

Building Healthy Soil

Building and maintaining healthy soil is critical to long-term productivity of the land, protecting the environment and promoting healthy communities. Sound management practices can improve soil condition, while poor ones may lead to continued degradation of our soil resources.

This focus sheet provides general information on healthy soil. It focuses on adopting best management practices that will build and maintain the health of our soil.

What is healthy soil?

The term “soil health” refers to the condition of the soil. Healthy soil is productive with less effort. It has physical, chemical and biological properties that easily support healthy plants, humans and other animals, and maintain a healthy environment.

What are the characteristics of healthy soil?

According to the *Cornell Soil Healthy Training Manual* (<http://soilhealth.cals.cornell.edu>), healthy soil has the following characteristics:

- **Good tilth:** Good soil tilth (suitable physical condition) helps plant roots develop with the least amount of effort.
- **Sufficient depth:** Soil should be deep enough not to limit growth of plant roots.
- **Sufficient but not excess supply of nutrients:** An adequate supply of nutrients such as nitrogen and phosphorus is important for optimal plant growth, but excess nutrients left in the soil may degrade water quality due to leaching and runoff.
- **Small population of plant pathogens and insect pests:** Healthy soil has low populations of these organisms.
- **Good drainage:** Healthy soil drains water quickly, but holds enough water for plant uptake.
- **Large population of beneficial organisms:** Healthy soil has high, diverse populations of beneficial organisms including soil insects and earthworms.
- **Low weed problems:** Healthy soil can help plants out compete weeds, thus reducing weed problems.
- **Free of chemicals and toxins:** Healthy soil is free of harmful chemicals and toxins.
- **Resistant to degradation:** Healthy soil is more resistant to adverse events such as wind and water erosion, excess rainfall and extreme drought.
- **Resilience:** When unfavorable conditions such as drought stress occur, healthy soil will recover more quickly.

MORE INFORMATION

Soil Quality Concept:
<http://soils.usda.gov/sqi/concepts/concepts.html>

Soils for Salmon – Building the Soil for Healthier Landscapes and Healthier Streams:
www.soilsforsalmon.org

Natural Yard Care: A guide to improving soil and growing healthy landscapes:
www.ecy.wa.gov/biblio/0807064.html

Analytical Laboratories and Consultants Serving Agriculture in the Pacific Northwest:
<http://www.puyallup.wsu.edu/analyticallabs/>

Department of Ecology's List of Accredited Labs:
<http://www.ecy.wa.gov/apps/ea/acclabs/labquery.asp>

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What are the benefits of building and maintaining healthy soil?

Building or maintaining healthy soil improves the productivity of cropland, rangeland and woodland. Healthy soil requires less maintenance, making lawns, gardens and landscapes easier to care for. Healthy soil also helps reduce erosion from wind and water, thus protecting air and water quality. Other benefits include:

- Increased plant growth and crop yields.
- Increased retention and cycling of nutrients such as carbon, nitrogen, phosphorus and other nutrients.
- Increased capacity for soil to hold moisture and nutrients.
- Enhanced ability to filter and buffer potential organic and inorganic pollutants.
- Time and money saved by reducing water, fertilizer, pesticide and herbicide uses.

How do I build and maintain healthy soil?

Depending on the starting condition, building and maintaining healthy soil may require a lot of thought and significant actions over years. The following are general management practices that you can do to build and maintain healthy soil.

- Regularly add organic materials:
 - Apply animal manure, compost or biosolids to crop/orchard fields.
 - Apply compost (or compost blends) to yard, garden and ornamental beds before seeding and planting.
 - Leave lawn clippings on the yard (also known as grass cycling or mulch mowing).
- Adopt minimum or no tillage farming practices. This helps maintain soil structure, build soil carbon, reduce soil erosion and decrease greenhouse gas emissions.
- Keep the ground covered:
 - Leave crop residues on agricultural fields.
 - Use organic mulches such as wood chips and compost on the soil surface.
 - Grow cover crops.
- Manage animal grazing intervals. Intensive grazing can lead to decline of soil structure and compaction.
- Prevent soil compaction:
 - Minimize operations involving heavy agricultural machinery.
 - Keep heavy equipment off lawns.
 - Minimize rototiller use.
 - Avoid tilling when soil is too wet.
- Manage soil nutrients and reduce use of chemicals (pesticides and herbicides) to control plant diseases, pests and weeds:
 - Test soil to determine soil nutrient level and nutrient needs.
 - Apply optimal amount of nutrients at the right time and place to enhance nutrient use efficiency. Do not use more than recommended.
 - Use soil amendments such as animal manure, biosolids and compost instead of chemical fertilizers as nutrient sources for crops when possible.
 - Use appropriate soil amendments such as lime to overcome strong acidic soil conditions that limit plant growth.
 - Use non-chemical approaches to build soil health such as crop rotation for plant disease, pest and weed control.