



Stormwater Runoff Basics

Surface Water Pollution

Stormwater can carry many pollutants that have negative impacts on water quality. The following are some common pollutants in Iowa's waterways.

Bacteria. Too much of the wrong bacteria is not good for the environment. Sources of bacteria, like e.coli and fecal coliform come from pet & wildlife waste as well as failing septic systems. This bacteria gets flushed into stormwater runoff to local water bodies and groundwater and can result in drinking water boil orders and closed beaches throughout Iowa. Bad bacteria can make humans and animals sick.

Sediment. Too much sediment (dirt that ends up in water) is not good for our environment. Sources of sediment include dirt on impervious surfaces that are washed away with rain, as well as eroded soil from unprotected construction sites and streambanks. Muddy water in streams and lakes that is full of sediment impacts fish and other aquatic life as well as changes the water chemistry.

Fertilizers. Too much nitrogen and phosphorus in water is not good for the environment. Sources of nitrogen and phosphorus come from fertilized urban lawns and landscapes. Excess phosphorus in streams and lakes promotes algae growth, that depletes oxygen in the water. When this happens it not only makes for an unpleasant environment in which to swim or kayak, but fish and other aquatic life are impacted as well.

Pesticides. A modest number of currently used and recently banned insecticides and herbicides have been detected in urban streamflow at concentrations that approach or exceed toxicity thresholds for aquatic life.

Gas & Oil (hydrocarbons). Sources of hydrocarbons include oil and grease that leak from vehicles, gas station hot spots, parking lots and illegal dumping directly into storm drains.

Heavy Metals. Cadmium, copper, lead and zinc are commonly found in urban stormwater runoff. Sources include vehicles (brake linings), junk yards, metal rooftops, etc. While the quantities are not usually harmful to humans, these metals can be toxic to aquatic life and accumulate in sediment (dirt) found in streams, ponds, lakes and rivers.



Stormwater Runoff Basics

What is stormwater runoff?

Historically, when it rained on the prairie, the majority of rainfall soaked into the organic rich soils. Our streams were fed mainly through groundwater recharge. As soil surfaces in our communities are paved over or built upon, the rainfall has few areas to infiltrate into the soil and instead moves as runoff to local streams. This runoff is called stormwater runoff, which is rainfall and snowmelt that drains off impervious surfaces such as streets, parking lots, driveways, roof tops and compacted soils. It eventually drains into a storm drain in the street that enters an underground storm sewer system that discharges in most communities directly into local waterways such as rivers, streams, creeks and lakes. The concern with stormwater, is how it is managed locally for water quality and quantity or flood control. Most stormwater is released directly into local bodies without any treatment. Some communities use detention (dry basins) and retention (wet basins) to temporarily hold back stormwater during major rainfall events and release it more slowly to a local waterbody to minimize flooding impacts.

What are the challenges with stormwater?

Once 10% of a given watershed (drainage basin) has been converted to impervious surfaces, significant ecological damage occurs as an increase in stormwater runoff from urban development is quickly collected and discharged into the storm sewer drainage system. The following impacts occur:

1. Groundwater is no longer recharged
2. Surface water becomes polluted
3. Streambanks and channels are degraded
4. Flooding occurs

Soil Health and Your Lawn



Healthy Soils, Healthy Streams

Turf grass in Iowa's communities makes up a significant land area. The soils beneath the turf, especially in newer, developed areas is highly disturbed and most often very unhealthy. As a result, many lawns are over fertilized and generate a lot of runoff that goes directly to local streams and carries fertilizers with it. When it comes to lawn care, the focus is usually on how green and thick the grass is above ground with little focus on the soils beneath the turf grass. Healthy soils will result in healthier turf grass with less runoff and water pollution.

What is Soil Health?

Soil health or soil quality, is the ability of soil to function as a vital living ecosystem that sustains plants, animals, and humans. It is also directly connected to local stream quality. Soil isn't dead and it is not just "dirt"! It has billions of living and breathing bacteria, fungi, and other microbes that are part of a dynamic symbiotic ecosystem. Only "living" things can have health, so viewing soil as a living ecosystem reflects a fundamental shift in the way we care for our nation's soils. Healthy, functional soils provide nutrients for turf grass and plants, they absorb and hold rainwater for use during dry periods, they filter and buffer potential pollutants from lawns, and provide habitat for soil microbes to flourish to sustain the ecosystem.



What are Characteristics of Good Soil Health?

Good Structure: Healthy soils have good structure, which is the arrangement of the solid parts of the soil and the pore space between them. Loose granular soils have large and small pores that allow for rapid infiltration of rainfall. Most urban soils beneath turf grass are highly compacted which results in loss of structure and pores and results in more rainfall running off the lawn than soaking into it.



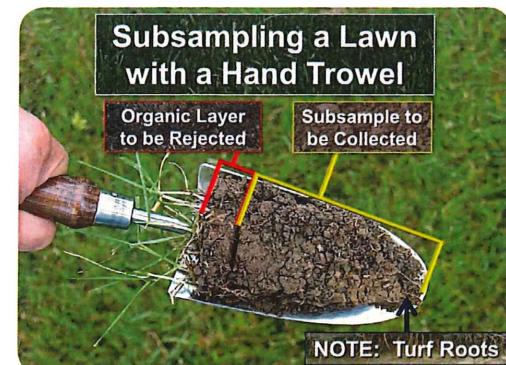
Adequate Organic Matter: This is one of the most important components, thus an indicator, of a healthy soil. It is the tiny fraction of soil composed of decomposed matter. Organic matter: provides carbon as an energy source for soil microbes; holds soil particles together; supplies, stores, and retains nutrients including nitrogen and phosphorus; improves the soil's ability to store water and make it available to turf grass; contributes to less compaction; reduces rainfall runoff and helps with turf grass root development.

Soil Fertility: Fertility is the ability of soils to provide essential nutrients and water for turf grass growth and reproduction. Healthy soils will have good fertility which is usually assessed through soil chemical analyses for such nutrients as nitrogen, phosphorus, and potassium, to name a few.

Soil Management

Management choices affect soil health and soil structure, amount of organic matter, fertility including water and nutrient holding capacity and soil depth. An assessment of soil health can be the starting point. Choose management methods that will foster soil function for the future. Following are recommended practices:

1. When building a new home, make sure that there is adequate topsoil, at least 4 inches and that the subsoils and topsoil are decompacted before seeding or sodding. Topsoil can be amended with compost to increase organic matter.
2. On existing lawns, sample lawn soils before fertilizing for nutrients, pH, organic matter. Fertilize based on sample results and recommendations. Improve soil quality in the spring or fall by doing soil quality restoration, aerate the lawn, then topdress with a thin layer, 1/4-1/2" of compost. Reseed over the top using existing turf grass species.
3. Use "P-Free" fertilizers to reduce the amount of phosphorus applied to your lawn and reduce the amount of phosphorus in runoff to storm sewers that discharge to local streams.



<https://ohioline.osu.edu/factsheet/hyg-1132>



TahoeBMP.com
LakeCountyIL.gov

More information: <https://iowastormwater.org/basics/healthy-soils-healthy-streams/>

Other Stormwater Pollution Prevention Tips:

- **Sweep up excess fertilizers from sidewalks or driveways**
- **Don't apply fertilizers and herbicides right before a rainfall event**
- **Blow grass clippings back onto the lawn after mowing**
- **Spot spray herbicides rather than spraying the entire lawn**