K-STATE Research and Extension
Department of Agronomy

Gardening on Brownfields: Testing Your Soil for Nutrients, pH, and Organic Matter

MF3095 Brownfield Sites

Before gardening on any site, it is important to test soils for nutrients, pH, and soil organic matter, i.e. agronomic parameters, to make sure whatever planted will grow and perform. Testing is even more important on sites previously occupied by structures and not used for any type of gardening activity. The soil quality on these sites tends to be poor.

Examples of common soil quality issues include low organic matter, low nutrient concentration, shallow and/or compacted soil, and poor drainage. Nutrients and organic matter usually need to be replenished before gardening on these types of sites. Based on soil test results, you will be able to supply the right nutrients in the correct quantity and adjust the soil pH to optimal growing conditions. A soil test for agronomic parameters generally does not provide information on the soil type, degree of compaction, drainage, potential contaminants, or insects/pests.

Fees for soil tests vary depending on where you live in the United States. If you live in a state with a soil laboratory at a land grant university, you may be able to get the testing done through the agricultural extension office of your county. Some counties do not charge a fee for testing, some charge minimal fees (in the range of $5 to $8), others charge more. Call your local extension office or check its website for soil testing and associated pricing (see listing by state on Page 2). If you have the test done by a commercial laboratory, fees may be higher than extension offices offer.

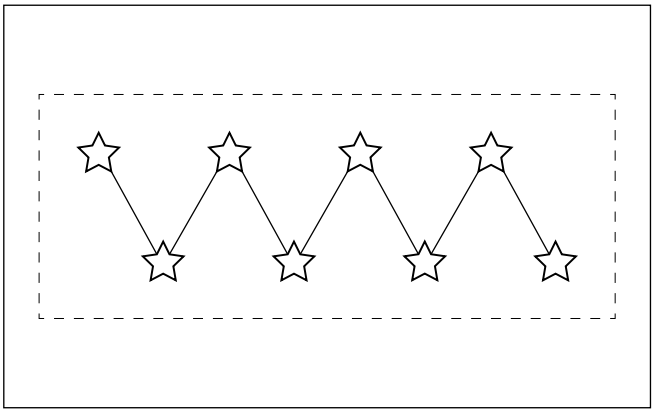
Results for any type of testing, including agronomic testing, depend on proper sample collection. To get accurate test results, collect a representative sample. The steps to collect soil samples for agronomic testing are outlined below.

Tools needed for sample collection include: a clean trowel, a shovel or spade, and a clean plastic bucket. Never use tools used to handle fertilizer or lime, unless you clean the tools with soap and water, as this influences the test results.

Step 1: Identify the area to be tested. Soil tests are usually inexpensive, so it may be useful to take separate samples. For example, if you want to plant in areas on your property with noticeable soil differences, such as sandy versus clayey soils, soils on a slope versus soils on level ground, vegetated versus bare areas, separate soils samples from each area should be obtained for testing. Sample according to present or intended use as different uses have differing nutrient requirements: for example, sample the areas designated as lawn and flower or vegetable beds individually. If in doubt where to sample and you have an extension office in your area, contact them for advice.

Soil should be sampled to a 6-inch depth and placed in a resealable plastic bag.

Step 2: From each area you want to test, take multiple samples and combine them to obtain a representative sample to submit to the laboratory. Obtaining samples



When taking a composite soil sample, use a zig-zag pattern of locations (stars) to get a representative sample within the test area (dotted line).

from locations arranged in a zigzag pattern provides a representative, composite sample. *Note: Do not sample wet soils If you have to take a wet sample, air-dry it before submitting for analyses. Do not use heat to dry the sample.*

Use a trowel or shovel/spade to collect a soil sample from the surface to a depth of 6 inches and put the individual samples in the plastic bucket. Take samples from approximately 10 different locations in the area you want to test. Combine all soils samples in the plastic bucket and mix well. This is your composite sample.

Remove all plant and other debris. Fill a resealable zipper storage bag with about 2 cups of mixed soil. Close bag tightly, label with your name and address, and bring/ship to your extension office or a commercial lab.

Soil Test Resources

Below is a listing of states and their associated soil testing services. Most of these links also provide information on other soil and garden related topics.

Alaska — University of Alaska Fairbanks cooperative extension: *https://www.uaf.edu/ces/ah/soils/* This website provides information on soil sampling and testing.

Alabama — Alabama Cooperative Extension System, soil testing services: *http://www.aces.edu/anr/soillab/*

Arizona — University of Arizona Cooperative Extension publication: *https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1111-2016_0.pdf.* The University of Arizona does not offer soil testing services. This link provides a list of laboratories performing soil, plant, feed or water testing.

Arkansas — University of Arkansas Soil Testing Lab, soil testing by the University of Arkansas Cooperative Extension Service: *www.uark.edu/depts/soiltest/NewSoilTest/index.htm*

California — University of California: Selected Plant and Soil Laboratories in Northern and Central California: *http://cesonoma.ucanr.edu/files/27431.pdf* and University of California, Orange County Master Gardeners: *http://mgorange.ucanr.edu/Soils-Fertilizers-Compost/?ds=547&uid=1*

Colorado — Colorado State University Soil Testing Lab: *www.soiltestinglab.colostate.edu/*

Connecticut —University of Connecticut Soil Testing Lab: *www.soiltest.uconn.edu/*

Delaware — University of Delaware Soil Testing Program: *ag.udel.edu/dstp/*

Florida — University of Florida Cooperative Extension Soil Testing Services: *soilslab.ifas.ufl.edu/ESTL%20Home.asp*

Georgia — University of Georgia Cooperative Extension Soil Testing Services: *aesl.ces.uga.edu/*

Hawaii — University of Hawaii at Manoa: *www.ctahr.hawaii.edu/ougc/soil.asp*

Idaho — University of Idaho soil testing: *http://www.uidaho.edu/cals/analytical-sciences-laboratory/services/soil-chemical-and-physical*

Illinois — Illinois soil testing, recommendations by University of Illinois Cooperative Extension: *urbanext.illinois.edu/soiltest/* The University of Illinois Extension does not offer soil testing, but it provides a list of soil testing companies, indicating the services that each offers.

Indiana — Purdue University Extension: *https://ag.purdue.edu/agry/extension/pages/soil_testing.aspx* Purdue University's Extension does not offer soil testing, but provides a list of recommended soil testing labs in Indiana as well as Ohio, Michigan, Kentucky, and Illinois.

Iowa — Iowa State University Extension Soil & Plant Analysis Lab: *www.extension.iastate.edu/Publications/ST11.pdf* This is Iowa State University's form for submitting a soil sample. It includes information about proper sampling procedures, testing fees, and shipping address.

Kansas — Kansas State University Agronomy Soil Testing Lab: *www.agronomy.k-state.edu/services/soiltesting/homeowner-services/soil-analysis/index.html*

Kentucky — University of Kentucky College of Agriculture Soil Testing Lab: *soils.rs.uky.edu/index.php*

Louisiana — Louisiana State University Soil Testing Lab: *www.lsuagcenter.com/en/our_offices/departments/SPESS/ServiceLabs/soil_testing_lab/*

Maine — University of Maine Soil Testing Lab: *anlab.umesci.maine.edu/* Each county's cooperative extension office's home page has additional details about hours, forms, etc.

Maryland — University of Maryland Extension: *https://extension.umd.edu/hgic/soils/soil-testing* The University of Maryland no longer has a soil testing lab. This website provides a list of regional soil testing labs in Maryland, information on how to sample soils, and garden tips.

Massachusetts — University of Massachusetts Soil and Plant Nutrient Testing Laboratory: *soiltest.umass.edu/overview*

Michigan — Michigan State University, Department of Crop and Soil Sciences: *http://spnl.msu.edu*

Minnesota — University of Minnesota Soil Testing Lab: *soiltest.cfans.umn.edu/*

Mississippi — Mississippi State University Soil Testing Lab: *http://extension.msstate.edu/lawn-and-garden/soil-testing*

Missouri — University of Missouri Extension Soil Testing Lab: *soilplantlab.missouri.edu/soil/*

Montana — Montana State University: *http://store.msuextension.org/publications/yardandgarden/mt200705ag.pdf* This document provides information on soil testing, data interpretation, fertilization guidelines and a list of laboratories in the appendix.

Nebraska — University of Nebraska: *lancaster.unl.edu/hort/articles/2011/SoilTest.shtml* The University of Nebraska Extension does not offer soil testing but on their website provides URLs for labs that provide these services.

Nevada — University of Nevada Cooperative Extension: *www.unce.unr.edu/publications/files/ag/2009/fs0938.pdf* The University of Nevada Cooperative Extension does not provide soil testing. However, this is a good link to their brochure about soil testing and a listing of nearby soil testing labs.

New Jersey — Rutgers New Jersey University Experiment Station: *njaes.rutgers.edu/soiltestinglab/*

New Mexico — New Mexico State University: *http://aces.nmsu.edu/aes/soil-testing.html* The New Mexico State University Soil Testing Laboratory closed June 29, 2012, but its website lists laboratories that perform soil testing in New Mexico and the region.

North Carolina — North Carolina Department of Agriculture and Consumer Services: *www.ncagr.gov/agronomi/uyrst.htm*

New York — Cornell University: *http://cnal.cals.cornell.edu/soil-testing/*

North Dakota — North Dakota State University soil testing services: *www.ndsu.edu/soils/services/soil_testing_lab/*

Ohio — Ohio State University does not provide soil testing, but this website has information on soil sampling and testing as well as a list of soil testing labs: *https://ohioline.osu.edu/factsheet/hyg-1132*

Oklahoma — Oklahoma State University, Soil, Water and Forage Analytical Laboratory: *www.soiltesting.okstate.edu/*

Oregon — Oregon State University: *smallfarms.oregonstate.edu/soil-testing*. Oregon State University does not provide soil testing. This website contains a listing of laboratories that perform this service.

Pennsylvania — Penn State Cooperative Extension: *www.aasl.psu.edu/SSFT.HTM*

Rhode Island — The University of Rhode Island Master Gardener Program offers free soil testing (pH and texture): *http://web.uri.edu/mastergardener/gardening-and-environmental-hotline/*

South Carolina — Clemson University, Agricultural Service Laboratory: *https://www.clemson.edu/public/regulatory/ag-srvc-lab/soil-testing/index.html*

Tennessee — University of Tennessee Soil, Plant and Pest Center: *soilplantandpest.utk.edu/soil/index.htm*

Texas — Texas A&M Cooperative Extension: *soiltesting.tamu.edu/webpages/forms.html*

Utah — Utah State University Cooperative Extension: *http://www.usual.usu.edu/*

Vermont — University of Vermont, Agricultural and Environmental Testing Laboratory: *pss.uvm.edu/ag_testing/?Page=soils.html*

Virginia — Virginia Tech Soil Testing Laboratory: *https://www.soiltest.vt.edu/*

Washington — Washington State University: *https://puyallup.wsu.edu/soils/soils/* This website provides information on how to sample soils and a listing of laboratories performing soil tests in the Pacific Northwest and Oregon.

West Virginia — West Virginia University Soil Testing Lab: *https://soiltesting.wvu.edu/*

Wisconsin — University of Wisconsin Soil Testing Laboratories: *https://uwlab.soils.wisc.edu/soil-samples/*

Wyoming — University of Wyoming Soil Testing: *www.uwyo.edu/uwexpstn/soil_test.html* The University of Wyoming Soil Testing Laboratory no longer accepts soils samples from the public. There is an agreement with Colorado State University to accept soil samples from Wyoming residents. Go to *www.soiltestinglab.colostate.edu/* for submission specifics.

Sabine E. Martin, Ph.D.
Adjunct Professor
Hydrogeology, Brownfields, and Redevelopment

Ganga M. Hettiarachchi, Ph.D.
Professor
Soil and Environmental Chemistry

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