Tree Planting

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Dig Hole

Insert Tree

Questions?

Planting/Transplanting Trees

- What's the objective?
  - Shade
  - Aesthetics
  - Screening
  - Windbreak
  - Storm Water Abatement
  - Air Quality
  - Physical Barrier
  - Wellness
  - Food
  - Wildlife
  - Erosion
  - Building materials
  - Exercise/Fun/Profit

- **Pre-planting Considerations**
  - Site Selection / Assessment
  - Species Selection
  - Stock Types
- **The Planting Process**
  - Container Trees
  - Ball and Burlap Trees
  - Bare Roots
- **After Care**

Site Selection / Assessment

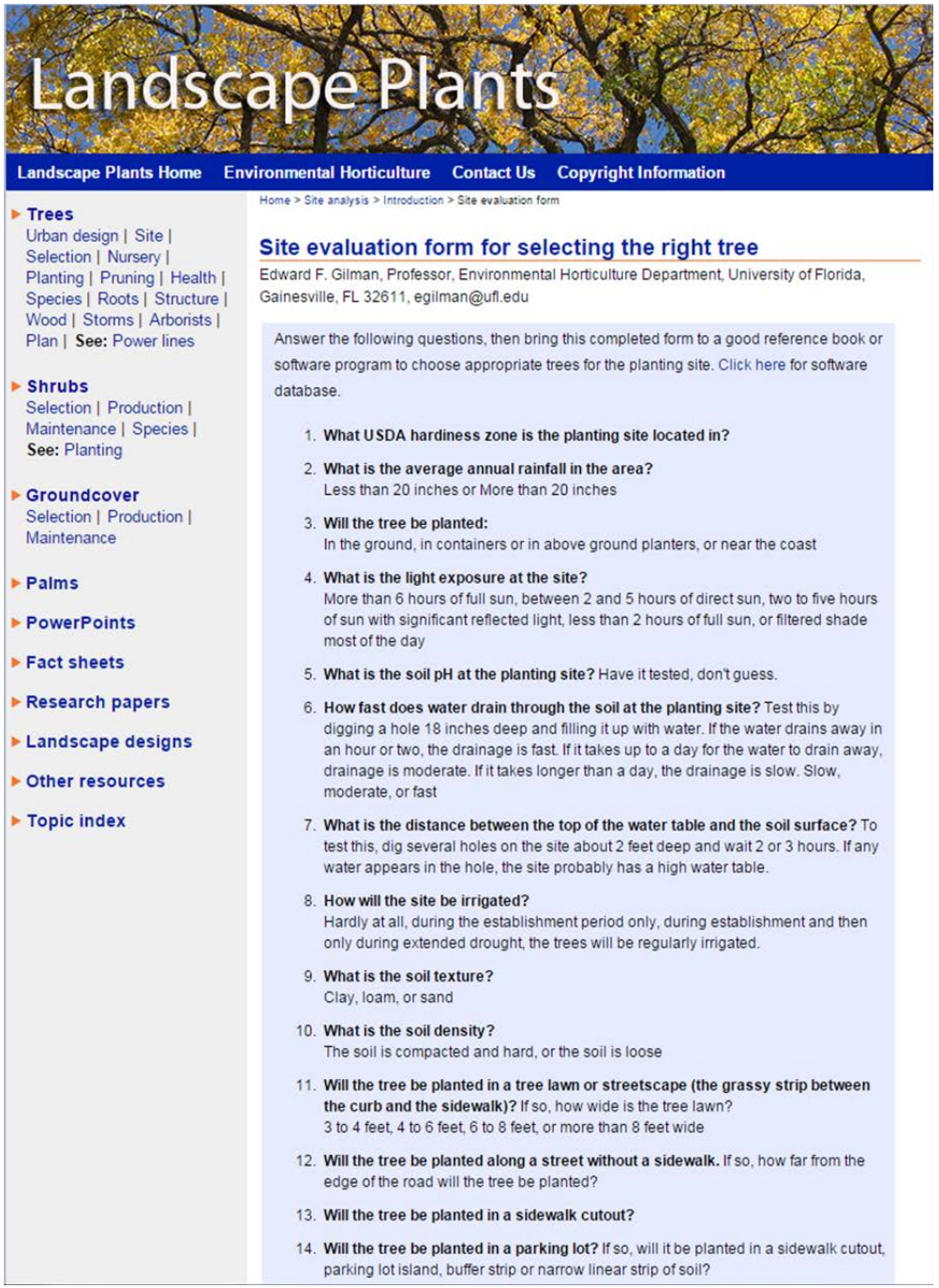
- Soils
- Light
- Topography/Slope
- Wind
- Water
- Maintenance
- Needs
- Conflicts
- Future Considerations

Site Evaluation and Selection

27 Site Considerations

(#27 lists fourteen different aspects)

9 page publication to elaborate



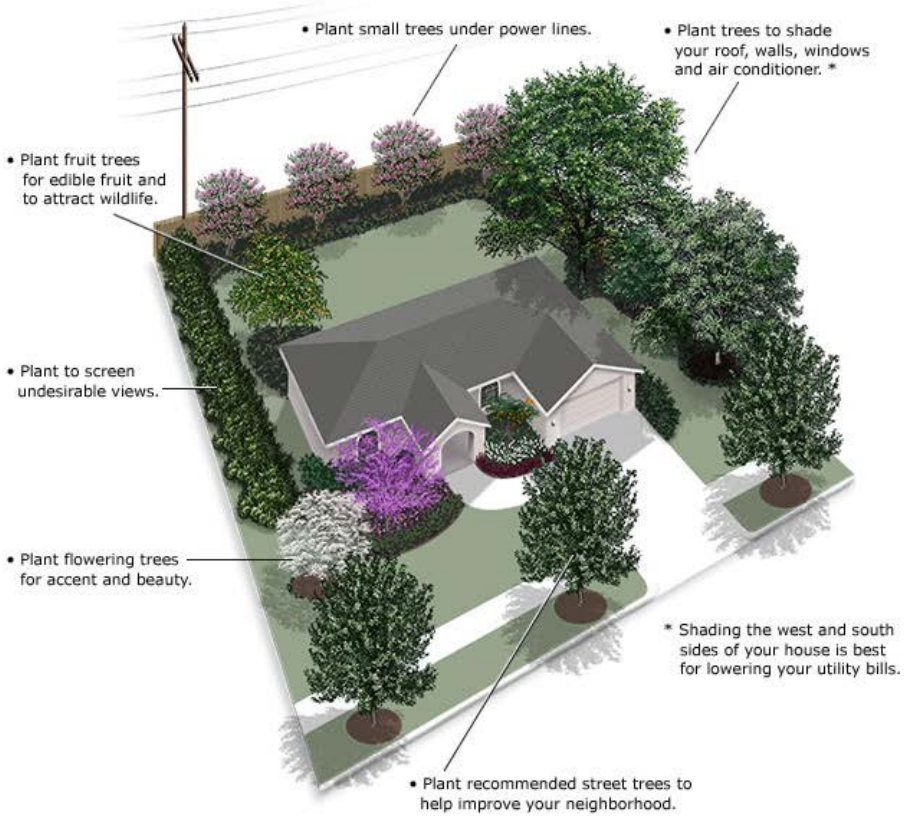
Texas Tree Planting Guide

http://texastreeplanting.tamu.edu

A Visual Approach

http://texastreeplanting.tamu.edu/TreePlantingTools.html

Landscaping Around Your House

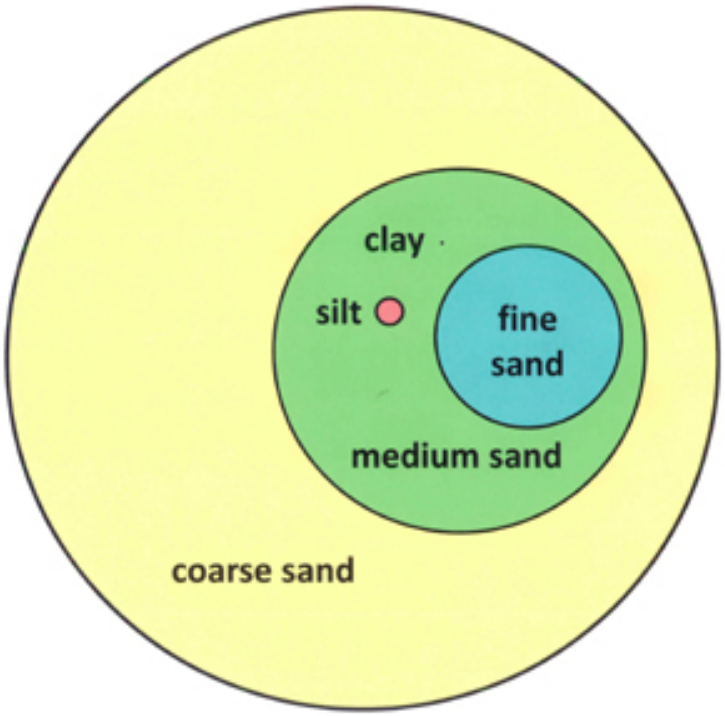


VIDEO

(en Español)

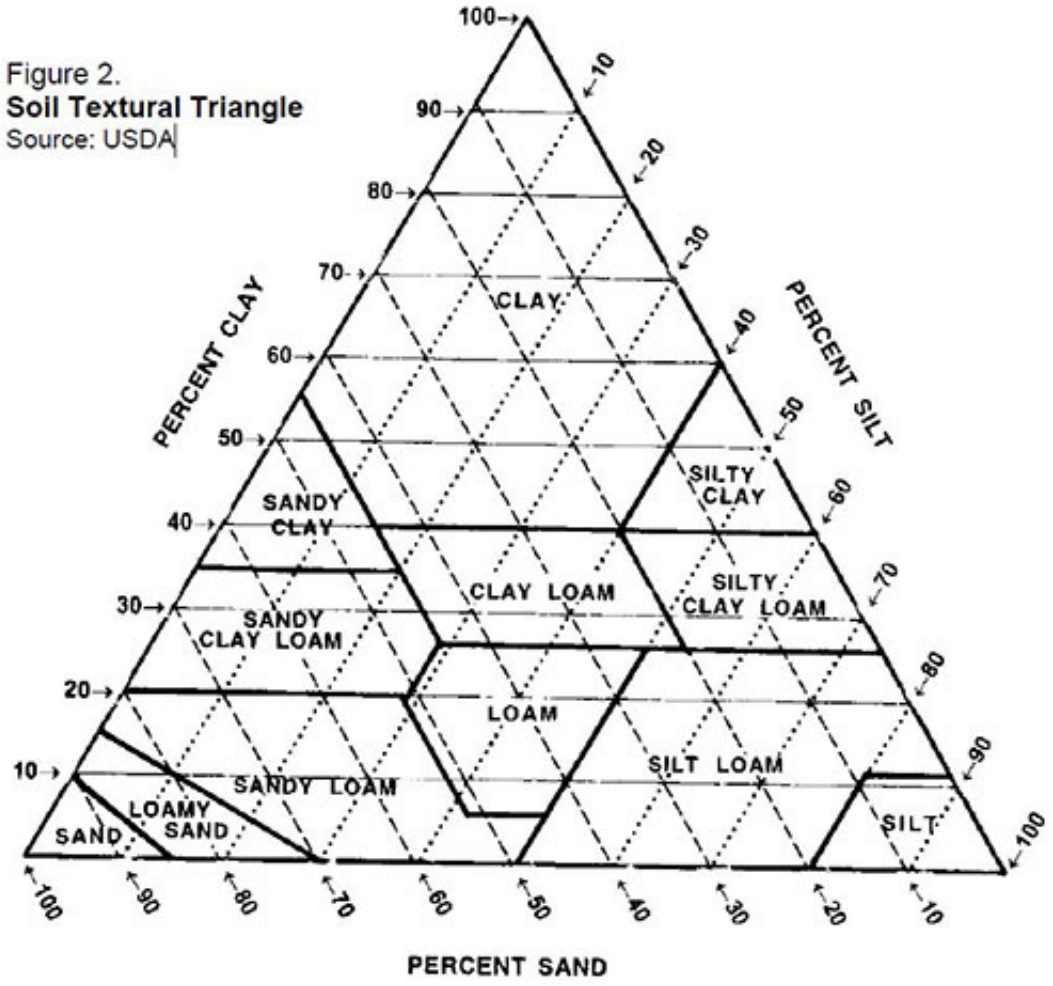
Site Selection / Assessment

- **Soils**
  - Texture Class/Structure (sand, silt, clay)
  - Drainage
  - pH
  - Fertility

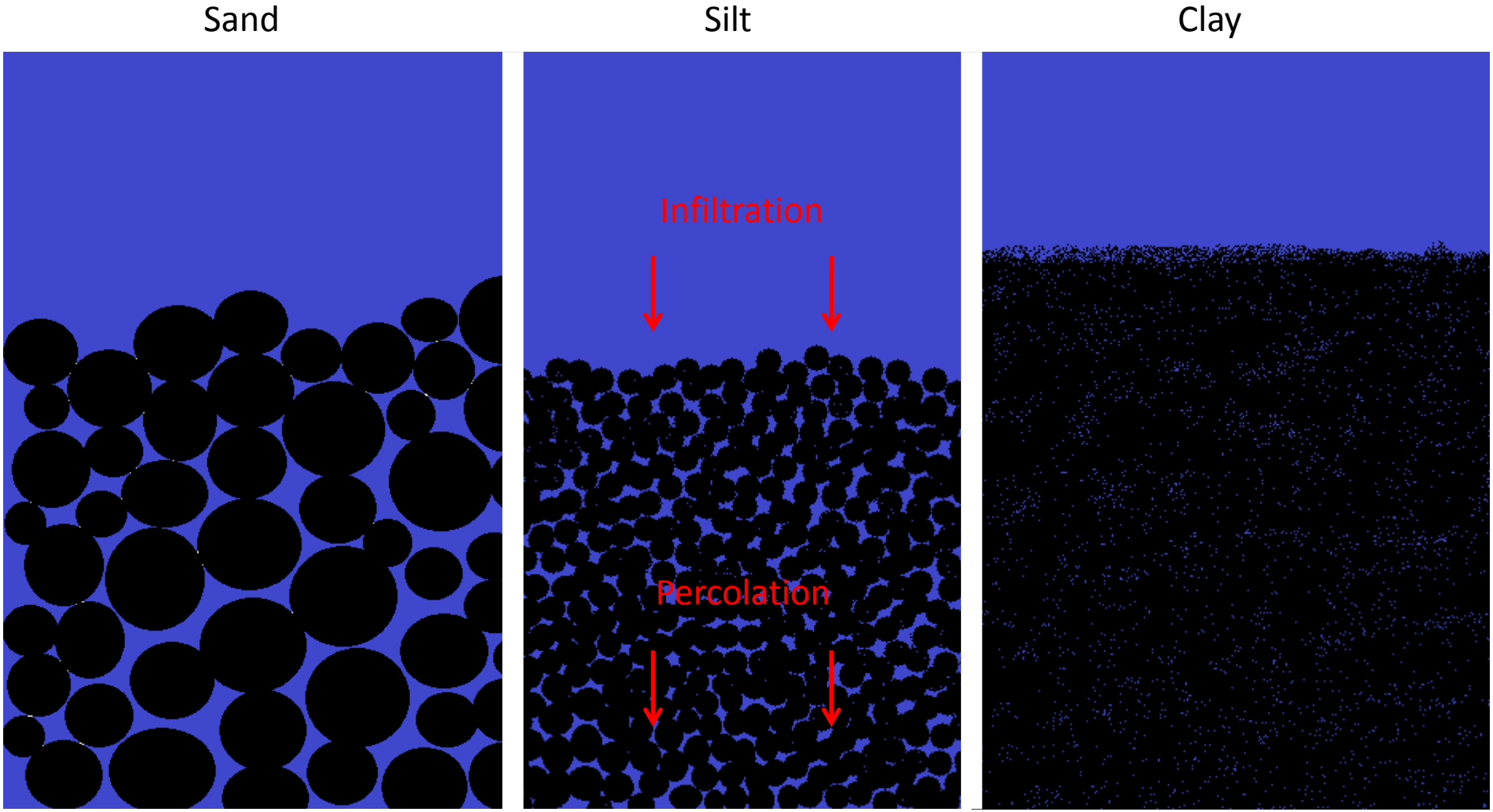


In-Field Soil Type Test(s)

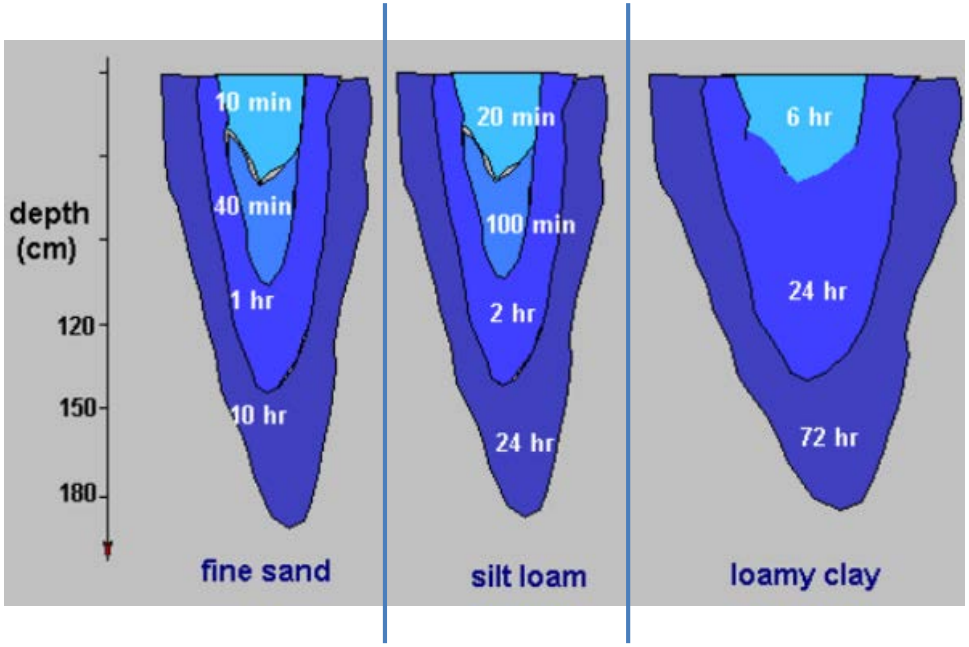
Soil Texture Classes



Drainage-Infiltration / Percolation

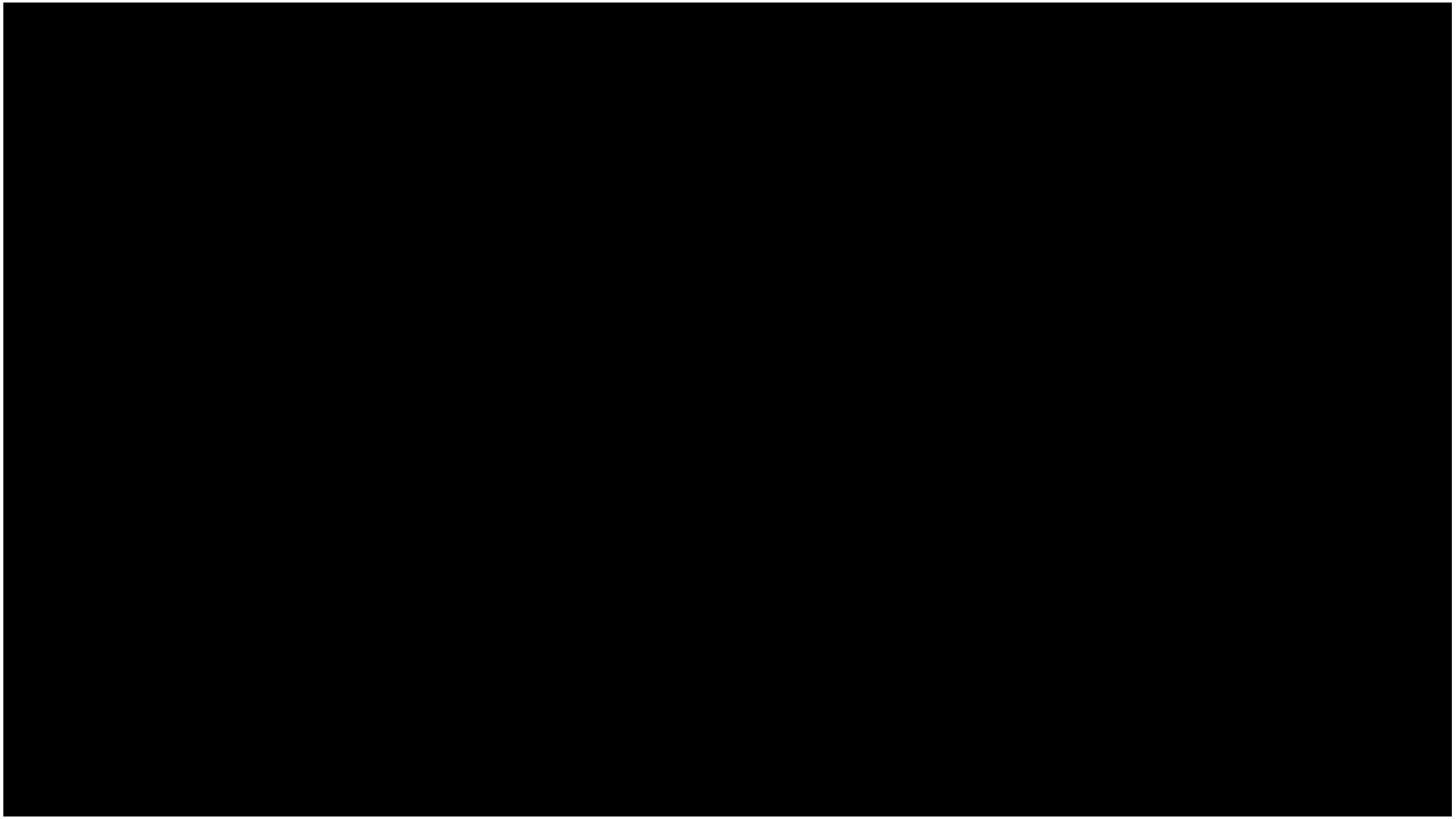


Water Movement in Soil



Note the dramatic differences in percolation time and distribution patterns between soil types

Water Movement in Soil



Soil Horizons

O (humus or organic
A (topsoil)

E (eluviated horizon)

B (subsoil)

C (parent material)

R (bedrock)

O HORIZON
Surface litter: Partially decomposed organic matter

A HORIZON
Topsoil: Humus, living creatures, inorganic minerals

E HORIZON
Zone of leaching, materials move downward

B HORIZON
Subsoil: iron, aluminium humic compounds are accumulated and clay leached down from A and E horizons

C HORIZON
Weathered parent material: Partial breakdown of inorganic minerals

R HORIZON
Bedrock

Soil pH

"An acid is defined as a substance that tends to release hydrogen ions (H+). Conversely, a base is defined as a substance that releases hydroxyl ions (OH-). All acids contain hydrogen ions, and the strength of the acid depends upon the degrees of ionization (release of hydrogen ions) of the acid. The more hydrogen ions held by the exchange complex of a soil in relation to the basic ions held (Ca, Mg, K), the greater the acidity of the soil."

Mosaic Group

Soil pH For The Rest Of Us

Concentration of Hydrogen ions compared to distilled water			
	1/10,000,000	14	Liquid drain cleaner, Caustic soda
	1/1,000,000	13	bleaches, oven cleaner
	1/100,000	12	Soapy water
	1/10,000	11	Household Ammonia (11.9)
	1/1,000	10	Milk of magnesium (10.5)
	1/100	9	Toothpaste (9.9)
	1/10	8	Baking soda (8.4), Seawater, Eggs
	0	7	"Pure" water (7)
	10	6	Urine (6) Milk (6.6)
	100	5	Acid rain (5.6) Black coffee (5)
	1,000	4	Tomato juice (4.1)
	10,000	3	Grapefruit & Orange juice, Soft drink
	100,000	2	Lemon juice (2.3) Vinegar (2.9)
	1,000,000	1	Hydrochloric acid secreted from the stomach lining (1)
	10,000,000	0	Battery Acid

Typical Soil Range

Soil Fertility

2525 Joe B Rushing Rd
Fort Worth, TX 76119

Sample received on: 12/9/2014
Printed on: 12/22/2014
Area Represented: 39000 sqft

Tarrant County
Laboratory Number: 424467
Customer Sample ID: F1M
Crop Grown: SHADE TREES

Analysis	Results	CL*	Units	ExLow VLow Low Mod High VHigh Excess.	Fertilizer Recommended
pH	7.6	(6)	-	Slightly Alkaline	
Conductivity	592	(-)	umho/cm	Slight (CL*)	
Nitrate-N	16	(-)	ppm**		0.7 lbs N/1000sqft
Phosphorus	154	(50)	ppm		0 lbs P2O5/1000sqft
Potassium	442	(175)	ppm		0 lbs K20/1000sqft
Calcium	10,764	(180)	ppm		0 lbs Ca/1000sqft
Magnesium	277	(50)	ppm		0 lbs Mg/1000sgft
Sulfur	19	(13)	ppm		0 lbs S/1000sqft
Sodium	26	(-)	ppm		
Iron	32.74	(4.25)	ppm		
Zinc	6.48	(0.27)	ppm		
Manganese	6.58	(1.00)	ppm		
Copper	2.25	(0.16)	ppm		
Boron	1.31	(0.60)	ppm		
Limestone Requirement					0.00 lbs/1000sqft

Textural Analysis Test (hydrometer)

Sand	43	%
Silt	18	%
Clay	39	%
Textural Class:	Clay Loam	
Organic Matter	4.11	%

Detailed Salinity Test (Saturated Paste Extract)

pH	7.4		
Conductivity	0.72	mmhos/cm	
Sodium	37	ppm	1.611 meq/L
Potassium	10	ppm	0.268 meq/L
Calcium	175	ppm	8.743 meq/L
Magnesium	7	ppm	0.604 meq/L
SAR	0.75		
SSP	14.35		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

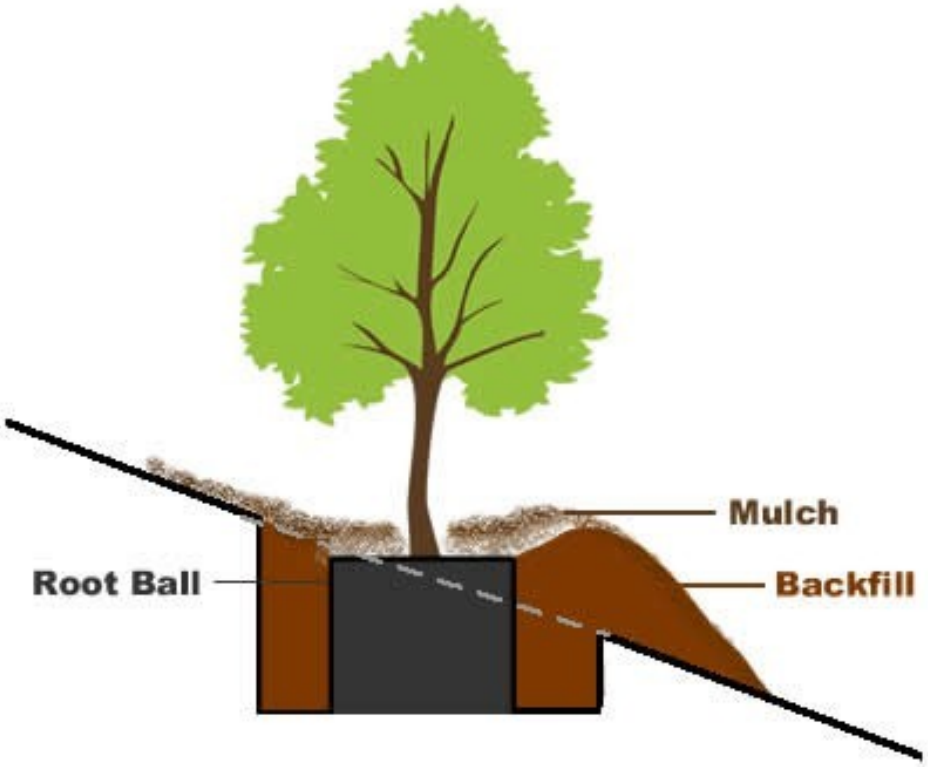
Phosphorus: Phosphorus is highly elevated, avoid phosphorus containing fertilizers and organics for the next 5 years, retest annually.

Site Selection / Assessment

- **Light**
  - Reflected light and/or reflected heat
  - Exposure affects soil moisture
  - Shade Tolerant: most maples and hollies, persimmon, redbud, rusty blackhaw, roughleaf dogwood, red mulberry, Eve's necklace, Carolina buckthorn
  - Shade Intolerant: most pines and junipers, pecan, black walnut, desert willow, sycamore, willows
  - Somewhere In-Between: most oaks, ash, hackberry/sugarberry

Site Selection / Assessment

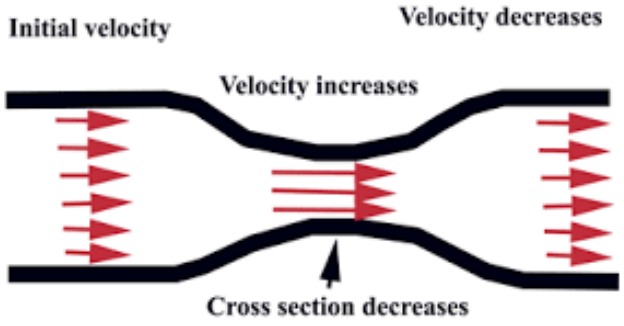
- **Topography/Slope**
  - Movement of water is downslope
  - Top of hill dries out quickly
  - Bottom of hill may stay wetter than expected
  - Western/southern exposures



Planting on a slope

Site Selection / Assessment

- **Wind**
  - Growing conditions affect failure susceptibility (limited soil space, deflected roots, shallow soil)
  - Species prone to breakage/toppling
  - Increased evapotranspiration
  - Venturi effect / Downdraft effect

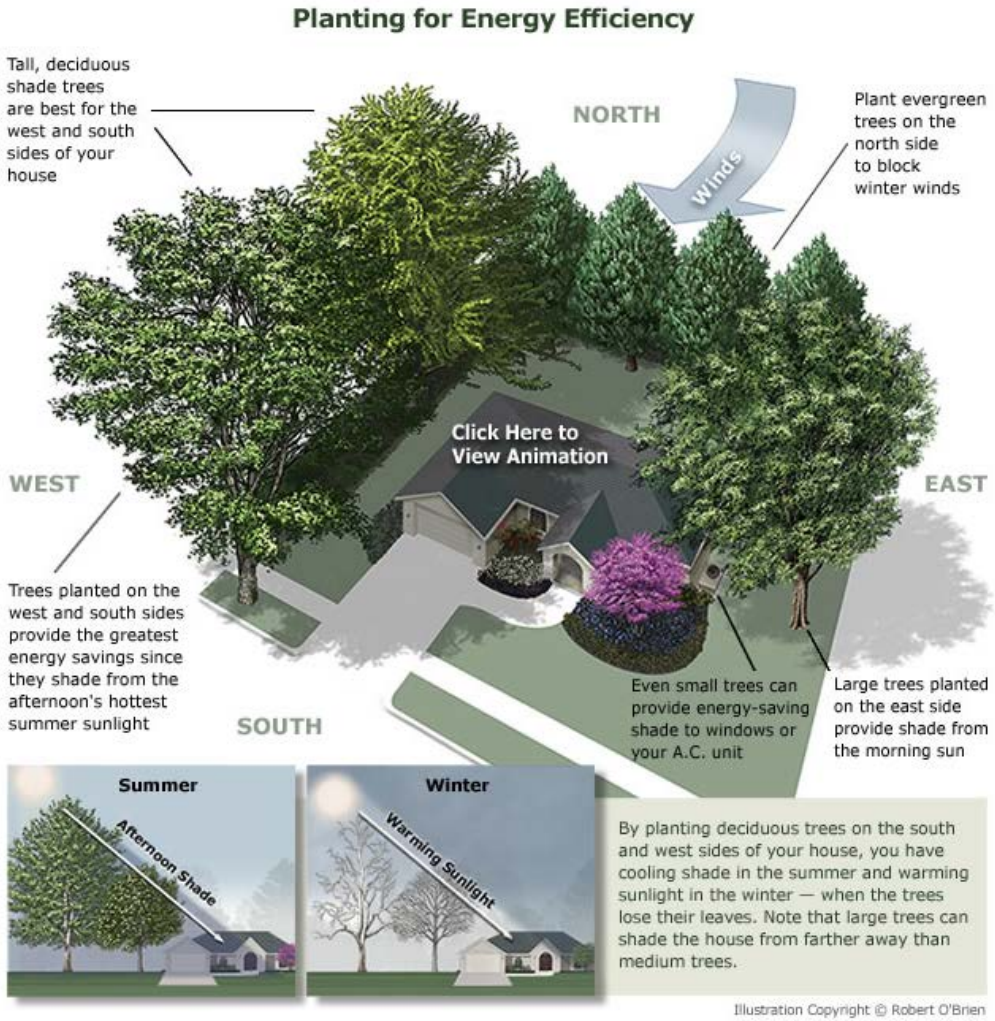


Site Selection / Assessment

- **Water**
  - Establishment period
  - Watering methods
  - Persistently wet/dry soils
  - Correlation to other site characteristics
- **Maintenance**
  - Ease of access
  - Increased maintenance due to location?

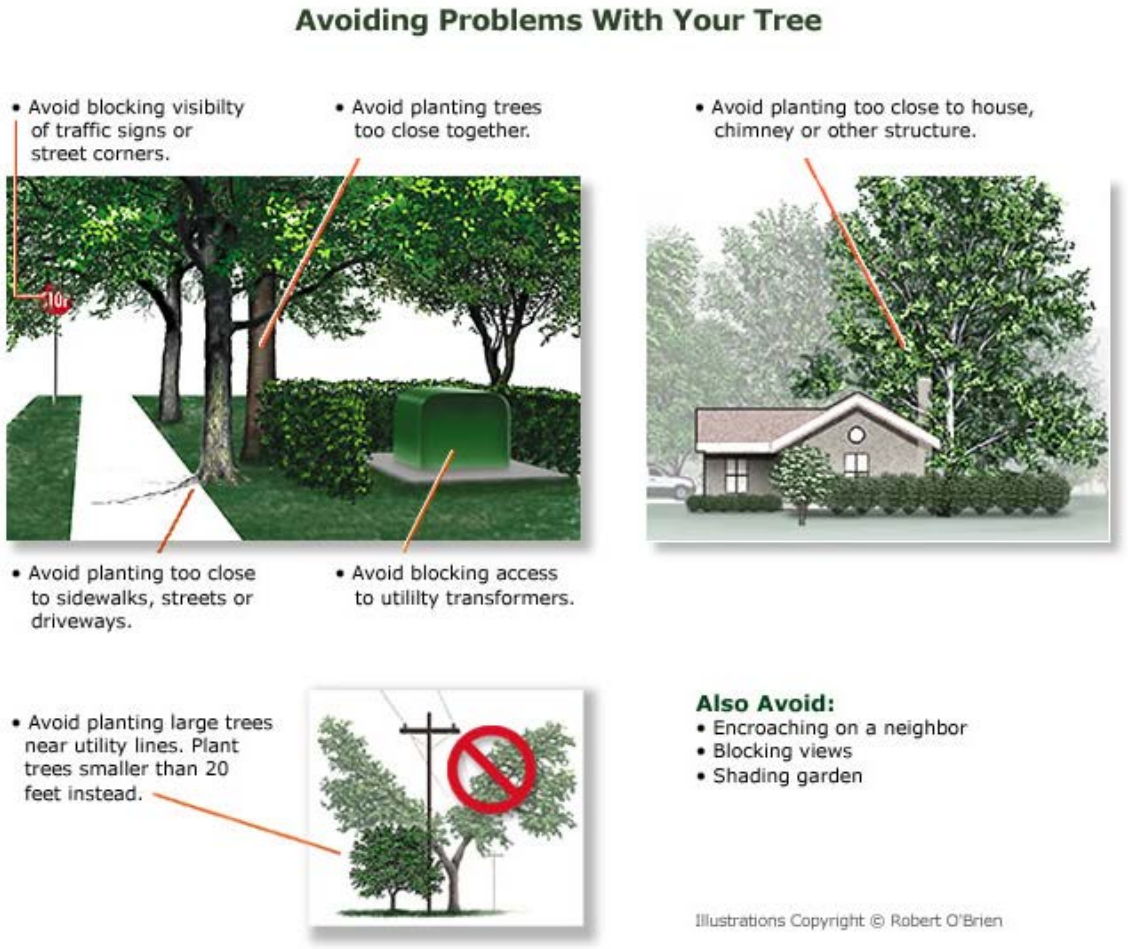
Site Selection / Assessment

- **Needs**
  - Shade
  - Energy efficiency
  - Wind screen
  - Noise buffer
  - Aesthetics
  - Food
  - Wildlife



Site Selection / Assessment

- **Conflicts**
  - Wires
  - Signs/Signals
  - P.O.S.E
  - Property Lines
  - Legal Restrictions
- **Future Considerations**
  - Room to Grow
  - Visibility
  - Maintenance

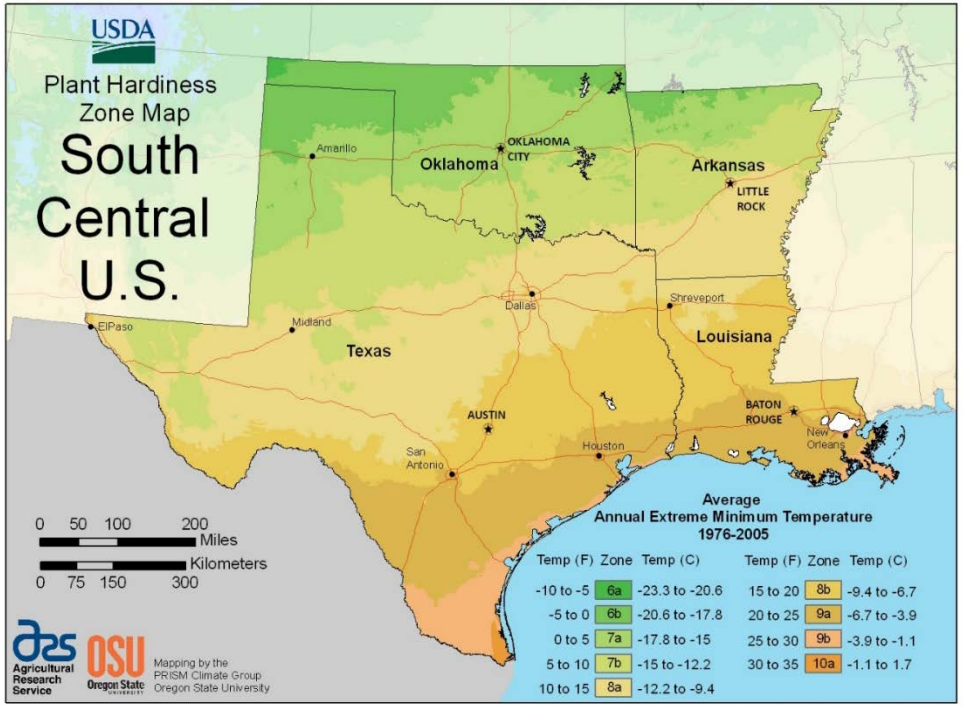


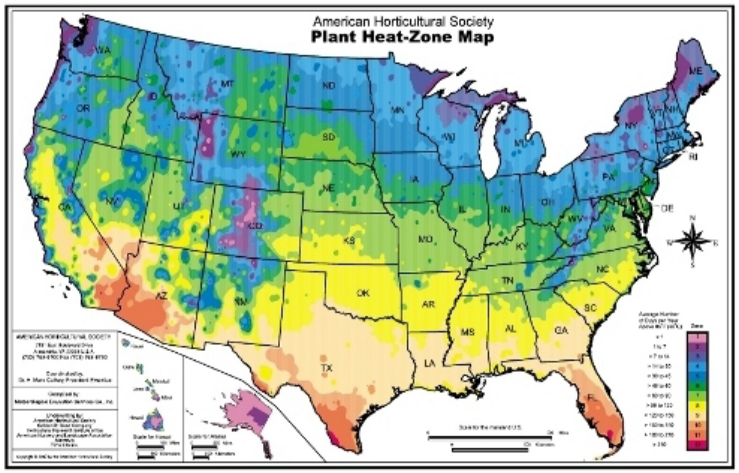
Species Selection

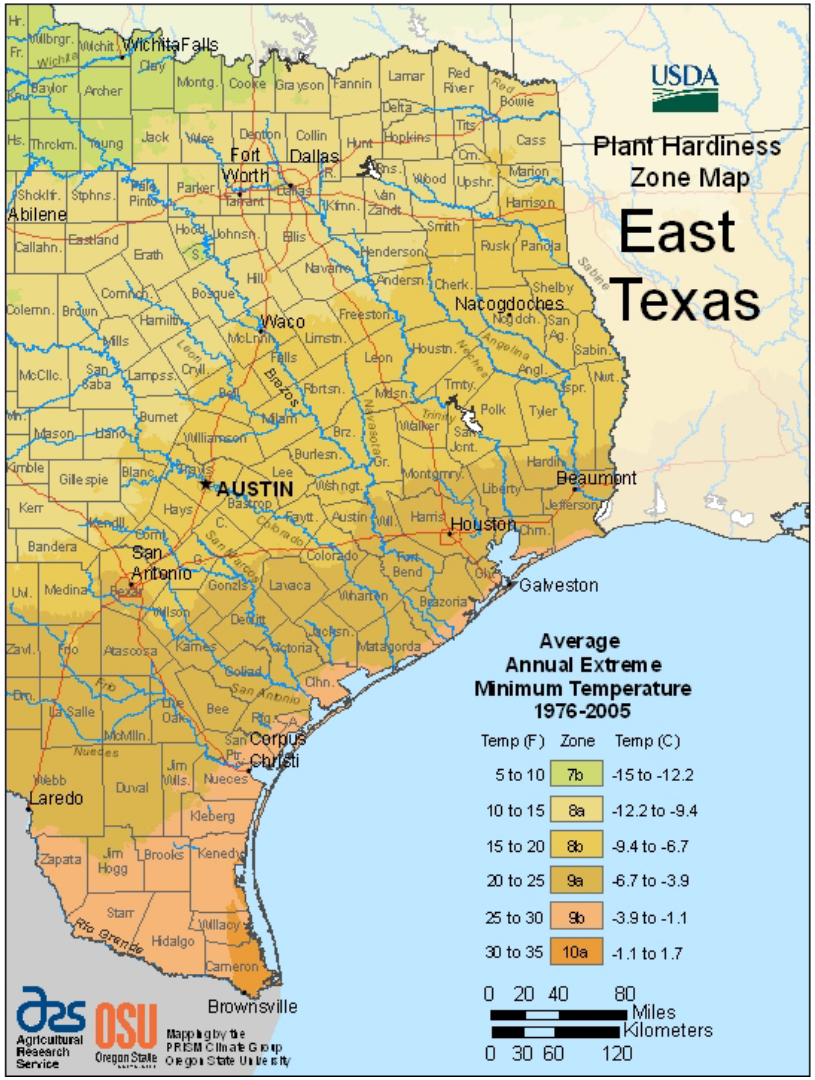
** Often goes hand-in-hand with site selection **

- Mature Size (large, medium, small)
  - How large is “large”?
- Hardiness/Heat Zones
- Light/Water/Soil Requirements
- Native, Adapted or Both?
- Evergreen vs Deciduous
- Hazardous Potential
  - Requires a “target”
- Disease/Pest/Character Flaws

Hardiness / Heat Zones

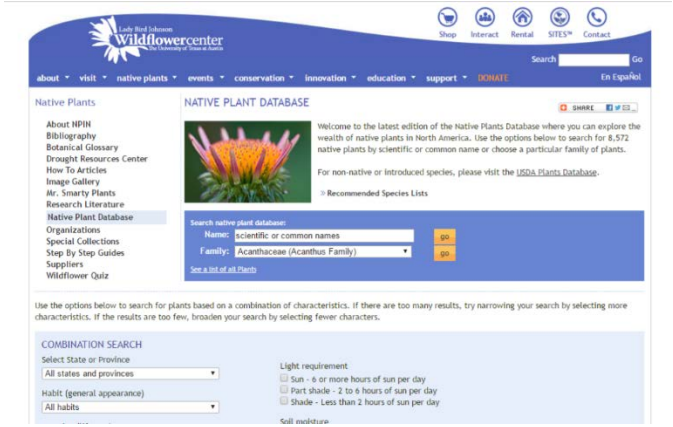






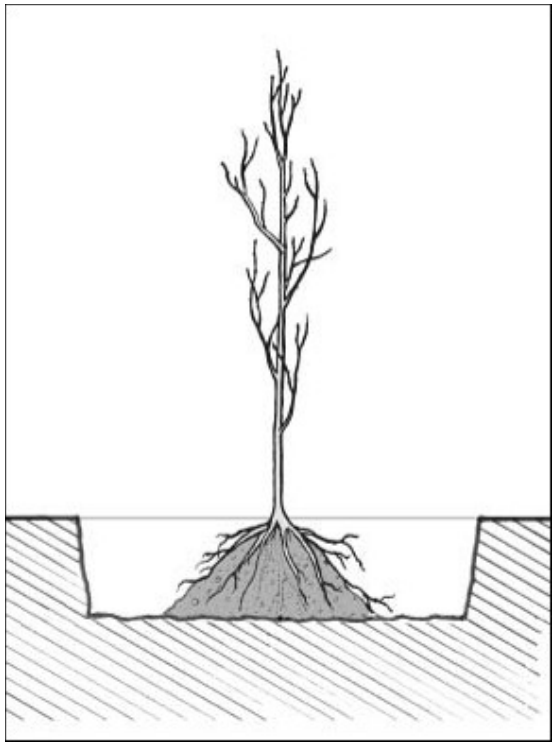
Species Selection

- Numerous sources available
- Use local/regional tools when possible
- Observe your surroundings
- Availability is greatest limiting factor



Stock Types

- **Bare Root**
  - Shortest window for planting
  - Common method for fruit trees
  - Popular for mass planting or mitigation sites
  - Method may be applied to other stock types
  - Roots are visible
  - Take extra care with grafted trees



Missouri Gravel Bed

- Adaptation of bare root method
- Uses gravel/sand substrate with regular irrigation
- Produces lots of fine absorbing roots
- Not a growing method, but a planting preparation method
- Fine roots can dry out very quickly
- Preparation of stock to prep for MGB stage is labor intensive
- Can be affordable way to utilize bare roots with greater survival rates

Stock Types

- **Ball and Burlap (B&B)**
  - Common with very large material
  - Mortality rate can be a concern
  - Requires either special equipment or is very labor intensive
  - Lower cost of production than containers
  - Root condition is a mystery

Stock Types

- **Container Trees**
  - Available in many sizes
  - Can be planted year-round
  - Typically lower level of “transplant shock”
  - Root system can likely be inspected
  - Root defects are common
  - Production is expensive (high initial outlay)

The Planting Process

The 11th Commandment

- Thou shalt plant a $10 dollar tree in $100 hole (rather than a $100 tree in a $10 hole).

General Considerations

$$0 = CF_0 + \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \frac{CF_3}{(1+IRR)^3} + \ldots + \frac{CF_n}{(1+IRR)^n}$$

Or

$$0 = NPV = \sum_{n=0}^{N} \frac{CF_n}{(1+IRR)^n}$$

- Trees are an investment
  - Initial outlay
  - Ongoing maintenance (best spent early)
  - Dividend yield (benefits...the longer the better)
- Timing
  - Fall, Winter, Spring, Summer
- Legal Obligations
  - Call before you dig (two business days prior)
  - Dial 811 or visit www.texas811.org
  - Contractor's responsibility if work is "hired out"

Root Flare

- Find/expose the root flare
  - aka trunk flare
- Important area for air/gas exchange
- Exposed flares have lower probability for girdling roots and decay
- Exposing flares often uncovers root defects
- Growth rate greatly diminished and mortality significantly higher when planted too deep
- Beware of grafted trees

The Hole Truth

- Dig a hole 2-5 times the width of the root ball, but only as deep as the top of the root flare (slightly less is often even better)
- Saucer shaped hole aids in root spread
- Keep the soil in piles near the edge of the planting hole (you'll need it)
- Break up any glazing on the walls of the hole
- Checking depth
- Digging deeper
- Peds/Clods/Rocks/Other stuff

Placing the Tree (Containers)

- Remove the container (roll, slide, cut, etc.)
- Support the weight of the tree by the root ball, not the trunk or limbs (except with bare root and MGB trees)
- Place tree in center of hole and upright (check from multiple sides)
- Check and recheck depth
- Lift (by root ball) and fill/pack, as needed
- Pay attention to scaffold branches to determine if tree needs to be turned

Root of the Problem

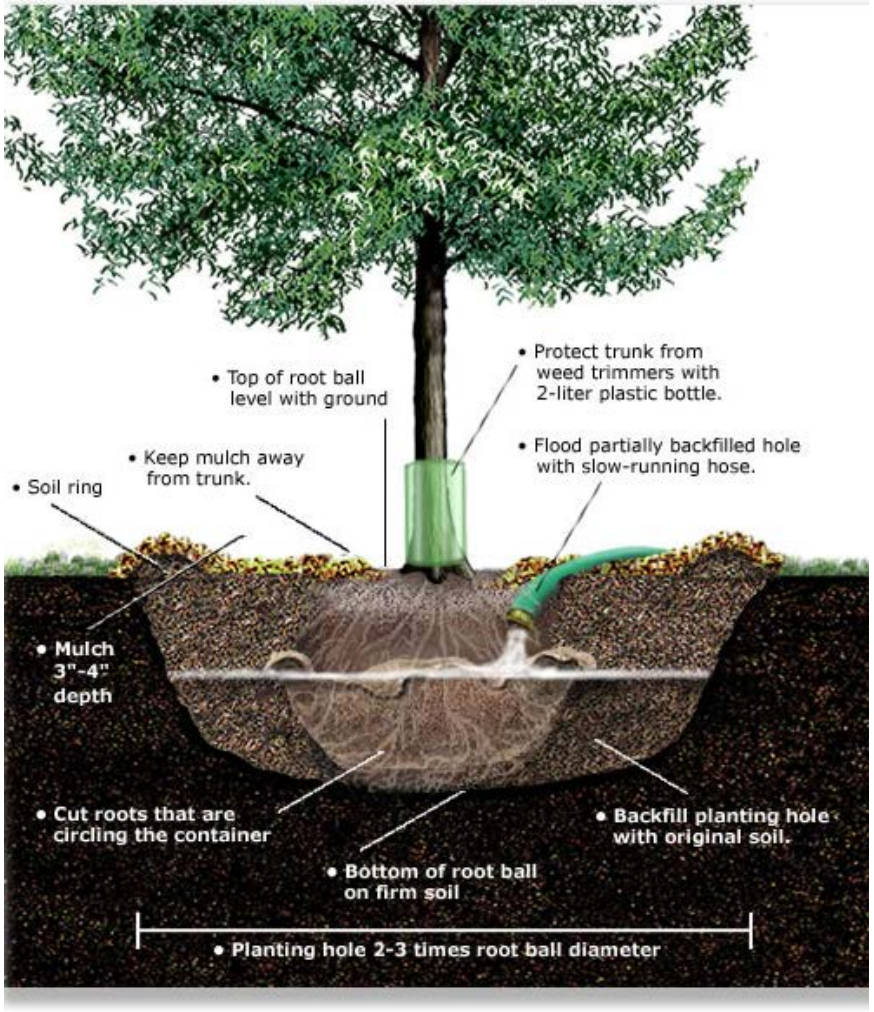
- Any container grown tree may be prone to circling roots
- Shaving is most effective
- Slicing is better than nothing
- Both methods can be done with some success on large root balls after tree is in hole with a sharp spade

Placing the Tree (B&B)

- Set the B&B in the hole, using the basket to support the weight
- Go slowly to prevent root damage
- Recheck depth
- Check tree is straight and faced appropriately
- Remove as much of the basket, burlap and strap/twine as possible without disturbing placement of tree or breaking apart root ball
- Check that the root flare is exposed (before placing in hole is better, but tricky at best)
- Circling roots

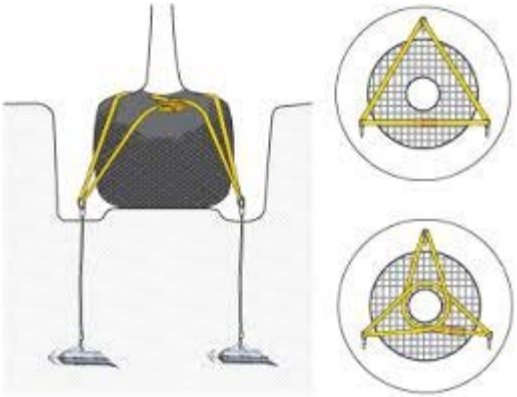
Backfilling

- Use the existing soil
- Place partial backfill and tamp or apply water
- Place more backfill and tamp or apply water
- Place even more backfill and tamp or apply water
- Keep root flare exposed
- Keep tree straight throughout
- Use any excess soil to create a soil ring around edge of planting hole
- Amendments?



Staking

- Only stake if truly necessary
- Multiple methods available
- Staking is temporary, not a fixture
- Must protect trunk and limbs from damage
- Must stake loosely to allow trunk movement
- Can be hazards unto themselves



Watering

- After planting, water root ball thoroughly
- Big bubbles mean big air pockets
- Opportunity to move soil into large voids
- Continue watering regime until tree is established
- More watering products available than even stakes

Mulching

- A 2”-4” thick layer of mulch, evenly spread across the root zone is sufficient
- Keep mulch off the trunk (by several inches)
- Include the soil ring when mulching newly planted trees

Bare Root / MGB Trees

- Mound or berm needs to be constructed in bottom of planting hole to support roots
- Root pruning is easy to perform (and may be necessary to fit the hole
- Soaking or hydrogels are often used to prevent desiccation during planting

After Planting

- Watering
- Pruning
  - Only broken, dead, crossing for first year or two after planting
- Fertilizing
  - Probably isn't necessary, at planting or other, when using native/adapted trees in native soil
- Weeding
- Stakes/Wraps/Other

Beware of Bad Information