

Soil Biology

Soil is by far the most biologically diverse part of the earth. It contains a complex food web of prey, predators and decomposers. These organisms require the same elements we require: air, water, food and shelter. The soil flora and fauna increase water holding capacity, improve soil structure to help reduce erosion, and provide plant nutrition.

One teaspoon of healthy soil may contain:

- Bacteria- 100 million to 1 billion
- Fungi- up to 100 yards of fungal hyphae
- Protozoa- several thousand
- Nematodes- up to several hundred
- Arthropods (insects)-500-2000
- Earthworms-arid soils may have none to several

Plant growth is dependent of the soil microbes who in turn rely on available carbon and nitrogen in the correct proportions. Plants and microbes have a symbiotic relationship and need each other to exist.

Soil Chemistry

pH- determines the soil's ability to supply nutrients to a plant. A high pH lowers availability of some micronutrients. Mojave Desert soils range in pH from 8.0-8.4 on average.

Macronutrients/ non-mineral:
Carbon, Hydrogen, Oxygen

Primary nutrients:
Nitrogen (N), Phosphorous (P), and Potassium (K)

Secondary nutrients:
Calcium (Ca), Magnesium (Mg), and Sulphur (S)

Micronutrients include boron, chlorine, copper, iron, manganese, molybdenum, cobalt and zinc.

Fertilizer recommendations are based on soil tests and are customized for soil conditions and plant/crop needs.

Organic matter in most native arid soils is very low and ranges from 0-.50%

Soil Facts

- A 5-ton layer of soil spread evenly on an acre is about the thickness of a nickel. An acre is about the size of a convenience store and parking lot.
- Healthy soils are more resistant to erosion and require less fertilizer.
- An acre of healthy soil contains as much bacteria by weight as a cow or two.
- In a desert environment it takes about a thousand years to build an inch of soil.
- Soil is the largest single water pollutant by volume and is usually due to soil erosion.
- Soil filters out pollutants that may contaminate drinking water.
- Agriculture is the nation's largest employer from growing food and fiber to processing and marketing products.

Soil Erosion

The United States is losing 6.4 BILLION tons of soil each year because of erosion.

Erosion by wind:

Soil can be protected from wind erosion by keeping a permanent crop on the surface, by using windbreaks, or by keeping mulch on the surface.

Surface rock fragments, also called 'desert pavement' protect soil from wind erosion. Desert pavement is very important for soil protection in the arid environment where vegetation cover is lacking.

Soil crusting is also important for controlling wind erosion. This occurs naturally when water dissolves chemicals that bind with soil particles when they dry.

Soil binders or dust palliatives may be purchased and applied where other wind erosion techniques have failed.

Erosion by water:

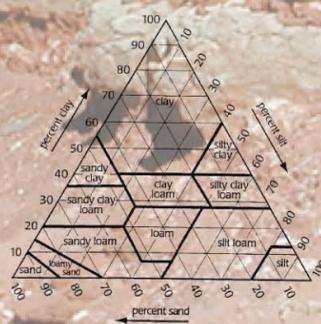
Did you know that a falling raindrop hitting the soil is the equivalent of 10 tons of TNT?

A raindrop falls at the rate of 15 mph. Raindrops hitting bare soil have two effects: they dislodge soil particles and seal the soil surface. A raindrop that reaches the soil surface can infiltrate the soil, evaporate or flow overland as runoff. Sediment traveling in runoff is significant in the Mojave because it can reduce reservoir storage capacity.

Terracing ground that slopes will reduce runoff velocity and preserve soil. Rock cover, mulch or vegetation cover will reduce the impact of falling rain and help keep soil in place and keep our water clean.

Soil Description

Fine earth is composed of three particle sizes: sand, silt and clay, and the proportions of each in the fine earth (<2mm) determine soil texture. Texture can be determined from the soil textural triangle.



Soil description will include the following characteristics: texture, color, reactivity, % coarse fragments (>2mm), available water holding capacity, consistency and structure.

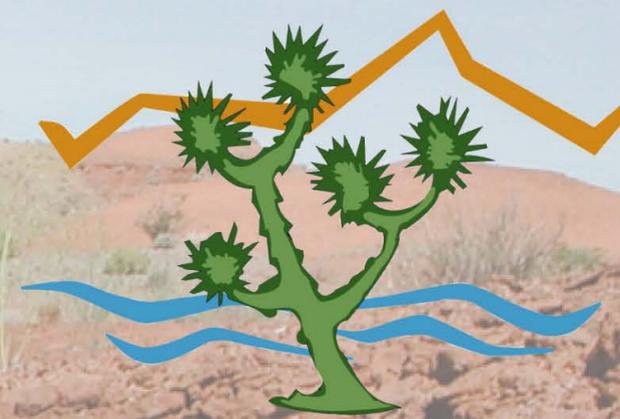
The soil survey provides information on soil profile, soil productivity and chemical properties, engineering properties, wildlife habitat potential, building site limitations, recommended landscape plantings, characteristic native plant communities and climatic information.

Arid soils are very diverse. Soil depth can be very shallow (less than 10") to very deep (greater than 6') to bedrock or hardpan.

Local soil surveys are available through the USDA-NRCS office near you.

SOIL

Much more than just dirt...



Conservation District
of Southern Nevada
Serving Clark County



**NATURAL RESOURCES
CONSERVATION SERVICE**

**Urban Dwellers Guide
to Arid Soils of the
Southwestern United States.**

Soil Maintenance Calendar

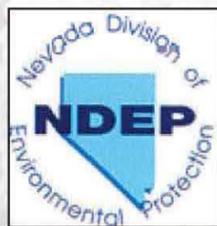
Preparing your garden's soil is just as important as deciding which trees, shrubs, vegetables and ornamentals you will plant.

Use this helpful maintenance calendar to manage your soil's fertility year round.

Soil & Water Quality

Protecting water quality starts in our own backyards. Urban runoff travels directly from our yards into storm drains ending up in Lake Mead, the drinking and recreational water source for the 1.5 million residents of Clark County. What we apply to our garden soils, controlling erosion, and improving your soil's water holding capacity will go a long way towards protecting water quality. Using organic gardening methods as opposed to heavy dependence on chemical fertilizers will protect water sources should any water escape from your yard.

Funding for this project was provided by the Nevada Division of Environmental Protection's Bureau of Water Quality Planning.



JANUARY

January may be too cold to plant, but it is the perfect time to amend your soils for the spring. If you're unsure which amendments your soil needs, a simple soil test purchased from your local nursery or homecare center will help you make that determination. Applying soil amendments to the soil surface now will allow ample time for them to decay over the winter, administering nutrients deep into the soil with each rain or watering. An inexpensive and organic amendment is homemade compost, which will also increase your soils water retention capabilities and aeration.

FEBRUARY

Spend some more time in your yard digging compost and mulch into your soil to relieve soil compaction. Remember that each tillage releases nitrogen from your soil into the atmosphere so use a light hand to preserve nutrients. Used coffee grounds are a great addition to rose beds.

MARCH

To loosen compacted soil and provide good plant nutrition you can add up to 50% organic matter, such as straw, compost, dried grass clippings and wood bark mulch. In doing so you will increase water percolation, the soil's water holding capacity and encourage proper aeration, allowing for the best plant root growth. Remember that plant and tree root zones in our arid desert environment generally only reach from 2 to 12 inches down, so maintaining healthy upper soils is of utmost importance to establishing and maintaining healthy plants.

APRIL

Start applying a healthy two-to-four inch mulch of organic materials now. Apply a heavy mulch of tree bark or compost in landscaped areas and pathways to increase water retention, keep plant roots cool, and cut down on weeds. Make sure to apply mulches an inch or two from plant stems and tree trunks to avoid possible crown rot.

MAY

Curious about the quality of your backyard soil? You can always contact the Natural Resources Conservation Service at (702) 262-9047 ext. 3 to receive a soils report for your area. For the adventurous, the University of California Cooperative Extension suggests an easy and fun way to determine the texture of your soil on your own. Fill a jar two-thirds full of water and the rest with your backyard soil. Shake the jar well, and place it somewhere it can easily be observed without disturbance. As the soil begins to settle you will notice a layering effect. Heavy particles, like sand, will settle to the bottom of the jar first, followed by silt and then clay particles. Any organic matter will float. Good loam soils contain about 45% sand, 35% silt, and 20% clay. This little test should give you a good idea of what kinds of textures and nutrients may be beneficial additions to your garden. If you've been improving your soil and want to see how it measures up, take a sample from some unimproved ground nearby, test it the same way and do a comparison.

JUNE

Make sure to pay attention to your compost pile's moisture needs during the summer months. Your pile should have the consistency of a wrung out sponge. Regular watering and aeration will increase the ability of bacteria in your pile to quickly break down organic matter. If your pile is located in direct sunlight, you may want to cover the top of the pile with a tarp to keep moisture from evaporating too quickly.

JULY

Keep adding to mulches throughout the summer to conserve water, keep roots cool, and discourage weeds from taking root. Remember to water well before applying the mulch and to cultivate some of the mulch into your existing soil, or you'll insulate dry soil rather than moist soil. Mulch can be effectively applied to shrubs, trees, vines, flowers and vegetable beds.

AUGUST

Keep bulking up your compost pile with dead and dried matter from your yard, non-greasy kitchen scraps, grass clippings, and a few handfuls of healthy soil. Cutting up larger items will expose more surface area to bacteria and allow for faster breakdown.

SEPTEMBER

Remove any dead plant material from the soil surface, and turn the surrounding soil to uncover any underground pests and weed seeds. Taking the time to remove such pests now will protect your fall plantings and save you removal time in the spring.

OCTOBER

If you're not planning a fall/winter garden consider planting a "green manure" of cover crop to enrich the soil. Choices such as alfalfa, annual rye and buckwheat seeds are all inexpensive and locally available. Till plants into the soil next spring two or three weeks before planting to allow enough time for decomposition and give springtime seeds and seedlings a healthy start.

NOVEMBER

Dig mulch, manure and compost into and around your garden and landscape beds. These amendments will break down over the winter providing nutrients for immediate use by seeds and transplants in the spring. The lazy gardener's approach would be applying amendments to the topsoil layer but waiting until springtime to dig it into the soil. Periodic watering and winter rains will percolate through the manure, compost and mulch providing a lovely brew of "tea" to replenish the soil underneath.

DECEMBER

Loosely cover your compost pile with a tarp or black plastic trash bag to hold in heat and keep December rain showers rain from washing away valuable nutrients.