



## NATIVE LANDSCAPE CERTIFICATION PROGRAM Level 1

### ***Introduction to Native Landscapes***

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**Slide objective:** Title slide.

This program was designed by the Native Plant Society of Texas to teach people about landscaping their yard using native plants.

**Please use L1 Intro presentation for class specific introduction slide show, including:**

- Class sponsors
- Overall program (NLCP) description
- Class overview of teaching methods and types of certification
- Level 1 class objectives
- Class introductions, logistics (refreshments, restroom locations, emergency exits), handouts overview, and announcements
- Appreciation for program development

L1P1 v3.0 18.0415 NTX.pptx

## Introduction to Native Landscapes

Outline

- Benefits of Natives in the Landscape
- Landscape and Development
- Landscaping with Natives
- Resources



Blackeyed Susan  
(*Rudbeckia hirta* var. *angustifolia*)

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**Slide Objective:** Provide an outline of the “Introduction to Native Landscapes” presentation.

Level 1 Part 1 – class topic presentation.

This presentation will discuss the ‘Value of Native plants in the Landscape’, the current or conventional thinking on landscapes, and finally, how to landscape with natives.

The presentation ends with a resources for students.

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## Definitions

**Indigenous or native plant** – evolved and occurs naturally, with no human intervention, in a particular region or environment

**Texas native plant** – indigenous to Texas prior to Euro-American settlement (plants historically translocated by Native Americans are accepted as native in this definition)

**Endemic plant** – native, unique or restricted to a certain geographic location, defined zone, or habitat type

**Slide Objective:** Introduce terms often used when discussing native plants

**Native and indigenous plant** can be used interchangeably. A plant that exists in a region without human introduction. <http://landscapeforlife.org/plants/use-native-and-adapted-plants/> A plant that lives or grows naturally in a particular region without direct or indirect human intervention.

<http://www.wildflower.org/glossary/search.php?term=native&definition=Definition+search>

- NLCP has developed the definition of a native plant as one that evolved and occurs naturally, with no human intervention, in a particular region or environment.
- A plant can be native to Texas, but not native or indigenous to specific regions of Texas.

**Texas native plant** as used by the Native Plant Society of Texas and many other organizations describes a plant that was indigenous to Texas prior to Euro-American settlement (early 1800s). In this use of the term, a native plant can be one that is thought to have been brought to Texas prior to Euro-American settlement by Native Americans.

**Endemic plant** is used to describe a plant that is native, unique or restricted to a defined geographic location, such as an island, nation, country or other defined zone, or habitat type. Plants that are indigenous to a place are not **endemic** to it if they are also found growing elsewhere. You may see a plant described as being endemic to a specific county of Texas or endemic to a specific soil type or geologic formation.

**Adapted Plant** – is not native and not invasive, but is able to thrive in the local climate and soil conditions. <http://landscapeforlife.org/plants/use-native-and-adapted-plants/>

## Benefits of Natives in the Landscape

- Save Water
- Improve Water Quality
- Provide Wildlife Habitat
- Improve Air Quality
- Reduce Maintenance
- Create a Sense of Place



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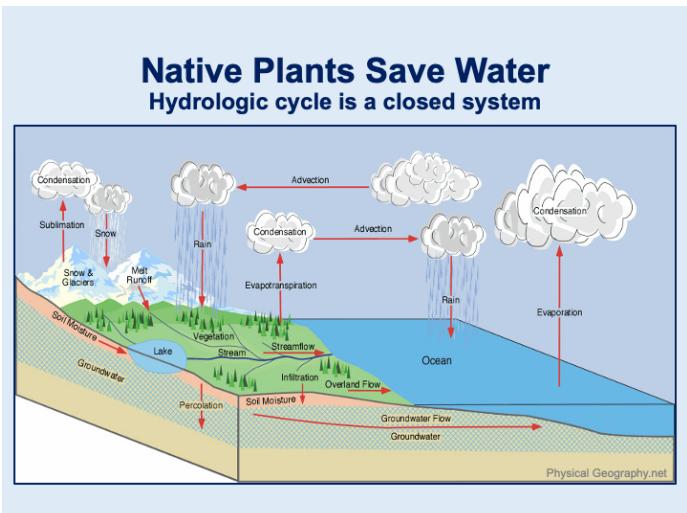
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**Slide objective:** Introduce 6 reasons natives are valuable in a landscape.

Each topic is discussed in detail in later slides.

- Save Water
- Improve Water Quality
- Provide Wildlife Habitat
- Improve Air Quality
- Reduce Maintenance
- Create a Sense of Place



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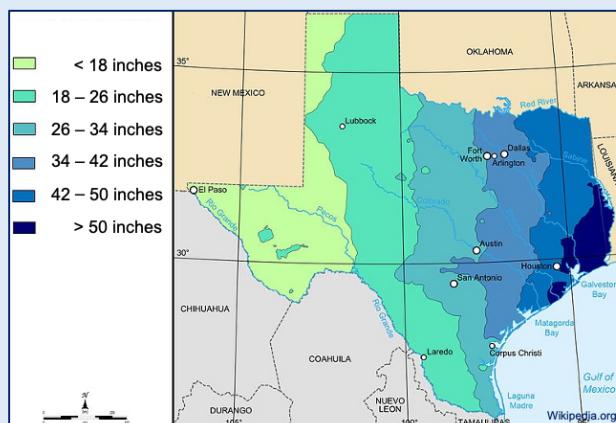
**Slide objective:** Explain water cycle and the importance of water conservation. State the source of local water supplies.

Why is it important to conserve water?

- The water cycle is a closed system. Water sources are interconnected. We only have so much water and we can't create more water.
- Precipitation infiltrates the soil and then some of it percolates further into ground recharging aquifers or flowing underground into creeks and streams.
- We can help recharge our water supplies; aquifers and lakes, by planting native plants that require less water and have deeper root systems which help channel rainwater into the soil and groundwater
- Saving water also saves money.

## Native Plants Save Water

Once established native plants survive on local precipitation



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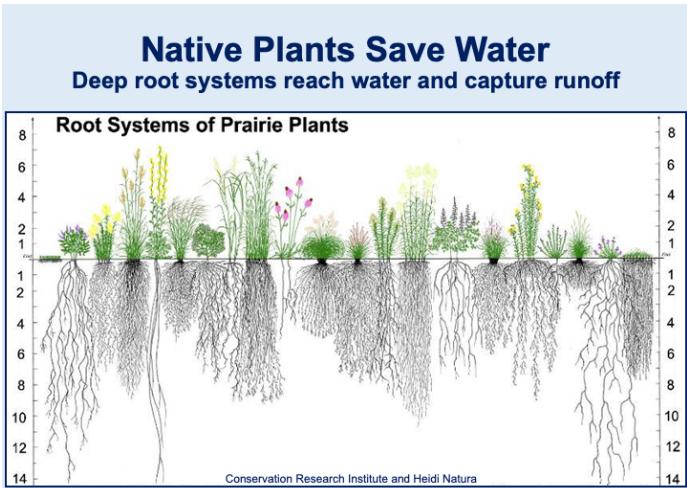
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**Slide objective:** Native plants, once established, can typically survive on local precipitation amounts.

Native plants, specifically indigenous plants, are able to survive on the amount and patterns (flood to drought) of rainfall that naturally occur in their area because they have specific adaptations for their region. For example plants indigenous to arid regions have small or waxy leaves that reduce the amount of surface area for transpiration.

Once established, native plants in a landscape require very little water aside from naturally occurring rainfall. They typically do not need extra irrigation to survive.



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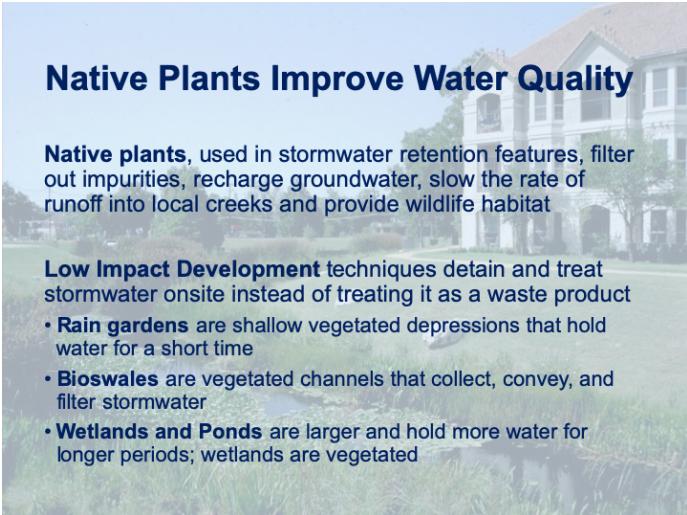
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**Slide objective:** Native plants have deep root systems that can reach water in the soil and can help channel rainwater into the ground

One of the adaptations that help many native plants survive on the amount of rainfall that naturally occurs in their area is their ability to develop deep root systems.

This graph shows just how long the root systems of typical prairie plants are. Native prairie plants (grasses and forbs) can develop root systems up to 14 feet deep while a typical non-native turfgrass normally only develops root systems that are 6 inches deep.

Not only do the deep root systems of native prairie plants help the plants obtain water from the subsurface water table, they also help channel rainwater deeper into the ground, capturing the rainwater for storage in the soil or underlying aquifer. Capturing rainwater and storing it in the soil and/or aquifer, reduces the amount of surface runoff occurring during rain events which also reduces soil erosion.



## Native Plants Improve Water Quality

**Native plants**, used in stormwater retention features, filter out impurities, recharge groundwater, slow the rate of runoff into local creeks and provide wildlife habitat

**Low Impact Development** techniques detain and treat stormwater onsite instead of treating it as a waste product

- **Rain gardens** are shallow vegetated depressions that hold water for a short time
- **Bioswales** are vegetated channels that collect, convey, and filter stormwater
- **Wetlands and Ponds** are larger and hold more water for longer periods; wetlands are vegetated

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**Slide Objective:** Explain how stormwater retention features (Low Impact Development) that include native plants help improve water quality

The previous slide showed how the deep root systems of native plants can help capture and direct rainfall into the soil

Native plants can be used in stormwater retention features to enhance the services these features provide

These Low Impact Development (LID) techniques provide the following functions and values:

- Detain stormwater, thus keeping the water on site where it can be used, instead of treating it as a waste product.
- Filter out impurities
- Create habitat
- Recharge groundwater supplies
- Slow the rate of release into local creeks, thus reducing erosion of the creek bed and banks
- Increase property values (the apartments that border this wetland have a 10% premium on the price due to the view of the wetland)

Wetlands and ponds may need supplemental water during dry periods to maintain wetland plants

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## Native Plants Provide Wildlife Habitat



### Wildlife needs

- Food
- Shelter
- Water

**Slide objective:** Wildlife have three basic requirements: food, shelter, and water.

Native plants provide the best shelter and food for native wildlife because the region's plants and animals have developed interrelationships over thousands of years of co-existence.

Many of the rare, threatened and endangered plant and animal species in Texas are those whose natural habitats have been lost, degraded or fragmented.

Insects are essential for maintaining populations of plants and animals and therefore supporting insect populations with native plants is very important.

Dead trees provide habitat for many cavity nesting bird species.

Dead logs on the ground provide important amphibian and reptile habitat.

Kyle McManus photo: The Oriole is on an Anaqua in the Coastal Bend area (not a Chinaberry).

## Native Plants Provide Wildlife Habitat

Provide year-round food for wildlife



Offer a diversity of plants that bloom or fruit throughout the seasons for maximum beauty and benefit to wildlife

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**Slide objective:** Including a variety of native plants that provide food throughout the year will attract wildlife all year round.

For example, Agarita offer flowers in the spring followed by berries in early summer, Lantana flowers all summer and into fall, providing nectar for insects and birds, American Beautyberry blooms in the spring and offers berries in the fall, & Yaupon provides fruit in the winter.

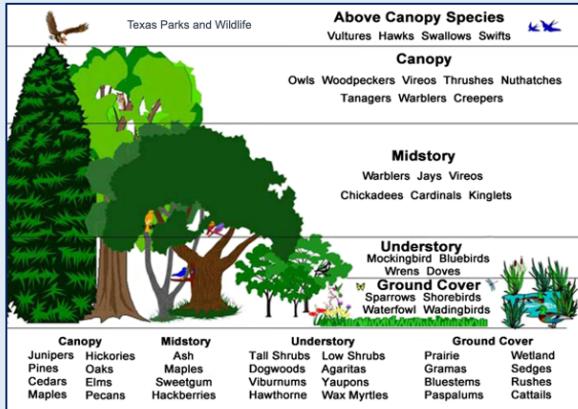
Fall flowering plants are very important for providing food (nectar) to migrating monarch butterflies as they travel from northern North America to their wintering grounds in Mexico.

Winter time is a time of scarce food for many animals and including fruit-bearing plants in our landscapes will reward us with excellent wildlife viewing opportunities.

Planning our landscapes so that the plants offer flowers and fruit in all seasons not only helps support wildlife, it also provides year-round color in your landscape.

## Native Plants Provide Wildlife Habitat

Vertical layers provide diverse wildlife habitats



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**Slide objective:** Natural vegetation communities provide a range of vertical heights supporting a greater diversity of wildlife species than typical landscapes consisting mainly of turfgrass and trees.

Wildlife use a variety of vertical layers to meet their needs for shelter, food and nesting sites. They may nest in the canopy of a tree, but feed at ground level, for example.

This slide shows how a variety of birds use the different layers in a landscape.

We can attract and support a higher diversity of wildlife by creating a landscape using indigenous plants that grow at varying heights.

Including indigenous evergreens in our landscapes assures some greenery during the winter months, which offers wildlife some cover and protection (SHELTER). Many evergreens also provide food. Examples of native evergreens include junipers, yaupon holly, mountain laurel, live oaks, and evergreen sumac.

Illustration may be found at Keep Texas wild:

<https://tpwd.texas.gov/education/resources/keep-texas-wild/come-fly-with-me/where-the-birds-are>

## Native Plants Provide Wildlife Habitat

Plants are the base of the food web



Melvin Yap

96% of resident bird species rely on insects for feeding their young.

(Doug Tallamy, Spring Wildflower Symposium, 2014)

- Supporting
- Insects
  - Amphibians
  - Reptiles
  - Birds
  - Mammals

Wildlife diversity is important to a healthy ecosystem

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**Slide objective:** Plants are the base of the food web.

In this photo an adult mockingbird is feeding insects to its fledglings.

- The availability of insects, particularly during nesting season, is very important to resident birds as well as to migrating species.
- In Texas, about 650 bird species migrate through or reside in Texas and almost all require insects for food during some stage of their life.
- “96% of resident bird species rely on insects for breeding (i.e. feeding their young)”  
(Doug Tallamy, Spring Wildflower Symposium, 2014)

Insects are the base of the food web for many wildlife species including: amphibians, reptiles, birds, & many mammals

- Native plants provide the best habitat for supporting native insect populations
- Insects are often very specific about which species of plants they require for food or shelter

Not only do many wildlife species depend on insects for their survival, most plants also depend on insects for maintaining their populations

- Insects play an extremely important role in pollinating both native plants and agricultural crops

Photo: © 2011 Next-Door Nature— no reprints without written permission from the author. Thanks to Melvin Yap for making his photo of an adult northern mockingbird feeding two fledglings available through a Creative Commons license.

## Native Plants Provide Wildlife Habitat

Some animals depend on specific plants

Monarch butterflies

- Only lay eggs on milkweed
- Larvae eat only milkweeds
- Once eaten, milkweed toxins provide protection for larvae and adults from predators



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**Slide objective:** Some animals are completely dependent on specific native plants or specific habitats for survival.

For example, the monarch butterfly larvae will only eat milkweed plants.

- During their multigenerational spring migration from their wintering grounds in Mexico, adult monarch butterflies seek out native milkweeds along their migration route in Texas and further north into Canada on which to lay their eggs
- The eggs hatch and morph through five larval stages, and as they grow the larvae eat the milkweed plant on which they hatched
- When these larvae become adult monarch butterflies they will continue migrating north and will seek out milkweed plants on which to lay their eggs
- The fifth and last generation of monarch butterflies to grow up will migrate in the fall all the way back to the wintering grounds in Mexico, feeding on nectar from fall blooming plants along the migration route which generally follows Interstate 35 in Texas

It is very important to plant milkweed plants in Texas to support spring migrating monarch butterflies and fall blooming plants to support fall migrating monarch butterflies, however a few things we need to consider include:

- Milkweed plants are eaten by the monarch butterfly (and other butterfly) larvae – so they generally will not look pretty in our landscape – best to plant them among other plants that will mature later in the spring and summer
- Butterfly larvae are extremely sensitive to insecticides, especially systemic insecticides
  - Need to buy milkweed plants only from suppliers who can verify that the plants have not been treated with systemic insecticides or grown near plants that were treated by systemic insecticides
  - Need to refrain from applying insecticides to milkweeds plants (remember they are meant to be eaten!) or their neighboring plants
  - If we grow tropical milkweed, then we need to cut it back and remove all clippings in late fall so that we are not providing overwintering habitat for OE – a disease that impacts monarch butterflies. “OE”, Ophryocystis elektroscirrha, is a protozoan parasite that infects the Monarch (and Queen).

## Native Plants Provide Wildlife Habitat

Plant Diversity

### A variety of plant species

- Increases the chances that an animal can find food
- Provides an assortment of vertical layers
- Supports a greater number of insect species that support a greater diversity of wildlife



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**Slide objective:** In summary, native plants increase native biodiversity by providing a variety of sources of shelter and food.

We can increase the natural biodiversity in our landscapes by planting a variety of native plants and by so doing we:

- Provide a variety of vertical layers to support an increased number of wildlife species
- Provide a variety of nectar sources to support a greater number of insect species, and other pollinators (hummingbirds and bats for example)
- Increase the chances that wildlife can find food or shelter in our landscapes
- Provide color in our landscape year-round

To increase natural biodiversity, we do not have to grow a hodgepodge of plant species. We can provide the variety of plants and layers needed by wildlife through planned landscapes, including formal landscapes. We'll discuss landscape planning in more detail later in the program.

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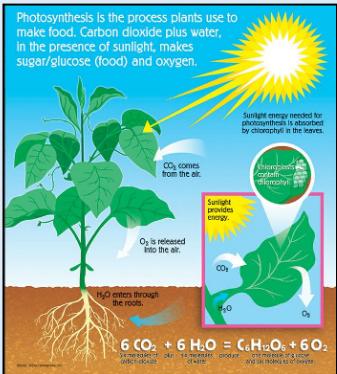
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## Native Plants Improve Air Quality Sequester Carbon



- During photosynthesis: plants take in carbon dioxide (CO<sub>2</sub>) from air and water from the soil to make food
- The CO<sub>2</sub> is converted to carbon and oxygen is released back into air
- The carbon is stored (sequestered) in plant tissue as sugar
- Air quality is improved by the removal of CO<sub>2</sub> – a greenhouse gas

**Slide Objective:** Plants take in CO<sub>2</sub>, sequester carbon, and release oxygen through photosynthesis

Let's take a deep breath—we have plants to thank for the oxygen we are breathing so effortlessly right now!

**Photosynthesis** is the process in which a plant absorbs water through its roots, carbon dioxide (CO<sub>2</sub>) through its leaves, and using energy from sunlight, transforms these compounds into glucose (a sugar or food) for the plant's use and oxygen that is released as a byproduct into the air.

- In other words: the carbon from the CO<sub>2</sub> is stored in the plant, a process referred to as carbon-sequestration.
- All animals, including humans, depend on oxygen to survive and plants provide oxygen through photosynthesis.

All plants improve air quality in this way. However, not all plants do it with the same efficiency.

- When plants die and decompose their stored carbon is released mostly as CO<sub>2</sub> again, therefore long-lived plants are better at storing carbon than short-lived plants
- Native plants are typically woody trees, perennials, or bunch grasses that have permanent structures (trunks, stems, roots) in which to store carbon, even during winter months; as compared to turfgrass, for example, which has very little structure in which to store carbon because its roots are not long and it is mowed frequently removing portions of leaves where carbon is stored
- Native plants often live longer, require less trimming, and are not replaced annually like many of our conventional landscape plants, and thus are more efficient at sequestering carbon than non-native plants

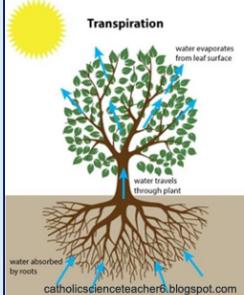
## Native Plants Improve Air Quality

### Reduce Temperatures

Urban temperatures can be higher than surrounding rural areas by 5 or more degrees, creating a heat island



Plants help lower temperatures through shading and transpiration



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**Slide Objective:** All plants reduce air temperature by producing and giving off water vapor to the surrounding air.

In urban areas with lots of asphalt & concrete (which absorbs heat & can raise city temps), temperatures can be higher than surrounding rural areas by + 5 degrees. This phenomenon is called the Urban Heat Island.

Plants, especially trees & shrubs, help lower air temperatures through the process of transpiration.

- During transpiration liquid water is converted to water vapor (a gas) inside the plant and is then released to the surrounding air from pores in the leaves.
- The water vapor cools the air around the plant (similar to cooling fans/misters found at “cooling off stations”).

Plants can also reduce air and soil temperatures through shading.

Photo: Downtown Austin

## Native Plants Improve Air Quality

Reduce Harmful Emissions

- Reducing turf areas decreases the use of lawn equipment
- Gas powered lawn equipment produce harmful air emissions



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**Slide objective:** Native landscapes require less maintenance using gas-powered tools

By converting more lawn areas to native landscaping, we can reduce the amount of time that we are operating gas-powered tools.

To reduce harmful emissions from lawn equipment, the EPA has adopted emission standards to control both exhaust and evaporative emissions from small spark-ignition engines. Phase 3 exhaust emissions standards take effect in 2011 or 2012, depending on the size of the engine. Evaporative emission standards address fuel permeation through fuel system components and fuel venting during engine operation.

<https://www3.epa.gov/otaq/smallsi.htm>

## Native Plants Reduce Maintenance

- Little or no irrigation once established
- Less mowing
- Little or no fertilization or pesticides
- Less waste – leaves and clippings may be reused



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**Slide objective:** Native plants require little maintenance.

Native plants require

- Little or no irrigation once established
- Little or no fertilizer or pesticides to stay healthy
- Little trimming and the leaves and branches that are trimmed can be composted or left for mulch

Compare the native landscape to the lawn across the street which irrigation, fertilizing, mowing, trimming, and blowing



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**Slide objective:** Native landscaping requires less maintenance and enhances enjoyment of the outdoors

There are many advantages to home owners too. There is less lot to maintain while more land is available for views, walks, stress relief, etc. Views are permanently protected. Natural resources are all around for them to enjoy. Homes retain value much more than traditional developments.

The usual situation is that urban residents have to put back what was destroyed during development. It would be much more efficient & I'd love to be assisting them with how to manage their existing landscapes instead.

Photo: This is Molly Hollar at the Molly Hollar Wildscape in Arlington.

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## Native Plants Create a Sense of Place

- Create a distinctive and interesting landscape
- Offer residents and visitors a unique experience
- Provide a sense of being here – not in California, Africa, China...



**Slide objective:** Native plants make landscapes more interesting and representative of the region's natural characteristics.

No plant identifies Texas more than Bluebonnets, our state flower.

- They can be seen blooming in spring along our roads, in prairies and pastures, schoolyards, and church yards
- Wildflower conservation in Texas and the nation benefited from the tireless efforts of Lady Bird Johnson promoting the use and preservation of wildflowers along roadways
- The Lady Bird Johnson Wildflower Center in Austin, a renowned resource for native plant enthusiasts, was started with the support of Lady Bird Johnson

"I have always been a natural tourist. Lyndon used to say I kept 'one foot in the middle of the big road'. Wherever I go in America, I like it when the land speaks its own language in its own regional accent." Lady Bird Johnson

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## Native Plants Create a Sense of Place

Anywhere, USA



**Slide objective:** Conventional housing and commercial developments often look the same wherever they are located.

- Houses all look the same.
- Lawns all look the same.
- There is nothing in the architecture or landscaping to indicate what region of the state or country you are in.
- Where do you think this photo was taken? It is Plano, TX

## Native Plants Create a Sense of Place

Each ecoregion has a unique look



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**Slide objective:** Show an example of natural vegetation community representative of your region.

Photo: This is a native Blackland prairie near Celina, Collin County.

## Native Plants Create a Sense of Place

Preserving existing vegetation keeps identity



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**Slide objective:** One of the best ways to create a sense of place is to preserve existing vegetation on a site.

- Provide parking without taking out everything.
- They know they are in Central Texas.
- Project met all landscaping requirements by saving trees with understory.

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## Native Plants Create a Sense of Place

Using native plants in our landscapes gives our homes and offices a distinctive regional look



**Slide objective:** Native plants can be planted in new landscapes to give the development a regional look.

Native plants can even be used in formal landscapes to create a sense of place.

Photos: An office in San Antonio, Texas & residence in North Texas landscaped with native plants

## Landscapes and Development

- **Recognize Conventional Development**
  - Building Process
  - Landscaping New Projects
- **Consider Sustainable Development Advantages**



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**Slide objective:** Consider the effects that our development practices have on our landscapes.

Conventional development often eliminates regional characteristics by removing or modifying the native plant communities.

This section helps the student **Recognize Conventional Development** by looking at the **Building Process** and how we traditionally landscape new projects.

We ask students to consider instead the benefits of **Sustainable development**.

Photo: Typical destruction of all existing habitat & landscape for development

## Building Process



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- Speculators and developers often clear understory, removing desirable shrubs and small trees, so buyers can see the lay of the land
- Instead, preserve existing ecological systems to avoid problems that must be solved after damage is done

**Slide objective:** The Building Process begins with the marketing and sale of the property. In conventional development strategies, this stage may begin with the removal of native habitat.

### Conventional building process strategy:

- Speculators and developers often clear the understory so that potential buyers can easily see the land and the terrain.
- Common practice is to remove brush and anything of 4" caliper or less with little knowledge to the species and habitat that they are removing.

### The problem:

- Some understory species may be very old and still be less than 4" caliper.  
(100-year-old Texas Persimmon might be less than 4") (A 100 year old Rusty Blackhawk viburnum might be less than 4" caliper)
- Habitat requires multiple levels of vegetation – more than canopy and ground level vegetation.
- Other ecological systems such as hydrological systems and air quality systems, can be disrupted with the vegetation removal.

### Sustainable solution:

- Preserve existing vegetation and ecological systems to avoid the problems of disrupted habitat, soil erosion, possible flooding, contributions to air pollution.

## **Building Process**

### **Permitting Process**

#### **Permitting agencies may require submittal of**

- Site Development Plans for housing, industrial, and commercial developments including
    - Building footprint
    - Land grading
  - Drainage and stormwater management
  - Property boundaries and utility easements
  - Tree survey
  - Tree removal and replacement plan
  - Landscape plan
- Building Permit Application
    - Building details
    - Irrigation plan

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**Slide objective:** To understand the governing bodies and requirements of the building process and how that affects the landscape.

The Building Process is most often governed by cities and their ordinances, but may also be governed by counties, the state or other governing agencies.

### **Site Development Plans**

Includes all parts of the site's development:

- Site layout including building footprint, driveways, and parking; grading plans, drainage plans, utility plans; tree survey and tree removal plans, landscape and tree replacement plans.
- It is good that the landscape is part of this early process and collaboration with civil engineering can limit or control the destruction of ecological systems.
- Tree surveys identify the location, species and the size of existing trees.
- Tree removal and replacement plans identify the trees that are to be removed to allow for the buildings and other development such as roadways and parking and the associated site grading.
- Landscape plan is the planting of replacement trees and planting of all the landscape ordinances required on the site. Landscape Ordinances vary widely between cities, but often include, Site trees, Street trees, parking screening, and buffers between land uses.
- Typical conventional development processes do not encourage understory preservation. A few forward thinking Tree Preservation and Landscape ordinances incentivize the use of understory vegetation for landscapes.
- Underbrushing and the placement of utilities along the front of properties often prevent the use of native vegetation for a final landscape on commercial and residential projects.
- Utilities including drainage often require all vegetation to be removed. There are no grade change restrictions in San Antonio as long as the drainage rules are met.

### **Building Permit Application**

If a Site plan is submitted, this is a second step to the process.

In rural areas the **building permit** stage can be the first time the final landscape will be considered. In the ETJ (5 miles outside city) a tree permit is required but no landscape plan.

Tree ordinances can typically be found online at City websites. Development Ordinances, Tree preservation, Landscape are some typical search words.

**Chapters may choose to provide a link to their regional cities Tree Ordinances in their Resource section.**

## Landscaping New Projects

Typical Conventional Landscape

- A small tree planted in front
- Non-native turfgrass
- Small foundation shrubs



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**Slide objective:** Provide an example of a typical conventional landscape

Typical Conventional Landscapes are often devoid of any of the original plants from the site.

- The planting of one or more canopy trees is normally required.
- Turf grass is relatively inexpensive and a favored groundcover for conventional landscaping.
- Typically, evergreen plantings are desired to cover the foundation. Often exotic shrubs are used because of the availability of evergreen shrubs.

In a new neighborhood there is often 1 tree planted in front of the house with a large lawn and a few foundation shrubs.

## Sustainable Development Advantages

### Water Use

- Native plants can typically live on local rainfall and use less of our limited water supplies on the landscape

### Water Quality

- Native landscapes need fewer chemicals, produce less chemical runoff, and increase stormwater infiltration with extensive root systems

### Air Quality

- Native landscapes reduce harmful air emissions by using native turf grass, reducing turf areas and increasing bed areas
- Native plants typically sequester more carbon

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**Slide objective:** Discuss the differences between conventional and sustainable development

- *Water Use:* Non-native plants, including the turf grass, require on-going irrigation. Landscape irrigation accounts for a large proportion of municipal water use. Native plants can typically live on local rainfall and use less water.
- *Water quality:* Conventional landscapes require more fertilizer and pesticides than sustainable native landscapes and therefore contribute more pollution to our creeks, rivers, lakes, and bays. Extensive native plant root systems help stormwater infiltrate into the soil rather than run off the landscape.
- *Air Quality:* Most lawn equipment emissions contribute to air pollution. By reducing turf areas and increasing bed areas, need for gas powered maintenance equipment is reduced. Conventional landscapes may release more stored carbon to the atmosphere than native landscapes since non-native plants are typically mowed, trimmed, or pruned more frequently than native plants.

## Planning and Landscaping with Natives

- Regional Conditions
- Site Assessment
- Site Design
- Installation
- Maintenance



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**Slide Objective:** Introduce the next section of the presentation, “Planning and Landscaping with Natives,” the sustainable alternative.

Now that we know using natives in landscapes is important because it's better than the conventional way of doing things, how do we get there?

**Regional Conditions:** There are 3 important regional influences on vegetation that must be considered when planning a native landscape – annual precipitation, annual temperature, and soils.

**Site Assessment:** A site assessment helps us understand what we have to work with - existing hardscapes, plants, and environmental conditions to consider in creating a sustainable landscape.

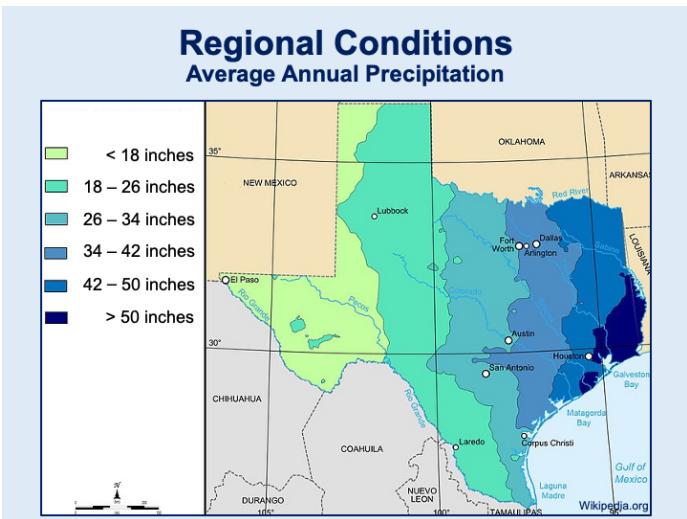
**Site Design:** Once the assessment is complete it's time to create your native landscape plan. There are several approaches to the design: you might want to preserve only what you already have, convert some of your landscape, or install a completely new landscape – or do a combination of the three. There are a number of considerations to take into account when you are considering which plants to preserve.

**Installation:** During landscape installation it is important to take into account:

- Best practices for protecting the plants you have,
- The state of existing soils and whether to amend them.
- Enhancement of soils with compost and protection of soils and plants with mulch.

**Maintenance:** Native landscapes require limited maintenance, primarily:

- Limited watering.
- Mulching.
- Pruning.
- Unwanted plant removal.



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**Slide objective:** Average annual rainfall varies from west to east across Texas, affecting the vegetation that naturally grows in each region.

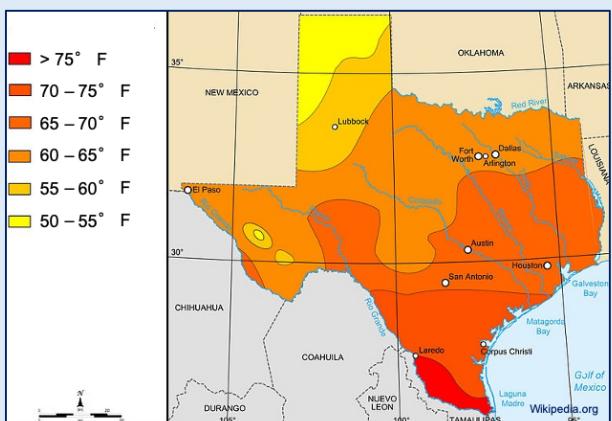
Texas is a big state!

- It is approximately 830 miles across west to east (El Paso to Beaumont) and 860 miles from North to South (Dalhart to Brownsville).
- El Paso gets a yearly average of 8 inches of rain while Beaumont gets 50 inches.
- A typical suburban lawn needs an inch of rain a week. Here in TX, even Beaumont doesn't get that much rain!
- Variations in climate make a big difference in the plants that can grow in an area.
- Plants that are native to one part of Texas may not be native in other parts of the state.

Our regional average annual rainfall is 34" to 42".

## Regional Conditions

Average Annual Temperature



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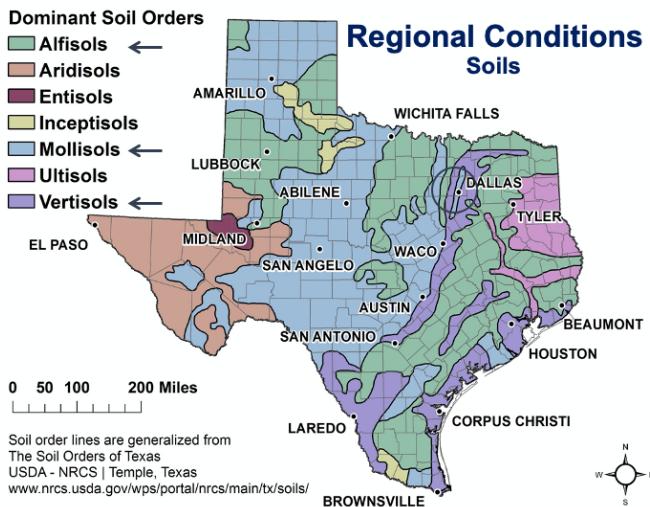
\_\_\_\_\_

**Slide Objective:** Average annual temperature varies from north to south across Texas, affecting the vegetation that naturally grows in each region.

- The northern tip of the Texas panhandle – around Dalhart, for example - has an average annual temperature of 55 degrees F.
- The southern point of Texas – near Brownsville, for example - has an average annual temperature of 75 degrees F.
- Variations in climate make a big difference in the plants that can grow in an area.
- Plants that are native to one part of Texas may not be native in other parts of the state.

Graphic: Annual average TX temp by wikipedia.org

Our regional average annual temperature is 65 – 70 degrees F.



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**Slide Objective:** Soil types vary within Texas due to the different parent materials from which they formed and the climate and other environmental factors under which they developed.

- Just like with plants and animals, soils are classified or grouped by similar properties. The highest level of classification is Soil Orders and there are 12 soil orders in the U.S.
- There are 9 soil orders in Texas but only 7 soil orders occur in large enough areas to be mapped as shown in this slide
- Along with climate and vegetation, soils are used to help distinguish ecological regions or ecoregions which we shall discuss in a few minutes

***You do not have to know or present the following level of detail about the soil types, however, you may wish to talk about the soil orders in your area:***

**Alfisols** are naturally fertile soils with high pH.

**Aridisols** are the dry soils of the deserts.

**Entisols** are young soils with little evidence of horizon (soil layer) development.

**Inceptisols** are young soils with weakly developed but noticeable horizons.

**Mollisols** are dark-colored; very fertile soils of grasslands.

**Ultisols** are highly weathered soils with low pH and a clay-enriched subsoil.

**Vertisols** are very clayey soils with low pH. They shrink and crack when dry and expand when wet.

[http://www.nrcs.usda.gov/wps/PA\\_NRCSConsumption/download?cid=stelprdb1247203.pdf](http://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=stelprdb1247203.pdf)

## Regional Conditions

### Typical Soil Profile

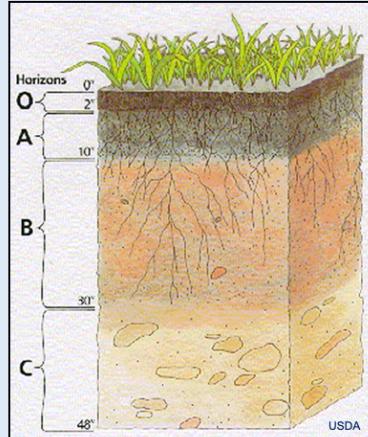
O – Organic layer

A – Top soil

B – Accumulation zone

C – Weathered or rocky bedrock

Solid bedrock  
underlies the soil in  
most places



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**Slide Objective:** Soils are characterized or distinguished based on properties such as the color and texture of their soil layers which are referred to as horizons.

The lowest level of soil classification is soil series and each soil series has a typical soil profile usually with four horizons

- **O horizon** is a layer of non-decomposed or decomposed organic matter
- **A horizon** is the topsoil
- **B horizon** is the subsoil and is typically where fine soil particles such as clay accumulate
- **C horizon** consists of weathered parent material

Solid bedrock underlies soils in most places. However, unconsolidated sands and muds underlie the soils of most of east Texas and the coast

Width of soil horizons varies with soil type and stage of soil development

Factors that affect the actual soil profile in a specific area include

- Placement on the landform – hillsides have less soil development while concave locations have better soil development
- Previous land use – plowing, grading and other soil disturbances disrupt profile
- Erosion – either naturally-caused or human-caused can remove the O and A horizons

You can find the name of the soil series or soil map unit for your area, and more information about your soil by:

- Consulting the *Soil Survey* for your county (<http://www.nrcs.usda.gov/wps/portal/nrcs/surveylst/soils/survey/state/?stateId=TX>)
- Using the USDA NRCS Web Soil Survey application online (<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>)
- Downloading the free app “SoilWeb” for your smart phone.

Image: <http://nesoil.com/properties/horizons/>

**Regional Conditions**  
Soil Particles

The diagram illustrates the relative sizes of soil particles. It consists of three concentric circles. The outermost circle is yellow and labeled 'coarse sand'. The middle circle is green and labeled 'medium sand' at the bottom and 'fine sand' at the top. The innermost circle is light blue and labeled 'clay' at the top and 'silt' at the bottom. Below the circles, the text 'www.ext.colostate.edu' is visible.

- **Sand**
  - 0.05 (fine) to 2mm (coarse)
  - Feels gritty
- **Silt**
  - 0.002 to 0.05 mm
  - Feels smooth
- **Clay**
  - Less than 0.002 mm
  - Feels sticky

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**Slide objective:** Explain the relative particle sizes of the 3 basic soil components.

Soil particles range from tiny (clay) to large (sand). The relative proportion of these three basic soil components determine a soil's texture as we will see in the next slide.

**Sand** is a granular material of a size finer than gravel and coarser than silt, composed of finely divided rock and mineral particles. Composition of sand may vary depending on local rock sources and conditions, but the most common constituent of sand in inland continental areas is silica, usually in the form of quartz. The second most common type of sand is calcium carbonate formed by degraded coral and shellfish.

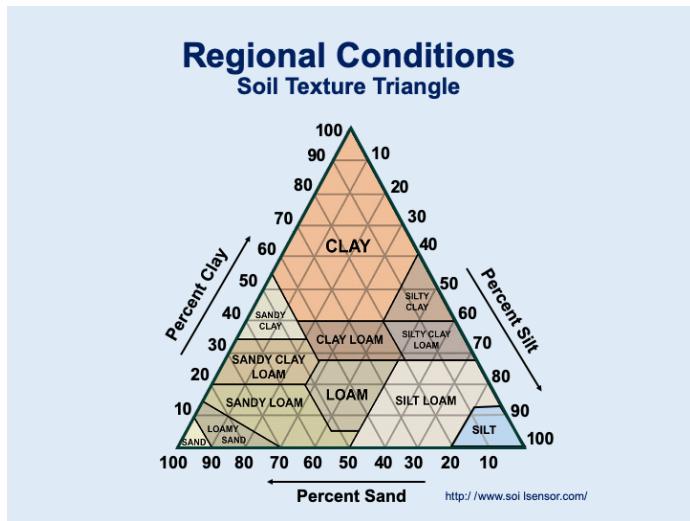
**Silt** is a granular material of a size between sand and clay whose mineral origin is quartz and feldspar. Silt usually has a floury feel when dry and a slippery feel when wet. Can be visually observed with a hand lens.

**Clay** is a fine grained material that combines one or more clay minerals with traces of metal oxides and organic matter. Particle size is smaller than silt.

Not illustrated:

**Gravel** is a granular material of a size greater than sand 2 – 75 mm.

**Rock** is a granular material of a size greater than 75 mm.



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**Slide objective:** The relative proportions of the three soil particles are used to describe the soil texture. Soil texture is one of the characteristics used to describe soil horizons and to distinguish soil series

The soil texture triangle is used to classify soil texture and with practice you can determine soil texture by its “feel”. A common soil texture term used in Texas is “sandy loam”. You can see from the triangle that sandy loam consists of 0 to 20% clay particles (horizontal lines), 0 to 50% silt particles (right leaning lines), and 50 to 70% sand particles (left leaning lines). In other words, at least  $\frac{1}{2}$  of the soil texture is made up of sand particles and the remainder is made up of either silt or clay or a combination of the two.

#### 1. Clay soils:

- Have the greatest capacity to hold moisture and nutrients and are typically more fertile than other soils.
- Easily compacted and often exhibit shrink-swell properties.
- Addition of organic matter improves water infiltration and percolation.

#### 2. Silty soils:

- Have a medium capacity to hold moisture and nutrients.
- Some ability to be compacted.
- May need some additional organic matter to allow for better water infiltration and percolation.

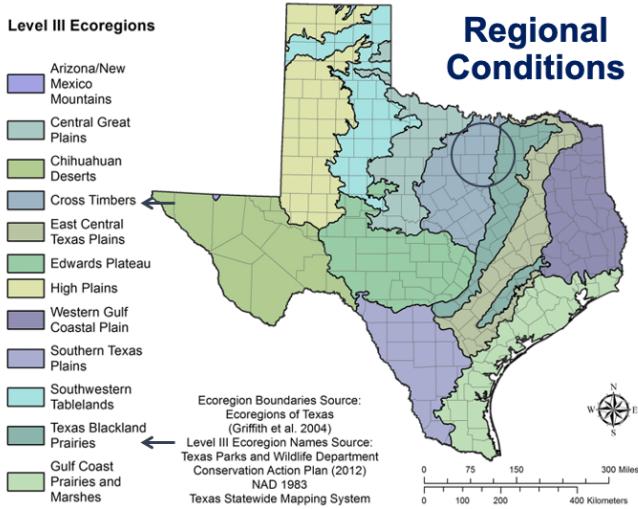
#### 3. Sandy soils:

- Have little capacity to hold moisture and nutrients
- No ability to be compacted; instead is easily drained.
- May benefit from the addition of organic matter, clay, or silt.

#### 4. Loamy soils:

- Usually easiest to manage for plant growth.
- Typically a more neutral pH – about 7 - which is better for plant growth.

Graphic: <http://www.soilsensor.com>



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**Slide objective:** Introduce the EPA Level III ecological regions (Griffith et al. 2004) with ecoregion names changed to match those of Texas Parks and Wildlife Department's Conservation Action Plan (2012).

This is just one of many broad classification systems used to group regions of Texas with similar geology, climate, soils and vegetation. This system is useful because it is used by many government agencies and NGOs and has an accompanying book with descriptions of the landforms, geology, soils, climate, vegetation, land use and historic (pre-settlement) conditions for each of the Level III ecoregions as well as for the Level IV ecoregions which we will look at in the next slide.

You may see other maps with similar regional boundaries but with different names. For example the Western Gulf Coastal Plain is also known as the "Piney Woods" while the East Central Texas Plains is also known as the "Post Oak Savannah".

Eleven Level III ecoregions are found in Texas as shown on the map in this slide.

Regional information:

- Cross Timbers
- Texas Blackland Prairies

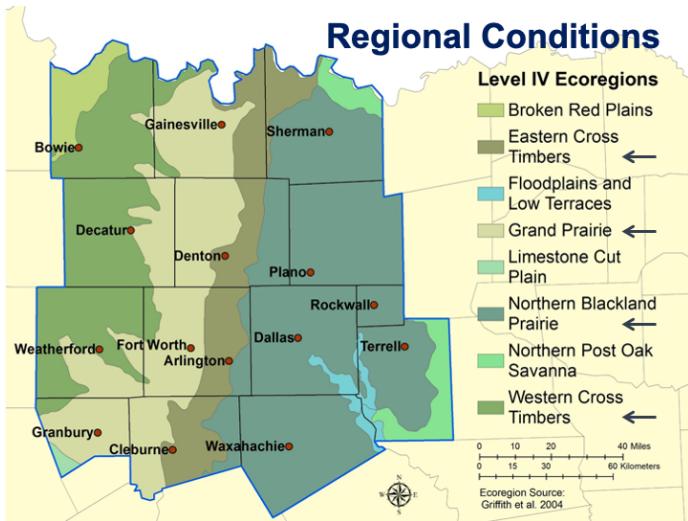
Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: [Ecoregions of Texas](#):

[ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf)



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**Slide objective:** Introduce the EPA Level IV Ecological Regions (Griffith et al. 2004) of the host chapter area.

1. Areas are further divided into 4 (Level IV) ecoregions which we will discuss in more detail:
  - Eastern Cross Timbers
  - Western Cross Timbers
  - Grand Prairie
  - Northern Blackland Prairie
1. These ecoregions represent diversity of climate and soils with unique plants and attracting specific wildlife species.

Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: Ecoregions of Texas:

[ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf)

## **Eastern and Western Cross Timbers**

West of I-35 in the North TX region

### **Topography**

- Gently rolling plains and low hills

### **Geology**

- Sandy upper layers with cretaceous sandstone and claystone bedrock

### **Soils**

- Mostly fine sandy loams, Alfisols and Ultisols
- Clay subsoils that retain water



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**Slide Objective:** Describe ecoregion in terms of topography, geology/soils, and vegetation communities.

Level IV Ecoregion 29b, Eastern Cross Timbers

Level IV Ecoregion 29c, Western Cross Timbers

EC is in the eastern part of Tarrant and Denton Counties and W part of Dallas County

WC is in the Western part of Tarrant county to the west

Sandy soil feels gritty in your hand and falls apart easily if you wet it and try to make something with it

Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: Ecoregions of Texas:

[ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf)

## Eastern and Western Cross Timbers

West of I-35 in the North TX region

### Vegetation Communities

- *Upland oak savanna* post oak, blackjack oak cedar elm, hickory, live oak, eastern red cedar, and sumac
- *Riparian* pecan, black willow, cottonwood, sycamore and boxelder
- *Understory* buffalograss, purple threeawn, persimmon, sassafras, Virginia creeper, and greenbriar



Old Growth Post Oak in West Cross Timbers  
Fort Worth Nature Center

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**Slide Objective:** Describe ecoregion in terms of topography, geology/soils, and vegetation communities.

Level IV Ecoregion 29b, Eastern Cross Timbers

Level IV Ecoregion 29c, Western Cross Timbers

EC is in the eastern part of Tarrant and Denton Counties and W part of Dallas County

WC is in the Western part of Tarrant county to the west

Sandy soil feels gritty in your hand and falls apart easily if you wet it and try to make something with it

Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: Ecoregions of Texas:

[ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf)

## Northern Blackland Prairie

Prevalent in eastern counties of North TX region

### Topography

- Rolling to nearly level plains; gilgai and mima mounds; riparian stream bottoms

### Geology

- Upper Cretaceous chalks, marls, limestones, and shales

### Soils

- Mostly fine-textured, dark, calcareous, and productive Vertisols

- Characterized by clay soils that shrink when dry and swell when wet



Carol Feldman  
Burleson Prairie

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**Slide Objective:** Describe ecoregion in terms of topography, geology/soils, and vegetation communities.

Level IV Ecoregion 32a, Northern Blackland Prairie

The Northern Blackland Prairie is most of Dallas County and all of Collin County and Rockwall County. Also, if you ever get south of Dallas I think very much of Ellis County as classic blackland prairie. Very flat. Very rich black soil. Not many trees. Lots of farmland.

Less than 5000 acres of unplowed blackland prairie remains. Most is in cultivation or has developed into cities because it is very fertile.

Dominated by warm season tallgrasses that grow well in the late spring and summer months and flower in fall: little bluestem, big bluestem, and indiangrass

Blackland soils have lots of clay and tend to make those awful cracks in your walls as the foundation moves with the soil shrinking and swelling depending on the season.

Clay feels sticky in your hand and can easily form into a ribbon or ball when moist. Also called black waxy or gumbo, soil is black in color and feels waxy.

Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: Ecoregions of Texas:

[ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf)

## Northern Blackland Prairie

Prevalent in eastern counties of NTX region

### Vegetation Communities

- *Tallgrass prairie* with little bluestem, big bluestem, Indiangrass, tall dropseed, eastern gamagrass, switchgrass, forbs; most converted to other uses
- *Wooded stream bottoms* with bur oak, Shumard oak, sugar hackberry, elm, ash, eastern cottonwood, and pecan



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**Slide Objective:** Describe ecoregion in terms of topography, geology/soils, and vegetation communities.

Level IV Ecoregion 32a, Northern Blackland Prairie

Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: Ecoregions of Texas:

[ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf)

## Grand Prairie

Central Tarrant County and Western Denton County

### Topography

- An undulating plain with some bedrock exposure that is resistant to weathering; incised with streams

### Geology

- Lower Cretaceous limestones with marls and clay

### Soils

- Mostly fine-textured, dark, calcareous, but thinner than the Northern Blackland Prairie



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**Slide Objective:** Describe ecoregion in terms of topography, geology/soils, and vegetation communities.

Level IV Ecoregion 29d Grand Prairie

- FW prairie is in central part of Tarrant County and Western part of Denton County
- It is bounded on the east and west by the sandstones of the Cross Timbers, and its open plains contrast with the Cross Timbers oak woodlands.
- Much of the FW prairie still remains because much of it was unplowed. Most is in cattle ranches today. The bedrock being so close to the surface made farming unprofitable.
- Shallow soil is hard to dig in deeply. The upper crust is clay based so should feel sticky when wet and should be easy to form into a ball or long ribbon when moist.
- Less precipitation than Northern Blackland Prairies.

Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: Ecoregions of Texas:

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## Grand Prairie

Central Tarrant County and Western Denton County

### Vegetation Communities

- *Upland prairies* with little bluestem, big bluestem, Indiangrass, sideoats grama, Texas cupgrass and tall dropseed; generally shorter with thinner soils & dryer prairie conditions
- *E escarpments* with live oak, juniper, sumac, Texas persimmon
- *Wooded stream bottoms* with elm, pecan, hackberry and bur oak



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**Slide Objective:** Describe ecoregion in terms of topography, geology/soils, and vegetation communities.

Level IV Ecoregion 29d Grand Prairie

- Prairies are areas with few trees, dominated by grasses and flowers, or forbs. Prairies occur on many different types of soils but require less rainfall than eastern deciduous forests.
- The vegetation of the Grand Prairie is similar to the Northern Blackland Prairie, but plants tend to be shorter because it is drier and thin-soiled. Shorter grasses like Sideoats grama, hairy grama, tall grama, and buffalo grass dominate.

Source of the ecoregions of Texas:

Website: [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm)

Map: [ftp://ftp.epa.gov/wed/ecoregions/tx/tx\\_eco\\_pg.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/tx_eco_pg.pdf)

Book: Ecoregions of Texas:

[ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco\\_Jan08\\_v8\\_Cmprsd.pdf](ftp://ftp.epa.gov/wed/ecoregions/tx/TXeco_Jan08_v8_Cmprsd.pdf)

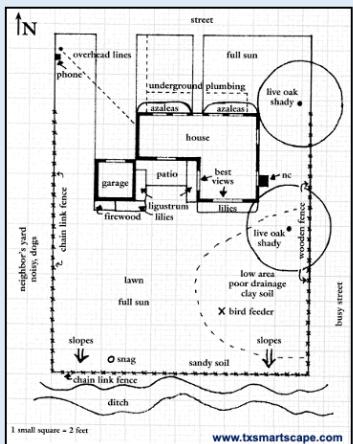
## Site Assessment Base Plan

### Create a base plan of existing conditions

- House, property line
- Existing plants, beds, fencing

### Considerations for deciding which existing plants to save

- Native/non-native
- Water needs
- Size and location
- Shade
- Wildlife habitat



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**Slide Objective:** Create a base plan of your property which includes the existing plants and other conditions

It's possible to save existing native plants if building in a natural setting, or in your existing home landscape. Start by mapping, and creating an inventory. Create a simple base map of your property. Include your house, property line, existing plantings, flower beds, overhead lines, fencing, soil conditions, slope, etc.

- Locate existing plants on the base plan.
- Decide which plants to save. Save plants that will benefit your future landscape.
  - Are they native?
  - Consider the water needs. Are they low water use? If not, are they in a naturally wet micro environment?
  - Do they provide shade? Existing trees are usually bigger than a newly planted tree and will provide instant shade.
  - Do they provide food & shelter for wildlife?
  - Are they in a location that benefits your future landscape?

Graphic: From Texas Smartscape webpage. They provide a good basic section on how to design your yard. In resource list.

**Site Assessment**  
Considerations

- Sun/shade
- Wet areas
- Water drainage
- Soil conditions
- Climate
- Breezes
- Views
- Pathways
- Utilities

Figure 8-29 Windbreak designed for seasonal wind patterns.

Taken from: [Site Planning by R. Gene Brooks, 1988, pg 110.](#)

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**Slide objective:** Assess existing environmental conditions at your site.

Regional conditions; rainfall, temperatures, vegetative regions, geology, and soil types are the framework of a site when planning a landscape. In addition, a site will have micro-conditions and unique site requirements.

A site assessment -Label areas on your base plan:

#### Environmental conditions

- *Vegetation*; (identified on previous slide)
- *Sun conditions*; sunny or shady,
- *Moisture conditions*; wet areas, dry areas, and water drainage routes & direction,
- *Topography*; slopes & relatively flat areas
- *Soil conditions*; compacted areas, fertile areas, poor percolation areas, erosion potential
- *Breezes*; map prevailing wind directions,
- *Wildlife features*; show items such as tree cavities, nesting areas, or water sources.

#### Cultural conditions & needs

- *Views*; from windows, ones you want to maintain or keep hidden.
- *Pathways*; that you, your children, pets, or guests use.
- *Utilities*; Overhead wires that limit tree planting locations

Graphic: An example of a site condition. Ventilating breeze is from the south so landscapes should be designed to take advantage of this for cooling & block cold north winds. From Gene Brooks 1988.

Site soils conditions can be obtained from the NRCS website:  
[websoilsurvey.nrcs.usda.gov](http://websoilsurvey.nrcs.usda.gov)

## Site Design

### Sustainable Options with Native Plants

#### Preserve existing native habitat

- Minimize construction impact to immediate project area
- Transplant existing plants from project area to landscape
- Use best management practices to prevent soil erosion

#### Convert existing conventional landscapes

- Replace failing exotic plants with natives
- Replant sections of lawn or beds with natives



#### Install native plant landscapes

Notes: \_\_\_\_\_

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**Slide Objective:** Identify options and strategies for planting natives in a landscape.

#### Preserve existing native habitat

- ‘Building in the Envelope’ is the process of minimizing the construction impact in an existing native area. Construction is limited to already disturbed areas or limited to a ten foot envelope around the house footprint. The existing native habitat IS the new landscape. Many variations of this philosophy and practices exist.
- Plants that were in the building footprint are rescued and later transplanted back into the landscape.

#### Convert existing landscapes

- Natives can be planted into an existing landscape one plant at time as older exotic landscapes fail or die.,,
- Or whole beds or areas can be planted with natives with other non-natives plants in other areas.

#### Install native plants

All non-natives can be removed and only natives installed. The selection of native plants for the new landscape can be identified by considering the plants found in the region’s vegetation community.

## Site Design

Preserve Existing Native Plants

- **Identify** plants to be preserved in the final landscape
- **Coordinate** with engineer and contractor to adjust locations of buildings, driveways, parking areas and utilities to avoid impacting plants to be preserved and to implement best management practices
- **Include** preservation plans and tree protection specifications in contracts
- **Protect** native plants, identified for preservation, during construction

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**Slide objective:** Preservation of natives is possible by surveying plants, creating a plan, working with those in charge, and protecting vegetation.

- Preserving existing native habitat is best done during new development – doesn't matter whether it is commercial or residential.
- Create the market for such landscapes by code, incentives, desire to be green or sustainable & pilot projects which are attractive.

### The preservation process

- Begin with a *site assessment* to identify and develop an understanding of the valuable aspects of the site (including native plants and habitat). This is a visual assessment to be used by future home owners, buyers, developers, engineers, landscape architects, lands clearing operators, and landscape maintenance staff.
- *Coordinate* the plan with architect, engineer, and contractor. Sometimes a slight site plan adjustment can keep grading, roadways, and other building needs from destroying habitat.
- Once the decision is made to utilize the existing plants in a landscape, define a *preservation plan* to protect, rescue, or manage, that includes well defined specifications.
  - Include contracts with the ability to modify in the field while maintaining the initial concept. Verbal agreements don't work.
  - Provide a root zone protection plan. Many cities require this; some don't.
- *Protect* the trees and areas to be preserved during the construction process
  - Use fencing if possible to insure agreements are kept.
  - Use signage to increase awareness on the need to maintain trees & vegetation through the construction process. (*Ladybird Johnson Wildflower Center had big signs on their trees saying "This tree is worth \$12,000" so the contractor would know what they would have to pay if they damaged it.*)
  - Provide for watering and professional pruning if pruning is needed during construction.
  - After construction, plants may be "groomed" to fit needs.

## Site Design

Preserved natural areas can be managed to meet landscape goals

- Instant shade
- Mature landscape
- Privacy
- Safe Wildland/Urban Interface
- Water conservation
- Wildlife habitat
- Sense of place



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**Slide Objective:** Provide examples of ways that landscape preservation can meet landscape goals and will enhance a landscape.

- Photo: This tree-save area between apartment & children's playground/swimming pool was going to be put into Bermuda grass with irrigation. Apartments under the 1997 San Antonio ordinance. City worked with property manager to make it usable. It is highly used by the residents. (Photo from Melissa Miller)
- Note that pre-existing native plants can be managed to meet any landscape goals; chipped material from cleared understory can be used as mulch; additional plants can be added to enhance
- **Wildland/Urban Interface** – A term identified for the landscape management used to reduce the spread and intensity of wildfires and improve the overall safety of the community. Management includes removing dead plants or plant parts, pruning trees properly & removing some of the understory, pruning the remaining understory to re-invigorate shrubs & ground cover plants.

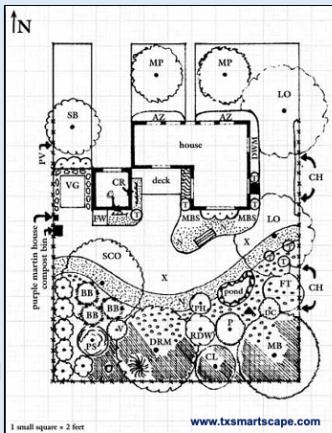
## Site Design Landscape Plan

### Hardscape Plan

- Outdoor living spaces
- Pathways
- Utility areas
- Lighting and irrigation

### Planting Plan

- Plant types based on site assessment
- Variety in height, texture, color
- Fragrance, nectar, seasonal interest
- Plant availability



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**Slide objective:** Create a planting plan

- First, layout the hardscape. Identify outdoor living spaces, pathways (where people travel), and utility areas. Lighting and irrigation might be considered.
- Now that you have assessed your conditions, & you already have a base plan that includes your existing plants you want to preserve, you select new plants. Use the information from your site assessment to determine the sun/shade conditions, soil conditions, height and/or color requirements of the specific site you are wanting to plant, then filter out those species that do not match the criteria.
- Create a palette of plants that provide whatever aspect you seek such as fragrance, color, flowers, and/or fruit year round and/or provide shade on the west & south side of the house or protection around windows.

Graphic: Planting plan example by Texas Smartscape

**Installation  
Tree Protection**

**Notes:** \_\_\_\_\_  
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**Damage to unprotected trees**

**Protection Methods**

Kay Jenkins

Carol Feldman

Kay Jenkins

**Slide objective:** Use fencing and mulch to protect trees and plants in construction.

Steps can be taken to preserve natural areas so that significant damage is not done by large equipment traffic or dumping.

- Fencing around trees at the dripline.
- Protect trunks by wrapping with wood staking.
- Protect from root compaction by putting thick mulch over tree roots. Thick mulch should only be used as a temporary method of protection. It should be removed once the work is completed.

Note: Keeping work and workers off of root zone with fencing techniques is preferred. The mulching technique should only be used in unusual situations.

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**Installation  
Soil Conditions**

**Healthy soils provide**

- Physical support
- Oxygen
- Water
- Mineral nutrients
- Soil organisms

**Unhealthy soils may be**

- Compacted
- Low in organic matter
- Low in nutrients
- Low in soil organisms
- Eroded



**Slide objective:** Identify for students the differences between healthy and unhealthy soils.

**Healthy soils** provide for healthy plants. They offer:

- Physical support for roots.
- Oxygen is taken into the plants through the roots.
- Water is taken into the plants through the roots.
- Mineral nutrients and healthy micro & macro soil organisms found on the roots (such as mycorrhizal fungi) are necessary for the health of the plant.

### **Unhealthy soils**

- Compaction leads to:
  - Reduced water infiltration (rate at which water enters into the soil surface) & percolation (rate at which water moves through the soil profile) & thus less water available for plant growth
  - Reduced pore spaces & thus oxygen required for root growth. Roots must have oxygen to grow.
  - Physical barriers to root penetrations
- Low in organic matter & nutrients which leads to:
  - Reduced water holding capacity
  - Reduced micro & macro soil organisms which exacerbates the conditions of compaction, reduced water-holding capacity & low nutrients
- Highly eroded soil conditions may be:
  - Rocky, gravelly
  - Low in organic matter

## Installation

### New Plantings

- Add compost or another type of organic amendment to improve soil, if needed
- Install plants at a spacing to accommodate mature size
- Place a 2" to 4" thick layer of mulch to maintain moisture and to regulate soil temperature



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**Slide objective:** To prepare beds first add compost, then plants, then a thick layer of mulch.

- Compost can be purchased or you can make your own. There are manure based compost, Cotton Bur compost, & many more. The best compost is that from your own locality. Avoid mulches comprised of husks of trees in the hickory family, particularly black walnut
- Mulch may be shredded wood, grass clippings, leaves,

## Maintenance

- Water the first three years, especially the first
- Add mulch every year, if needed
- Prune trees and shrubs for shape
- Prune dormant perennials and bunch grasses in winter
- Remove unwanted plants
- Share and enjoy



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**Slide objective:** Native plants do require maintenance, but much less than a conventional landscape.

It's unreasonable to think that Native Landscapes do not require maintenance. BUT they do require less fertilizer, less water, & less mowing than an exotic landscape.

### Maintenance

- Drip irrigation can be used to establish plants (drip irrigation normally has no water restrictions) & for supplemental watering during times of extreme drought.
- Mulch yearly. Any type of mulch can be used, or no mulch at all for a more natural look. Just leave the fallen leaves.
- Pruning is not necessary other than to ensure property is not damaged but may be desired to maintain pathways or a more formal look or shape.
- Some weeding is important to ensure that invasive plants that you didn't plant such as privet & bermuda grass don't take over.
- Seedlings can be left if desired or removed for a more formal look/to share.

## Resources

### Native Plant Society of Texas

- Native Plant Week (3<sup>rd</sup> week in October)
- Native Landscape Certification Program (NLCP)
- Bring Back the Monarchs to Texas (BBMT)
- Natives Improve and Conserve Environments (NICE)

### Resource Handout in Packet



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**Slide objective:** Review the Resources handout(s) for your area – highlight the Native Plant Society programs.

The Native Plant Society of Texas (NPSOT) has a number of programs to educate the public about native plants and their benefits:

1. **Texas Native Plant Week:** In 2009, the State of Texas established the third week of October as the Texas Native Plant Week. Its objective is to “recognize the role of native plants in conservation and to provide incentive for schools to teach children the importance of native plants.”
2. **Native Landscape Certification Program (NLCP):** A series of classes that promotes the use of native plants in private and public landscapes and encourages conservation of natural landscapes. <http://npsot.org/wp/nlcp/>
3. **Bring Back the Monarchs to Texas (BBMT):** The program’s purpose is to educate NPSOT members and the public about Monarch conservation, to produce and distribute milkweeds that support Monarch butterfly reproduction, and to restore Monarch habitats throughout the Texas migration flyway. <http://npsot.org/wp/monarchs/>
4. **Natives Instead of Exotics! (NICE!) or Natives Improve and Conserve Environments (NICE), depending on your location:** A program developed by the Boerne Chapter of NPSOT and adapted by other chapters to promote the use of native plants in landscapes. The underlying problem has been that growers are reluctant to grow native plants due to the limited market. However, it is difficult to create a market when there are no native plants available for sale. NPSOT chapters work with local nurseries to stock specific native plants. The chapter provides educational materials to provide with nursery plants. [www.npsot.org/wp/boerne](http://www.npsot.org/wp/boerne)

## Resources

- Websites
- Organizations
- Local Native Plant Nurseries
- Reference Books



Reference Books



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**Slide objective:** Review the Resources handout(s) for your area – highlight websites, organizations, local nurseries with native plants, reference books.

Websites:

Organizations:

Local nurseries:

Reference books:

**More information to highlight regarding your chapter resources (websites, organizations, nurseries, books):**

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