

Making Water Quality Connections

Water Quality Conditions Observed	Possible Associated Problems	Possible Associated Causes
<p>Decrease in Dissolved Oxygen</p>	<p>Temperature increase</p> <p>Organic waste – once part of a living plant or animal (food, leaves, feces, etc.)</p> <p>Chemical runoff – herbicides, pesticides, insecticides</p> <p>Trash</p> <p>Lack of algae and rooted aquatic plants</p> <p>Low water levels</p>	<p>Reduction in vegetation shading body of water; increase in sediment or suspended solids; industrial cooling processes</p> <p>Leaking or failing septic systems; waste from farms and animals (pets and feedlots); discharge from food-processing plants, meat packing houses, dairies and other industrial sources; garbage; industrial waste (organic fibers from textile, paper, and plant processing); sewage treatment plants, natural processes; grass, tree and shrub clippings; urban runoff; agricultural runoff</p> <p>Golf courses; residential lawns; agricultural lands; recreational parks</p> <p>Litter washed into sewer systems</p> <p>Multiple sources of water pollution (e.g. chemicals, toxins)</p> <p>Climatic or weather change</p>
<p>Fecal Coliform Bacteria E. Coli Enterococci</p>	<p>Organic waste – feces from human beings or other warm-blooded animals</p>	<p>Leaking or failing septic systems; failing sewer systems</p> <p>Direct discharge from mammals and birds with access to waterways or waste entering a body of water as runoff</p>
<p>Increase in Temperature (Thermal Pollution)</p>	<p>Organic waste – once part of a living plant or animal (food, leaves, feces, etc.)</p> <p>Reduction in vegetation shading body of water</p> <p>Industry and power plant discharge</p> <p>Runoff from warmed urban surfaces</p> <p>Suspended solids</p> <p>Flow of water impeded</p>	<p>Natural processes; grass clippings; tree and shrub clippings; unnatural fish or animal kills</p> <p>Shade trees and shrubs removed from stream bank for urban development, irrigation, and industrial and agricultural expansion, exposing the water to direct sunlight</p> <p>Water returned to source is at higher temperature than at initial intake point</p> <p>Impervious land cover such as paved streets, sidewalks and parking lots</p> <p>Urbanization leading to increased numbers of buildings, homes and roads on lands which previously were natural areas, and absorbed rain and snowmelt more efficiently</p> <p>Removal of streamside vegetation; overgrazing; poor farming practices and construction causing excessive soil erosion</p> <p>Dams, dikes and diversions for agricultural, industrial or municipal practices decrease flow rate of river, absorbing more heat from sunlight</p> <p>Dams created from beavers or log jams</p>

Water Quality Conditions Observed	Possible Associated Problems	Possible Associated Causes
Turbidity	Suspended solids (ranging from clay, silt and plankton, to industrial wastes and sewage)	Erosion from agricultural fields; construction sites; residential driveways, roads and lawns; natural and accelerated erosion of stream bank; excessive algae growth
High Total Dissolved Solids/Total Solids		Leaves and plant materials Wastewater treatment plant Run off from urban areas Dredging waterways Waste discharge (garbage, sewage) Excessive population of bottom-feeding fish (such as carp) that stir up bottom sediments
Excessive Phosphates	Human wastes Organic waste – once part of a living plant or animal (food, leaves, feces, etc) Run-off from fertilized land Industrial waste	Leaking or failing septic systems; sewage treatment plants Waste containers leaking; lack of waste storage facilities; animals have direct access to waterways Pet wastes not collected and disposed of appropriately Removal of natural vegetation for farming or construction practices, causing soil erosion Draining swamps and marshes for farmland or commercial/residential development Drained wetlands no longer functioning as filters of silt and phosphorous Agricultural fields, residential lawns, home gardens, golf courses, recreational parks
Excessive Phosphate	Detergents Natural events	Poorly treated sewage; broken pipes; farms; golf courses; sewage treatment facilities; industrial discharges Household and commercial cleaning agents washing into the water and sewage systems Forest fires and fallout from volcanic eruptions
pH	Vehicles for transportation Industrial waste Runoff from fertilized land	Improper engine maintenance of vehicles (emissions systems) Industrial or mining drainage; sewage treatment plants Agricultural fields; residential lawns; golf courses; recreational parks

Physical Observations	Possible Associated Problems	Possible Associated Causes
Water Appearance		
Green, Green-Blue, Brown or Red	Indicates the growth of algae	High levels of nutrient pollution, originating from organic wastes, fertilizers, or untreated sewage.
Muddy, Cloudy	Indicates elevated levels of suspended sediments, giving the water a muddy or cloudy appearance	Erosion is the most common source of high levels of suspended solids in water. Land uses that cause soil erosion include mining.
Dark Reds, Purple, Blues, Blacks	May indicate organic dye pollution	Originating from clothing manufacturers or textile mills.
Orange-Red	May indicate the presence of copper	Copper can be both a pollutant and naturally occurring. Unnatural occurrences can result by acid mine drainage or oil-well runoff.
Blue	May indicate the presence of copper, which can cause skin irritations and death of fish	Copper is sometimes used as a pesticide, in which case an acrid (sharp) odor might also be present.
Foam		Excessive foam is usually the result of soap and detergent pollution. Moderate levels of foam can also result from decaying algae, which indicates nutrient pollution.
Rusty	Tannic Water (natural)	Leaves
Multi-Colored (oily sheen)	Indicates the presence of oil or gasoline floating on the surface of the water. Oil and gasoline can cause poisoning, internal burning of the gastrointestinal tract and stomach ulcers.	Oil and gasoline pollution can be caused by oil drilling and mining practices, leaks in fuel lines and underground storage tanks, automotive junk yards, nearby service stations, wastes from ships, or runoff from impervious roads and parking lot surfaces.
No unusual color	Not necessarily an indicator of clean water.	Many pesticides, herbicides, chemicals, and other pollutants are colorless or produce no visible signs of contamination.
Odors		
Sulfur (rotten eggs)	May indicate the presence of organic pollution.	Possible domestic or industrial wastes.
Musty		May indicate the presence of sewage discharge, livestock waste, decaying algae, or decomposition of other organic pollution.
Harsh		May indicate the presence of industrial or pesticide pollution.
Chlorine	May indicate the presence of over-chlorinated effluent	Sewage treatment plant or a chemical industry.
No unusual smell	Not necessarily an indicator of clean water.	Many pesticides and herbicides from agricultural and forestry runoff are colorless and odorless, as are many chemicals discharged by industry.
Dead Salmon Smell?	Spawned out Salmon carcasses	Spawned out Salmon

Modified from Earth Force Materials