Managing Landscapes for Healthy Soils and Water

Mississippi Smart Landscapes

Mississippi State University Extension Service

Smart Landscapes powerpoint topics:

1. Landscape Design and Energy Savings
2. Biodiversity, Pest Management and Wildlife
3. Managing Landscapes for Healthy Soils and Water

Presentation outline:

1. Healthy Soils
    - Assessing soils
    - How to determine your soil type and drainage
    - Practices to improve soils
    - Controlling erosion
2. Healthy Water
    - Capturing water
    - Directing water drainage
    - Slow down water to infiltrate into soil

PART ONE: SOILS

The foundation of all gardens and landscapes is soil. A large part of successful gardening is understanding how to best select plants and work with your existing soil types.

Soil types can vary widely across the state of Mississippi, in your county, and even on your property

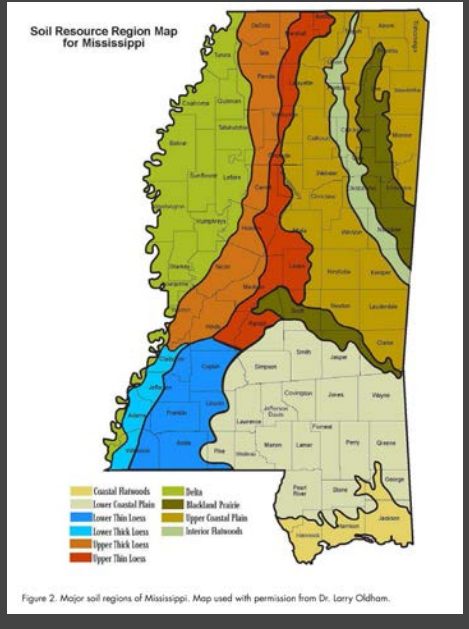
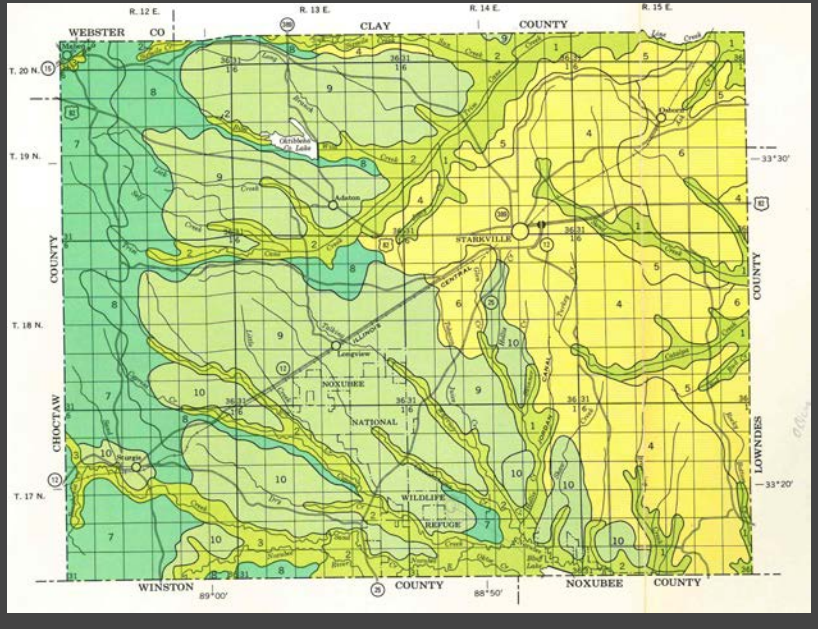
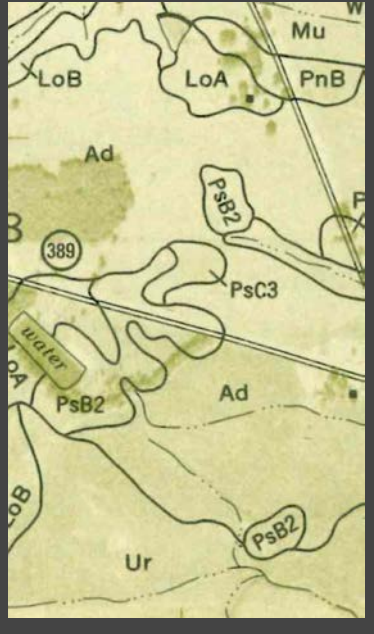


Figure 2. Major soil regions of Mississippi. Map used with permission from Dr. Larry Oldham.

State soil map



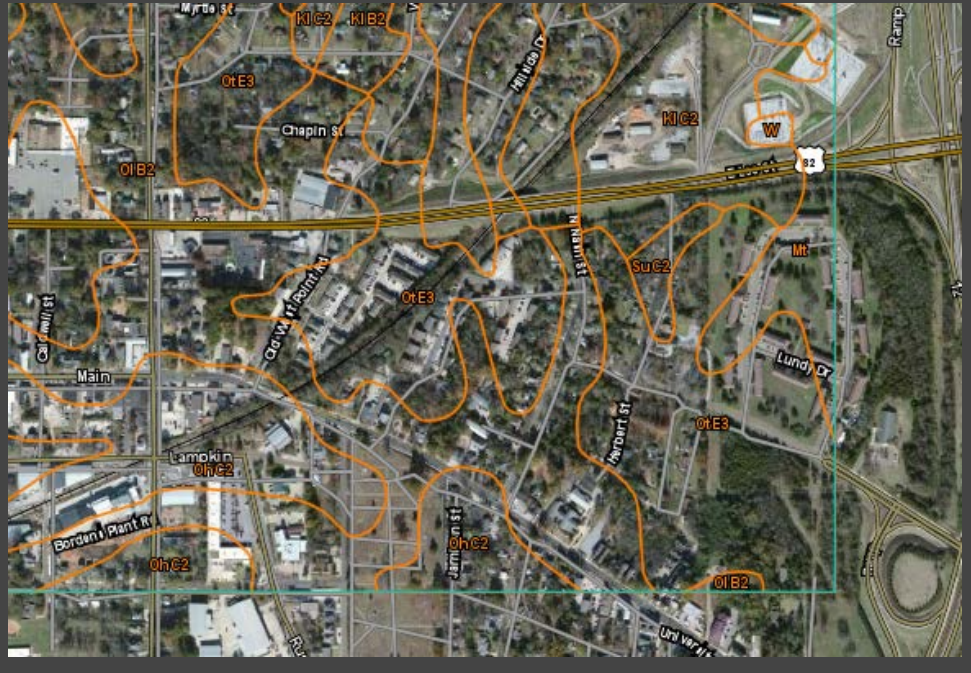
County soil map



Local soil map

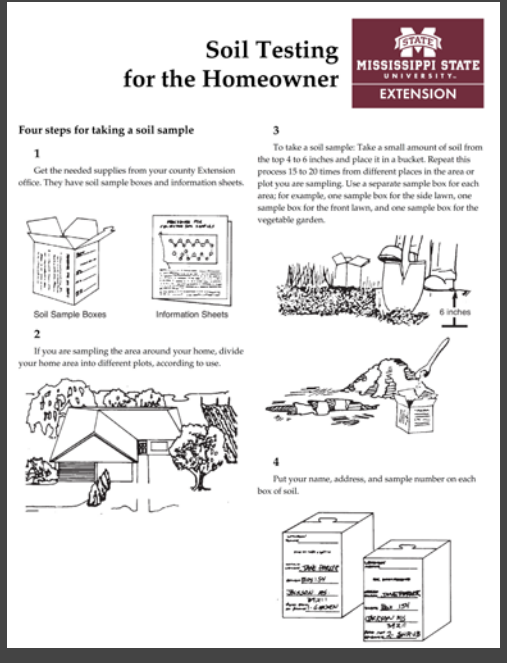
USDA Web Soil Survey https://websoilsurvey.sc.egov.usda.gov/

General soils data for all Mississippi lands are available online



You can find out more about your specific soils from the

Mississippi State University Extension Service Soil Testing Laboratory



Soil Testing for the Homeowner

MISSISSIPPI STATE UNIVERSITY EXTENSION

Four steps for taking a soil sample

1

Get the needed supplies from your county Extension office. They have soil sample boxes and information sheets.

Soil Sample Boxes

Information Sheets

2

If you are sampling the area around your home, divide your home area into different plots, according to use.

3

To take a soil sample: Take a small amount of soil from the top 4 to 6 inches and place it in a bucket. Repeat this process 15 to 20 times from different places in the area or plot you are sampling. Use a separate sample box for each area; for example, one sample box for the side lawn, one sample box for the front lawn, and one sample box for the vegetable garden.

6 inches

4

Put your name, address, and sample number on each box of soil.

The Soil Testing Laboratory analyzes soil and plant samples submitted by homeowners for fertility recommendations and problem solving.

Telephone: 662-325-3313

Shipping Address:
MSU-ES Soil Testing Laboratory
190 Bost North
Mississippi State, MS 39762

Publication Number: IS1294

THESE ARE THE IMPORTANT SOIL LAYERS FOR LANDSCAPES:

Organic layer

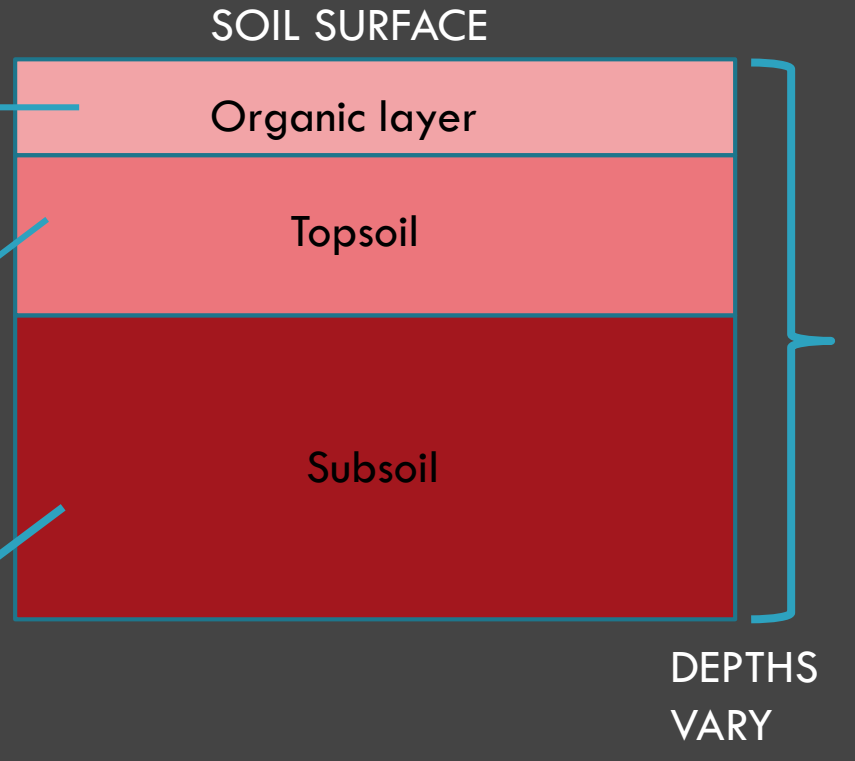
The topmost layer of soil usually consists of leaves and organic materials which adds nutrients to the soil through decomposition.

Topsoil

The layer under the organic layer is called topsoil which is a combination of mineral soil and organic matter. Contains most roots.

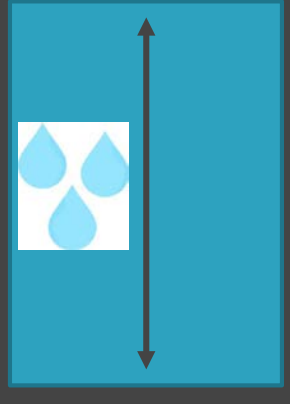
Subsoil

It is composed of a mixture of sand, silt or clay with low amounts of organic matter.



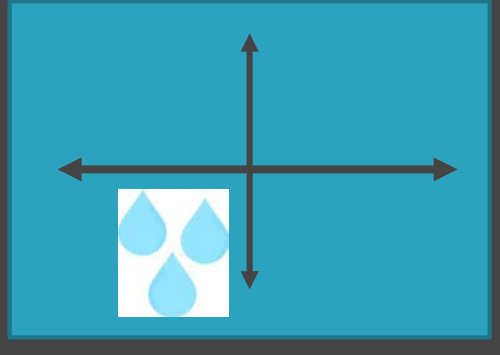
The amounts of sand, silt and clay in your soils determine how well your soil drains.

Sandy soils



Water drains deeply
Well-drained soils

Silty soils



Drains moderately wide and deep
Well-drained but retains some water

Clay soils

Drains shallow and wide
Poorly-drained soils

You can see how much sand, silt or clay that you have in your soil with a simple soil sediment test:

1. Place a 1/2 cup of soil in the jar. Add 1.5 cups of water.
2. Cap the jar and shake for 5 minutes. Allow to settle for 24 hours.
3. Record and label the total depth of soil.
4. Shake the jar for another 5 minutes. Allow it to stand 30 seconds. Measure the depth of the settled soil and record as SAND DEPTH.
5. Do not shake the jar again. Let it stand for another 30 minutes. Measure the depth by subtracting the sand depth to determine the SILT DEPTH. Record and label the data.
6. After three hours, the remaining unsettled particles are clay. Calculate the CLAY DEPTH by subtracting the silt and sand depth from total depth.

How to Determine Soil Drainage in Your Garden: Perc test

1. Dig a hole in your soil that is 12” deep and wide.

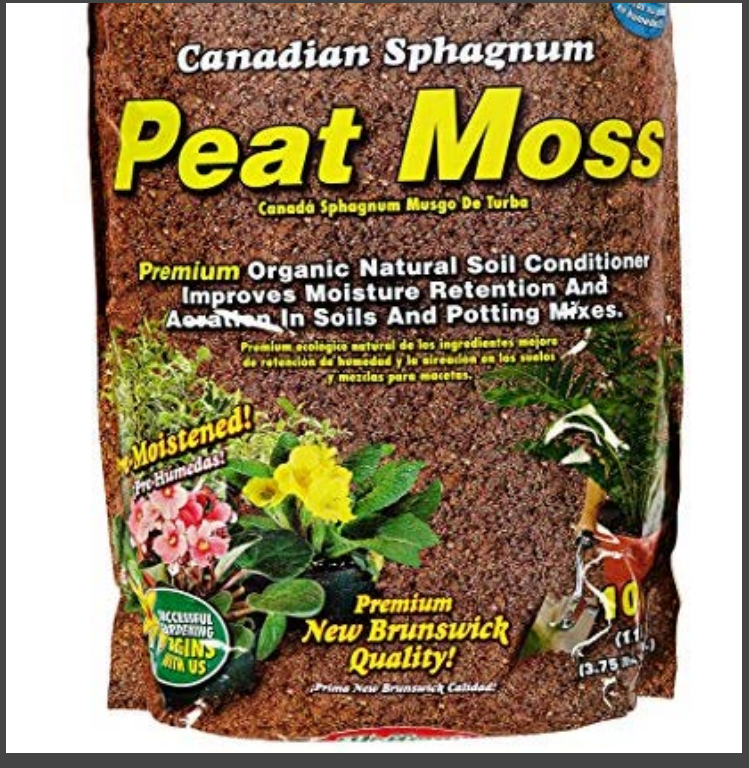
2. Fill to the top with water and let sit overnight.

3. Fill again to the top with water and wait an hour. If the water level drops at least 2 inches in 1 hour, the drainage is considered normal. If the level drops more than 5 inches in 1 hour, it is considered too much. If the level doesn't seem to drop at all, the soil drainage is poor.

For sandy well-drained soils

If a sandy soil dries too quickly between watering, you can add peat moss into planting holes to help retain moisture.

Adding organic mulches on top of planting beds will also help soils from drying due to evaporation.



Annual applications of organic mulches (any kind) is the best practice you can use to build or maintain soils

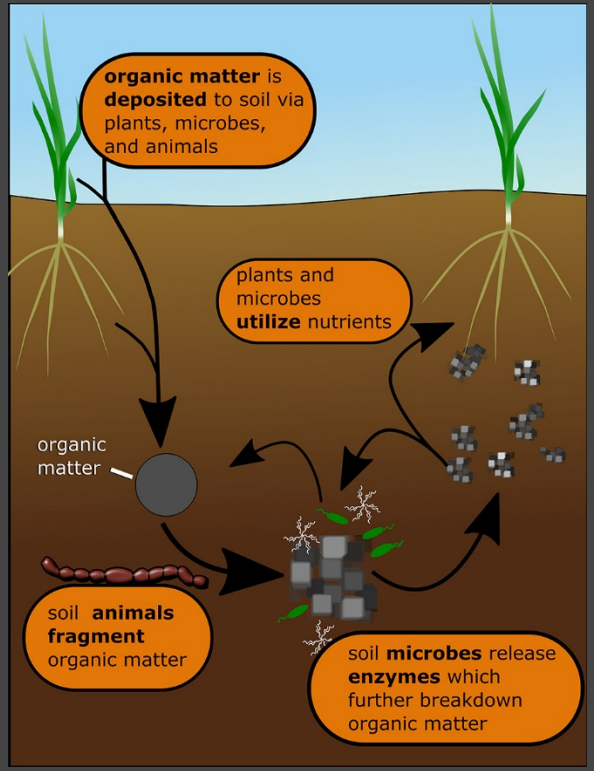
Raking leaves into garden bed areas or under trees helps build organic matter

Adding organic matter = Healthy worm populations

Earthworms help soil by opening air and water pathways and decompose organic matter.

Healthy worm populations = healthy soil microbes

Organic matter broken down by earthworms and other soil fauna are then broken into nutrients by soil microbes which are then used by plants



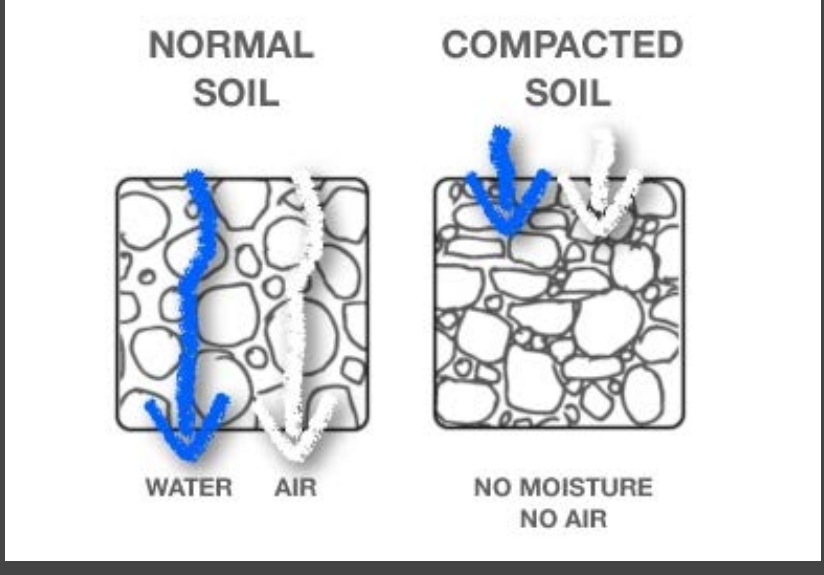
If soils don't drain well:

Clay soil types are common in Mississippi and can frustrate gardeners that grow plants which require better drainage.

Soils that do not drain well can also occur from three other conditions :

1. Soil compaction.

Compacted soils occur from equipment or traffic that compress air spaces in soil layers.



Solutions for compacted soils include:

1. Topdressing garden beds with compost or mulch. Earthworms and other soil insects do a great job of loosening soil over time.
2. Light cultivation when soil is dry. Compacted surficial soils can be loosened with hand tools such as hoes, or mechanical equipment such as disking or chisel plowing. Be sure to avoid impacting tree roots when possible.

Soils that do not drain well can also occur from:

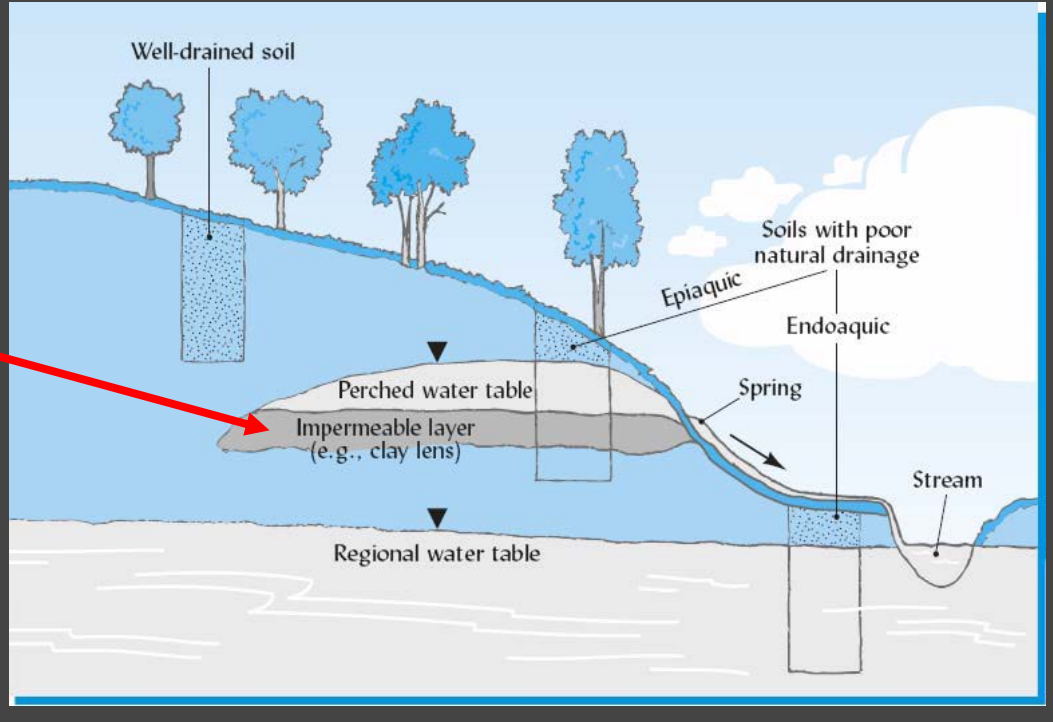
2. Topsoil removal or fill. It is common around new houses for the original topsoil to be removed or filled– leaving poorly drained soils.

Soils may be need to be restored if previously removed.

- Adding topsoil to restore soil layer. Be sure soil drains away from structures, and do not place soil greater than 2” depth around existing tree roots.
- Adding compost or mulch layers will help build topsoil over time.

3. Perched water table

Some soils have a clay layer below that keeps groundwater closer to the surface



Solving perched water table problems may require consulting with a soils or drainage expert.

If you are having problems with property flooding, wet basements, septic field drainage, or severe house settling– you will need to contact a professional that has the equipment and expertise to assess the problem.

How can you best garden in clay soils?

* 1. The easiest and best solution is to buy plants that perform well in clay soils. Do not use plants that require good drainage, avoid plants such as:

- Azaleas
- Dogwoods
- Hybrid tea roses
- Loropetalum
- Japanese maple

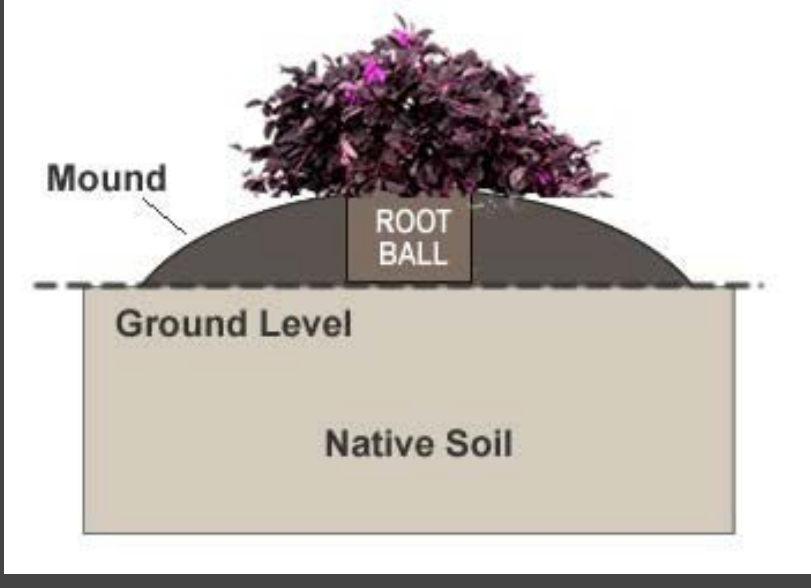
There are many plants suited for wet or clay soils and include:

Perennials:	Shrubs:	Trees:
Stokes aster	Dwarf palmetto	Bald cypress
Louisiana iris	Buttonbush	Red maple
Native hibiscus	Sweetspire	Mayhaw
Daylily	Summersweet	Bay magnolia
St Johns wort	Deciduous holly	Cow oak

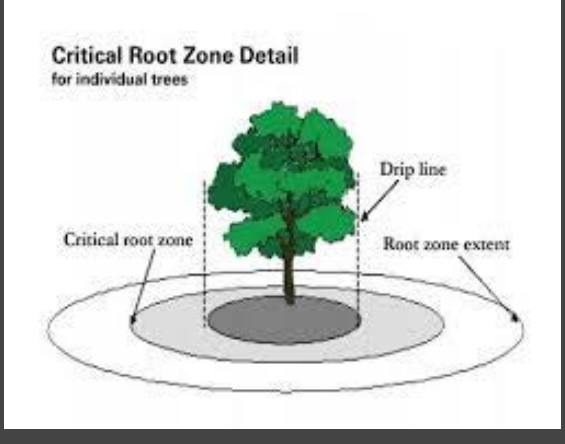
* See a full list of plants at http://extension.msstate.edu/rain-gardens

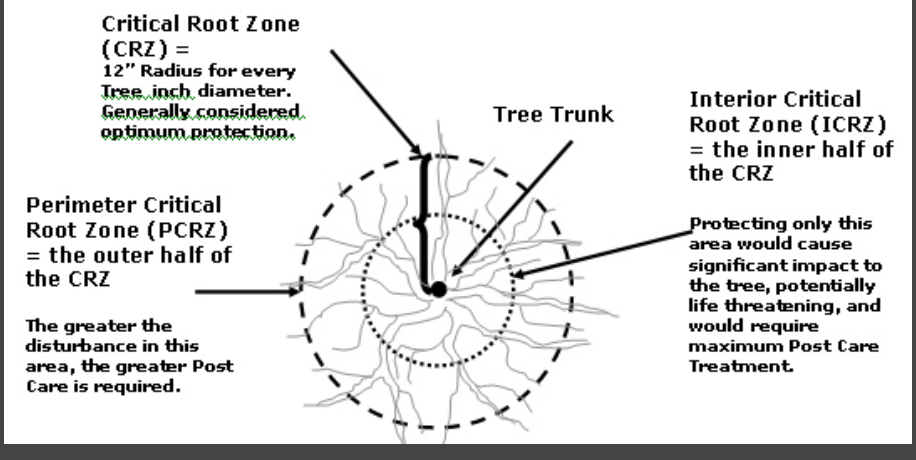
Another technique that you can use to grow dry-loving plants in clay soils is to create raised beds

Raised beds work well for shrubs and perennials but are less successful for larger trees which require a deeper root zone. For smaller plants add 6”-8” of soil to the existing surface.



When creating raised beds around existing trees, avoid covering more than 15% of the critical root zone with soil to avoid potential tree damage





WORKING WITH SLOPES

Steep slopes are often a problem for homeowners. It's best to avoid maintaining lawn areas on slopes that can be hazardous when mowing.

Avoid the mower on a rope

WORKING WITH SLOPES

Soil erosion on slopes can cause severe problems and even water pollution if allowed to wash into local streams or waterways.

WORKING WITH SLOPES

Planting trees or shrubs on steep slope areas minimizes maintenance and prevents soil erosion as large roots secure soil

WORKING WITH SLOPES- TERRACES

This terraced garden was built in a steep area that was difficult to grow grass. Terraces slow runoff and allow more water to infiltrate the soil where it can be used by the plants.

WORKING WITH SLOPES-- GABION BASKETS

While it can be expensive using wood or concrete to create terraces, there are lower cost wall options such as using rock-filled wire baskets

WORKING WITH SLOPES-- NETTING

High-density polyethylene nets can also be used at moderate cost and then planted in shrubs or wildflowers to help stabilize slopes.

PART TWO: WATER

Water is the lifeblood of the garden

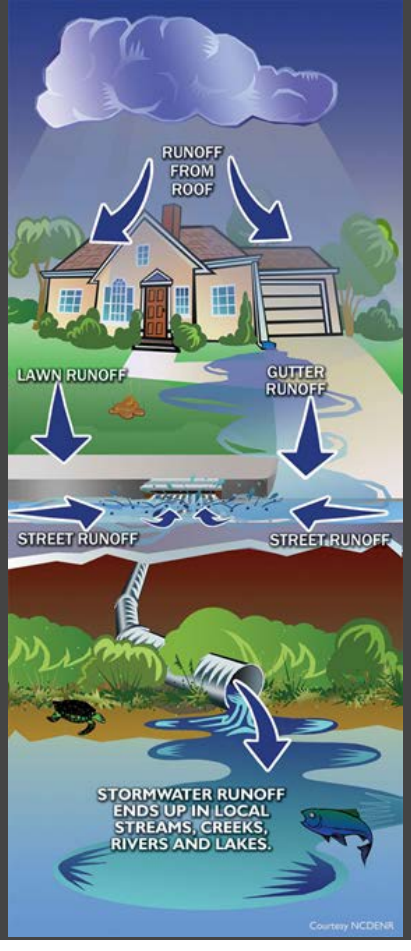
Water is also the lifeblood of your community

How you work with water in your own home landscape does impact your community watershed

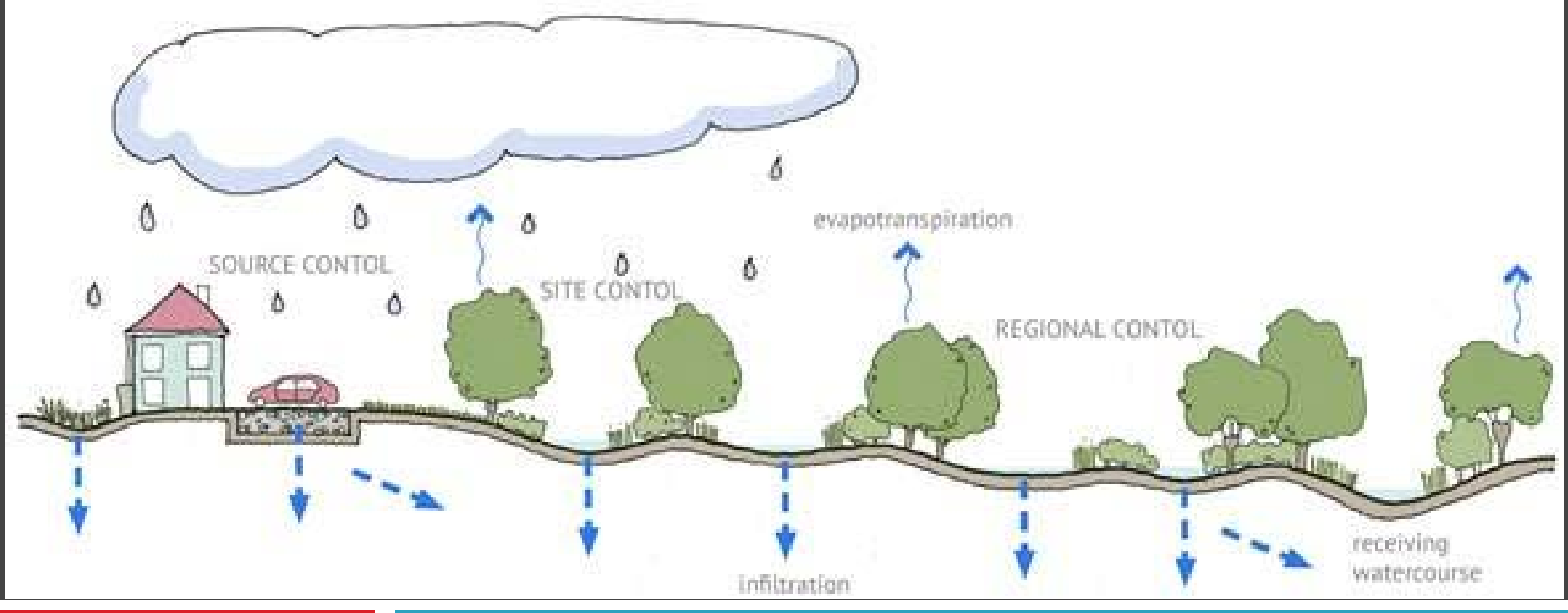
Small amounts of pollution from roads and driveways can add up to significant amounts of water pollution in neighborhoods and cities

Surface Water Division of the MDEQ Office of Pollution Control states that:

"Nonpoint source pollution–or polluted runoff– is the leading cause of water quality problems in Mississippi, especially in residential areas."



FORTUNATELY, THERE ARE SMALL STEPS THAT YOU CAN TAKE ON YOUR OWN PROPERTY TO HELP IMPROVE LOCAL WATER QUALITY



The 3 main principles for working with water on your property are:

1. Capture and reuse water
2. Provide a course for water to flow
3. Slow down and infiltrate

1. Capturing to reuse water is a Mississippi tradition

Cistern near Natchez Trace, Mississippi

Cistern at Beauvoir, Biloxi, Mississippi

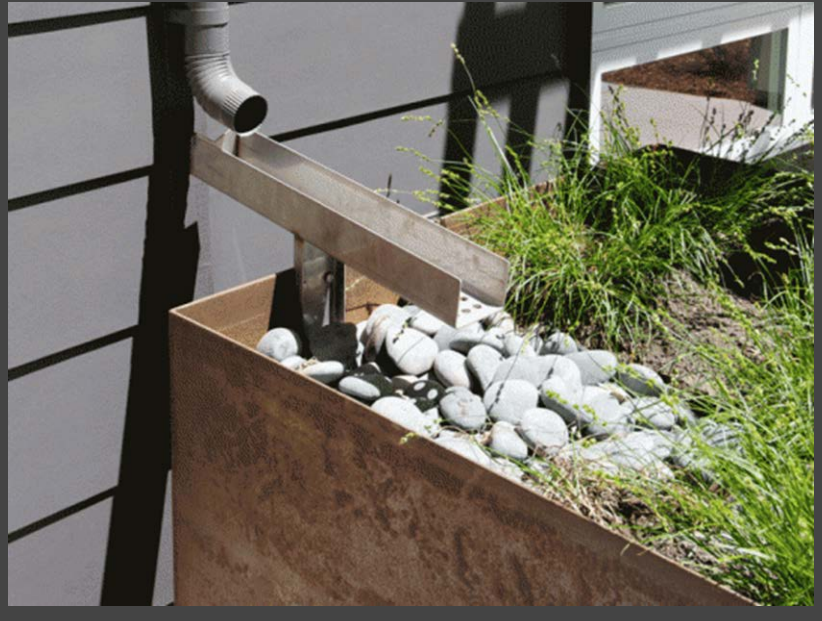
Rain barrels are smaller versions of cisterns to capture water

- Easy to make and install
- Kits are available at many hardware stores

BENEFITS OF RAIN BARRELS

- Encourages water conservation.
- Re-uses rain water -- saving water usage and money.
- Reduces runoff.
- Captures runoff before it has a chance to pick up pollutants that end up in nearby waterways.
- Easy to install.

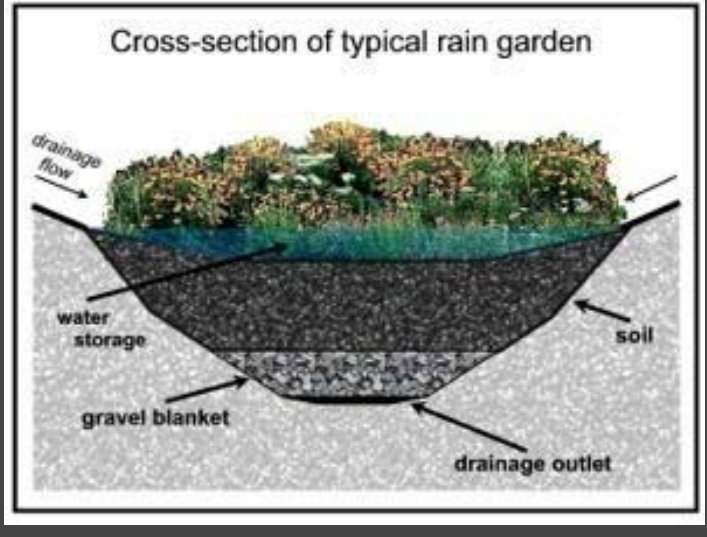
CAPTURE – PLANTING BEDS



Channels

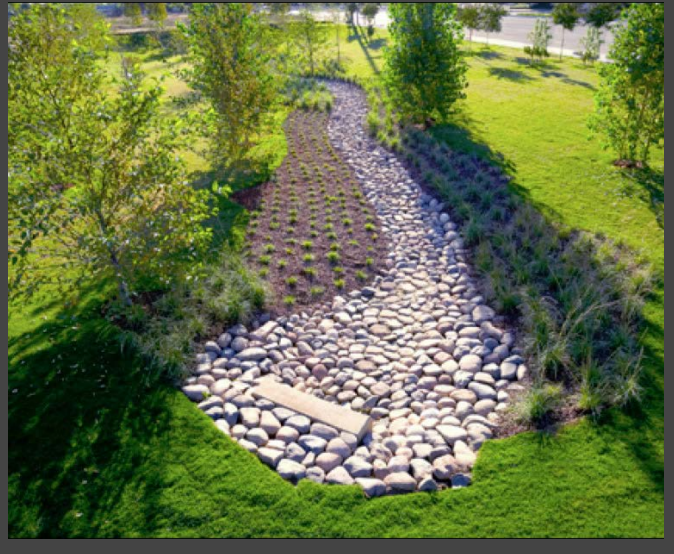
Curb cuts

RAIN GARDENS



BENEFITS OF RAINGARDENS

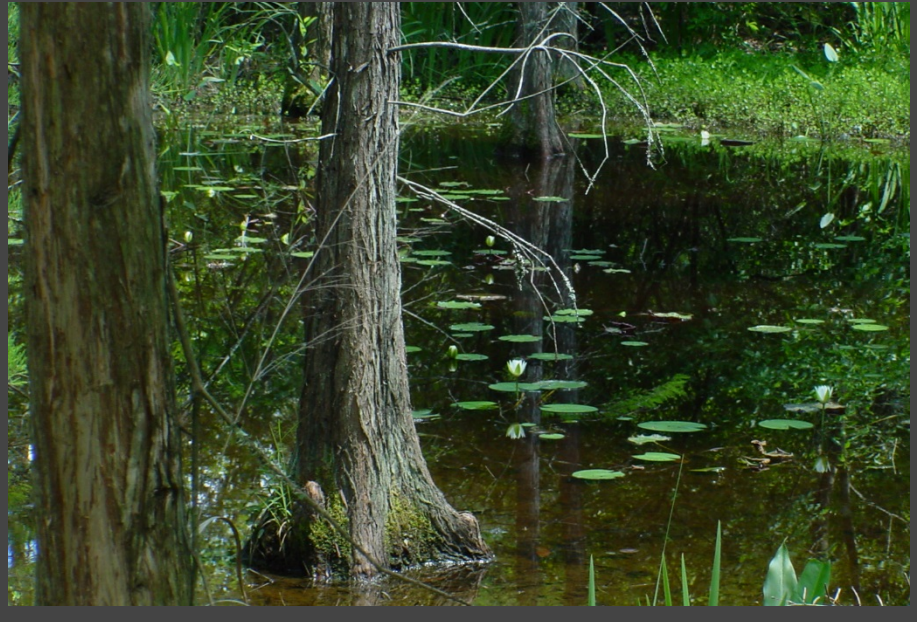
- Filter runoff pollution
- Recharge local groundwater
- Conserve water
- Improve water quality
- Remove standing water
- Create habitat for birds & butterflies



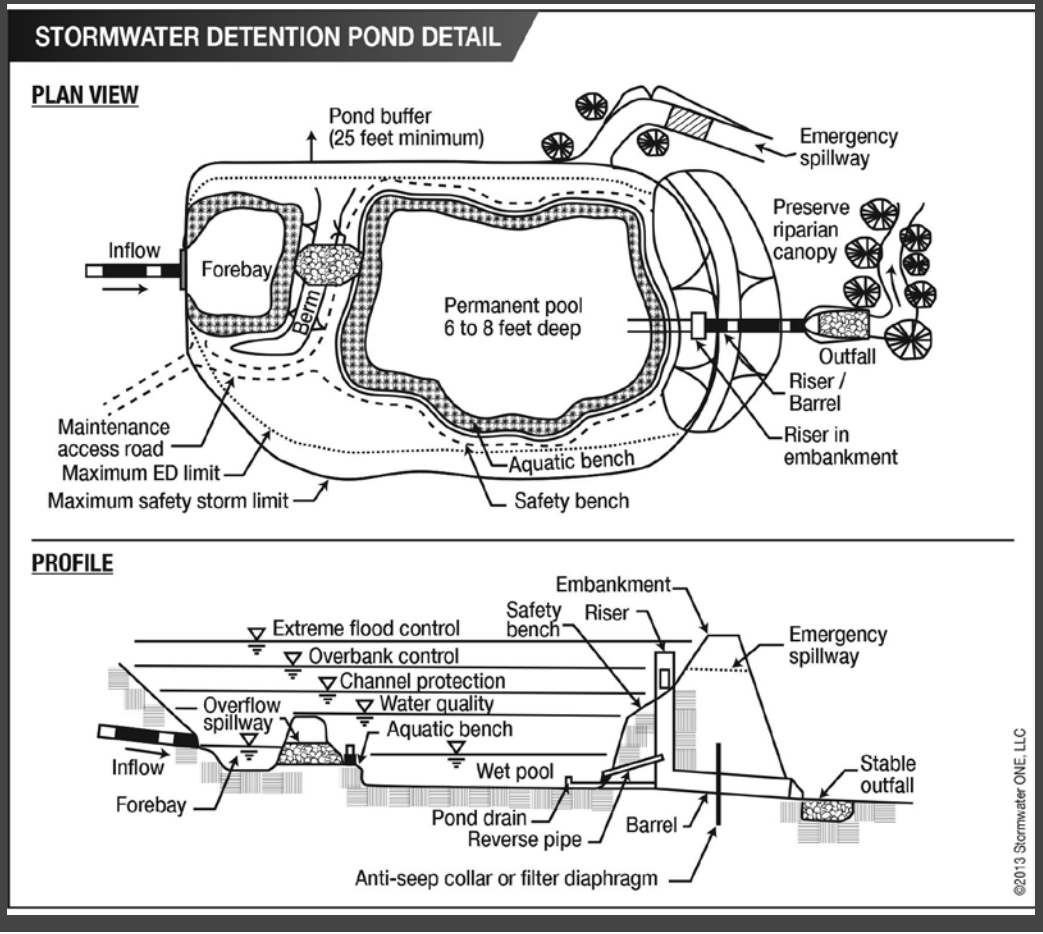
PONDS AND POOLS ARE ANOTHER WAY TO STORE SITE WATER

BENEFITS OF PONDS AND POOLS

- Settles soil sediments
- Cleans water with plants
- Prevents flooding
- Creates wildlife habitat
- Looks great!



Ponds can be designed to prevent flooding from heavy rainfalls by an engineer or other professional



2. Provide a course for water to flow

DRY SWALES

Rock or other permanent material is added to prevent soil erosion

Weirs slow water down to let it absorb into the soil

A weir

Dry swale

French drains are pipes that you can purchase in hardware stores to drain surface water

Perforated pipes are laid in a gravel trench and filter cloths prevent siltation

3. Slow water down and infiltrate

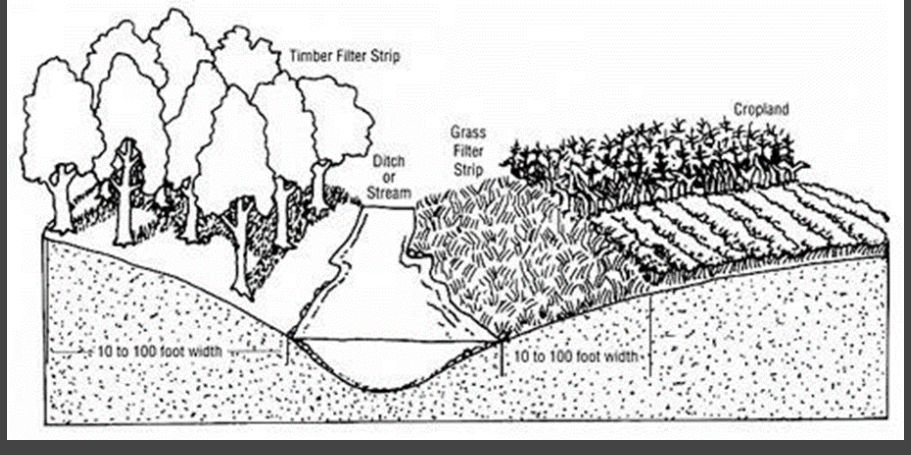
3. Slow down and infiltrate

Direct roof drains onto a grassed area instead of pavement. Turf allows water to infiltrate into the ground for cleaning and reducing flooding

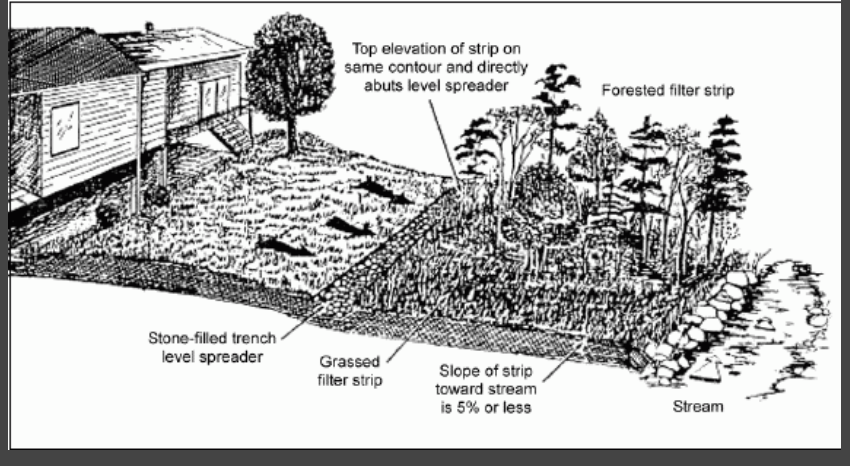
From: https://www.mdeq.ms.gov/water/surface-water/nonpoint-source-pollution-program/steps-to-help-control-nps-pollution/

Use pavements such as gravel, stone, or pavers that allow rainfall to filter down to the soil rather than traditional concrete and asphalt which run to drains.

Vegetative buffers are unmown grass or shrub areas along waterways to slow water on slopes to catch sediments



In addition to catching sediments, if designed wide enough vegetative filters can also filter some water pollutants



How you can best work with water on your site depends on your property size and context

Using good practices for your property soils and water are two important keys to creating a Smart Landscape

For more Smart Landscapes info and media, be sure to visit:

1. Mississippi Smart Landscapes website available at http://extension.msstate.edu/smartlandscapes

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2. Our Facebook page at https://www.facebook.com/smartlandscapesmsu/

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