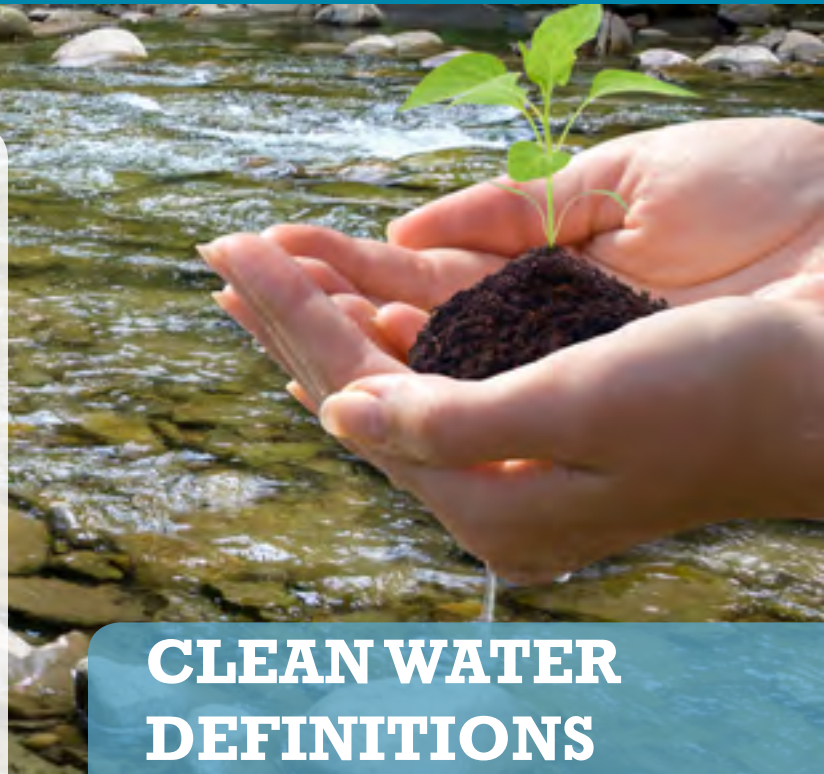


HEALTHY SOIL = CLEAN WATER

WHEN IT COMES TO CONSERVING AND PROTECTING WATER RESOURCES IN URBAN ENVIRONMENTS, IT'S IMPORTANT TO CONSIDER THE ROLE OF HEALTHY SOILS. SOIL AND WATER ARE INTERCONNECTED. MAINTAINING HEALTHY SOILS ENHANCES THE QUALITY OF THE WATER RESOURCES THAT OUR COMMUNITIES AND ECOSYSTEMS DEPEND ON.



CLEAN WATER DEFINITIONS

The NRCS's four Soil Health Principles and many of the NRCS conservation practices that support soil health simultaneously promote clean water. Healthy soils infiltrate and store more water than unhealthy soils.

Increased infiltration and storage results in less runoff, less soil erosion, and less sediment and nutrient loading to streams, rivers, lakes, and wetlands. Infiltrated water recharges aquifers, which are a critical source of drinking water, and also ensures a sustained flow of clean, cool water that replenishes surface water bodies sustaining quality ecosystem habitat.

Healthy soils cycle nutrients, like nitrogen and phosphorus, reducing their loss from the urban landscape and reducing eutrophication of adjacent water bodies. Healthy soils can also retain and/or degrade pesticides, heavy metals, and other urban pollutants, thereby protecting aquifers and surface waters from harmful nonpoint source (NPS) pollutants.

Following the NRCS's four Soil Health Principles and implementing conservation practices not only promotes healthy soils, but also promotes clean water.



Eutrophication

The process by which a water body becomes enriched in nutrients that stimulate the growth of aquatic plant life. When the plants die and decompose, dissolved oxygen is depleted rendering the waterbody unsuitable for recreation and uninhabitable by fish and aquatic organisms.

Nonpoint source pollution

Nonpoint source pollution is derived from multiple diffuse sources as opposed to point source pollution, which is generated from a single known source. Non-point source pollutants are found throughout the urban landscape e.g. chloride from road salt, nitrate from lawn fertilizers, and cadmium from vehicle brakes. Nonpoint source pollution accumulates on parking lots, roadways, roofs, and lawns where it is carried via water to lakes, streams, rivers, wetlands, and aquifers.



example of healthy roots



Soil Health Principles	Practices	Healthy Soil	Clean Water
Minimize Soil Disturbance	<ul style="list-style-type: none"> Minimize tillage and other disturbances on urban gardens and farms. <ul style="list-style-type: none"> - No-Till (329) Prevent soil compaction, minimize heavy traffic on lawns and gardens. 	Reducing soil disturbances slows the mineralization of organic matter, helps preserve strong soil structure, and reduces erosion potential.	Undisturbed, healthy soils have higher porosity and water holding capacity which increases infiltration and reduces runoff and the transport of sediment and NPS pollutants to water bodies.
Keep the Soil Covered	<ul style="list-style-type: none"> Grow deep-rooted native plant and grass species. <ul style="list-style-type: none"> - Conservation Cover (327) Mulch exposed soils or apply compost <ul style="list-style-type: none"> - Mulching (484) 	Ground cover protects the soil by: <ul style="list-style-type: none"> shielding it from the impact of raindrops stabilizing it with a supply of organic matter retaining moisture regulating temperature 	Ensuring the soil surface is covered with litter or vegetation minimizes runoff and erosion potential thereby reducing flooding and sediment transport to downstream waterways.
Keep a Living Root in the Soil	<ul style="list-style-type: none"> Choose plants that grow the entire year. <ul style="list-style-type: none"> - Tree and Shrub Planting (612) Integrate cover crops and perennials <ul style="list-style-type: none"> - Cover Crops (340) Aerate the soil to encourage root growth 	Living roots supply the soil ecosystem with energy in the form of organic matter. This improves the soil's ability to retain and cycle nutrients, increases water holding capacity, and supplies food for insects and soil microorganisms.	Healthy soils with living roots and robust microbial communities retain and cycle nutrients and pollutants thus reducing transport of contaminants to aquifers and surface waters reducing eutrophication and negative impacts of NPS pollution.
Maximize Diversity	<ul style="list-style-type: none"> Establish multiple plant species Minimize pesticide use <ul style="list-style-type: none"> - Integrated Pest Management (595) Utilize crop rotation techniques <ul style="list-style-type: none"> - Conservation Crop Rotation (328) 	Plant diversity above ground promotes biodiversity below ground. Diverse communities are more effective at breaking down and cycling nutrients and other pollutants while simultaneously reducing pests or weeds.	Diversity helps build healthy soils that have the capacity to capture, physically filter, and biologically degrade pollutants before they enter ground and surface waters.

• Parenthetical numbers denote MN NRCS Conservation Practice Code. <https://efotg.sc.egov.usda.gov/>

To find out more about the benefits of healthy soils visit <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/>

