representations to make predictions and solve problems.

(8.14) Underlying processes and mathematical tools. The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.

(8.15) Underlying processes and mathematical tools. The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models.

§111.34. Geometry (One Credit)

(6) Underlying mathematical processes. Many processes underlie all content areas in mathematics. As they do mathematics, students continually use problem-solving, computation in problem-solving contexts, language and communication, connections within and outside mathematics, and reasoning, as well as multiple representations, applications and modeling, and justification and proof.

Precalculus**§111.35. Precalculus (One-Half to One Credit)**

(2) As students do mathematics, they continually use problem solving, language and communication, connections within and outside mathematics, and reasoning. Students also use multiple representations, applications and modeling, justification and proof, and computation in problem-solving contexts.

Technology Applications**§126.12. Technology Applications (Computer Literacy), Grades 6-8**

(2) Through the study of technology applications foundations, including technology-related terms, concepts, and data input strategies, students learn to make informed decisions about technologies and their applications. The efficient acquisition of information includes the identification of task requirements; the plan for using search strategies; and the use of technology to access, analyzes, and evaluates the acquired information. By using technology as a tool that supports the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create a solution, and evaluate the results. Students communicate information in different formats and to diverse audiences. A variety of technologies will be used. Students will analyze and evaluate the results.

(4) Information acquisition. The student uses a variety of strategies to acquire information from electronic resources, with appropriate supervision.

(5) Information acquisition. The student acquires electronic information in a variety of formats, with appropriate supervision.

(7) Solving problems. The student uses appropriate computer-based productivity tools to create and modify solutions to problems.

(8) Solving problems. The student uses research skills and electronic communication, with appropriate supervision, to create new knowledge.

Social Studies**§113.22. Social Studies, Grade 6**

(6.21) Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of sources including electronic technology.

(6.22) Social studies skills. The student communicates in written, oral, and visual forms.

(6.23) Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings.

§113.23. Social Studies, Grade 7

(7.8) Geography. The student uses geographic tools to collect, analyze, and interpret data.

- (7.21) Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of sources including electronic technology.
- (7.22) Social studies skills. The student communicates in written, oral, and visual forms.
- (7.23) Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings.

§113.24. Social Studies, Grade 8

- (8.10) Geography. The student uses geographic tools to collect, analyze, and interpret data.
- (8.30) Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of sources including electronic technology.
- (8.31) Social studies skills. The student communicates in written, oral, and visual forms.
- (8.32) Social studies skills. The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings.

English Language Arts and Reading

§110.22. English Language Arts and Reading, Grade 6

- (6.1) Listening/speaking/purposes. The student listens actively and purposefully in a variety of settings.
- (6.2) Listening/speaking/critical listening. The student listens critically to analyze and evaluate a speaker's message(s).
- (6.5) Listening/speaking/audiences. The student speaks clearly and appropriately to different audiences for different purposes and occasions.
- (6.13) Reading/inquiry/research. The student inquires and conducts research using a variety of sources.
- (6.17) Writing/grammar/usage. The student applies standard grammar and usage to communicate clearly and effectively in writing.
- (6.20) Writing/inquiry/research. The student uses writing as a tool for learning and research.
- (6.24) Viewing/representing/production. The student produces visual images, messages, and meanings that communicate with others.

§110.23. English Language Arts and Reading, Grade 7

- (7.1) Listening/speaking/purposes. The student listens actively and purposefully in a variety of settings.
- (7.2) Listening/speaking/critical listening. The student listens critically to analyze and evaluate a speaker's message(s).
- (7.13) Reading/inquiry/research. The student inquires and conducts research using a variety of sources.
- (7.17) Writing/grammar/usage. The student applies standard grammar and usage to communicate clearly and effectively in writing.
- (7.20) Writing/inquiry/research. The student uses writing as a tool for learning and research.
- (7.22) Viewing/representing/interpretation. The student understands and interprets visual images, messages, and meanings.
- (7.24) Viewing/representing/production. The student produces visual images, messages, and meanings that communicate with others.

§110.24. English Language Arts and Reading, Grade 8

(8.1) Listening/speaking/purposes. The student listens actively and purposefully in a variety of settings.

(8.2) Listening/speaking/critical listening. The student listens critically to analyze and evaluate a speaker's message(s).

(8.5) Listening/speaking/audiences. The student speaks clearly and appropriately to different audiences for different purposes and occasions.

(8.7) Reading/fluency. The student reads with fluency and understanding in texts at appropriate difficulty levels.

(8.10) Reading/comprehension. The student comprehends selections using a variety of strategies.

(8.13) Reading/inquiry/research. The student inquires and conducts research using a variety of sources.

(8.17) Writing/grammar/usage. The student applies standard grammar and usage to communicate clearly and effectively in writing.

(8.18) Writing/writing process. The student selects and uses writing processes for self-initiated and assigned writing.

(8.20) Writing/inquiry/research. The student uses writing as a tool for learning and research.

(8.22) Viewing/representing/interpretation. The student understands and interprets visual images, messages, and meanings.

(6.24) Viewing/representing/production. The student produces visual images, messages, and meanings that communicate with others.

§110.42. English I (One Credit)

(1) Writing/purposes. The student writes in a variety of forms, including business, personal, literary, and persuasive texts, for various audiences and purposes.

(4) Writing/inquiry/research. The student uses writing as a tool for learning.

(6) Reading/word identification/vocabulary development. The student uses a variety of strategies to read unfamiliar words and to build vocabulary.

(8) Reading/variety of texts. The student reads extensively and intensively for different purposes in varied sources, including world literature. The student is expected to: (B) read in such varied sources as diaries, journals, textbooks, maps, newspapers, letters, speeches, memoranda, electronic texts, and other media.

(13) Reading/inquiry/research. The student reads in order to research self-selected and assigned topics.

(15) Listening/speaking/evaluation. The student listens to analyze, appreciate, and evaluate oral performances and presentations.

(16) Listening/speaking/purposes. The student speaks clearly and effectively for a variety of purposes and audiences.

(21) Viewing/representing/production. The student produces visual representations that communicate with others.

§110.43. English II (One Credit)

(1) Writing/purposes. The student writes in a variety of forms, including business, personal, literary, and persuasive texts, for various audiences and purposes.

(4) Writing/inquiry/research. The student uses writing as a tool for learning.

(6) Reading/word identification/vocabulary development. The student acquires an extensive vocabulary through reading and systematic word study.

- (7) Reading/comprehension. The student comprehends selections using a variety of strategies.
- (8) Reading/variety of texts. The student reads extensively and intensively for different purposes in varied sources, including world literature.
- (13) Reading/inquiry/research. The student reads in order to research self-selected and assigned topics.
- (15) Listening/speaking/evaluation. The student listens to analyze, appreciate, and evaluate oral performances and presentations.
- (16) Listening/speaking/purposes. The student speaks clearly and effectively for a variety of purposes and audiences.
- (21) Viewing/representing/production. The student produces visual representations that communicate with others.

Understanding Nonpoint Source Pollution

Key Terms

Acute Toxicity: The ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Any severe poisonous effect resulting from a single, short-term exposure to a toxic substance.

Bioaccumulation: The process in which a nonbiodegradable or slowly degradable chemical is retained and accumulated in the body and moved through the biological food chain by being passed from one organism to another as the contaminated organism is preyed upon by another organism.

Bloom: The accelerated growth of algae and/or higher aquatic plants in a body of water. This is often related to pollutants that increase the rate of growth.

Ecological Impact: The effect that human-made or natural activity has on living organisms and their abiotic (non-living) environment.

Eutrophication: A natural process in which a body of water is enriched by nutrients such as phosphates and nitrates that are washed in through runoff. These nutrients provide nourishment for plants in the water, which in turn become food for fish and other aquatic life. The term, eutrophic, means well nourished. Eutrophication has come to mean, however, a condition in which a body of water receives an excess of nutrients from agricultural runoff or sewage and the natural process is accelerated. The excess plant growth can block sunlight from the bottom of the body of water, preventing photosynthesis, which is necessary to re-supply the oxygen in the water. As animals in the water die because of lack of oxygen, they decompose which removes additional oxygen from the water.

Erosion: Process by which earth materials are loosened and worn away and deposited in another area.

Food Chain: The dependence of organisms upon others in a search for food. The chain begins with producers (plants) and ends with the largest of the consumers (carnivores).

Habitat: The area in which an organism lives.

Household Hazardous Waste: Any discarded liquid or solid material or container holding gases which may have an adverse, harmful, or damaging biological effect in an organism or upon the environment itself.

Nonpoint Source: Large or disperse land area such as crop fields, streets, and lawns that can be discharged pollution into the environment over a large area. Pollution sources are diffuse and do not have a single point of origin. The pollutants are generally carried off the land by storm water runoff. The commonly used categories for nonpoint sources are: agriculture, forestry, urban, mining, construction, dams and channels, land disposal, and saltwater intrusion.

Nutrient: Any substance used by living things to promote growth. The term is generally applied to nitrogen and phosphorus in water and wastewater, but is also applied to other essential and trace elements.

Photosynthesis: The manufacture by plants of carbohydrates and oxygen from carbon dioxide and water in the presence of chlorophyll using sunlight as an energy source.

Point Source Pollution: A single, identifiable source of pollution such as a discharge from a municipal or industrial wastewater treatment plant.

Runoff: The part of precipitation or irrigation water that runs off land into streams and other surface water.

Sedimentation: The process of depositing insoluble particles of soil and other solids into a body of water. These particles become suspended in water, clouds the water, and reduces photosynthesis. Some sediment settles to the bottom of the body of water, destroys feeding and spawning grounds, and clogs and fills lakes and rivers.

Tolerant Organisms: Organisms that have the capacity to grow and thrive whenever subjected to unfavorable environmental factors.

Toxic: Capable of causing injury or death through ingestion, inhalation or skin absorption. Some toxic substances cause cancer, genetic mutations, and fetal harm.

Tributary: A stream or river that flows into a larger stream or river.

Watershed: The area of land from which precipitation drains to a single point. Watersheds are sometimes referred to as drainage basins or drainage areas.