



Native
Plant
Society
of Texas

NATIVE LANDSCAPE CERTIFICATION PROGRAM Level 3

Installation and Maintenance



Level 3: Installing and Maintaining Native Landscapes – Explores the differences in installation and maintenance between native plant landscapes and traditional landscapes. This course offers (1) professional contractors the opportunity to learn the nuances of working with native plants and (2) individuals the opportunity to learn how to care for their native plant landscape. CEU credit is important for this course.

Class Topic explores the look of native landscapes and issues surrounding planting a native landscape. Students learn where to find and purchase native plants, the placement of plants, and soil improvements and mulch that may be needed. Maintaining a native landscape can be profitable for those who know what native plants should look like, what and how to prune, what's a weed, and what tools to use. Native plant irrigation requirements, tree trimming, pests, and disease issues are covered in this course. Managing for wildlife and larger scale landscape management is addressed.

Plant Knowledge covers the introduction and identification of 45 native and 5 invasive plants different from Levels 1 and 2. Plant selection for this level will focus on plants found in urban landscapes. Native trees, ornamental trees, shrubs, flowering plants, grasses/sedges, groundcovers, and vines are covered. Also includes an introduction and identification of five invasive plants not covered in Levels 1 and 2.

Class includes an outdoor plant hike and an optional test.

Beginners: Will gain information and knowledge on how to maintain their own landscape or how to hire someone who knows how to maintain a native landscape.

Advanced: Course is designed to train landscape contractors in best practices to install and maintain native landscapes while addressing profit considerations.



Slide Objective: To familiarize all the students with the look of a native plant landscape.

Some contrasts and issues of the look of a native landscape.

- In some areas, clients have an obsession with lush and evergreen landscapes, the regional native plants may have very few evergreen opportunities. Clients, professionals, and neighbors will need to develop an appreciation of seasonal change with the use of native plants.
- With the increased use of perennials in a native landscape, there is typically more flowering color.
- People who are accustomed to a manicured and often sheared hedge landscape may find a native landscape messy looking, but natives landscapes can be either formal or wild-scaped- as long as the plants are native.

Photo: Left – Entry to townhome subdivision, McKinney, Texas

Right - College campus at Texas Woman's University, Denton

Ecoregion Specific Notes:

(Replace with 1 or 2 photos of a landscape that has planted natives from your area)

MMO

Vital Functions of Native Landscapes

Support Wildlife & biodiversity
Conserve Water
Improve Water & Air Quality
Create a Sense of Place

Methods used should not impair ecosystem function.



Native Plant Society of Texas



Lee Marlowe
Beetles on Texas Thistle



Mike McGee
Ruby Crowned Kinglet



Lady Bird Johnson Wildflower Center
Gulf Fritillary Caterpillar



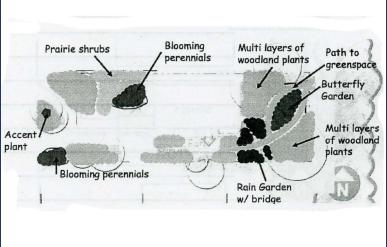
Mike McGee
Gulf Fritillary Butterfly

Slide Objective: To review the basic functions of a native plant landscape and that our landscape and maintenance techniques MUST NOT remove the very basic foundations of the habitat.

- Review: We examined the basic functions of a native plant landscape in Level 1.
- Wildlife habitat & species biodiversity
- Water Conservation
- Improve Water and Air Quality
- Create a Sense of Place
- Human needs are not the only thing to consider when installing or maintaining a landscape.
- Landscape and Maintenance techniques should not inhibit the function of the habitat. To that end, use of chemical pesticides and herbicides are not recommended except under limited circumstances where other means are not effective, and the benefits significantly outweigh the risks. High nitrogen fertilizers should not be used.

MMO

Planning a Native Plant Landscape



The diagram illustrates a cross-section of a native plant landscape. It shows multiple layers of vegetation, including 'Prairie shrubs', 'Blooming perennials', 'Multi layers of woodland plants', and a 'Rain Garden w/ bridge'. A 'Path to greenspace' leads through the landscape. An 'Accent plant' is highlighted. A compass rose indicates North (N).

Consider Habitat Conditions

Preserve Existing Native Plants

Reference Plant List Spreadsheet

Plants Suited to the Site Will Do Best

 Native Plant Society of Texas

Slide Objective: Review the Level 2 basics for planting design and plant preservation.

*Plantings that are best suited for your site have the greatest chance of success.

Consider:

- Environmental Conditions
 - Light, moisture, hydrology, soil conditions, micro-climates, mature size & shape of the plant
Native plants evolved here and have the best chance to thrive
Group plants that require comparable conditions together
- Preserving existing native plants from the site
 - Preserving and protecting existing plants – It takes years to grow mature trees
 - Transplanting existing plants
 - Regenerative gardens and landscapes are the landscapes that allow natives to grow. A really good knowledge of invasives is necessary to do this type of landscape

MMO

Planning a Native Plant Landscape

Regulations and Other Requirements

- Laws & codes
- Aesthetics
- Economic considerations
- Function



Sandra Fountain



Mike McGee

Native Plant Society of Texas

Slide Objective: Review the Level 2 basics for planting design and plant preservation.

- Regulations and other requirements
 - Laws, codes and regulations for urban landscapes, developments and unincorporated county land, aesthetics, economic considerations must be considered in the native landscape design.
 - The owner's desired views of plants and wildlife and their aesthetics must be considered in the basic layout of the landscape.
 - Budget for the initial landscaping and plans for future additions need to be considered and incorporated into the design.
 - Last and perhaps most importantly function of the landscape must be included in the design. Functions to be considered include drainage, shade and wind breaks to reduce energy costs, access ways for people and vehicles, areas for play, recreation and outdoor seating, maintenance access to garden areas, perhaps water storage including rain gardens, screens from undesirable views.
 - All while preserving existing native plants from the site – This is why planning before installation is so important

MMO

Native Landscape Installation

Native Plant & Seed Sourcing

Soils and Preparing to Plant

Planting and Plant Placement

Planting and Mulching



Sandra Fountain

Native Plant Society of Texas

Slide Objective: Introduce the next section of installing a native plant landscape and each topic to be discussed.

MMO

Native Plant Sources

Research early in the process

Nursery Plants

Regionally grown
Contract growers

Other Sources

Native plant sales
NPSOT chapter sales
Other specialty sales
Plant swaps

Botanical names are more accurate than common names to identify plants



Janet Rademacher

Native Plant Society of Texas

Slide Objective: Discuss where to find and purchase Native Plants and the possible issues that may be involved.

Knowing where you are getting the plants is an early step in the process of installing a native plant landscape – even though purchasing the plants may come a little later.

Purchasing plants from a nursery is the most common method of acquiring plants.

- It's best to buy natives from a regional grower. Sometimes plants are available from growers that may be out of state; Florida has growers that typically sell many of our native Texas plants. The closer a grower is to your region, the better chance there is that that native is of local plant variety.
- Larger quantities of plants can sometimes be acquired through contract growing. The grower takes an order and several months later delivers the plants.
- There are nurseries that specialize in providing native plants and are often the best supplier. Experience will help find these resources. Your local NPSOT chapter can be a great resource for this information.
- Planning will also include plant size. This will also affect scheduling and price.

Other issues:

- Locally grown plants are preferred. Locally grown plants have adapted to local conditions and will do better than the same species from a distant source.
- Contractors may find that they need to get plants from more than one supplier and will need to account for this in their installation proposals, for both scheduling and price.

Other resources: NPSOT native plant sales, Nature Center plant sales, a local NPSOT chapter member. Check quality by making sure there is a good root system. Quantities and selections may be limited.

MM1

Plant Source: Transplants

New Seedling Sprouts

Divide Plants

Rescued Plants & Saplings



Mr. Texas Bluebonnet: The Carroll Abbott Story, by Ernest Tremayne, December 7, 2008



Slide Objective: To discuss transplants as a source for native plants.

(Transplant techniques will be discussed later in the presentation.)

Carroll Abbott, known as the father of the Native Plant Society of Texas, started a native landscaping business and widely used native transplants because native plants were not available in nurseries.

- Survival rates for transplants are less than planting pot grown or ‘well-healed’ transplants.
- Transplant plants that have grown too big for the space so that continual cutting and pruning will not be required.
- Large, healthy blooming plants can be divided in early Spring into several, smaller plants. This will create additional plants and stimulate growth. Plant division should be done during cool, cloudy periods to reduce transpiration and transplant shock.
- New seedlings can be the source of plants for other areas of your landscape or potted up for other uses.
- Transplant because of transitioning conditions. e.g. around a newly planted tree, conditions were originally sunny, but will be shade conditions after a few years.
- Plants acquired from ‘rescue’ situations. e.g. property soon to be bulldozed for development. Some chapters (eg, Austin) arrange for rescue of native plants and advertise opportunities to rescue to members and the public.

MMO

Plant Source: Seeds

- Cost Effective: Small and Large Areas**
- Seed-soil Contact**
- Timing**
- Establishment**



Slide Objective: Seeding, what are the considerations?

(Seeding techniques will be discussed later in the presentation)

Cost – Seed can be an inexpensive way to plant.

Where can it be used? – Small OR large areas. Effective when planting prairies, wildflowers, some groundcovers and riverbank planting.

Good seed to soil contact is critical – this may require some site preparation depending on the site conditions. Site preparation needs may include: cutting existing foliage, removal of invasives or other existing plants, harrowing, raking, or rolling after seed is dispersed. Minimum soil disturbance is usually a good rule.

Timing – Consider when to plant, but also what your expectations are for growth.

- When to plant - Plant at a time when nature would plant that seed. If a plant seeds out during the fall & winter – that is the best time to plant that seed. If a plant forms its seed in spring & summer (spring grasses) then spring is the best time to plant that seed.
- Growth expectations – Under good conditions, seed growth can be quick. But if there are deadlines for a hardy stand, whether they be erosion or the George Bush Library opening, deadlines do need to be planned with room for a second or even third seeding.
- Some seeds need cold stratification, so require a season of cold before germination

Successful establishment -- Seeding takes time and water availability to ensure seed success.

Wildlife may eat seed before natural rains provide moisture to get germination. Supplemental irrigation may be needed to get established. It may take 2 or 3 years to establish a garden, meadow or prairie from seed.

Additional resources

Native American Seed website [How to Grow Native Seeds | Native American Seed
\(https://seedsource.com/how-to-grow-native-seeds/seedsource.com\)](https://seedsource.com/how-to-grow-native-seeds/seedsource.com)

How to Grow Native Plants of Texas and the Southwest, Jill Nokes, University of Texas Press
Chapters II-IV. Gathering and Storing, Seed Germination, Seed Planting

MMO

Plant Source: Soil Seed Bank

Identification is key

Identify Emerging Native Plants
Identify Unwanted or Non-native Plants
Remove Unwanted Plants



White Avens rosette



Carol Feldman
Cedar Sedge



Carol Feldman
Clematis pitcheri

Slide Objective: To identify a soil seed bank as a resource for native plants.

To allow a native seed bank to provide plants, the first step is to remove the weedy & invasive plants:

- Don't remove a plant until you KNOW what the plant is, and that it is not desired - retain ground covers, (natives or mulch) to protect soil, until you're ready to plant.
- Try not to disturb soil: hand removal is often the best technique for removing invasives.
- Burns to remove invasives is an option in some conditions.

Consider the neighbors: if a protected land management area, allow these plants to encroach the perimeter, dropping seed as they reproduce,

Protect the understory of tree mottes, allowing the naturally deposited seed (birds) to grow and reproduce as a contribution to the seed bank

Be patient and watch soil moisture, which is required for seed germination

Resources: Apps – iNaturalist, Seek, PlantNet, Google lens, PictureThis (not free). The first three applications support citizen science projects. For additional resources identifying weeds, see slide in maintenance section of this presentation.

MMO

Nature Builds Healthy Soils & Plants

Nature's Way is Best!

Healthy Soil = Healthy Plants

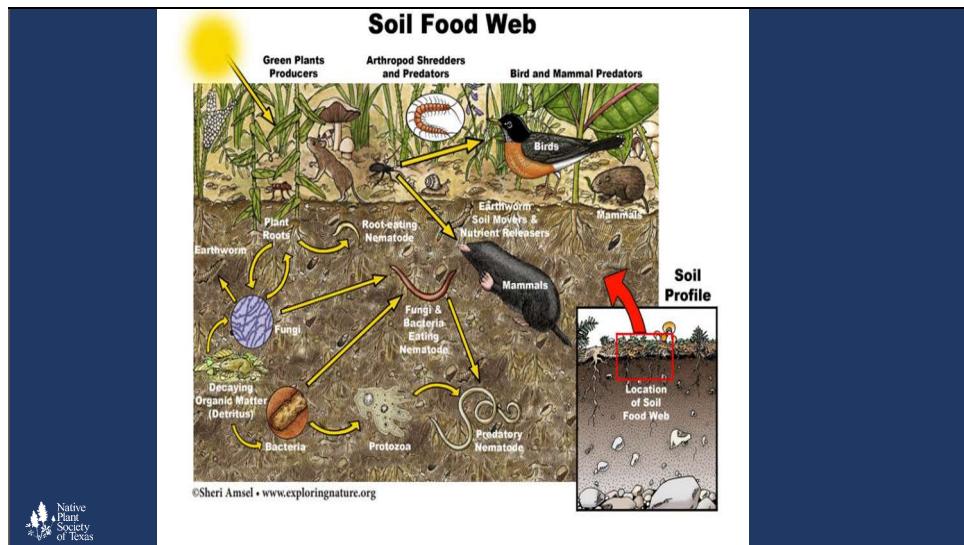
Photos by Mike McGee

Prairie

The slide features a dark blue background with white text. At the top right is a yellow square containing the letters 'MMO'. Below it is a large white title 'Nature Builds Healthy Soils & Plants'. To the left of the title are two bold statements: 'Nature's Way is Best!' and 'Healthy Soil = Healthy Plants'. At the bottom left is a small logo for the Native Plant Society of Texas. In the center is a photograph of a prairie landscape with a herd of bison grazing in the foreground and mountains in the background. The word 'Prairie' is written at the bottom right of the photo. At the very bottom left, it says 'Photos by Mike McGee'.

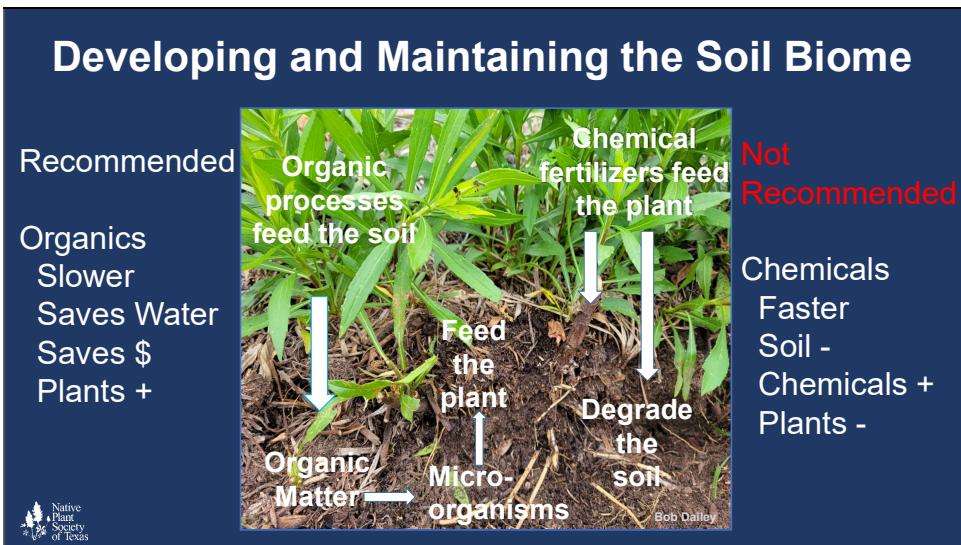
Slide Objective: Establish the goal of creating healthy soil that will provide everything needed for healthy plants.

- Think about the most beautiful nature landscapes you have seen – an old growth forest, a mountain meadow (**click on slide**), a marsh (**click on slide**) or native prairie (**click on slide**). All these landscapes thrive without man's intervention. Each of these natural landscapes supports a diversity of wildlife. Natural processes build healthy soil that nurtures the plants 24/7 for free. We need to learn from nature about how to maintain healthy soils to support our home landscapes and avoid the cost and many harmful consequences of artificially treating our own landscapes with manufactured chemicals.
- The goal is to establish a soil filled with a diverse ecosystem of macro and micro-organisms that will supply all the nutrients the plants will need to thrive. An additional benefit from creating healthy soil is that more of the precipitation that falls will enter the soil, most of which will be stored for use by the plants. Less supplemental water will be needed and less of the precipitation will run-off and less soil will be eroded away. Once a healthy soil has been built up no chemical fertilizers or chemicals of any type will be needed. The practices we will be discussing feeding soil. This is much better than feeding the plant only while degrading the soil with chemical fertilizers. Chemical fertilizers are manufactured chemical salts where the nitrogen, phosphorus and potassium are in a chemical form that can be immediately accessed by plants.
- To do this we will need to increase the organic matter in the soil by adding mulch and perhaps add natural fertilizers and natural means to renewed biologic activity (e.g., compost tea). Rebuilding soil is a slow process that has significant benefits to the environment and plant health. An urban residence or other 'pre-landscaped' property might have exotic turf grasses and exotic shrubs that would need to be removed and depleted soils that require rebuilding.
- Natural and undisturbed sites may not require plant removal or selective plant removal. These sites may also have benefited from years of leaf litter, grasses not being mowed, and general regeneration of the soil through natural processes.



Slide Objective: Introduce the soil food web. Establishing and maintain a healthy soil is an objective of all of the maintenance and installation recommendations in this course.

- The soil food web is a complex and natural ecosystem with several processes to cycle nutrients and allow plants to access necessary chemicals and nutrients in the soil.
- A teaspoon of healthy soil contains millions of organisms. Understanding of the complex soil food web is advancing rapidly. The importance of soil to the climate and health of all life including human health continues to grow with scientific advances and studies.
- Most recommended installation and maintenance practices in this course are predicated on maintaining or creating a healthy soil food web.
- Essentially all manufactured chemicals used to fertilize plants, control plants pests or diseases, degrade soil health. In turn the nutritional value of plants to the animals eating the plants is significantly impaired by these chemicals. In large measure, the recent move towards organically grown foods is based upon this understanding as well as superior taste.
- Plants themselves impact the soil food web. Plant roots exude fluids that inhibit harmful microbes and promote beneficial microorganisms specific to the plant. A diversity of native plants helps maintain a healthy soil food web.



Slide Objective: Differentiate the difference between the organic process of feeding plants and artificial chemicals.

- The nutrients in the soil cannot be accessed directly by plants. A symbiotic relationship between micro-organisms allows plants to access these nutrients in exchange for sugars from the plants. Decaying plant material feeds the soil micro-organisms that in turn feed the soil. Chemical fertilizers provide nutrients (nitrogen, phosphorus and potassium mainly) in a chemical form plants can access immediately.
- There are important differences between feeding plants organically or with organic fertilizers and with chemical fertilizers. While organic processes are slower, they provide important benefits. Soil soaks up rain far better and holds moisture much longer thus significantly reducing need for supplemental water. A healthy soil biome provides biologic protection against disease and fungus that can attack plants.
- While organic fertilizers are quicker at feeding nutrients to the plants, they have many downsides. They degrade the soil biome and limit the natural process of nutrient transfer to the plants. Chemical fertilizers build up salts in the soil that impairs the plants from accessing moisture in the soil. Degradation and changes to the soil biome leave plants exposed to disease and fungus. Chemicals in the run-off pollute receiving streams and the ocean. The large dead zone that forms in the Gulf of Mexico every summer is caused by fertilizers in the run-off from America's croplands. Additional chemicals are necessary to combat disease that further deteriorate the soil biome.
- Most soils have been significantly degraded by overgrazing or industrial agriculture practices or importing excavated dirt from well below the surface to raise and level the land before setting the foundation. Recreating a living, healthy soil biome will take time and application of organic matter on to the land.

MM1

Understand Existing Soil and Drainage

- Examine the Soil
- Dig a 12" Hole if Possible
- Test Water Infiltration
- Soil Tests

Photos by Mike McGee

Slide Objective: Present methods for examining soil, testing drainage and infiltration and tests of the soil texture and chemical characteristics.

Once the location(s) of beds or native garden areas are set, it's useful to understand the current condition of the soil and check on water infiltration. For this you will need a square or sharpshooter shovel, source of water and tape measure and perhaps cardboard or tarp for the soil.

Start digging a hole about 12" in diameter or square with straight, vertical sides and 12" deep if possible. Minimum soil depth for turf grass is 6". For perennial plants 6"-12" required. Additional soil depth may be needed in some central Texas area. Examine the soil removed in layers. Healthy soil will be dark brown with lots of organic matter binding the soil together. The presence of earth worms is a sign of a healthy living soil. The soil at the right in the photo is from an established bed that has been mulched for several years. The soil at the left is sandy loam soil below a lawn area. Note the stark difference in color. The composition of the soil can be tested using the jar test method described in Level 1.

In the example shown note that the near surface layer is darker indicating more organic mater than the higher sand content soil. If a clay layer is encountered, this could impair drainage. Several holes may be needed to understand variations across a property. Fill the hole with water and let it drain over night. Fill the hole with water the next morning with water. Measure and note water depth every hour. Average water infiltration rates of 2-3" per hour are ideal. Greater than 4"/hour indicates a high sand content porous soil and low organic content. Infiltration rates of 1"/hour or less overall or any segment indicates probable presence of clay. Measures to prevent the soil become saturated may be necessary because of clay barriers.

Soil can be sent to labs for analysis. Routine analysis from Texas A&M Agrilife includes pH, texture (sand, silt, clay %) conductivity, N, P, K, and magnesium, sodium and sulfur for a cost of \$32. There are several home tests that can be done to measure biologic activity. Reference: Teaming with Microbes, Jeff Lowenfels & Wayne Lewis

MM1

Bed Prep on Existing Turf or Weeds

**Don't Disturb Soil
Cover with Cardboard or Paper to Block the Sun
Layout Bed and Cover
Remove Turf at Border
Cover with Topsoil
Mulch**



Mike McGee

Native Plant Society of Texas

Slide Objective: Discuss the process for building beds over existing turf or heavily weeded garden areas.

To build a healthy soil we want to minimize disturbance to the soil to preserve soil structure, fungi and bacteria that is already present. Treating turf with a strong herbicide is easy and relatively quick but the problem is these herbicides significantly degrade the soil micro-organisms that will require a long time to rebuild. The preferred strategy is to kill the plants or turf by removing sunlight and then build the soil by decomposition of organic matter, the natural way. Turf can be physically removed but this removes organic matter and microorganisms useful for building up the soil.

(click)

To do this, first layout the area of the bed and mark the outline with spray paint or a hose. Mark the location of any irrigation heads. Then cover the area with cardboard or several sheets of newspaper (7 minimum) and wet the paper or cardboard thoroughly.

(Click)

Then remove turf around the perimeter and place it upside down on the cardboard.

(Click)

Then cover the carboard with topsoil to near the depth desired for the bed or a minimum of about 2 or 3”

(Click)

Lastly, top the area with mulch (preferably local hardwood or pine straw). Do not use dyed mulch and avoid mulches with chemicals added since these will degrade the soil health we are trying to build. The following pictures show how this method is used to create a large bed from turf grass to established beds of native shrubs and perennial plants. Note: this method will not kill Bermuda grass. Bermuda grass is a Texas invasive species. Hand removal of Bermuda that sprouts through the cardboard/soil/mulch will be required.

Landscape Conversion



Native
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of Texas

Mike McGee

Slide Objective: Describe some of the considerations in landscape conversion (lawn to natives)

There are multiple considerations when converting a lawn to native beds or shrubs. They include:

- Irrigation. In this example some turf grass remained outside of the native beds. To allow for conversion to drip irrigation for the beds, the reach of drip spray heads was a factor to consider. It's advisable to create a sketch of irrigation features during installation for future reference. As discussed later, supplemental watering will be needed to establish plants. Also, during droughts supplemental watering may be required for native plant survival. Irrigation may be useful initially and during drought in landscapes without turf grass.
- Neighbors and HOA's. Native landscapes should be broadly appealing and encourage neighbors to plant natives. It's important that native landscapes appear intentional with defined borders and are attractive through the year for BOTH the owners and to encourage others.
- Change. Plants grow and "move" over time. Most gardens evolve over several years. The design concept should allow for change and how growing trees will change the available sunlight over time. It is particularly important to think long term in the layout of hardscapes and trees and shrubs.
- Soil. If supplemental soil is used for establishing beds, be sure to use high quality soil from a reputable sources. It's an important initial investment.

MMO

Soil Enrichment When Preserving Existing Plants

- Shredded or Mowed Leaves**
- Compost**
- Compost Tea**
- Organic Fertilizers**
- Fungi and Bacteria**
- Removal of Weeds/Invasives**



Wikimedia Commons



www.compostwerks.com

Native Plant Society of Texas

Slide Objective: To introduce the procedures for working in areas where the existing plants or seed bank located in the soil is to be preserved.

To build up the organic matter and soil biome in existing beds or landscapes there are several methods that can be employed. Top dressing with leaves is a good way to add organic material to decompose and use low-cost materials. Shredding or mowing leaves hastens decomposition and prevents matting that can impair water and air movement and reduces the volume. Shredding or mowing also may kill beneficial insects and creates pollution. Consider whether shredding is necessary and if the advantages are greater than the disadvantages. Leaf mold compost is an excellent source of organic matter and will improve soil texture and water storing capacity. Compost makes an excellent supplemental source of organic materials that is also rich in fungi and bacteria. The compost pile shown is the amount of composite that an average two-person household will produce in a year. Leaf mold compost from a nursery is an excellent way to add organic matter to soil. Compost tea can also be sprayed on beds to add nutrients and microbiology directly. Organic fertilizers are also beneficial to soil health and will not burn plants or degrade the soil. Organic fertilizers are made from natural sources and contain low levels of N,P,K (less than 10%) that will not burn plants. The nutrients in organic fertilizers feed the soil biome. In recent years, several companies have begun marketing fungi (e.g., mycorrhizal fungi) and bacteria inoculates that can be utilized to improve soil health and in turn plant health. With this approach, weeds or invasives will need to be separately removed. Weed removal will be discussed further later in this presentation.

Planting and Plant Placement Considerations

- Sun/Shade**
- Water/Drainage**
- Soils**
- Maintenance**
- Mature spread**
- Mature Height**
- Wildlife benefits**

Evergreen/Perennial

Seasonal Interest

Color/Feature



Carol Feldman

Slide 18



Slide Objective: To identify considerations for planting placement.

Landscape plans are the first step to the installation & development of any landscape. Plant locations should be laid in the landscape plan and the plant spacing can be determined by the scale of the drawing. The actual planting should not be done until it is determined that the plants are in locations that ensure growth for the plants.

Knowing the design characteristics of native plants allows you to ensure that the plant is in a good location. Level 2 of the NLCP program expands on these design characteristics.

- Sun/Shade requirements – One word of caution: urban building shade is more intense than shade that you find in natural areas.
- Water requirements – The water needs of each plant species should match the moisture conditions of the site location.
- Soil type – Urban soils can be the result of many years of abuse or soils brought in as fill for a building. Sometimes a specific location might be a soil problem because of something that happened years before, such as chemical, paint, petroleum, oil, gas disposal.
- Maintenance - Consider access for anticipated maintenance activities & potential conflicts with structures/people/neighbors/other uses. Example: Set plants back from sidewalks so that the plant's spread will not require significant cutting to keep the path clear. Include maintenance paths between and through beds.
- Wildlife benefits – If a plant attracts birds, be sure that they have a safe place from the resident cat.
- Spacing – Since native perennials are often 1 gal plants or smaller, place them far enough apart to allow for their mature growth. Consider leaving access space around plants. To determine plants' mature size, consult the Maintenance Matrix spreadsheet.
- Mature Height – Knowledge of the mature height will help so that plants do not have to be sheered to keep under windows, power lines, view etc.
- Evergreen/Perennial – a mixture of evergreen and perennial is biodiversity in a native landscape
- Seasonal Interest
- Color/Feature

3D's – Density, Diversity and Duration

- Dense plantings provide shelter and food for pollinators. However, consider mature size of plants to give them room to grow.
- Diversity equals biodiversity which is natures imperative for continued changes over time
- Duration is enduring flowers in the growing space (attempt to have something blooming at all times)



Slide Objective: To visually understand the growth potential for plants, and the difference between their size at planting and their mature size.

- Over planting - Being aware of a plant's size and shape at maturity can be determined by looking at the Plant List Spreadsheet
- Over watering – Plants with the same water needs should be planted together to prevent over watering
- Plants take 3-5 years to reach their mature size

In top photo – tree died from Oak Wilt and was removed. Yuccas were planted where the tree trunk was.

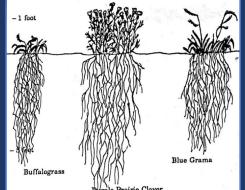
When to Plant
Ideal planting times are about root growth

Trees and Shrubs
Fall & winter

Perennials
Fall through spring depending on local conditions

Seed Planting
When the plant spreads its seed naturally

Summer is Most Difficult, Avoid if Possible

Native Plant Society of Texas

Slide Objective: To discuss the question most asked by landscaping clients. When is the best time to plant?

The issues:

Texas weather allows us the option for year-round planting but...

- Summer planting is *least* desirable and *most* difficult because watering requirements to keep plants alive in our Texas heat are difficult.
- By planting in fall & winter, the plant has little upper plant growth during this time, but the plants grow roots through the fall & winter. Upper plant growth begins in spring, taking the energy from the root growth. The goal is to have adequate root growth to support the spring upper growth when the plant hits the long, hot, dry summer.

Perennials and deciduous plants sell better in spring because this is when the natural upper growth occurs and the plants look good in the nursery.

- Nurseries have a better plant selection in the spring.
- People think of plants and new beginnings in the spring, making it a popular time to plant.
- Nurseries like to lessen their stock during the summer months so that watering the plants is not such a burden. If you buy a plant in summer, be prepared to nurse it until fall.
- Nurseries lessen their stock a second time in early winter and can provide sales for smart shoppers.

Seeding - Plant at a time when nature would plant that seed. If a plant seeds out during the fall & winter – that is the best time to plant that seed. If a plant forms its seed in spring & summer (spring grasses) then spring is the best time to plant that seed.

Sketch: Native grass roots (source unknown). Notice Buffalo grass roots shown at 5' depth.

Ecoregion specific notes:

In the Hill Country, Bluebonnet seeds are planted in the fall. There must be rain for the seeds to germinate. There is continued root growth through the winter, the plant will bloom in spring and go to seed in early summer. Bluebonnets are annuals.

MM1

Landscaping with Abundant Wildlife



Deter with Sight, Sound, Smell, Texture Fencing

Susan



Native Plant Society of Texas

Slide Objective: Planning for Wildlife while installing a native garden

- Soil disturbance attracts wildlife- new plants and new growth are forage; wildlife is attracted to water in new installations
- All strategies must include plans to change as animals learn. For example, animals become accustomed to a barrier and will continually attempt to challenge it and may succeed.

Deter with Sound, sight, smell and texture:

Deterrents like sprayers or lights on motion detectors will likely need to change as animals adapt or habituate. Examples including moving moving location of sprayers or add or rotating between different deterrents like sparkling pin wheels, big inflatable snakes (for squirrels) or solar predator lights 2-3' above ground.

Motion activated water sprays can be effective in deterring deer.

Particularly strong-smelling plants can deter deer. Examples include garlic, onion, lemon grass, oregano. Texas native plants with a strong aroma that can deter deer include Mexican Hat (*Ratibida columnifera*), Damianita (*Chrysactinia mexicana*), Fragrant Mistflower (*Chromolaena odorata*) and salvia's (*coccinea*, *farinacea*, *roemeriana*, *greggii*)

Planting: Cedar branch teepee covering new plantings and tree seedlings, agarita and other 'pokey' shrubs act as 'nurse' plants

Exclusion is a more effective strategy than protective fencing:

Deer, hogs - High, strong fence the planting bed - at least 6', but expensive. Corral smaller areas (4' wide) selectively: Deer won't jump into a small enclosure, so fence inside corners of the building, fencing groups of trees will also encourage undergrowth from the seed bank

Deer 'proof' myth - strictly deer resistant: Plants with a strong smell or odor are not favored by deer (e.g., Texas lantana or Fragrant Mist Flower). However, if deer are starving, they will eat almost any vegetation. There is no plant deer will not eat if their survival is in jeopardy

VHO

Plants from the Nursery

Size Considerations

- Age
- Visual impact
- Price
- Installation Labor
- Final establishment



Carol Feldman
4.5" caliper Bur Oak



Carol Feldman
5 gal Bur Oak

 Native Plant Society of Texas

Slide Objective: To discuss the sizing of trees at installation.

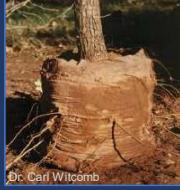
Landscape plans should specify sizes to plant for the particular situation.

The decisions is made because of the following constraints:

- Most cities will not allow smaller than 3" caliper trees on commercial and public property. Some cities require 4" caliper trees.
- Larger trees give an initial visual impact that may be required if the property is going to be sold, i.e. residential subdivisions.
- Smaller trees (5 gal) take off and grow faster than the 4.5" diameter (caliper) tree. The larger tree will be in shock and not produce growth for some time.
 - It is sometimes said that a 5 gal tree and a 4" caliper (diameter) tree will be the same size in 4-5 years.
 - For a 100-year lifespan- For example: The first 30 years would be the growth of the tree, the next 30 years would be the reproducing years of the tree and the last 30 years would be the decline of the tree. Overly mature nursery plants may have less time left to live. Know your specific species characteristics.
- There is a difference in cost, the bigger the tree the more it costs. Typically think about \$110 - \$150 per caliper inch, until you get to 6-8" sizes. These bigger trees require bigger equipment to lift, transport, and plant the tree and prices increase substantially.
- Smaller size trees may require additional pruning and training to create the best form for the tree.
 - A tree grows from the top and the fork of a branch 30" from the ground will never get any higher. For large trees (not tall shrubs), the lowest level a branch should be is 7 feet above the ground. When a tree starts at 3' tall, all the lateral branching will need to be eventually pruned. However, a growing tree needs leaves to grow, so premature removal of the limbs is not advised. It's called "training a tree."
- Trees may need protection from sun scald. Sap of the tree can boil in Texas sun. Nursery stock typically has all young lower branches removed.

MMO

Planting Trees

- Containerized**
 - Traditional containers
 - Grow bags
- Balled & Burlap (B&B)**
 - Machine dug
 - Hand dug
- Bare Root**
 -   Jimmy Turner, Facebook Circling tree roots
 -  Bare root
 -  Dr. Carl Witcomb Tree grown in Witcomb tree bag
 -  Larry Craig, CO Tree Farm Container grown

Native Texas Nursery

Slide Objective: To discuss the difference between a Balled & Burlap, Container Trees and Bare Root trees for planting

Containerized are grown only in containers. In the nursery, as the tree grows, it is ‘bumped up’ in container sizes. Container grown trees can suffer from roots hitting the container and will circle the pot. Trees that are properly repotted in a larger pot in a timely manner can be a great source of trees. However, if a tree’s roots start circling, special attention is required to address girdling roots and these measures may not be successful. Special pots and grow bags have been designed to prevent this.

Advantages: 1) Can be planted any time of the year

- 2) Many sizes available
- 3) Prior to planting, retains moisture better

Disadvantages: 1) Container-grown trees can result in root girdling
2) May have excess soil covering the root ball or crown

Balled & Burlap trees are grown in the ground. When they reach a size that is desirable for sale, they are dug and wrapped with burlap and sometimes a metal cage to hold the “ball” together. B&B trees are commonly harvested with a tree spade, that potentially will cut the tree’s roots and put the tree in shock. This will slow the tree growth for some time and potentially cause branches of the tree to die.

If these same trees are harvested by hand digging, with care taken not to cut the feeder roots, but shape the root ball to include any rogue roots, they are far more successful.

Advantages: 1) Larger sizes available

- 2) Lower costs
- 3) Trees dug by hand have a greater success rate than container grown

Disadvantages: 1) Vital Roots may be cut when harvested by machine
2) Prior to planting, readily loses moisture

Bare Root trees are dug and stored without any soil around their roots. Usually only done with smaller sizes (sprig diameters less than 2”). Trees should be dug and planted with very little time between. The time can be extended by soaking the roots, but soak roots for no longer than 1 hour.

Advantages 1) Less expensive and therefore viable for mass plantings

- 2) More feeder root mass available
- 3) Smaller material size makes for easier planting

Disadvantages: 1) Possible high mortality –special handling with polymers to prevent root desiccation especially if holding a few days prior to planting

- 2) May need additional protection due to size (e.g. from mowers)
- 3) No initial impact because these plants start smaller

MMO

Planting Trees

Location

- Buildings
- Walkways
- Powerlines

Process

- Hole size and treatment
- Plant treatment
- Finish and Water

Native Plant Society of Texas

Larry Hicks, Mark Bird, & Michael Nentwich

Slide Objective: Discuss tree planting

Location

- Select the right tree for the right location: keep large species trees (50'+) at least 20 feet away from structures and 25 feet from overhead utility lines.
- Call for utility locates. Also know buried utilities on your property.
- Dig a hole 2-3 times as wide as the root ball but not deeper than root flare: prefer top of root ball to be 1" above existing soil grade.

Planting Process - Dig an Ugly Hole, 2-3 times as wide as root ball,

- Remove tree from the container and/or all twine, wire, burlap and any other material from the root ball.
- Spread out roots and cut or remove any circling/girdling roots (except for mountain laurel).
- Place tree in the hole, do not hold trees by the trunk.
 - Backfill halfway with original soil and water in thoroughly.
 - Backfill the rest of the original soil and water in thoroughly.
- Mulch with wood chips: 2-3 foot radius, 1-2 inches deep, but keep 2-3 inches away from trunk.
- Watering your tree
 - Always check your tree for soil moisture before watering
 - Watering schedules vary per your soil, temperature, time of year & rain conditions
 - Watering schedules are normally more frequent for the first weeks, with reduced frequency as tree gets established.
 - Provide a schedule of watering for the client or maintenance crews.
 - Watering by hose, buckets, watering truck, or tree watering bags such as “Gator Bags”.

Ecoregion Note: Provide an example of a tree watering schedule that is typical for your local region.

MMO

Watering Newly Planted Trees & Shrubs

Supplemental Water Required

- 1 – 3+ years
- Monitor for wilt, yellowing or brown tips
- Check soil
- Keep mulched
- Remove weeds or grass



Mike McGee

Native Plant Society of Texas

Slide Objective: Provide property owners with information on watering newly planted trees and shrubs

Established native plants should not need additional water except during extended periods of drought.

Supplemental water is required for newly planted trees and shrubs until the roots are well established. For large caliper (diameter) transplanted trees (4" trunk diameter at 6" above the ground) this may take 6 years. For the first year, water should be frequent enough to keep soil moist but not soggy. In hot, dry period this may be 2 or 3 times per week. But be careful, too much water can deprive the roots of oxygen and can kill the plant. Check the soil before watering and monitor the plants for signs of insufficient water – wilting, yellowing or brown patches on leaves.

To keep the soil moist and reduce water needs keep the area around the plant free of weeds or grass until the roots are established. Drip irrigation can be an effective way to water newly planted trees and shrubs. But monitor the soil and plant to ensure the drip is not over or under watering.

Planting Shrubs, Perennials, & Grasses

Root Bound Plants

Planting Techniques



Above: Root bound pot



Left: Healthy root system in a pot

www.rootsimple.com

Mountain States Wholesale Nursery

Slide Objective: To discuss the planting of perennials, shrubs & grasses. Understand what to do when a plant is root bound.

Look for healthy roots: do not buy root bound plants

Root bound perennials are common, although not desired. If planting these root bound plants, cut as shown or pull the roots out of the mat. The goal is to get roots so they will grow out into the new soil.

Planting shrubs, perennials and grasses

Photo: <http://www.rootsimple.com/wp-content/uploads/2014/04/rootbound-669x501.jpg>

Healthy root system

Photo via Janet Rademacher, Mountain States Wholesale Nursery

VH1

Planting Transplants

General

Woody Shrubs & Trees

Perennials & Grasses



 Native Plant Society of Texas

Slide Objective: To discuss transplanting techniques.

General Techniques

- Prune or Cut back upper branches and end shoots
 - Pruning transplanted plants is often difficult for the gardener, but usually is essential for viability. Cut back the upper branches and end shoots of limbs to compensate for loss of root area and to encourage new branching and foliage growth come spring. Reduce some of the foliage to help reduce the transpiration rate of the plant until the plant compensates with regrowth.
 - It is best to cut back the plant by at least one-half to two-thirds before transplanting.
- Plant top of roots at ground level, its normal depth, immediately after digging for best results.
- Cool, rainy or overcast days are the best time to transplant everything.
- Water in plants immediately.
- Plants may need to be shaded for several days if transplanting is done during a period of high temperature (Use umbrellas attached to stakes or cedar limbs to form a tepee)

Transplant shrubs and trees

- Woody shrubs and trees are best planted in winter
- Be sure to water the plant before moving it and give the plant time to take in the water. Also, water the soil into which you are transplanting. Use a sharp shovel, follow roots down to get as much of the root ball as possible. Try to keep the root hairs as moist as possible

Transplant Perennials and Grasses

- Perennials are best transplanted from emerging seedlings very early in their growing season.
- Water in the transplant immediately.
- Dig the plant ball, preserving roots equal in size to the crown of the plant.
- Moving with soil and root ball is preferred; bare root transfers can also be successful, provided the root hairs are kept moist
- Transplants can be stored for a short amount of time in water, Superthrive solution or Hasta Grow
- Apply compost tea if needed.

VHO

Planting Seeds

- Hand Broadcast**
- Mechanical Seeding**
- Seed and Mulching Techniques**



Carrie Dubberley

Seeded Thunderturf* at LBJ Wildflower Center

 Native Plant Society of Texas

Slide Objective: To discuss seeding techniques for planting.

* Thunder Turf is a native grass mix of Buffalograss, blue grama, and curly mesquite distributed by Native American Seed.

Seeding is nature's way. The best techniques mimic the natural planting systems of nature, the way native plants have evolved.

Seed alone techniques Need to ensure that the seed has made good contact with the soil (pat or roll seeds as necessary)

Hand Broadcast - throwing out seed by hand. Good for small areas. Could result in uneven dispersion – heavier seeding rates required. Seeds are buried only $\frac{1}{2}$ their diameter. Tiny seeds are broadcast and patted on to soil surface. A firm seed to soil contact is very important

Mechanical seeding

- Seed drill – For seeds that need to go into the ground. Mechanically cut or till into the ground with the seed falling from a seed bin directly behind the blade.
- Broadcast seeder – a mechanical device that throws the seed for you. Usually in a circular pattern. Can be handheld or tractor mounted.

Seed & mulching techniques Provide immediate contact with soil type medium, retain moisture for the seed, protect from wildlife eating seed, and can cost more.

- Seed balls are a great way to keep wildlife from eating your seed and allowing natural rains to germinate the seed with little movement of the seed location. It is a great way to involve children and other groups in the preparation of the seed balls. In this way, the public takes pride in their participation.
- Hydro-mulch compost techniques cost more than ordinary hydro-mulch, but the compost retains moisture and seed germination is quicker than mechanical seeding.
- Erosion control blankets that contain seed are ideal for riverbank planting where erosion control is needed until plants develop a healthy root system.
- Natural planting - Using the plant and its seed together as a seed and mulch source is most like nature. Plant serves as a mulch to the seed. Prairie hay is an example, but may have weed seeds.

VH1

Mulch

Value of Mulch

- Insulation**
- Conserves water**
- Weed barrier**
- Insect habitat**



Pannage.com

 Native Plant Society of Texas

Slide Objective: To discuss the use of mulch and the importance of its use in Texas landscapes.

Mulch is one of the more important planting and maintenance items in a Texas landscape.

Value of mulch

- Insulates roots against the Texas sun and heat
 - A 3" layer of mulch can significantly lower the temperature of the root zone
- Conserves water in the ground by preventing surface evaporation
- Acts as a weed barrier
 - Do not use weed barrier fabrics, as they slow the decomposition of mulch which breaks down to become nutrients for the plant
- Provides habitat for insects – as you will notice birds flicking leaves looking for caterpillars and insects to eat

VH10

Organic Mulch

Breaks down into compost and supplies nutrients

Considerations

- Organic, no coloring
- Weed seeds
- Environment
- Use of rocks not recommended

Technique

2-4" typical mulch depth



Native Plant Society of Texas

Slide Objective: Considerations for organic mulch and techniques for its use.

Considerations:

- Organic mulch decomposes and provides nutrients. Leaves/twigs breaks down to mulch, Mulch breaks down to compost, Compost mixes with minerals/rocks and becomes soil
- Nitrogen and other nutrients needed by the plants are a by-product of this decomposition (Humus is the organic component of soil, formed by the decomposition of leaves and other plant material by soil microorganisms.)
- Weed seed contamination is a consideration as to what you use for mulch. Although straw fulfills the mulching requirements, it usually does not make a good mulch because of the wheat seeds that it contains.
- Pecan shells can be a light weight and inexpensive mulch. Many horticulturists recommend their use.
- Locally sourced materials (e.g., leaves, pine straw, pecan shells) may be best. Leaves and yard debris sent to landfills often decompose anaerobically creating methane that contributes to climate change. If mulched, the carbon in these materials is converted to beneficial uses.
- Avoid colored mulches. There is little regulation as to the product used to provide the color. In addition, they look out of place in a natural landscape.
- Use of rock is not recommended. It retains heat, then loses heat in the evening and creates a warmer local environment. It is difficult to weed. It degrades soil. For erosion control, consider native grasses

Technique

If using shredded wood mulch or leaf litter mulch

A minimum 3" of mulch provides the best results.

3 cf bag of mulch -- 8 bags per 100 sf.

2 cf bag of mulch -- 12 bags per 100 sf.

(that is 8 or 12 bags in a 10' by 10' space)

Replenish as needed to maintain mulch depth. If mulch is too thick rain may not penetrate or can get too hard during summer.

- Replenishment needs will be dependent on site conditions
- Ideally natural leaf litter may suffice
- A light dressing of mulch may improve aesthetics

Native Plant Maintenance



Slide Objective: Division slide to indicate Maintenance section.

MMO

Native Plant Maintenance Topics

- Impact on the Environment**
- Pruning**
- Disease**
- Seasonal and Plant Specific Maintenance**
- Soil Health**
- Weeding**
- Watering**



Native
Plant
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of Texas

Slide Objective: Introduce the topics covered in the maintenance portion of the presentation.

MMO

Aesthetic Choices Drive Maintenance

Formal	Natural
	

Gail McConnell

Carol Feldman

Native Plant Society of Texas

Slide Objective: Introduce the concept that aesthetic choices will drive maintenance needs and costs

A formal style will require substantially more attention and pruning to maintain a neat appearance or specific shape than a natural style. Increased rainfall or irrigation will also increase growth and, more likely in a formal style, will increase maintenance needs and costs. Natural gardens can be appealing even when overgrown, while formal gardens need to be pruned and trimmed to look good.

However, formal garden maintenance can be more readily outsourced and does not require special knowledge in pruning or how to differentiate between desirable and undesirable plants/invasives, and so may be less expensive. Whereas knowledge of good gardening practices and plant identification is needed to maintain a healthy natural style.

Note the “mulch volcanoes” below the shrubs in the formal garden image.

Maintenance Techniques Affect the Environment

Do Not Disrupt Wildlife Habitats **

Avoid Chemical Pest Control Techniques

Use Supplemental Nutrients Sparingly

Use Supplemental Water Only as Needed



** Doug Tallamy, 2007



Gail McConnell

Slide Objective: To get participants thinking about native plant maintenance in a different way. Maintenance can accommodate the human needs for order and neatness, and also, provide food and habitats for wildlife.

*Maintenance techniques should not remove the very basic foundations of the habitat. Chemical pesticides, high nitrogen fertilizers, and herbicides that kill the basis for habitat food chains should not be used.

- Insects are an essential part of the food chain - birds, anoles and other wildlife feed on insects
- Insects also feed on plants and may impact aesthetics, but accepting a certain level of insect pest damage is important if there is intention to provide habitat or healthy ecosystem services. In particular, birds feed soft caterpillars to their chicks. It takes 6-9,000 caterpillars to feed a clutch of chickadees to the fledgling stage. (Doug Tallamy)

**Insects are the foundation to the biodiversity that sustains us. Insects are the basis of many food chains: amphibians, reptiles, birds, and many mammals need insects as a food source. Plant eating insects are often very specific about which species of plant they eat. For instance, monarch caterpillars are only able to eat milkweed species, the vast majority of which are native plants. This is one of the major reasons that native plants are much better than other plant species at attracting wildlife to our yards. If there are no insect holes in your plants, you probably don't have many other animals either. (Tallamy, 2007)

Supplemental nutrients

*High nitrogen runoff from fertilizer applications, feedlots, and other high nitrogen sources contaminate water resources and contribute to the algae growth in water bodies.

*Supplemental nutrients (amendments, fertilizer, compost, etc.) may increase normal plant growth and result in higher maintenance needs.

Supplemental water

Native plants may grow to greater sizes or spread more, when supplemental watering provides more water than the typical rainfall for the region. This may require more maintenance to cut them back or to remove spreading plants. More importantly, indigenous native plants are adapted to their surroundings and exist in the wild without supplemental water. Native plants save water. Mature plants need only need supplemental water during droughts.

MMO

Respecting Natural Growth Patterns May Reduce Maintenance

The slide features two photographs. The left photograph shows a large, mature tree with a wide, spreading canopy, growing next to a metal fence. The right photograph shows a smaller tree with a narrow, upright canopy, growing near a paved path. Both images demonstrate how respecting a plant's natural growth form can reduce maintenance needs.

Native Plant Society of Texas

Gail McConnell

Kathie Hefner

Slide objective: Respecting the natural growth form of native plants will reduce maintenance needs and cost

Magnolia trees naturally grow like Christmas trees, with their lowest branches growing wider and touching or near the ground. If respected, this natural growth shape captures its very hard seed pods that make mowing difficult. Respecting the natural growth of a plant will reduce maintenance needs and costs. Know how your plant grows, place them accordingly, and enjoy their natural shape.

MMO

Tree Maintenance

Best to Start When a Tree is Young

Use 5 Step Method to Young and Mature Trees

Prune When Dormant

Prune Less Than 1/4 of Live Branches

Replenish Soil Nutrients



Beth McCordell

Native Plant Society of Texas

Slide objective: Introduce and review tree maintenance

The Five-Step Technique should be used for mature and young trees.

Leaves provide food for the tree. Over-pruning will result in weak water sprouts that try to compensate for over-pruning. Water sprouts are shoots from the trunk or branches from latent buds. They are a tree's way of generating branches quickly in response to damage.

If trees are surrounded by lawn except for a small mulched area around the trunk, supplemental nutrients may be needed to mimic natural nutrient cycling. This would include an organic fertilizer application around the drip line 2 or 3 times per year.

MMO

FIVE STEPS to Train a Young Tree

- 1. Remove Diseased or Damaged Branches**

- 2. Select a Leader Branch**

- 3. Select the Lowest Permanent Branch**

- 4. Select the Scaffold Branches**

- 5. Select Temporary Branches**



Slide objective: Review Five Steps to training a young tree

A young tree is one that is less than 15 years old. Cass Turnbull, Guide to Pruning, 3rd ed., pg. 212.

Old adage: “As the twig is bent, so grows the tree.”

1. For newly planted trees, remove only dead, diseased, or damaged branches. Allow the tree to establish its root system. Leaves provide the tree and root system with food to grow. Pruning to train the tree begins in the second or third year, and then do so sparingly.

2. Select a vigorous, vertical central branch as the leader or tallest, central branch

The image shows an example of training a young tree, by removing a branch competing with a strong central leader.

<https://extension.okstate.edu/fact-sheets/training-young-shade-and-ornamental-trees.html>

- Select the lowest permanent branch based on the location and use of the tree—street-side needs about a 16' clearance for cars, 8' clearance is generally sufficient for sidewalk or trail areas.

4-5. Scaffold and temporary branches are defined in the next slides.

Scaffold Branches Give a Tree Shape and Balance

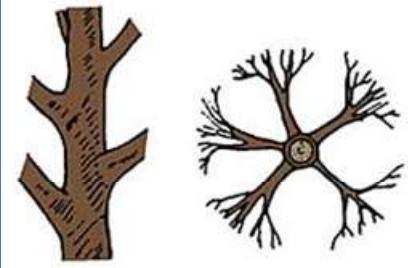


Figure 7. Scaffold branches of trees should have proper vertical and radial spacing on the trunk

 <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

Slide objective: Define scaffold branches

Scaffold branches are the main branches that give a tree its shape and balance.

<https://extension.okstate.edu/fact-sheets/training-young-shade-and-ornamental-trees.html>

“The space between permanent branches should be approximately 3% of the tree’s eventual height (1.5 feet for a 50-foot tall tree) Balance should be considered by retaining branches radially. “
https://tfsweb.tamu.edu/uploadedFiles/TFS_Main/Urban_and_Community_Forestry/About_Urban_and_Community_Forestry/Urban_Forest_Information_Sheets/How%20do%20I%20care%20for%20my%20tree%20-%20Pruning%20Young%20Trees.

MMO

Temporary Branches

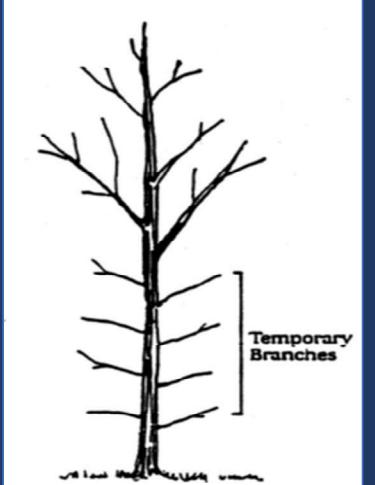
Protect the Trunk of a Young Tree

Provide Sustenance for Growth

Remove Gradually, Before They Reach 1" in Diameter

 Native Plant Society of Texas

<https://extension.okstate.edu/fact-sheets/training-young-shade-and-ornamental-trees.html>



Slide objective: Define temporary branches

Temporary branches are branches below the lowest permanent branch. Such branches provide sustenance to a young tree and are essential for growth. As the tree grows, they can be removed gradually.

“Temporary branches are important because they provide food for trunk growth, they shade the trunk, and they reduce the risk of tree damage due to vandalism. When possible, leave temporary branches on the trunk. In many cases it is useful to shorten their length to 2 or 3 buds and keep them cut back during the growing season.”

<https://www.sfpolicyworks.org/sites/default/files/Pruning%20and%20Young%20Tree%20Care.pdf>

“Young trees need their low temporary branches to provide sustenance, though they should be kept short enough not to compete with permanent branches. Low temporary branches also protect the trunk. As the tree grows taller, the lower branches may be removed, keeping desirable branches. As a tree grows, branches do not move farther off the ground. Prune off the low temporary branches gradually, over a course of several years, and before they reach one inch in diameter.

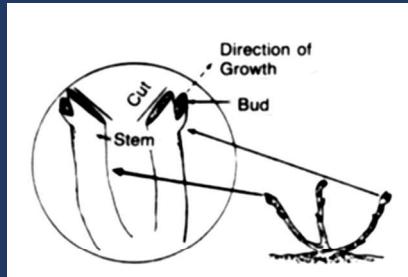
Never remove more than one-fourth of a tree’s branches at one time. Remember: it is better to make several small pruning cuts than one big cut. Avoid cutting large branches when possible.”

<https://extension.umd.edu/resource/pruning-trees-home-landscape#:~:text=Prune%20off%20the%20low%20temporary,cutting%20large%20branches%20when%20possible.>

Make Proper Cuts on Branches

**Cut Back To a Desired Branch or Bud
Growing in desired direction**

Cut above $\frac{1}{4}$ -inch
Downward 45-degrees



<https://extension.okstate.edu/fact-sheets/training-young-shade-and-ornamental-trees.html>



This illustration looks like a shrub, but it is useful to show the direction of the cut, the outer bud and the direction of new growth.

“When reshaping, cut back to buds or branches growing away from the center of the plant. Cut about one-fourth inch above the bud and downward at about a 45- degree angle.”

<https://extension.okstate.edu/fact-sheets/training-young-shade-and-ornamental-trees.html>

MMO

Make Proper Cuts at the Tree Trunk

Do Not Cut the Branch Collar



Native Plant Society of Texas

Gail McConnaughey

Slide objective: Emphasize that the branch collar is part of the tree trunk and cutting the branch collar opens the tree trunk to decay.

The branch collar is part of the tree trunk and cutting the branch collar opens the entire tree to decay. Leaving the branch collar is not leaving a stub. The branch collar will eventually disappear into the trunk as it grows over it. Bess Bronstein, Master Pruner Series-PlantAmnesty 2023.

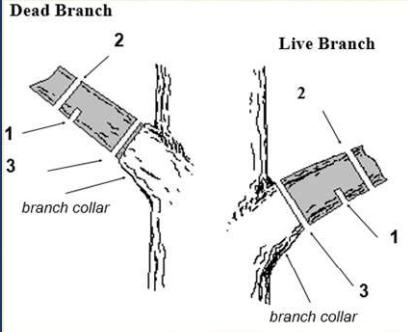
As late as 1968, flush cuts were the norm and wounds spray painted. See, John Philip Baumgardt, "How to Prune Almost Everything," page 36. "In the 1970's Dr. Alex Shigo, a pathologist with the U.S. Forest Service, began publishing his research on how trees heal wounds, 'Compartmentalization of Decay in Trees' or CODIT. Trees do not heal like humans. Whatever damage is done cannot be reversed. Trees wall off the wound from the surrounding tissue as the contents of the injured cells leak onto the wound, oxidize, and become a barrier to infection. Thus, painting a cut may actually interfere with the tree's healing process."

<https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>"

Note: Showing an actual trunk section, one where the branch can be removed from the branch collar is a striking demonstration that the branch collar is part of the tree trunk. A healed over cut is also interesting to show.

MMO

Three Cuts for Large Tree Limbs



1. Break cut
2. Remove weight
3. Final trim cut

Do not cut the branch collar

Native Plant Society of Texas

Slide objective: Review proper removal procedure for large tree limbs.

Three cuts should be made in the following order when removing large tree limbs, i.e., limbs over 1-½" in diameter.

<https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

1. Break cut on the underside of the branch, several inches away from the branch collar. This cut will ensure that if the branch breaks during the removal process, that the branch will not strip through the branch collar.
2. Second cut several inches along the branch from the break cut will remove the weight of the branch. Care should be taken to rope the branch so that it does not drop and injure other plants or persons
3. Final trim cut removes the remaining limb, just outside the branch collar. Do not cut into the branch collar.

MMO

Annual Tree Maintenance If Any Required

Review Growth

Follow the Five Steps

Make Correct Pruning Cuts

Limit Cuts to 1/4 or Less of Live Growth



Gail McConnell

Native Plant Society of Texas

Slide objective: Review the steps for annual tree pruning

Review the growth of the tree using the 5-steps for training a young tree.

1. Remove dead, diseased, damaged, “deranged” (crossing or rubbing) branches and branches that could fall and cause injury or property damage
2. Check that the leader branch is not being challenged by other branches
3. Check that the lowest permanent branches are at the height needed--street-side needs about a 16' clearance for cars, 8' clearance is generally sufficient for sidewalk or trail areas.
4. Check that the scaffold branches remain well-spaced between branches (about 3% of the tree's eventual height or 1.5 feet for a 50-foot-tall tree) and radially to give the tree balance and shape.
5. Remove temporary branches that are about 1" in diameter.

Emphasize that mature trees should only be pruned gradually. PlantAmnesty suggests a “pruning budget” of 1/8 of the leaves.

Research the size and shape of the tree before planting. Proper selection will avoid unattractive and unhealthy pruning cuts. The trees shown in the illustration were a poor choice since their size would interfere with the power lines.

See, <https://travis-tx.tamu.edu/files/2022/10/Tree-Pruning.pdf>

When to Prune

**Prune Diseased or Damaged Branches at Any Time
(Oaks see Oak Wilt Slide 50)**

Prune When the Least Damage Will Occur to the Tree

Best When the Tree is Dormant

Least Desirable is Immediately after New Growth



<http://counties.agrilife.org/montgomery/files/2011/05/pruningbrochure.pdf>

Slide Objective: Review the optimal time of year to prune trees

When a plant is dormant and when it puts out new growth is plant specific. Research and know your plant

Generally

Winter –Most plants, except narrow-leaved evergreens, are dormant. Their structure is visible, correct removal cuts can be made with less chance that diseases carried by insects will be spread

Spring -- Do not prune when branches are leafing out. Energy put into new growth should be replaced by new leaves before being removed

Summer -- Do not prune when natural predators are active. Moths can go into the pruning cuts of some cherries and plums, lay eggs, and kill the tree. Pruning might spur new growth that will not have time to harden before a freeze

Fall – Late pruning may remove valuable resources for the winter months

Source: <http://counties.agrilife.org/montgomery/files/2011/05/pruningbrochure.pdf>

MMO

Crown Pruning

**Remove Dead, Dying,
Diseased, Crossing,
and Rubbing Limbs**

**Maximum Pruning =
25% of Live Tissue at
One Time**



Larry Hicks, Mark Bird, & Michael Nentwich

Native Plant Society of Texas

Slide Objective: To describe the techniques for crown cleaning and thinning of landscape trees.

Branches in blue show typical branch removal pattern.

- Removal of dead, damaged, or diseased branches.
- Removal of “deranged,” i.e., crossing or rubbing branches.
- Remove uniformly throughout the tree (NOT just on inside branches)
- Thinning allows sunlight and air circulation to strengthen a tree. Prune small branches 1 to 3” in diameter from the middle to the end of the limb. Do not remove interior and lower branches.
- Do not remove more than 25% of live tissue at one time. Take your time, space pruning over 3-5 years. Less is more in pruning.

Cautionary note:

In crown cleaning and thinning, be careful not to:

- Remove too many of the lateral branches off a tree limb, or
- Remove too many lower limbs, or
- Remove all the lateral branches on a limb leaving foliage just on the ends of the branch.

PlantAmnesty, Working to end the senseless torture and mutilation of trees and shrubs.
www.plantamnesty.org

MM0

Avoid “Lion’s Tail” Trimming

Wind easily breaks limbs when all foliage is at the end



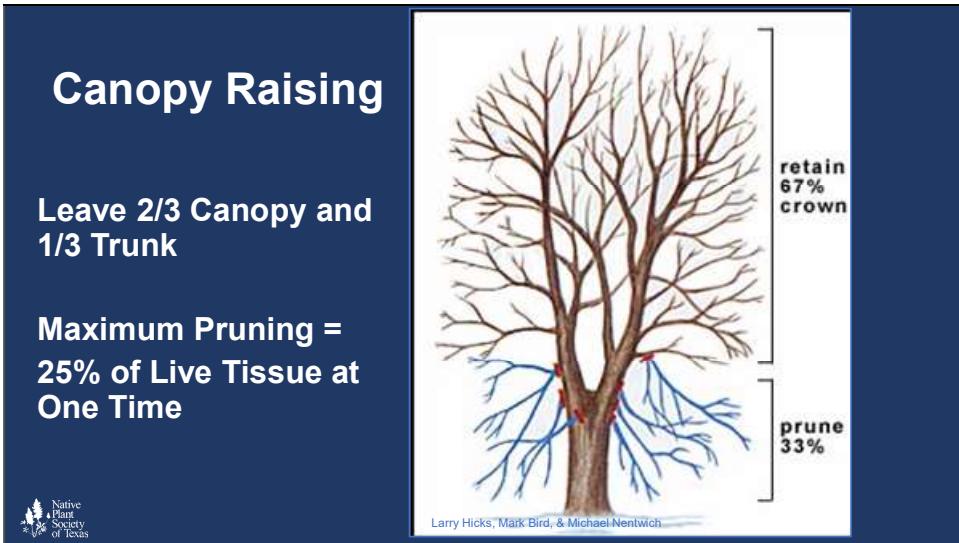
Carrie Dubberley

Native Plant Society of Texas

Slide Objective: To help students understand that the common practice of cleaning limbs is dangerous to the tree.

Stripping all the lateral branches off a limb, or “Lion’s tail pruning,” is bad density reduction. This practice is often cloaked in the idea that it will let more sun to the ground. It may do that, but leaving leaves only at the outer part of the limb is dangerous. High winds can take the leafy end and easily twist and break the limb. If the leaves are left more uniformly on the branch, the tree limb would act as one unit and not break as easily.

Sometimes when a tree is at the edge of a dense stand of trees, its branches will develop leaves just at the end in reaching for the sun, like a lion’s tail. Selective pruning to reduce the weight and density of these branch ends may help avoid breakage in high winds.



Slide Objective: To describe the techniques for canopy raising of landscape trees.

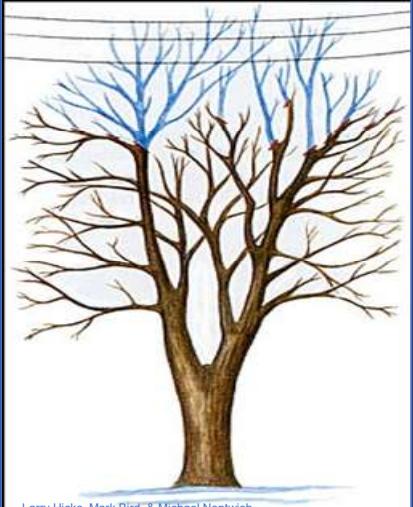
- Branches in blue show typical branch removal pattern. Limb up to no more than 1/3 of the tree height.
- City governments will have specific ordinances governing the requirements for raising tree canopies over roadways, alleys, and over sidewalks, generally, 14' over roadways and 8' over walkways

Canopy Reduction

Correct Placement Will Avoid This Type of Pruning

Cut to Desired Height

Maximum Pruning = 25% of Live tissue at One time



Larry Hicks, Mark Bird, & Michael Nentwich



Slide Objective: To describe the techniques for canopy reduction of landscape trees.

- Branches in blue show typical branch removal pattern. Limit cuts to 1/3 of the branch. Limit height reduction to once every 10-12 years.
- Consider removing and replacing the tree
- Emphasize that the tree should not have been planted in this location to begin with. Use smaller 30' maximum height trees under public utility lines. Smaller trees under home access lines.

MMO

Pruning Evergreens

Research the Plant's Growth Pattern

Do Not Cut into Bare Wood

Prune Pines Before Candle Growth

Prune Others When Dormant in Late Spring



Native Plant Society of Texas

Slide Objective: Introduce pruning techniques for narrow-leaved evergreens

Photo is of a Loblolly pine candle

Allow growth according to the plants natural shape.

Few if any buds form on woody stems. Cutting into bare wood may cause irreparable damage. Bare wood are branches without needles.

Prune pines before candles/new growth appear in Spring.

Prune other narrow-leaved evergreens when dormant in late Spring

Remove dead branches whenever they occur.

See, Douglas F. Welsh and Everett Janne, "Follow Proper Pruning Techniques," <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

Slide Objective: Introduce pruning techniques for narrow-leaved evergreens

Photo is of a Loblolly pine candle

Allow growth according to the plants natural shape

Few if any buds form on old wood. Cutting into bare wood may cause irreparable damage. Bare wood are branches without needles.

Prune pines before candle-growth in Spring. Candle-growth is the new growth at the branch tip.

Prune other narrow-leaved evergreens when dormant in late Spring

Remove dead branches whenever they occur.

See, Douglas F. Welsh and Everett Janne, “Follow Proper Pruning Techniques,” <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

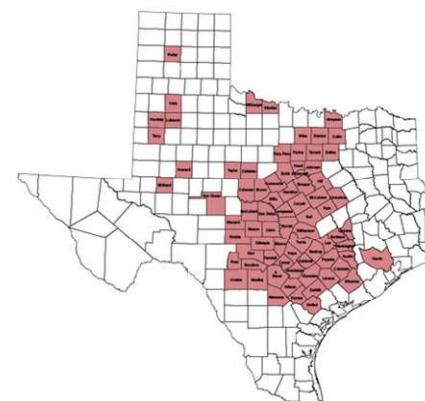
MMO

Oak Wilt

Infectious Fungal Disease
All Oaks Impacted
Central Texas Epidemic
No Pruning February to July
Immediately Paint Wounds/Cuts (any time)

TexasOakWilt.org for details

Counties with Confirmed Oak Wilt Occurrences 2019



Native Plant Society of Texas

Slide Objective: Introduction to oak wilt and the special precautions necessary for oak maintenance and preservation.

Oak wilt is a fungal disease caused by the fungus *Bretziella fagacearum* that invades and disables the water-conducting system in oaks. The fungus is spread two ways. Sap-feeding beetles carry the fungus to new trees. Below ground the fungus travels from tree to tree through interconnected roots.

Red oaks are the most susceptible to the disease and will often die within 4 to 6 weeks. Live oaks are particularly susceptible to spread through their interconnected roots.

If suspected contact a certified arborist and or county extension agent or Texas A&M Service forester for help in diagnostics. Through 2019 the disease has been confirmed in 76 counties in Texas centered in the Hill Country. (Click on slide to open map). Oak trees should not be pruned February through June. Any wounds or cuts in oaks should be immediately painted any time of the year. Any paint will suffice. These recommendations apply to all counties with confirmed oak wilt occurrences and adjacent counties. Texas Oak Wilt is a partnership between Texas A&M Forestry Service and the U.S. Department of Agriculture. Refer to their web site for detailed information, references and resources, contractors and additional recommendations on preventing spread of this disease.

Sick Plants - Resources

County Extension Office
Master Gardener Help Desk
Texas Plant Disease Handbook
[Plantdiseasehandbook.tamu.edu](https://plantdiseasehandbook.tamu.edu)
Texas Plant Disease Diagnostic
Laboratory
Certified Landscape Architect or Arborist



Joseph O'Brien, USDA Forest Service, Bugwood.org



Slide Objective: Provide students with a list of resources they can contact to help them diagnose and treat plants that are stressed or appear to failing

Diagnosing the cause of a sick plant is complex and difficult. The cause may be environmental (drought or flooded roots) or caused by animals, or mechanical damage or insects or too much shade or sun or problems in the soil or disease. Diagnostics often begins with identification of the plant. Then examine the surrounding area to determine if the problem is isolated or extends to other plants. Examine the area for clues to any changes that may have occurred such as block drainage. It is often useful to engage professionals or trained volunteers in helping with the diagnosis. County extension offices are a good resource to contact. The Texas Master Gardeners often have a help desk telephone line to call during the week or email address to send pictures and questions. For example, Harris, Montgomery and Grimes County Master gardeners have email addresses and phone numbers to contact a master gardener with questions as do many Texas counties.

Texas A&M University maintains a plant disease handbook that is an excellent on-line resource for diagnosing plant diseases and pests that are commonly encountered in Texas.
(<https://plantdiseasehandbook.tamu.edu/>) The handbook has a section for home landscapes with a number of potential problems for different species of ground covers, turf grasses, plants, shrubs and trees. This resources includes photographs and descriptions. This handbook is dominated by non-native plants.

A professional and ISA certified arborist or Texas certified landscape architect can be contacted in your area.

A well landscaped yard can increase home value by 10 to 12 per cent more than an average landscaped home. There are sound economic reasons to invest time and money in preserving mature trees and shrubs.

MMO



Mike McGee

**Tree Litter
(Not Diseased)**

Use as Natural Mulch
Thin layer

Mow, Shred, Grind
Faster decomposition
Kills Insects

Leave Snags and Branch Piles

Hugelkulture Beds

 Native Plant Society of Texas

Slide Objective: To discuss ways to deal with natural litter in a landscape.

Leave leaf litter on the ground, it's nature's mulch. Dried leaf litter can help protect newly planted plants from sun and heat. Leaf mulch more than a few inches thick can inhibit water infiltration or trap too much moisture leading to rot and fungal diseases. Shredding leaves makes a better compost that will breakdown quicker but also will kill insects.

Homeowners save money by using the leaves instead of purchasing mulch for the beds. Some homeowners will still feel uncomfortable with this or not like the appearance. A layer of mulch over the leaves will make it look more traditional.

Brush piles of tree branches are desired by some birds and native bees and will attract them to your garden.

Composting leaves and other natural litter. Compost piles/bins are a great alternative to putting natural litter in planting beds. Bins come in styles and prices to fit into any landscape, even high-end homes. Another alternative is to see if a neighbor wants them. Lastly, tree or green litter should not be sent to landfills. Recycling for them wherever you live, and you care about the environment, you really need to get them composted by someone.

Hugelkulture is a centuries old method used in Eastern Europe to use decomposing wood and garden debris as the foundation for raised garden beds. Hugelkulture is an elevated garden bed made from wood and garden debris covered with soil for growing vegetables. The method can be adapted for use in creating urban garden beds by excavating soil and filling with wood and garden debris and backfilled with the soil. The decomposing wood absorbs moisture and provides plant nutrients. There are several articles about this practice on the internet. <https://www.bhg.com/what-is-hugelkultur-gardening-7487034>

MMO

Shrub Pruning

- 1. Determine the Reason for Pruning**
- 2. Cut Dead, Broken and Diseased Branches to the Point of Origin**
- 3. Make Correct Cuts**
- 4. Make Selective Training Cuts for Shape**

 Native Plant Society of Texas

Slide Objective: To introduce the steps to consider in selective shrub pruning

1. Shrubs do not need to be pruned, so have a good reason to do so. Some of the reasons are reviewed on the next slide.

Otherwise, the thought process is similar as for pruning trees:

2. Cut dead, damaged, and diseased branches to the point of origin.
 3. Cut to a bud or branch growing in the desired direction (outwards) and cut $\frac{1}{4}$ -inch above the bud in a 45-degree angle away from the bud.
- Make selective training cuts. For instance, to control height, cut to the origin or base of the branch at the ground, or to shape a shrub into a tree form, select a leader and remove lower branches up to a third of the shrub height.

See, Douglas F. Welsh and Everett Janne, “Follow Proper Pruning Techniques,” <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

Reasons to Prune Shrubs

Train the Plant

Maintain Plant Health

Improve the Quality of Foliage/Stems

Restrict Growth



aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques

 Native
Plant
Society
of Texas

Slide Objective: Introduce primary reasons to prune shrubs

The reason for pruning will determine when, what, and how many cuts you make. Again, if you are happy with the growth and shape of the shrub, no pruning is needed.

Train the plant. Like trees, training should be done when a shrub is young, 1 – 2 feet in height. If a dense screen around an ugly utility box is desired, as shown here, low, dense branching can be encouraged by cutting the young shrub to 6-8 inches in height to encourage low branching. Before new growth appears in the next season, prune off a half of the new growth since the first cutting. In the second year, again prune off half of new growth. In the third year, shape the hedge, so that it is slightly narrower at the top. This will allow more sunlight to filter into the interior of the shrub.

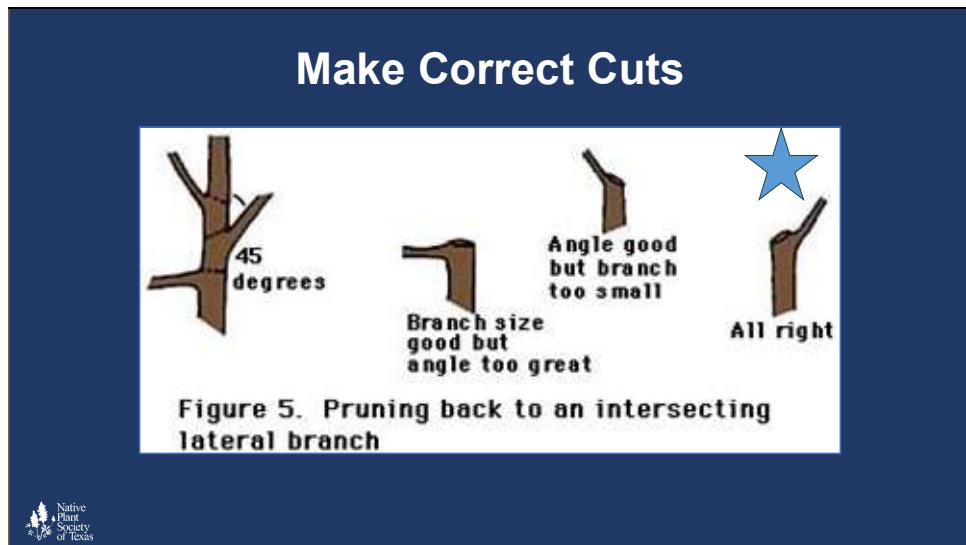
Plant health should always be kept in mind. For example, limbs encroaching in high traffic paths may be damaged or broken. Prune them to the mainstem or at the ground.

Improving the quality of foliage and stems may be accomplished by selective thinning. Cut the branch or stem to its point of origin on the main stem or at the ground. This method of pruning will not stimulate growth and will open the shrub to air and light. This method can also be used to maintain a shrub at a desired width and height.

Pruning can also encourage more flowers on spring flowering shrubs by removing new growth after flowers have wilted. See, Jim Childs, <https://www.gardengatemagazine.com/articles/how-to/prune/prune-spring-flowering-shrubs-for-more-flowers/>

Remember that selecting the right plant for the space will reduce maintenance time and cost.

[https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/](http://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/)



Slide objective: Demonstrate a good cut vs an improper cut

<https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/> When cutting back to an intersecting (lateral) branch, choose a branch that forms an angle of no more than 45 degrees with the branch to be removed (Figure 5). Also, the branch that you cut back to should have a diameter of at least half that of the branch to be removed. Make slanting cuts when removing limbs that grow upward; this prevents water from collecting in the cut and expedites healing.

When a branch or twig is cut, there is a good chance of decay. Make a clean, 45-degree slanting cut about one-fourth inch above and away from a bud—regenerative tissues are active in this area and the cut will callus over quickly as a bud breaks to replace the shoot you have removed.



Slide Objective: Selective shrub pruning can be used to achieve either a natural or formal look.

Natural look: Research the plant and retain its natural shape. American beautyberry has branches that gracefully arch.

Formal look: Limit shearing and use selective pruning when possible. Height can be controlled by selectively cutting to the origination of the too tall branch.

Photos: American beauty berry in natural shape
Texas sage, source unknown



Shearing is Discouraged

Removes New Leaves

Encourages a Dense Outer Shell, Blocking Light and Air Movement

Sheared Shrubs are More Susceptible to Disease

SF Gate

Native Plant Society of Texas

Slide objective: To explain the downside points of shearing.

Plant growth is controlled by the terminal bud, the bud at the end of a branch or stem. This terminal bud produces a constant flow of auxin, a suppressive hormone, to control the growth of the buds below it along the stem. Lower buds sprout into new shoots when the terminal bud has grown far enough away that the auxin level no longer inhibits the bud's growth. Shearing removes the terminal bud and the flow of suppressive hormones, causing a proliferation of new growth. This results in a dense outer shell that can block sunlight and air to the inner branches of the plant. Stacey Hirveta,

<https://www.provenwinners.com/learn/care/pruning-shrubs-part-1-why-prune;>

<https://myperfectplants.com/blogs/blog/what-is-apical-dominance>

Don't Shear: Why Johnny Can't Prune By Cass Turnbull

- *Costly and Time-Consuming:* The problem with shearing most plants is that shearing stimulates regrowth that is unattractive and needs to be re-sheared frequently to keep the plant looking tidy—sometimes as often as eight times a year. Selectively pruned plants need to be pruned less often to keep them within the size desired in a landscape. A key element of such pruning is that the plant doesn't react with watersprouts, ruining the looks of shrubs and trees and locking them into a high-maintenance regime, which equals high cost.
- *Unhealthy for Plants:* Any pruning book will explain that one prunes to open up the center of the plant, allowing air and light penetration to make the plant healthy. Shearing, on the other hand, creates a twiggy outer shell that gets ever denser and collects more deadwood and dead leaves every year, the opposite of a healthy condition. The results create the perfect protected place for pests and diseases, (*PlantAmnesty, Working to end the senseless torture and mutilation of trees and shrubs.* www.plantamnesty.org).

On the other hand, shearing to create a hedge has been used for centuries. The reasons include a desire for privacy hedges, fences, mazes, topiaries. Select plants that can withstand severe pruning and, when possible, shape the hedge like an inverted cone with the top narrower than the bottom to allow sunlight to reach the bottom leaves. See, Douglas F. Welsh and Everett Janne, "Follow Proper Pruning Techniques," <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>



Slide objective: To show the unhealthy consequences of shearing—dense outer shell and dead inner branches

Unhealthy for Plants: Shearing, on the other hand, creates a twiggy outer shell that gets ever denser and collects more deadwood and dead leaves every year, the opposite of a healthy condition. The results create the perfect protected place for pests and diseases, (*PlantAmnesty, Working to end the senseless torture and mutilation of trees and shrubs.* www.plantamnesty.org).

Timing of Native Shrub Pruning

In general, prune in late winter or before spring growth begins

~~Prune shrubs that bloom in Spring after they bloom~~



Jim Suter



Mike McGee

Prune shrubs that bloom in summer in late Winter/early Spring



Mike McGee

 Native Plant Society of Texas

Slide objective: to review the optimal time to prune blooming shrubs

Pruning after a native shrub blooms will eliminate much, if not all, the wildlife benefit of a plant that produces berries or seeds from pollinated blooms. Such shrubs should be pruned in late winter so wildlife can use the fruit. Also dormant season pruning will prevent the plant wasting energy on limbs that are removed.

Generally, shrubs that bloom early in the Spring, bloom on old wood. These shrubs begin to set buds for the next year shortly after the blooming season. Prune new growth after the blooms have faded. Check the internet and other resources for information on the type of shrub you are pruning.

Generally, shrubs that bloom in late Summer and Fall bloom on new wood. These shrubs should be pruned once the danger of a hard freeze has passed. Again, check the internet and other resources for information on the type of shrub you are pruning.

In Montgomery, Walker, and Grimes Counties, the following small trees or shrubs are valuable wildlife plants and represent plants with specific times to prune.

Sambucus nigra ssp. Canadensis, Common Elderberry blooms in Spring.

Although Elderberry blooms in Spring, it should be pruned in late winter to early spring so that it does not waste energy on supporting non-producing wood. The shrubs can produce suckers and runners, so it's important to remove any unwanted shoots or they may take over your garden.

<https://www.thespruce.com/what-is-elderberry-herb-1762285#toc-pruning>

Cephalanthus occidentalis, Button Bush blooms June to Sept.

Because of its size, many people prefer to keep buttonbush pruned. When left to grow untrimmed, the shrub takes on an irregular shape. Wayward or scraggly branches can be trimmed away for a more manicured look. Alternatively, these shrubs can be limbed-up by removing lower branches to establish a more tree-like shape. If it becomes unmanageable, simply cut the shrub down to the ground in early spring. Because it is such a fast grower, it will produce new growth very quickly.

<https://www.thespruce.com/buttonbush-growing-guide-5323850>

Pruning Vines

Cut at any Time: Dead, Diseased, or Damaged Vines to Healthy Wood

Cut When Dormant, Feb-May:

- Crossing branches to the main stem
- Vines on a trellis a third or more



Wasowski, Sally and Andy

Native Plant Society of Texas

Slide objective: To present concepts for pruning vines

Vines commence growing from the healthy cut tip

Cut interfering and crossing branches of woody vines to the point of interference or back to the main stem.

To make vines fit a trellis, cut back a third or more

Timing: Prune most vines during the dormant season, except trumpet creeper, which should be pruned in July to encourage flowering

See, Douglas F. Welsh and Everett Janne, “Follow Proper Pruning Techniques,” <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

Pruning Groundcovers

**Can be Gently “Mowed” or
“Weed-whacked”**

**Prune Before New Growth
in Spring**



Melody Lytle

 Native Plant Society of Texas

Slide Objective: Present pruning tips for groundcovers

Some groundcovers like *Calyptocarpus vialis* (Horseherb or Straggler Daisy), *Phylla nodiflora* (frogfruit), and *Salvia lyrata* (Lyreleaf sage), can be gently mowed or weed-wacked, at the highest height setting. In extreme summer heat, even an evergreen groundcover like Lyreleaf sage may go dormant, and no pruning will be needed. Pruning may not be necessary in unconfined areas.

See, Douglas F. Welsh and Everett Janne, “Follow Proper Pruning Techniques,” <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

MMO

Broad-Leaved Evergreens

- Shape When Young
- Remove Old or Weak Stems
- Research Plant's Growth Pattern
- Prune After Frost Danger Passes, Before New Growth

 Native Plant Society of Texas



Slide Objective: Introduce pruning concepts for broad-leaved evergreens

Broad leaved evergreen trees and shrubs have flat leaves and produce fruits which contain seeds. Native examples include Texas Mountain Laurel, Yaupon Holly and Evergreen Sumac. Prune during the dormant season. If pruned heavily, fruit will be reduced the following year. If pruned too early, flush growth could freeze setting back the plant. Best to remove 1/3 or less of the plant at one time.

<https://kidsnatureshows.com/kids-nature-school-deciduous-vs-evergreen/#:~:text=Broadleaf%20trees%20and%20shrubs%20have,an%20cones.>

See See, Douglas F. Welsh and Everett Janne, “Follow Proper Pruning Techniques,” <https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/>

MMO

Native Palms, Yucca, and Yucca-Like Plants

Prune for Safety Reasons

Leave 6" of Stem

Dead Leaves Protect Trunk, Wildlife Habitat

Remove "Pups" to Create Space or to Share


Alan Cressler



Slide Objective: Provide information on maintaining palms, yucca, and yucca-like plants

Pruning is generally not recommended for palms and yuccas. Green fronds provide food for the plant.

Prune for Safety reasons

- To clear walkways or paths

Remove dead leaves if a neater look is desired

- Consider leaving dead leaves for protection for the plant's trunk and as a wildlife habitat

Transplant yucca offspring

- Small new plants frequently grow at the base of a plant to eventually form a colony of yucca in an area. These small plants can be easily moved to other locations.

Flowering

- Only when they reach a certain age of maturity
- A specific moth is required to pollinate a true yucca plant
 - Without the yucca moths *Tegeticula* spp, the yucca plants would lose their only pollinators, and without the plants, the moths would lose their larvae food source. Each depends on the other for survival. National Wildlife Federation



Slide Objective: Introduce Seasonal Maintenance concept

Growing Season—Spring to Early Summer

Pull weeds

Prune flowering shrubs after blooms fade

Late Season—Summer and Early Fall

Plants are blooming and seeding. Occasional watering may be needed.

Dormant Season—Winter

Prune dormant trees and summer/fall blooming shrubs



Slide Objective: Identify the seasonal maintenance of perennials

Early Spring Thin, divide, and transplant fall blooming plants. See transplanting notes.

Mid Spring to Early Summer

Periodically cut back some perennials such as the larger salvias, native Texas aster and Fragrant mist flower, which benefit from being cut back one third to one-half at mid-season to keep them dense and encourage a strong late-season bloom.

Water only when the plants need it, rather than on a fixed schedule. Let the plants dry out between waterings, but don't let them get bone-dry or wilted. Probe the soil and if it is dry in the top 4" to 5"; then it is time to water. www.txsmartscape.com

For wildlife aesthetic: Leave seedling remains of flowers on the plant for wildlife and for spreading new plants.

For a neat aesthetic: Cut back stressed plants. Cut back to maintain walkways and other rights-of-way and to maintain desired height

Mid-Summer to Fall

Harvest seeds before they fall to the ground. Typically this is the hottest time of the year in Texas. Some of us would rather not be out gardening at this time. Weed and trim early in the day. Water as needed.

Winter--Dormant

For a wildlife aesthetic: Leave seed heads on herbaceous perennials for wildlife. Prune herbaceous perennials as late as possible (mid to late February). Woody perennials new spring growth will come from both the base and on the stem. Plants can be cut back or can be treated like a shrub and selectively pruned.

For natives from another ecological region, Esperanza (*Tecoma stans*) for example, prune after a light frost has hardened off the plant to reduce the exposure to hard freezes. Leaving stems helps to protect a plant against hard freezes. Also, pruning may stimulate new growth that can freeze. Native plants are accustomed to normal winters and do not require protection other than what mother nature would ordinarily provide

For a neat aesthetic:

Transplant and thin spring blooming plants. See transplanting slide notes.

Most perennials are cut back to 4" above ground level anytime after the first frost.

Beds should be mulched with leaves or shredded mulch to protect plants from winter freezes.

Seasonal Maintenance - Grasses

Growing Season	Late Season	Dormant Season
		

Photos by Carol Feldman

 Native Plant Society of Texas

Slide objective: Introduce seasonal maintenance of grasses

Growing Season

Grasses generally do not require maintenance. Last year's grass leaves can be raked out of new growth in mid-late spring. Grass will form a ring as it ages with the center becoming an area for natural compost.

Weed

Replenish mulch

Late Season

Grasses are seen in all their glory

Little maintenance required. This Lindheimer muhly has never been cut.

Dormant Season

Leave grasses as is for wildlife

For a neat aesthetic:

Rake or break off dead stalks and pull out dead growth of grasses when they start looking messy or just before spring – Mid-Feb to March 15 in North Texas.

Cutting back grasses is not done for the health of the plant – it is done for humans.

Some grass issues:

Folks who desire an evergreen landscape may complain about the buff color of grasses in their landscape. However, the buff grass visually “fills” the landscape and gives a fuller look to winter landscapes. More importantly, grasses left “in place” provide winter seeds for the birds and shelter for small wildlife.

MM0

Maintenance is Plant Specific

Create a Maintenance Schedule – Click on Slide to Launch Spreadsheet Demo

		Pruning & Trimming	Fertilizing	Watering	Notes
1	1. Canopy/Shade Trees				Prune for shape, always remove dead or dying limbs. Generally, raise canopy to 18' over roadway and 8' over walkways. Trim trees that are susceptible to oak wilt disease. If you have live oaks, trim them in the fall. Don't trim them in the spring, as they will all drop their leaves. Prune trees in the fall, as they are more dormant. This is not true for all trees, just live oaks.
2	PIN-1 American Sycamore (<i>Platanus occidentalis</i>)	D Fall Round seed white bark			Maintain no organic soil to that no leaf disease develops. Needs 30' water per year. Slow growing, massive tree.
3	PIN-1 Bald Cypress (<i>Taxodium distichum</i>)	D Fall Bald brown fall color			Little maintenance required. Leaves fall, but quickly rot to an ash-like, and usually requires little treatment. Roots from root can pose a problem for houses as removal can damage the house. Roots are very large and can come up in your walk.
4	PIN-1 Black Gum (<i>Nyssa sylvatica</i>)	D Fall			Prune for shape if desired. Very strong borer. Likes to be the only large shade tree in the area. Roots don't like sun to much.
5	PIN-1 Bur Oak, Gambel's (<i>Quercus macrocarpa</i>)	D Fall Large acorns			Removes shrubs from its base. Roots near surface, don't plant near walkways. Spring pruning.
6	PIN-1 Chinkapin Oak (<i>Quercus muehlenbergii</i>)	D Fall yellow red leaves	X		Prune for shape if desired. Very strong borer. Likes to be the only large shade tree in the area. Roots don't like sun to much.
7	PIN-1 Shumard Red Maple (<i>Acer shumardii</i>)				
8					
	Plant List				

Native Plant Society of Texas

Slide Objective: To provide an idea of a maintenance matrix that is an effective tool for maintenance companies, and for homeowners. This is also an effective tool to add into maintenance contracts.

A Maintenance Schedule Matrix

- Can be created by the design professional and therefore have some control as to the type of maintenance that might be completed to their projects.
- Is very useful for planning and bidding jobs for maintenance companies.
- Is a useful tool to add to maintenance contracts for Cities, Parks Departments and other public or private entities that ‘bid out’ maintenance.

EXCEL use demonstration

- From examining the Maintenance Matrix, maintenance crews can be scheduled into a pattern that works best for that site and the type of maintenance that the company does. For example:
- 3X in Spring, 2X in Summer, 2X in Fall, 2X in winter (This company does some tree trimming and the site has Live Oaks only)
- 3X in Spring, 1X in Summer, 2X in Fall, 1X in winter (This company does not trim trees and there are many perennials on this site)
- Introduce the maintenance handout for the course. This course handout should have plants learned in Level 1, 2, & 3 of the NLCP Program for your region. Explain how students can use this to make a site specific maintenance matrix. This tool can be used by designers, maintenance companies or anyone wanting to provide a maintenance matrix for a specific landscape.
- Show students how to use this as an Excel document by selecting plants in a column (not shown) sort from that column and then sort for the season. Then they have a work sheet for that site.
- A maintenance matrix is a regional component of the Class. The matrix should consist of all the plants identified in Levels 1, 2 and 3. Add seasons, and expand on maintenance for that specific plant.

MMO

Maintaining Soil Health

1. Limited Disturbance
2. Cover
3. Diversity
4. Living Roots
5. Habitat


Mike McGee



Slide Objective: Describe the principles to maintaining and building healthy soil.

- Limit physical and chemical disturbance of the soil. Tilling the soil tears apart the soil food web. Synthetic chemicals all have negative impacts on the life in the soil.
- Soil should be covered with mulch and other decaying organic matter that will provide food and habitat for macro and microrganisms that are feeding the plants.
- A diversity of plants above ground means a diversity of life below ground as well. Diverse ecosystems are resilient and healthy.
- Living roots in the soil are feeding soil biology with its basic food source: carbon. A densely planted landscape bed with many different shrubs, perennials, grasses and ground covers with natural mulch will provide all the nutrients the plants need by maintaining a healthy soil.
- Healthy soil depends upon a diversity of animals including pollinators, predator insects, earthworms, moles, rabbits, squirrels and deer

Rather than trying to minimize insects and other forms of life in our landscapes we should in general welcome them and realize they are a vital part of a living, healthy ecosystem.

MMO

Herbicides and Pesticides

~850 EPA Approved

Chemicals Enter the Soil

Harmful to Soil Health

- Significant reductions
- No EPA testing

Harmful to Human Health

Last Resort



Mike McGee

Native Plant Society of Texas

Slide Objective: Familiarize students with the negative impacts manufactured chemicals have on soil health.

Herbicides kill or harm soil invertebrates necessary for a healthy soil. According to a 2021 study, Pesticides and Soil Invertebrates: A Hazard Assessment (Front. Environ. Sci. 04 May 2021), over 60 % of tested parameters were negatively impacted by herbicides. The EPA estimates 50 to 100% of pesticides end up in the soil. Yet, the EPA only tests toxicity of herbicides to a single species, European honeybee, that spends its life without ever entering the soil. Scientists have called for changes to the EPA's practices to help preserve soil health.

The fungi and bacteria surrounding a plant treated with pesticides is reduced by 25 to 75 % by pesticide treatments. Among the consequence is increasing abundance of harmful bacteria in the soil. (Effect of Pesticides on soil Microorganisms, I. Kanaan, Sept 2019, Journal of Physics. Indirect Effects of Herbicide Blyphosate on Plant, Animal and Human Health trought its Effect on Microbial communities, Buggen et al, Frontiers in Environ. Sci., 18 Oct 2021).

Many herbicides are hazardous to human health if not properly handled.

There are instances where herbicides are the only viable option for eradicating weeds or invasives species. One example would be removal of a mature Chinese Tallow. The tree will continue to grow from roots despite repeated removal of the above ground tree. There are several reasons to consider herbicides as the removal technique of last resort yet they are by far the most common technique used. Visit any retail store with garden supplies and you will find shelves lined with different herbicides. The EPA has approved approximately 850 pesticides for use in the USA. This includes 72 pesticides banned or in the process of being phased out in the EU. (Donley, N. The USA lags behind other agricultural nations in banning harmful pesticides. Environ Health 18, 44 (2019).

Use of integrated pest management is recommended practice. This involves identifying pests and determining measures to prevent the pest or control it naturally. Then determine levels at which control is necessary. In many instances, biologic controls will manage the pest population, or the level of damage done does not merit treatment. If the determined level of pest is exceeded, only then undertake targeted chemical pesticides administered per recommendations.

MMO

Instead of Pesticides – Let Nature Work

Tolerate Most Bugs
Biologic Controls
Use Natural Chemicals

Native Plant Society of Texas

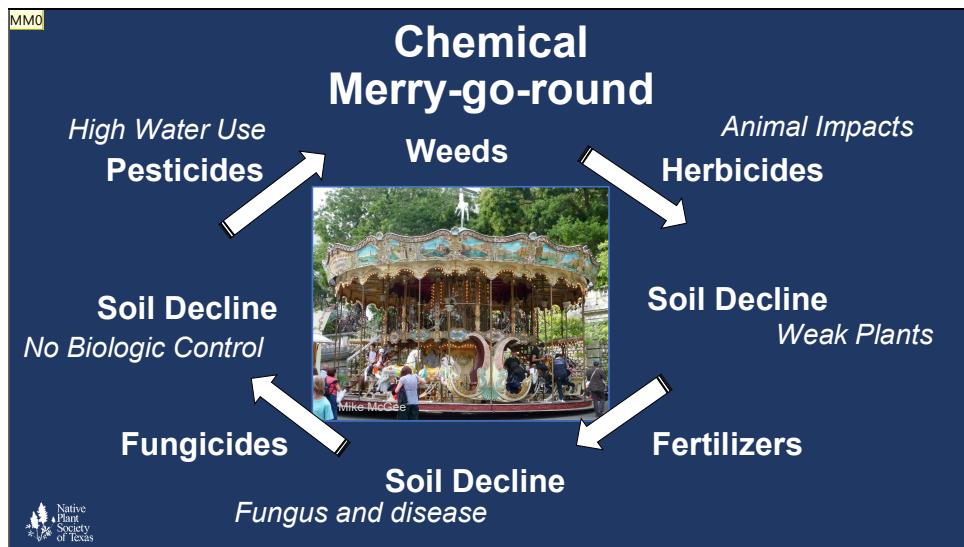
Photos by Mike McGee

Slide Objective: Evaluate the need for pest control and use naturally occurring chemicals when required.

Many insects are beneficial to native plants, and should be protected and encouraged, rather than eliminated. Insect larvae are essential for terrestrial birds to raise their young. In nearly all cases, biological control will prevent loss of native plants to insect infestation. One notable exception is a colony of leaf cutter ants can totally strip shrubs of vegetation. Harmful insects such as the mosquito can be most successfully managed by eliminating breeding sites – standing water of more than 7 days and less than 6 months. Where elimination of standing water is not possible, treat with BT (i.e. mosquito dunks) which targets mosquito and midge larvae. Yard misting systems are not recommended by the American Mosquito Control Association (AMCA) because of the undesirable effects, lack of efficacy data and promotion of insecticide resistance. See AMCA web site for additional recommendations.

When necessary, use natural chemicals to manage pests such as:

Insecticide - *Bacillus thuringiensis* (Bt) – kills mosquito larvae and most caterpillars such as tomato horn worms or web worms. Neem, garlic, water spray, and others.



Slide Objective: Treating with artificial chemicals degrades the soil and which then requires additional chemicals to combat the soil decline or disease brought on my previous chemical treatment.

As gardeners we need to understand the consequences of chemical treatments of our lawns and beds. Treatment of weeds with herbicides significantly decreases biologic activity and health of the soil that allows plants to unlock and access nutrients in the soil. Reduced nutrients from natural biologic activity causes weak plants , we revert to fertilizing with soluble nutrients that plants can access without relying on the degraded natural process. These fertilizers further degrade soil biologic activity and desirable soil properties. Fertilizers can alter soil pH and salt build up in the soil, damaging plants. High nitrogen fertilizers in particular leads to increased susceptibility to fungus. The chemical response is to treat with fungicides which again reduces soil biological health. This and lack of plant diversity leads to increased risk of insect infestations which leads to treatment with pesticides that causes further decline in soil health. Over the last 50 years organic content of our nations soils has dropped from 5 to 6 % to about 1 %. This is due to the reliance upon chemicals and what has been termed industrial agriculture practices. There are many adverse impacts from these practices. There is a positive revolution happening in agriculture today that is centered around improving soil health and in turn improved profitability and reduced erosion and pollution.

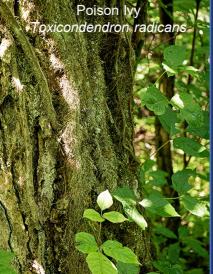
MMO

What is a “Weed”?

Any Plant Out of Place
Native
Non-native
Invasive Plant
Noxious Weeds



Fall Obedient Plant
Physostegia virginiana
Carolyn Worsham



Poison Ivy
Toxicodendron radicans

Photo Courtesy of Stephanie Brundage
Lady Bird Johnson Wildflower Center

Resource: www.texasinvasives.org Plant Data Base



Slide Objective: Provide an understanding of what constitutes a weed. Introduction to the need to identify plants before deciding on how to manage them.

- Weeding can be one of the most time-consuming aspects of gardening. Regardless of how much time is spent, no landscape can be free of weeds for any significant period of time. With knowledge and good practice, the time devoted to this activity can be significantly reduced.
- Definitions
 - Any plant out of place is the broadest and perhaps best definition of a weed. Identification is the first critical step in managing weeds. Is it a native that supports life in the ecosystem or non native that has been introduced? Native plants can be harmful to people, animals and other plants. One example would be our native Eastern Poison Ivy. Even beneficial and attractive native plants that spread aggressively can crowd out other plants in a garden. The Fall Obedient Plant is an aggressive native plant that can take over a native plant bed.
 - Invasive species are plants that are not native to the ecosystem and are harmful to the economy, environment or human health.
 - If the plant species is regulated by governmental authorities, it is termed noxious weed. There are 112 plants on the Federal Noxious Weed list and 31 plants on the Texas Invasive and noxious weed list.
- Texas Invasives is a partnership between several governmental, educational and private non-profit organizations. This organizations web site is an excellent resources on invasive species in Texas and methods of management. The web site has information on 178 plant species in Texas that have been identified as invasive by one of the member organizations.

<https://www.texasinvasives.org/>

MMO

Weed Reduction

- Remove Before Seeds Set**
- No Till**
- Mulch**
- Dense Planting**
- Identification**
- Weed Tolerance**



Deep-rooted sedge (*Cyperus enterianus*)
Image by Richard Carter, Valdosta State University, Bugwood.org

Native Plant Society of Texas

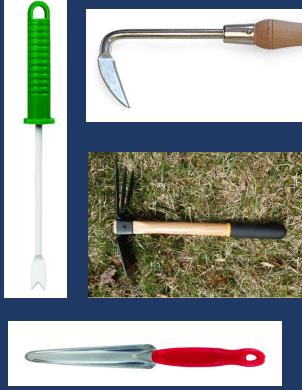
Slide Objective: Present strategies for reducing weeds.

There are several recommended strategies for reducing the amount of effort needed for weed or invasive removal. The first strategy is to remove the weed before they have a chance to seed. As a minimum, remove the seed heads before they can be dispersed. A good example of how important this is with a common invasive in disturbed land shown here, deep-rooted sedge, shown. A single plant can produce 500,000 to 1 million seeds annually. Removal of a single plant for seeding is far easier than dealing with the vast number of seedlings that can ensue. Another strategy is no till gardening. There is a seedbank of weed seeds in soil. Tilling raises seeds in the soil to the surface where they can germinate even though they may have been dormant for years. Mulching is also an effective strategy. It prevents seed to soil contact with dispersed seeds and reduces the chance of germination. If seeds do germinate in the mulch they are generally much easier to remove than from the soil. Placing cardboard on beds before mulching adds additional compostable material and also provides a more effective barrier to sunlight and thus reduces weed germination.. Another method for eliminating weeds is cover an area with clear or dark plastic during the growing season. At the edges, the plastic is dug into the soil creating a “hot house effect” that kills the weeds by heat. In hot weather climates, this can kill weeds and turn grasses in 4 to 6 weeks. If rainwater ponds on the plastic it will effectively stop heating process until the water is removed or evaporates. In wet climates or periods, this technique can take an extended period or be ineffective. A diversity of plants helps build healthy soil. Before removing plants, identify what they are decide whether or not removal is necessary or desirable. Unattractive native plants are serving to build the soil and are supporting wildlife in some manner.

Weed and Invasives Removal

Removal

- Identification
<https://weedid.missouri.edu/weedKey.cfm>
- Deep reach tools
- Wetting
- Disposal
- Early and often
- Many invasives need special treatment



Slide Objective: Describe process of weed removal including the importance of identifying the weed.

The first step in weeding is identification of the weed so we understand how the plant spreads to ensure that our removal method is as permanent as practical. Plant identification applications like iNaturalist or Seek can be helpful in identification. The University of Missouri has an on-line weed key that can be used to “key out” plants. This tool reduces the number of possible weeds and includes photographs to help confirm identification. Once weeds are known, then removal and disposal can be tailored to the weed. For example, hand pulling weeds that spread by rhizome and tubers will do no good if the rhizome and tubers are not removed fully. Examples include the Japanese Climbing Fern and Nut Grass. Further, the weed may spread by spores, like the Japanese Climbing Fern which requires the plant should not be mowed to prevent broadcasting the spores. In most cases, weeds should not be composted. Rather they can be destroyed by burning or disposal within a plastic bag. Identification is important to understanding what the plant looks like when it is young so it can be removed early which is generally much easier. Identification is also important to be able to distinguish between weeds and native plants you may want to leave.

In most cases it's important to remove most of the root to kill the weed. Often weeds will be growing among desirable plants which we don't want to disturb or damage during weeding. To facilitate this deeper and narrower weeding tools are often superior. It's almost impossible to effectively remove weeds and observe what is growing nearby with long handled weeding implements. Pulling weeds to fully remove the roots is much easier when the soil is wet. Soaking the area prior to weeding is a good strategy to reduce the time spent and effectiveness.

The adage a stitch in time saves nine applies to weeding. Caught early, weeds and invasives are much easier to remove when they are smaller than after they grow. The roots are shallower and less likely to be intertwined with those of desirable plants. Once well established there will be a large seedbank established in the soil or a proliferation of rhizomes. It's a far bigger chore that is harder to accomplish if weeding is allowed to get well advanced.

**Nutgrass or Purple Nutsedge
(Cyperus rotundus)**

Texas Invasive
Rhizomes
Allelopathic
Eradication Difficult
 Herbicides
 Mechanical
Disposal

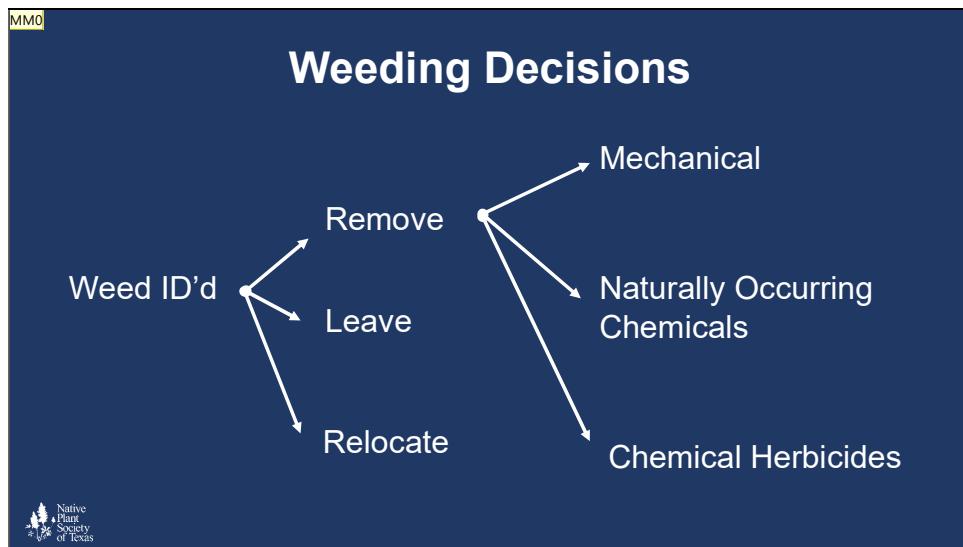


MS-MG3cc

Native Plant Society of Texas

Slide Objective: Illustrate why knowledge of the weed or invasive is critical to any eradication effort.

Nutgrass is a Perennial sedge that has been called the world's worst weed. It suppresses other plants by producing toxic compounds in the soil that can prevent germination. The sedge will grow through deep mulch and plastic mulch. The sedge is dormant in the winter but grows and spreads rapidly in warm weather. They reproduce from a rhizome or nut. Once mature the rhizomes produce a hard nut that can be as deep as 12" below the soil surface and connected to the sedge plant by a thin, wiry root. Most herbicides are not effective in eradicating the rhizome. Several applications are often required and requires fully saturating the leaves. Application in garden settings may kill or damage adjacent plants. TexasInvasives.org web site provides guidance on herbicides that can be used. Mechanical removal of an infestation in a garden bed is difficult and can require multiple courses of removal over several years to significantly reduce an infestation. The best strategy for mechanical control is to not allow any heavy infestation to establish. Unless the nut is removed regrowth will reoccur rapidly. Removed plants should be destroyed by fire or in a plastic bag in a landfill. Because the plants spread rapidly and are difficult to remove, infestations should be treated when they first appear. Once fully established, it can take several removal campaigns per year over 2 or 3 years, to bring this invasive plant into control. One rhizome can start another colony. It is virtually impossible to remove this weed from native beds entirely. Recommended disposal methods for nonnative invasives include: Place in an isolated brush pile that is tarped to air dry till the plants are no longer viable (do not include plants that have produced seeds. Allow to decompose naturally on site. Bag inside heavy, black plastic bags without holes. Allow to sit in sun for 3 weeks. Then dispose of in a landfill. Burning may be an option but must be done with regulations



Slide Objective: Discuss the decision process of what to do with a “weed” and reinforce the importance of identification. Identify when selective use of herbicides may be warranted.

The critical step in deciding what to do about a weed is identification and understanding the plant. Often we will find the plant is a native that we may find desirable elsewhere. Regardless the plant is providing some benefit to the soil by introducing carbon and organic matter. It is also using nutrients and perhaps competing with desired plants in this location or detracting from aesthetics. In the case of nut grass for example, leaving the it will result in rapid spread and reduced vigor of other plants (allelopathic). So removal is the best choice, and the sooner the better. Treatment with a naturally occurring chemical spray (e.g. vinegar, orange oil) is not a viable option. These chemically only damage the surface foliage and do not impact the rhizome “nut”. So the gardener is left with two options, manufactured chemicals that will kill nut grass (e.g., sedge hammer) or mechanical removal. Sedge specific herbicides may kill other desired plants near by. Read the label carefully. The herbicide will deteriorate soil health. Repeated applications are necessary to temporarily eradicate nut grass. The other alternative is mechanical removal. This is a time consuming process and will require several “campaigns” to eradicate from a bed. There is no easy and good choice. This is a case where selective use of an herbicide is permitted under NPSOT guidelines

MMO

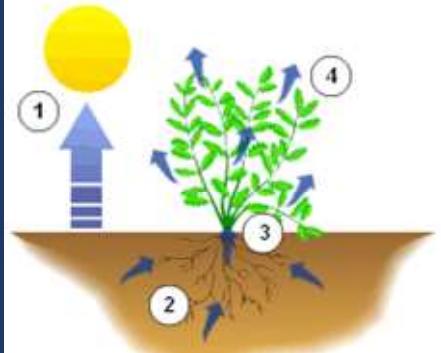
Evapotranspiration

Evapotranspiration: water loss by *evaporation* and *transpiration*

Cools Plants and the Air

Natural Water Cycle

Efficient irrigation replaces water loss from evapotranspiration not replaced by natural rainfall



Larry Hicks, Mark Bird, & Michael Nentwich

Native Plant Society of Texas

Slide Objective: Discuss the water needs of plants in a landscape. To understand the basic principles involved in the water consumption of plants.

Evapotranspiration is the combination of the words: *Evaporation & Transpiration*

- Evaporation is the loss of water from the soil.
- Transpiration is the loss of water into the air from the plant. It is the way plants cool themselves and also cool the air around them. Lushly vegetated landscapes are cooler as a result of this process. Evapotranspiration is part of the water cycle that returns water to the atmosphere.

- Water evaporates from soil surface
- Water absorbed by roots
- Water passed through plant tissue
- Water transpires (evaporates) from plant leaves

The amount of evapotranspiration varies depending on the sun/shade, wind, amount of mulch, soil types, temperature, and other climate factors. Irrigation should replace water loss from evapotranspiration not provided by rainfall. Healthy soils will reduce the need for supplemental watering. But in times of drought, irrigation is often necessary for survival of some native plants.

MMO

Water Native Trees and Shrubs In Drought

Look for Stress
Dropping, wilt, yellowing, brown tips

In Drought Water
Mature trees—weekly
6"-8" deep
~1" of water



Houston Public Media

Texas A&M Forestry Service: Community and Urban Forestry : Drought and Trees



Slide Objective: Provide property owners with information on watering during drought

Although native plants are adapted to the local environment, this does not mean that native trees , shrubs or perennials in your landscape will survive prolonged and extreme droughts. Drought stresses trees and makes them more susceptible to disease and pests. In the 2010 drought over 300 million trees died from the drought in Texas. In some locations loss of trees was devastating and took years to recover. For example, over 50% of the trees in Houston's Memorial Park died after the 2009 to 2011 drought. Most of these trees were native pines and oaks.

In a drought, mature trees will require supplemental water equivalent to about 1 or 2 gallons per week per inch of tree diameter. Supplemental water can be provided by a bucket, soaker hose, irrigation system or sprinkler. Watering should reach about 6" to 8" deep and should be equivalent to approximately one inch of rainfall. The Texas A&M Forestry service provides detailed descriptions of recommended practices to preserve trees through a drought.

The best approach is to monitor all plants during droughts and look for signs of wilt or drying and dying leaves. When plants are severely stressed by drought, they should be water deeply once per week to keep them alive.

MMO

Why Harvest Water for Our Landscapes?

Limited Resource

50%-70% of Water Use

Better for Plants

Reduce Run-off



Larry Hicks, Mark Bird, & Michael Nentwich
Mike McGee

City of San Antonio Development Services

Native Plant Society of Texas

Slide Objective: To discuss the possibility of watering plants with harvested water.

Benefits:

- Reduce the quantity of stormwater runoff
- Reduce potable water use for irrigation
- Reduce potable water use for building sewage conveyance
- Rainwater is better for plants.

Water Sources:

• Domestic or Municipal (Potable Water)

• Alternate Water Sources

- Reclaimed Water
- Captured Rainwater
- A/C Condensate

MMO

You Can Learn To Speak Natives By Becoming NLCP Certified!



Carol Feldman

NLCP Level 1 Class, Denton, Spring 2014

Native Plant Society of Texas

Slide Objective: To encourage professionals to use their NLCP certification to promote their business.

Encourage maintenance participants to use their NLCP Certification to validate their experience. It's OK to put the certification on written material like business cards, etc.

Two options will be available:

Certified in Native Plant Landscapes

For participants seeking a professional certification

Certificate awarded at the completion with competency of **four core classes**.

Certified in Native Plant Landscape Maintenance

For maintenance specialists seeking a professional certification

Certificate awarded at the **completion with competency of both Level 1 and 3**.

Photo: NLCP Class, Denton, by Carol Feldman

Note: Add how the certifications should be listed on their business cards, etc.

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