EARTH-KIND®

Landscaping for Beauty and Water Conservation

Earth-Kind Landscaping

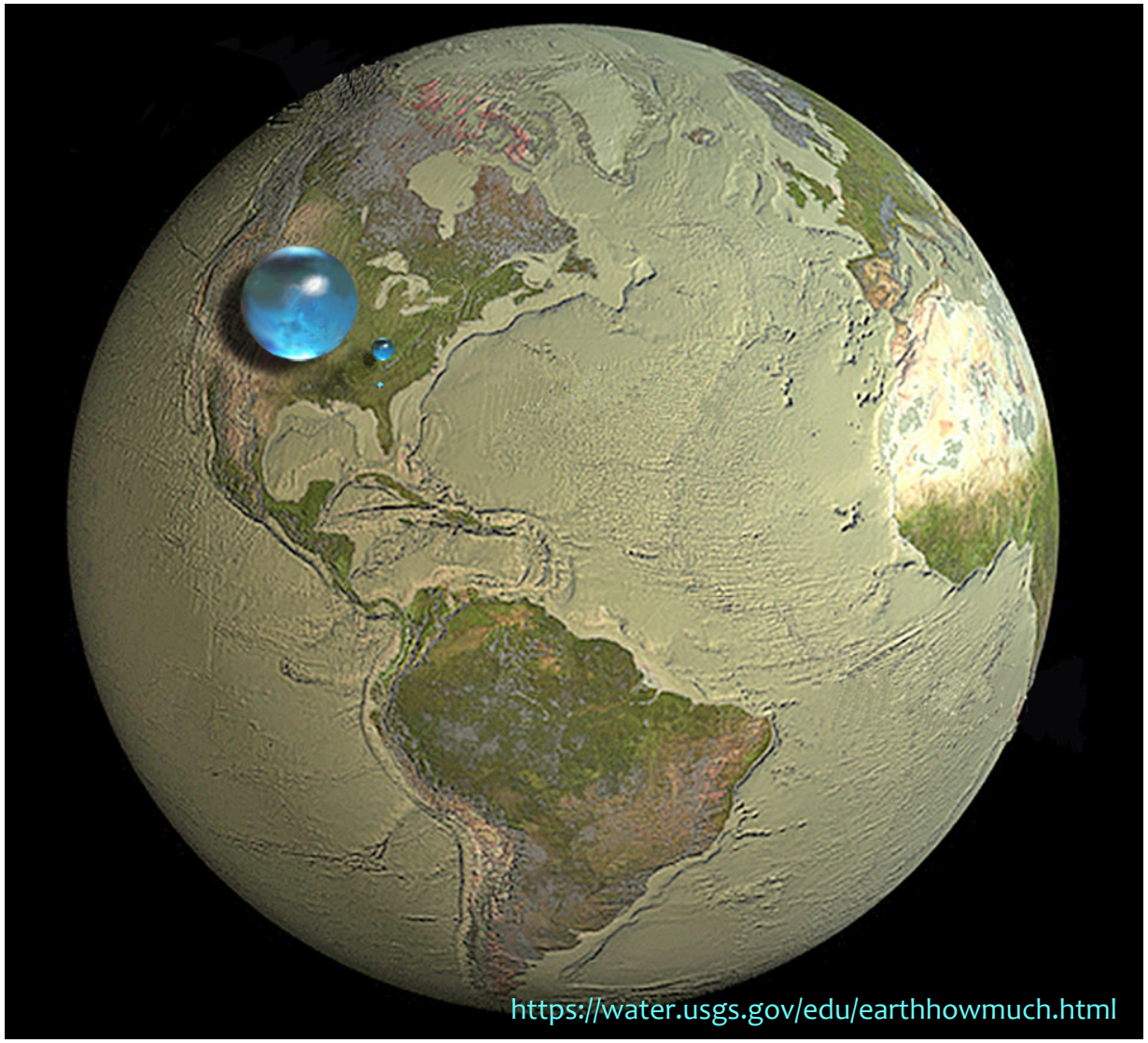
"Earth-Kind landscaping focuses on conserving and protecting natural resources through the use of ***environmentally friendly practices*** *to create* ***beautiful, easy-care*** *landscapes, as well as, vegetable gardens and fruit plantings."*

Goals of Earth-Kind

1. **Conservation of water AND quality**
2. **Reduction of chemical and fertilizer use**
3. **Energy conservation**
4. **Reduction of solid waste**

TEXAS A&M AGRILIFE EXTENSION

Water: is there enough?



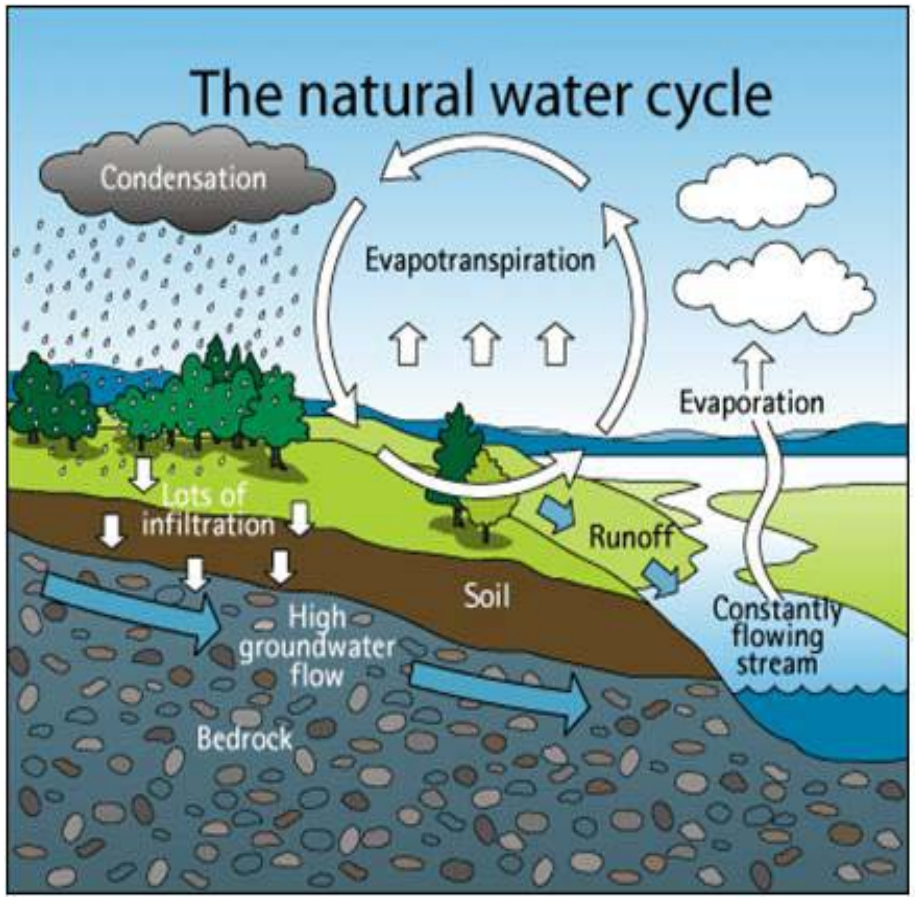
TEXAS A&M AGRILIFE EXTENSION

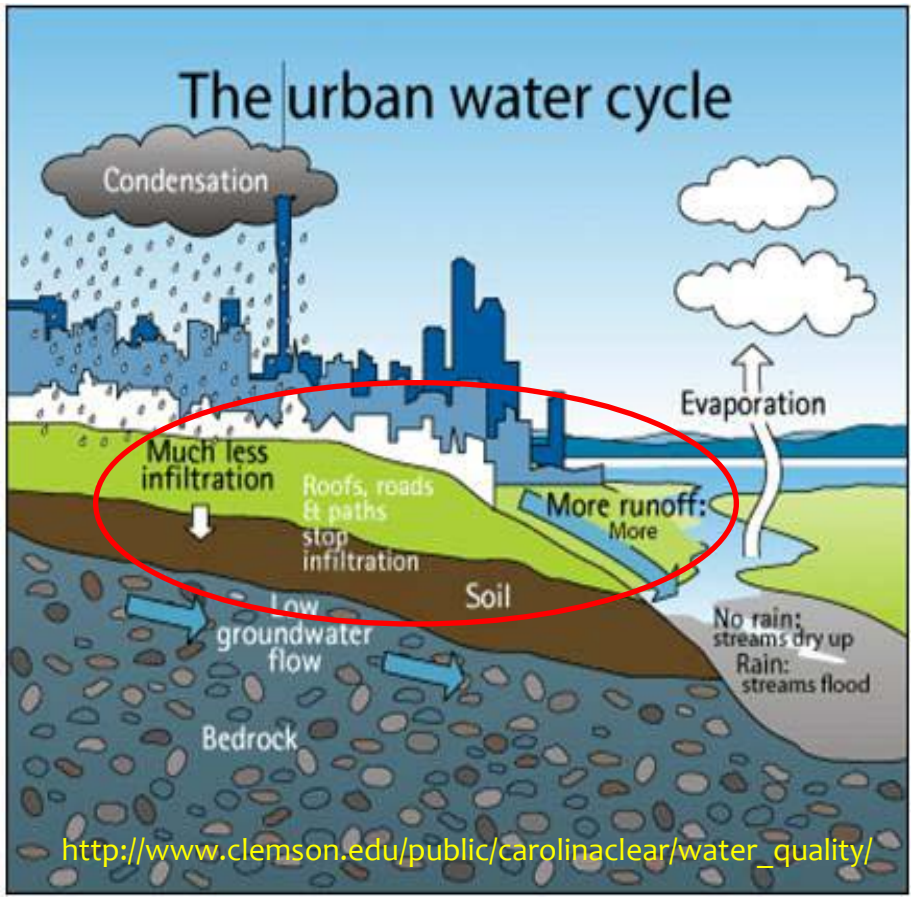
What role do landscapes play?

- By 2060, 46,000,000 people will need 22 Million acre-feet
  - Only 15 Million acre-feet expected to be available (TWDB)
- 25% to 30% of municipal water used in landscapes.
- 9 Billion gallons per day across the nation for landscaping (EPA)
  - As much as 50% wasted

TEXAS A&M AGRILIFE EXTENSION

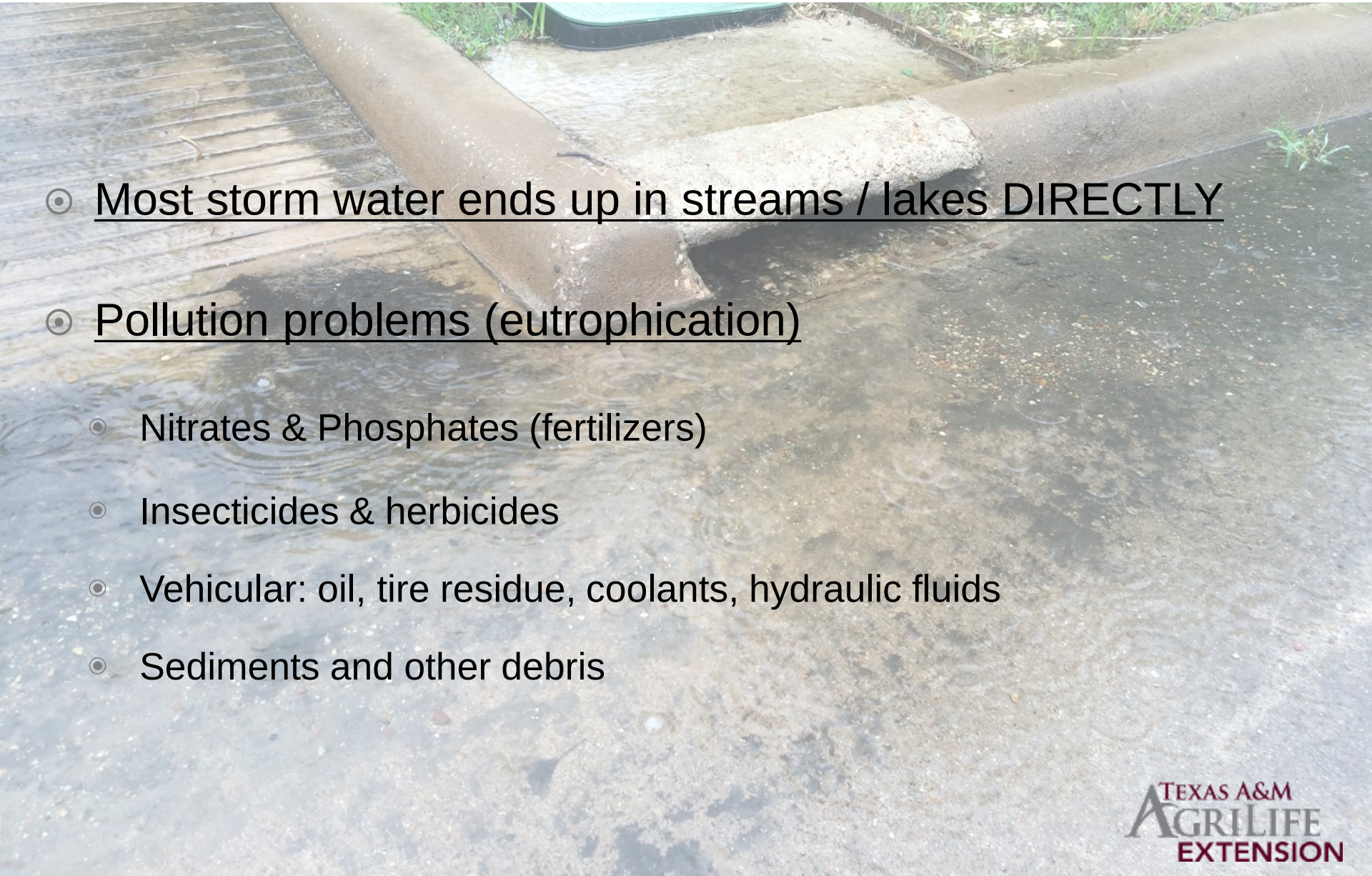
All water is shared





TEXAS A&M AGRILIFE EXTENSION

Urban runoff issues



- Most storm water ends up in streams / lakes DIRECTLY
- Pollution problems (eutrophication)
  - Nitrates & Phosphates (fertilizers)
  - Insecticides & herbicides
  - Vehicular: oil, tire residue, coolants, hydraulic fluids
  - Sediments and other debris

TEXAS A&M AGRILIFE EXTENSION

TEXAS A&M AGRILIFE EXTENSION

Earth-Kind Challenge

aggie-horticulture.tamu.edu/earthkind/challenge/test/

Earth-Kind®
Landscaping

Is your landscape contributing to a healthy and sustainable environment? There's one way to find out, take the Earth-Kind® Challenge. It's easy. Just answer this series of questions about the cultural principles and practices used in maintaining your landscape. You'll also find links to Earth-Kind® information along the way to assist in determining the most appropriate response.

If you need to, you can download a free PDF Reader.

After completing the questions, click on the SUBMIT button and you will automatically receive an Earth-Kind® score ranging from 0-100. The higher the score, the more you are doing to help preserve and protect the environment in which we live.

Remember - the value of this activity largely depends on how accurately the response to each question reflects your current maintenance principles and practices. *All questions should be answered.*

Landscape Design (10 points possible):

read more on landscape design...

Is there a plan or drawing of current and future landscape areas? Yes
How much turf area does the landscape include? Less than 30%
Are plants with like water requirements grouped together in the landscape (hydrozoning)? Yes

Soil Preparation (10 points possible):

read more on soil improvement

How much organic matter has been incorporated in to landscape planting areas? More than 50%

Plant Selection (15 points possible):

read more on plant selection

What percent of landscape plants have an Earth-Kind® Index value of 8 or higher (use the Earth-Kind® Plant Selector to find values of many common landscape plants)? More than 50%

Mulching (10 points possible):

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Earth-Kind Challenge

TEXAS A&M AGRILIFE EXTENSION

Thirsty Paving....??

Texas A&M AgriLife Extension

High-volume irrigation.....

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Mother Nature doesn't need help

Rain / Freeze Sensor

http://www.smarthome.com/orbit-irrigation-57069n-hard-wired-rain-freeze-sensor.html?src=Froogle&gclid=CjwKEAjwpsGqBRCioKet--bp_QcSJADCtbsbQMRKBZMPnbllfvy-eOzVQrcGEsIM7Ezuai02PZQPHhoCbIbw_wcB

TEXAS A&M AGRILIFE EXTENSION

Misuse of Fertilizers and Chemicals

- Residual nutrients more prevalent in urban streams than in rural ones (U.S. Geological Survey, 2013)
  - Phosphorous most common pollutant

- Wide availability of products
  - Readily accessible, relatively inexpensive

- Pollution of surface and ground water, soil, and air

TEXAS A&M AGRILIFE EXTENSION

Landscape Waste Accumulation

- Yard wastes account for 20% of landfill volume
  - Accounts for $250 Million in disposal costs in TX
- Municipal/county programs for recycling

http://www.santacruzwatersavingplants.com/Garden-Resources/Swales.php

Seven principles of Earth-Kind:

1) Planning and design
2) Soil analysis and preparation
3) Practical turf areas
4) Appropriate plant selection
5) Efficient irrigation and rainwater harvesting
6) Effective use of mulches
7) Appropriate maintenance

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Practical Turf Area

- Typically the heaviest water user in TX landscapes
- Largely due to behavioral issues:
  - Unrealistic quality expectations
  - Incorrect selection of species/variety
  - Improper management (excessive irrigation/fertilization)
  - Excessively large proportion of landscape
- Benefits:
  - Erosion control, water infiltration
  - Cooling through transpiration (30° F)
  - Effective design element

The Typical home landscape

- Majority of yard is turf by default
- Spray irrigation (excessive / improper usage)
- Poorly-adapted plant choices

http://imgkid.com/typical-suburban-house.shtml

TX Senate Bill 198

- A BILL TO BE ENTITLED AN ACT relating to restrictive covenants **regulating drought-resistant landscaping or water-conserving turf**.

- BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS: SECTIONA1.AASection 202.007(a), Property Code, is amended to read as follows: (a) property owners ' association may **not** include or enforce a provision in a dedicatory instrument that **prohibits or restricts** a property owner from:
  - (1) implementing measures **promoting solid-waste composting** of vegetation, including grass clippings, leaves, or brush, or **leaving grass clippings uncollected** on grass
  - (2) **installing rain barrels or a rainwater harvesting system**; [or]
  - (3) **implementing efficient irrigation systems**, including underground **drip or other drip systems** or
  - (4) **using drought-resistant landscaping or water-conserving turf**.

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Placement of Turf

Avoid placing turf in long, narrow strips that are difficult to water and maintain. This is especially true when using spray heads.

Try to keep turf in circular or square plantings that can be watered more efficiently.

TEXAS A&M AGRILIFE EXTENSION

Turf Selection Matters

Consider using species such as Zoysia and Buffalograss that are capable of going dormant during drought and can easily recover.

Specific varieties within the same species are require considerably less water than do others (new San Augustine cultivars).

Buffalograss (lower right) requires 25% less water to remain green than do most turf species. It can also go survive long periods without water when dormant.

TEXAS A&M AGRILIFE EXTENSION

Planning and Design: think long-term

- Proper spacing of plants
- Positioning and grouping
- Plant diversity

A&M LIFE EXTENSION

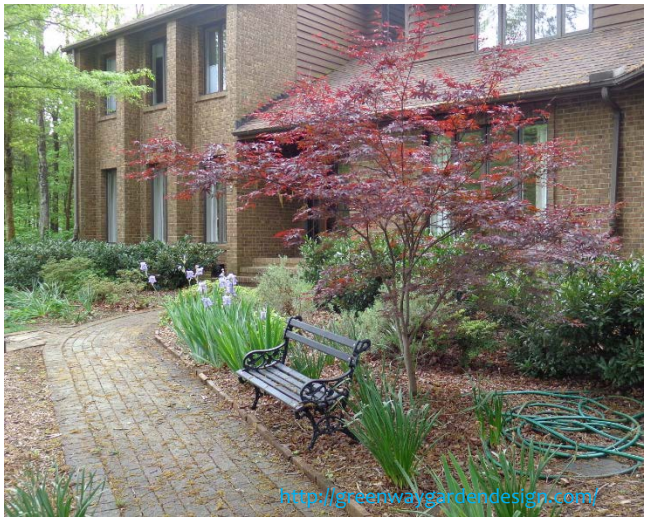
Final Plant Spacing

- Final Height / Width
- Air movement
- Watering
- Pests / Disease

TEXAS A&M AGRILIFE EXTENSION

Proper Plant Placement

- North side: shade & heavy water-users
- East side: part shade / heavy water users
- West / Southwest: arid / heat-tolerant
- South side: tropical / tender plants



Thinking outside the box…..

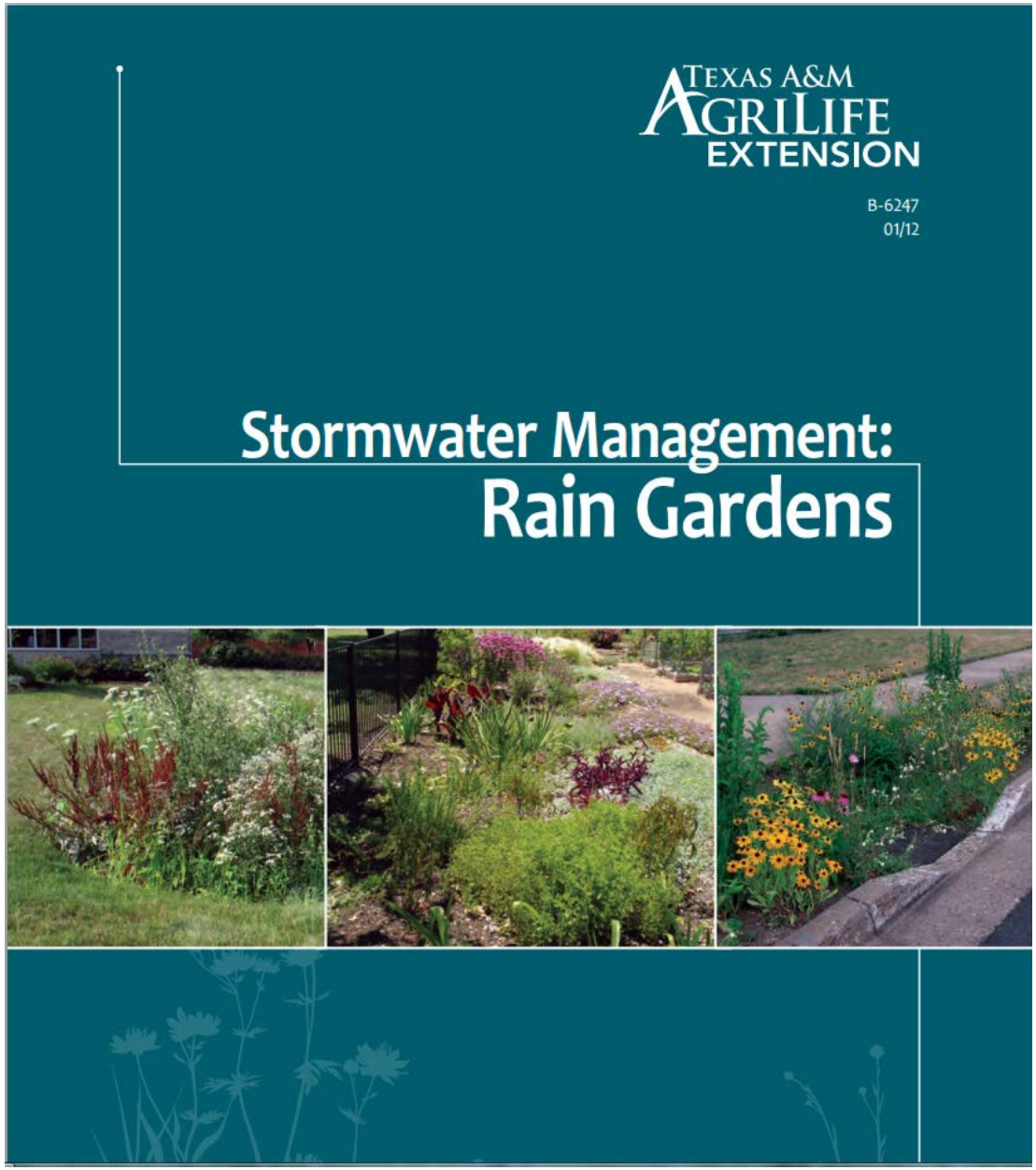
Areas of native vegetation support wildlife such as birds and beneficial insects, require no irrigation or maintenance, and serve as privacy screens

Wildflower meadows offer natural beauty with minimal care and water, attract butterflies, and can easily be incorporated in as small patches or larger expanses

TEXAS A&M AGRILIFE EXTENSION

Rain gardens

TEXAS A&M AGRILIFE EXTENSION



Texas A&M AgriLife Extension

Plants for a rain garden

Table 4. List and characteristics of rain garden plants

Botanical Name	Common Name	Height/Width	S/SH	W/D
Perennials				
Achillea millefolium	Yarrow	1 ft/1 ft	S	D
Acorus calamus	Sweet flag	4 ft/2 ft	S	W
Alstroemeria pulchella	Peruvian	3 ft/2 ft	S/PSH	W/D
Aquilegia hinckleyana	Texas columbine	12 in./12 in.	S	W/D
Asclepias tuberosa	Butterfly weed	3 ft/6 in.	S	D
Aspidistra elatior	Cast iron plant	24 in./24 in.	SH	W/D
Amorpha fruticiosa *	False indigo	5 ft to 10 ft/8 in.	S/PSH	W
Baptisia australis	Blue false indigo	3 ft to 6 ft/24 in.	S	W
Calyptocarpus vialis	Horseherb	4 in./18 in.	SH	W/D
Canna generalis	Canna	2 ft to 6 ft/2 ft to 6 ft	S	W
Coreopsis verticillata 'Moonbeam'	Moonbean coreopsis	1 ft/1 ft	S/PSH	W/D
Dichondra argentea 'Silver Falls'	Silver falls	2 in./4 in.	S/PSH	D
Echinacea purpurea	Purple cone flower	2 ft/2 ft	S	W/D
Eupatorium coelestinum	Blue mistflower	8 in./16 in.	S	W/D
Eupatorium purpureum	Joe-Pye weed	4 in. to 4 ft/2 ft	S/SH	W
Heliopsis helianthoides	Ox-eyed sunflower	3 in. to 5 in./30 in.	S	W
Hibiscus coccineus	TX Star hibiscus-red	6 ft/4 ft	S	W/WD
Hibiscus coccineus 'Lone Star'	TX Star hibiscus-white	6 ft/4 ft	S	W/WD
Hibiscus moscheutos	Swamp rose mallow	3 ft to 4 ft	S	W/D
Hymenocallis liriosme	Spider lily	2 ft/1 ft	S	W/D
Ipomopsis rubra	Standing cypress	2 ft to 6 ft/6 in. to 12 in.	S	W
Iris spp. bearded and hybrids	Iris	12 in./6 in.	S	D
Iris brevicaulis Louisiana species and hybrids	Louisiana iris	Up to 40 in./6 in.	S/PSH	W
Kosteletzkya virginica	Marsh mallow	6 ft/6 ft	S	W
Liatris spicata	Gayfeather	2 in./18 in.	S	W
Lobelia cardinalis	Cardinal flower	2 ft to 4 ft/2 ft	S/PSH	W
Lythrum salicaria	Loosestrife	3 ft/3 ft	S	W/D
Monarda fistulosa	Bee balm	2 ft/2 ft	S	W/D
Rudbeckia hirta	Black-eyed Susan	1 ft to 2 ft/1 ft	S	W/D
Rudbeckia fulgida 'Goldstrum'	Black-eyed Susan	2 ft/2 ft	S	W/D
Rudbeckia maxima	Giant coneflower	4 ft to 6 ft/2 ft to 3 ft	S	W
Ruellia brittoniana 'Katie's'	Ruella Katie	6 in./12 in.	S	W/D
Salvia coccinea	Scarlet sage	3 ft to 5 ft/1 ft to 2 ft	S/SH	W/D
Setcreasea pallida	PurpleHeart	12 in./24 in.	S/PSH	W/D
Sisyrinchium angustifolium	Blue-eyed grass	6 in. to 12 in./12 in.	S	W/D
Solidago altissima	Goldenrod	2 ft to 4 ft/3 ft to 5 ft	S	W/D

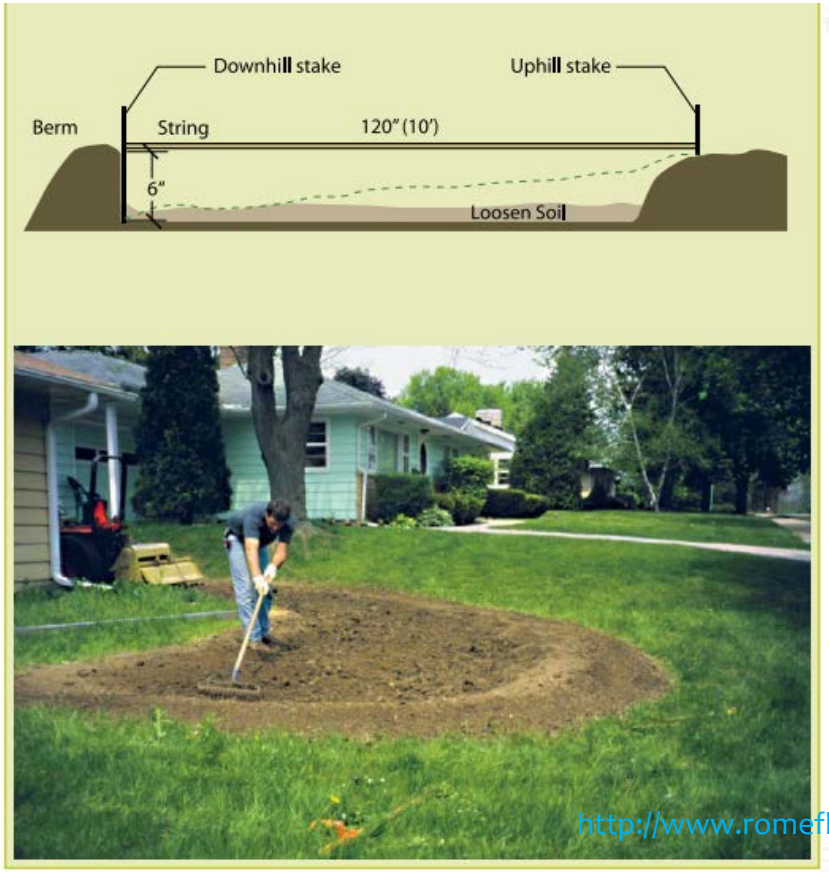
continued on next page

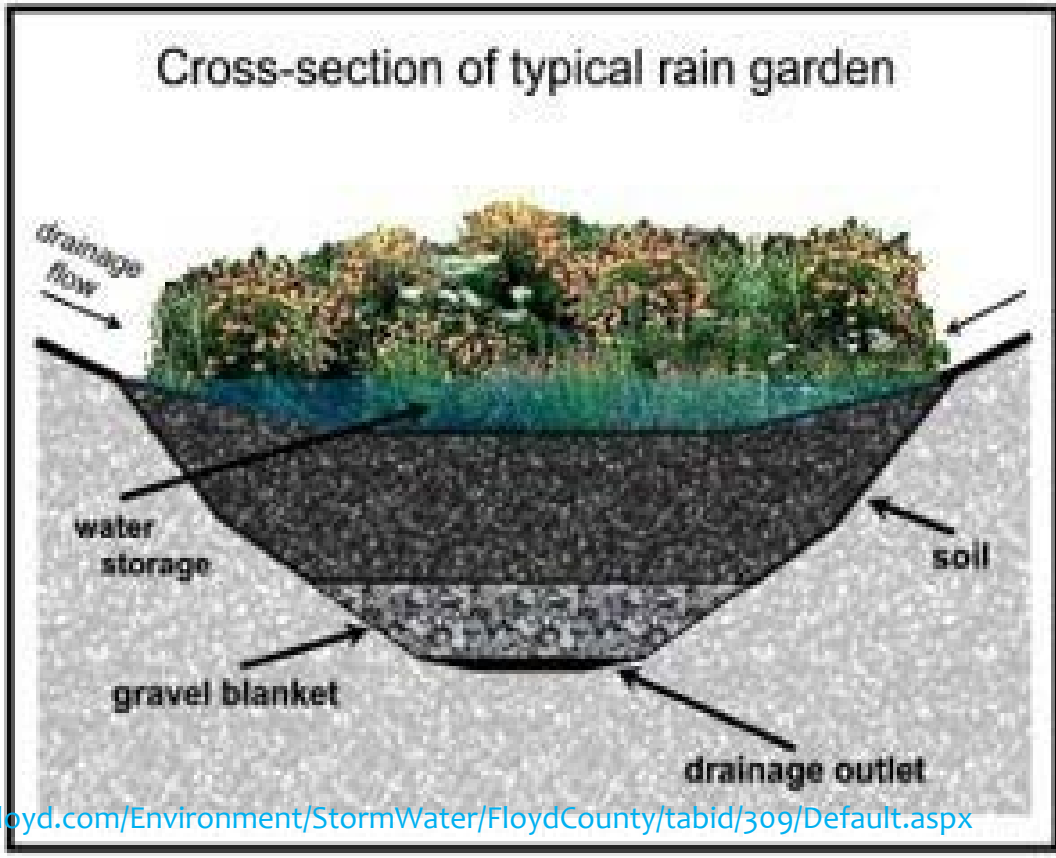
Table 4 continued.

Botanical Name	Common Name	Height/Width	S/SH	W/D
Perennials continued				
Stachys byzantina	Lamb's ear	6 in./12 in.	S	D
Tradescantia occidentalis	Spiderwort	2 ft/1 ft	SH/PSH	W/D
Vernonia fasciculata	Ironweed	4 ft to 6 ft	S	W
Zephyranthes spp.	Rain lily	6 in. to 10 in.	S	W
Grasses				
Carex spp.	Sedge	Varies	Varies	W/D
Chasmanthium latifolium	Inland seaoats	2 ft to 4 ft	SH	W
Muhlenbergia reverchonii	Seep muhly	2 ft to 4 ft	S	W
Panicum virgatum	Switch grass	3 ft to 4 ft	S	W/D
Shrubs				
Aesculus pavia	Scarlet buckeye	10 ft to 15 ft/6 ft to 10 ft	PSH/SH	W/D
Callicarpa Americana	American beauty berry	4 ft to 6 ft/5 ft to 8 ft	S/SH	W/D
Cephalanthus occidentalis *	Buttonbush	5 ft to 15 ft/6 ft to 8 ft	S/PSH	W
Clethra alnifolia	Summersweet clethra	3 ft to 10 ft/5 ft	S/PSH	W/W/D
Ilex decidua	Possumhaw holly	20 ft/15 ft	S/SH	W/D
Ilex vomitoria	Yaupon	20 ft/20 ft	S/SH	W/D
Itea virginica	Virgina sweetspire	3 ft to 5 ft/3 ft	PSH	W/D
Leucothoe recemosa *	Leucothoe, Sweetbell	3 ft to 10 ft/6 ft	S/PSH	W/W/D
Myrica cerifera	Southern wax myrtle	15 ft/10 ft	S/SH	W/D
Sabal minor	Dwarf palmetto	4 ft/5 ft	SH	W/D
Symphoricarpos orbiculatus	Coralberry	1 ft to 6 ft/1 ft to 2 ft	PSH/SH	D
Spirea x bumalda 'Anthony Waterer'	Anthony water spirea	2 ft to 3 ft/3 ft	S	D
Trees				
Acer rubrunm var. *drummondii*	Southern swamp maple	70 ft/30 ft	S	W/D
Betula nigra	River birch	30 ft to 50 ft/20 ft to 30 ft	S/PSH	W/D
Cyrilla racemiflora *	Leatherwood (Titi)	15 ft/10 ft to 15 ft		W/D
Magnolia virginiana	Sweet bay magnolia	2 ft to 30 ft/20 ft	S/PSH	W/W/D
Sophora affinis	Eve's necklace	30 ft/20 ft	S	W/D
Taxodium distichum	Bald cypress	70 ft/30 ft	S	W/D

S – Sun SH – Shade PSH – Part Shade W – Wet D – Dry
* Suitable for Texas Gulf Coast

Building a rain garden



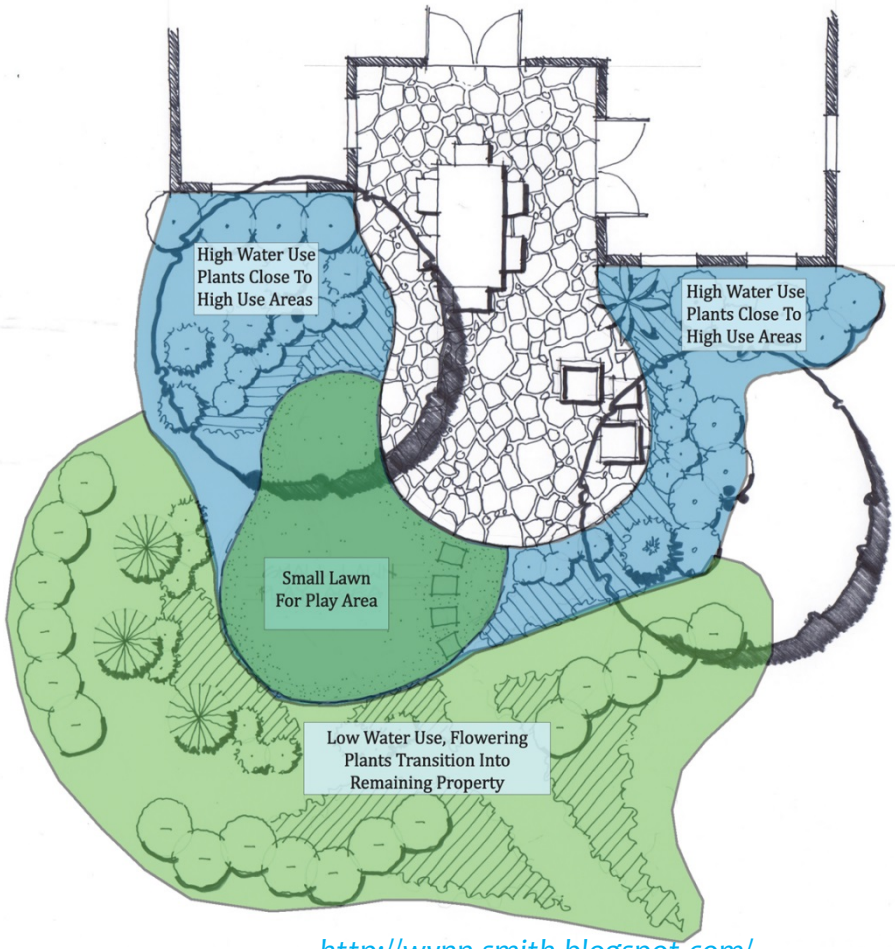


http://www.romefloyd.com/Environment/StormWater/FloydCounty/tabid/309/Default.aspx

TEXAS A&M AGRILIFE EXTENSION

Hydrozoning: planting based on water needs

- Regular (high) water use
  - Once or twice a week
- Occasional (medium) use
  - Once or twice a month
- Natural rainfall (low) use
  - Good performance
  - Supplement in severe drought



http://wynn-smith.blogspot.com/

TEXAS A&M AGRILIFE EXTENSION

Regular water use plants

- Most turf grasses
- Vegetables
- Wax leaf begonia
- Dianthus
- Sweet William
- Coleus
- Impatiens
- Caladium
- Gerbera daisy
- Geranium
- Pentas
- Nasturtium
- Banana
- Zinnia
- Snapdragon
- Pansy
- Elephant ear
- Croton
- Hosta
- Day lily
- Gingers

TEXAS A&M AGRILIFE EXTENSION

Medium water use plants

- Lantana
- Verbena
- Firebush
- Most ornamental grasses
- Esparanza
- Bird of Paradise (*Caesalpinia*)
- Artemeisa
- Hibiscus
- Most Iris
- Perennial herbs
- Turk's cap
- Perennial phlox
- Crinum lily
- Amaryllis
- Liriope

Cast Iron Plant
Asparagus fern
Mealy sage
Echinacea
Autumn sage
Mexican bush sage
Mexican mint marigold
Gomphrena
Purslane and moss rose
Wandering Jew
Vinca
Rock rose
Society garlic
Holly fern

TEXAS A&M AGRILIFE EXTENSION

Low water use plants

- Asiatic jasmine
- Yaupon holly
- Possumhaw
- Crepe myrtle
- Oleander
- Primrose jasmine
- Flowering quince
- Red yucca
- Elaeagnus
- Natal plum
- Cotoneaster
- Pitosporum

Earth-kind roses
Crimson barberry
Desert willow
Chinese pistache
Cedar elm
Bald cypress
Yuccas
Agaves
Texas redbud
Mexican plum
Monterrey and Chinkqpin oak
Live oak

TEXAS A&M AGRILIFE EXTENSION

Dealing with service alleys

TEXAS A&M AGRILIFE EXTENSION

The never-ending problem: shaded lawns

http://www.treeboss.net/seeding-under-trees.htm

http://www.dallasnews.com/news/community-news/20140524-week-12-with-neil-sperry-planting-below-shade-trees.ece

TEXAS A&M AGRILIFE EXTENSION

Ideal soil type???

Meanwhile in South Texas….

http://www.organicfarmingblog.com/ally-fertile-soil/

https://homeownerbob.wordpress.com/tag/black-gumbo-dirt/

Soil Preparation

- One-time incorporation of compost
  - Fully-finished (avoid nitrogen sink)
  - 3 inches (6 inches in sandy soils)
- Raised beds in poorly-drained sites
  - ≥12 inches and crowned in center
  - Facilitation of drainage and greater rooting depth
- Top-dressing with layer of organic mulch
  - Maintained year-round
  - Continuous nutrient and organic matter source

TEXAS A&M AGRILIFE EXTENSION

Choose your compost carefully!

http://www.progressive-charlestown.com/2012/05/garbage-is-really-compost-in-disguise.html

http://www.cranfordinc.com/

TEXAS A&M AGRILIFE EXTENSION

Properly prepared soil

- ✓ Drainage in clay soils through structure
- ✓ Water- and nutrient-retention in sands
- ✓ Slow release of nutrients by organic matter
- ✓ Greater diversity in soil microbes
- ✓ More expansive root system

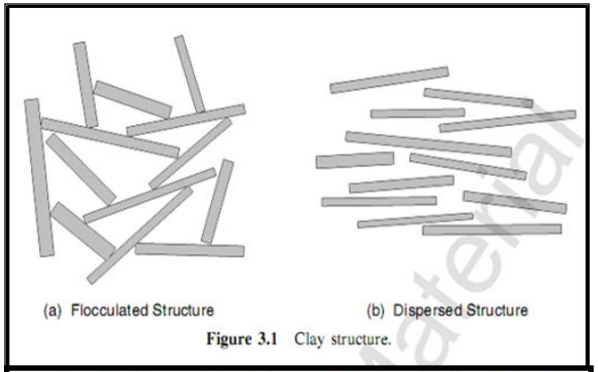
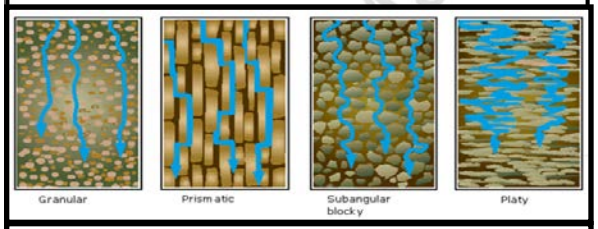
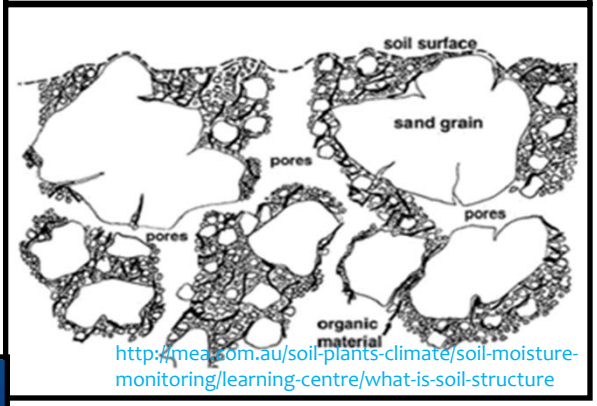
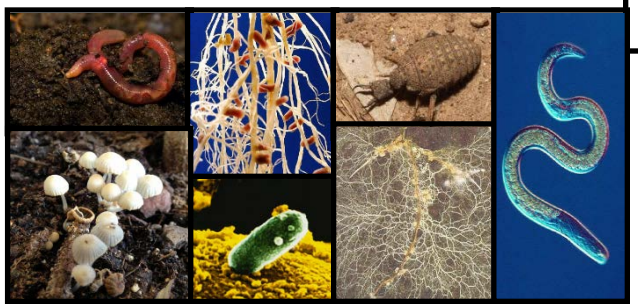


Figure 3.1 Clay structure.





http://mea.com.au/soil-plants-climate/soil-moisture-monitoring/learning-centre/what-is-soil-structure



TEXAS A&M AGRILIFE EXTENSION

Soil Analysis and Nutrient Monitoring

- Soil fertility test following soil preparation
  - Periodic routine analyses afterward
- Basis for all subsequent nutrient applications
- Little to no applications required
  - Typically only nitrogen (<1 pound actual N)

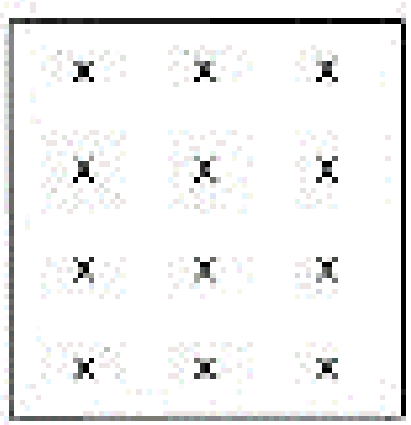
Analysis	Results	CL*	Units	ExLow VLow Low Mod High VHigh Excess.	Fertilizer Recommended
pH	7.7	(6.2)	-	Mod. Alkaline	
Conductivity	122	(-)	umho/cm	None	
Nitrate-N	4	(-)	ppm	Lo	140 lbs N/acre
Phosphorus	60	(50)	ppm		0 lbs P2O5/acre
Potassium	138	(100)	ppm		0 lbs K2O/acre
Calcium	888	(180)	ppm		0 lbs Ca/acre
Magnesium	269	(50)	ppm		0 lbs Mg/acre
Sulfur	12	(13)	ppm		5 lbs S/acre
Sodium	46	(-)	ppm		
Iron	3.27	(4.25)	ppm		
Zinc	3.29	(0.27)	ppm		0 lbs Zn/acre
Manganese	3.86	(1.00)	ppm		0 lbs Mn/acre
Copper	0.13	(0.16)	ppm		0.5 lbs Cu/acre
Boron					
Limestone Requirement					0.00 tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)		
pH	6.9	
Conductivity	0.57 mmhos/cm	
Sodium	58 ppm	2.514 meq/L
Potassium	14 ppm	0.366 meq/L
Calcium	38 ppm	1.904 meq/L
Magnesium	17 ppm	1.401 meq/L
SAR	1.96	
SSP	40.65	

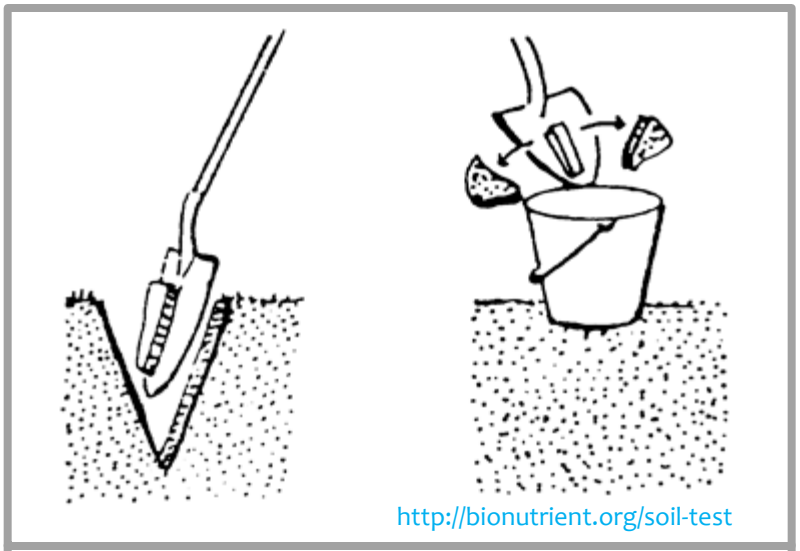
*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended.

TEXAS A&M AGRILIFE EXTENSION

Sampling: do it right, or don't do it at all…



http://www.sbreb.org/brochures/soilsampling/figure6.jpg



http://bionutrient.org/soil-test

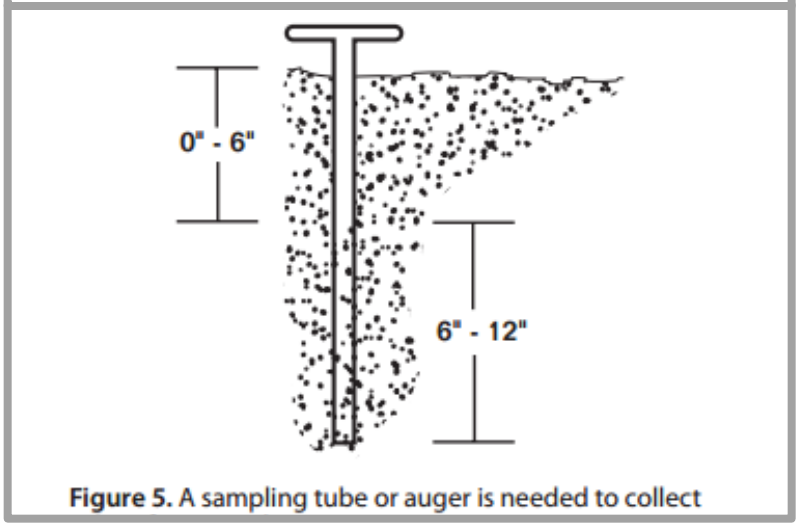


Figure 5. A sampling tube or auger is needed to collect

http://soiltesting.tamu.edu/publications/E-534.pdf

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AGRILIFE EXTENSION

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
Texas AgriLife Extension Service

SU 15

Urban and Homeowner Soil Sample Information Form

Please submit this completed form and payment with samples. Mark each sample bag with your sample identification and ensure that It corresponds with the sample identification written on this form. *See sampling and mailing instructions on the back of this form.
(PLEASE DO NOT SEND CASH)

SUBMITTAL AND INVOICE INFORMATION: This information will be used for all official invoicing and communication.

Name _____ County where sampled _____

Address _____ Phone _____

City _____ State_____ Zip _____ _____

CLIENT NAME: Client name will only be included with information above on result reports.

Name _____

Lab Use only

Payment (DO NOT SEND CASH)
- ☐ Check
- ☐ Money Order (keep your M.O. receipt)
- ☐ Credit Card*

Amount Paid $_____
Make Checks Payable to: **Soil Testing Laboratory**
*Additional Credit card payment forms can be downloaded at http://soiltesting.tamu.edu

SAMPLE INFORMATION (Required)

(see options listed below)

Laboratory # For Lab Use)	My Sample ID	Square feet of sampled area	Last Time Fertilized	I previously used fertilizers/organics	I am growing (see below*)	Requested Analyses
Example	Front Yard	2000	5/30/14	5 lbs 21-0-5 per 1000 sqft	F	☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11 ☐12
						☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11 ☐12
						☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11 ☐12

Annual, Flowers and Gardens
A. Azaleas and Camellias
B. Roses
C. Annuals
D. Vegetable Garden
E. Other

Turfgrass
F. Common Bermudagrass
G. Hybrid Bermudagrass
H. St. Augustinegrass
I. Centipedegrass
J. Buffalograss
K. Tall Fescue
L. Kentucky Bluegrass

Trees and Woody Ornamentals
M. Pecan trees
N. Fruit trees
O. Shrubs and Ornamentals
P. Shade trees
Q. Other trees

Describe any problems you have observed and want to correct:

1. Routine Analysis (R) (pH, NO_3-N, P, K, Ca, Mg, Na, S and Conductivity) (This test is a base test for basic fertilizer recommendations.)	$10 per sample
2. R + Micronutrients (Micro) (Adds Zn, Fe, Cu, and Mn to test 1.)	$17 per sample
3. R + Micro + Boron (B) (Includes Test 2 plus boron) (Recommended for individuals applying compost and manures.)	$24 per sample
4. R + Detailed Salinity (Includes Test 1 plus detailed salinity analysis) (Recommended for individuals using lower quality irrigation water.)	$30 per sample
8. R + Micro + B + Organic Matter (Includes Test 3 plus organic matter analysis)	$44 per sample
9. R + Texture (determines % sand, silt, and clay) (Includes Test 1 plus textural analysis)	$30 per sample
10. R + Micro + Texture (Includes Test 2 plus textural analysis)	$37 per sample
11. R + Micro + B + Organic Matter + Detailed Salinity (Includes Test 8 plus detailed salinity)	$84 per sample
12. R + Micro + B + Org. Matter + Detailed Sal. + Texture (Includes Test 8 plus textural analysis and detailed salinity and provides the most comprehensive	$84 per sample

TEXAS A&M AGRILIFE EXTENSION

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
TAMU Horticulture - Tim Hartmann
2133 TAMU - Room 202 HFSB
College Station, TX 77843

Sample received on: 3/20/2014
Printed on: 3/26/2014
Area Represented: 5000 sqft

Blanco County
Laboratory Number: 408230
Customer Sample ID: Stonefruit Trial
Crop Grown: FRUIT TREES

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.	Fertilizer Recommended
pH	7.6	(6)	-	Mod. Alkaline							
Conductivity	980	(-)	umho/cm	Moderate				CL*			
Nitrate-N	1	(-)	ppm**								1.4 lbs N/1000sqft
Phosphorus	10	(50)	ppm								2.4 lbs P2O5/1000sqft
Potassium	522	(175)	ppm								0 lbs K20/1000sqft
Calcium	11,350	(180)	ppm								0 lbs Ca/1000sqft
Magnesium	397	(50)	ppm								0 lbs Mg/1000sqft
Sulfur	334	(13)	ppm								0 lbs S/1000sqft
Sodium	85	(-)	ppm								
Iron											
Zinc											
Manganese											
Copper											
Boron											
Limestone Requirement											0.00 lbs/1000sqft

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

Conductivity: Salinity levels are becoming elevated, monitor levels or remove salts with 10-15 inches of clean leach water.

TEXAS A&M AGRILIFE EXTENSION

Analysis	Results	CL*	Units	ExLow VLow Low Mod High VHigh Excess.	Fertilizer Recommended
pH	7.6	(6)	-	Mod. Alkaline	
Conductivity	980	(-)	umho/cm	Moderate	
Nitrate-N	1	(-)	ppm**		1.4 lbs N/1000sqft
Phosphorus	10	(50)	ppm		2.4 lbs P2O5/1000sqft
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Sulfur	334	(13)	ppm		0 lbs S/1000sqft
Sodium	85	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					0.00 lbs/1000sqft

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

Texas A&M AgriLife Extension

Plant Selection for Water Conservation

What most people think off…

What it can really look like!

Texas A&M AgriLife Extension

Texas Natives

TEXAS A&M AGRILIFE EXTENSION

Why Use Natives.....?

- ✓ Drought and heat tolerance
- ✓ Nutrient efficiency / requirement
- ✓ Pest and disease tolerance
- ✓ Wildlife habitat (birds, butterflies, etc.)
- ✓ Support for beneficial organisms
- ✓ **Natural Beauty**

TEXAS A&M AGRILIFE EXTENSION

Baldcypress

Taxodium distichum

- Medium to large (50’ x 30’) tree
- USDA 5 to 11
- Deciduous, rust-red fall color
- Tolerant of flooding and drought
- Montezuma: better form and less knees

TEXAS A&M AGRILIFE EXTENSION

Mexican Buckeye

Ungnadia speciosa

- USDA 7 to 9
- Full sun to partial shade
- Spread: 10’-12’ high x 8’-10’ wide
- Texas native tolerates heat, drought, salts, and most soils
- Deciduous foliage (some fall color) with pink flowers similar to red bud

TEXAS A&M AGRILIFE EXTENSION

Texas Mountain Laurel

Sophora secundiflora

- USDA 8 to 10 (can survive in 7 with some occasional damage)
- Max spread 8’-12’ tall x 4’-8’ wide
- Full sun to partial shade with good drainage
- Showy evergreen foliage with very fragrant purple pea-shaped flowers in spring
- Great native with excellent heat and drought tolerance

TEXAS A&M AGRILIFE EXTENSION

Mexican Feathergrass

Nasella tenuissima (Stipa tenuissima)

- USDA 7 to 9 (can survive in 6)
- Full sun, good drainage
- 12 to 18 inches tall (occasionally 24”)
- Native to S. Texas / N. Mexico
- Very fine texture, adds movement
- Very drought, pH tolerant
- Occasional shearing to remove dead foliage

TEXAS A&M AGRILIFE EXTENSION

Mexican Bush Sage

Salvia leucantha

- USDA 8 to 10 (sometimes hardy to 7, annual elsewhere)
- Full sun
- Handsome silvery foliage, up to 3 to 5 feet in height
- Mostly pink / purple flowers in late summer through fall
- Drought and heat tolerant native

TEXAS A&M AGRILIFE EXTENSION

Red Yucca

Hesperaloe parviflora

- USDA: 6 to 11 (Liliaceae)
- Full sun to partial sun (some blooms in shade)
- 2 to 3 feet tall clumps (flowers to 5 feet)
- Dark green sword-shape yucca-like foliage
- Spikes of brilliant red, pink, yellow flowers
- Long bloom season from spring to late summer
- Ideal for xeriscapes; butterflies/hummingbirds
- Salt-tolerant, requires good drainage

Esparanza / Yellow Bells

Tecoma stans

- USDA: 8 to 11
- Full sun to partial sun
- 3 to 6 feet spread
- Herbaceous perennial, tropical shrub in S. Texas
- Dark green foliage, brilliant trumpet-shape yellow flowers
- Orange and creamy yellow-blooming cultivars available
- ‘Gold Star’ more compact and prolific than seedlings
- Extremely heat-tolerant; great for Southwestern exposure
- Tolerant of salinity, drought, and alkaline soil
- Periodic pruning to keep improve form
- Makes great companion for Pride of Barbados

Pride of Barbados

Caesalpinia pulcherrima

- USDA: 8b to 11 (annual elsewhere)
- Full sun to partial sun
- Herbaceous perennial, tropical shrub in S. Texas
- 3 to 6 feet spread (to 15 feet in Tropics)
- Panicles of stunning orange/yellow, mimosa-like foliage
- Great choice for areas with reflected heat
- Tolerant of heat, drought, salinity, and alkaline soils
- Requires at least decent drainage
- Often planted with *Tecoma stans* (Esparanza)

Firebush

Hamelia patens

- USDA: 8b to 11 (summer annual elsewhere)
- Full sun to partial sun
- Herbaceous perennial (small shrub in tropics)
- 3 to 5 feet spread, to 8 feet in the tropics
- Dense green foliage with red blush
- Brilliant red to yellow-orange tubular flowers
- Great for hummingbird / butterfly gardens
- Extremely heat-tolerant; best in middle of summer
- Tolerant of drought, salinity, and alkaline soils

Other Adapted Plants

TEXAS A&M AGRILIFE EXTENSION

Pomegranate

Punica granatum

- USDA 7 to 10 (varies considerably by cultivar)
- Max. spread: 2’-4’ feet for dwarf types, 8’-10’ (up to 20’) for normal forms
- Full sun to partial shade (full sun best for flower and fruit production)
- Ancient plant adapted to most soils, heat / drought tolerant
- Red/orange single or double flowers and showy edible fruit

TEXAS A&M AGRILIFE EXTENSION

TEXAS A&M AGRILIFE EXTENSION

Rosemary

Rosmarinus offincinalis

- USDA 7 to 10
- Spread: 2 to 5 feet, prostrate form 1 foot tall and spreading
- Full sun to partial shade, needs well-drained soil
- Mediterranean plant tolerant of drought and heat and variety of soils
- Gray-green to blue-green needle-like foliage is extremely aromatic
- Tiny tube-shape lavender flowers in spring and summer

TEXAS A&M AGRILIFE EXTENSION

Feijoa / Pineapple Guava

Acca sellowiana

- USDA 8 to 11
- Full sun to partial shade (some afternoon shade beneficial)
- Spread: 8’-12’ high x 7’-9’ wide with gray-green foliage
- Tolerant of a variety of soils, but prefers well-drained
- Moderately tolerant of heat, drought, and salinity
- Showy (edible) pink flowers give way to tasty fruit in late fall

TEXAS A&M AGRILIFE EXTENSION

Amaryllis

Amaryllis spp. (Hippeastrum spp.)

- USDA 8 to 11
- Full sun, tolerates some shade
- Many hybrids exist, Johnson's Hardy Red (*A*. x *johnsonii*) is hardiest
- Good drainage is necessary (*A*. x *johnsonii* more tolerant of heavy soil)
- Coarse, strap-like foliage (24") before or after flowers, disappears by early fall

TEXAS A&M AGRILIFE EXTENSION

Setcreasea / Purple Heart

Tradescantia pallida

- USDA 9-13 (survives 8b)
- Full sun (best color) to dense shade
- 12” to 18” tall, spreading
- Warm season perennial in cooler regions
- More compact improved selections
- Good drainage, tolerates some drought

TEXAS A&M AGRILIFE EXTENSION

Importance of proper selection: Disease

‘Care-free Beauty’ Rose (high tolerance)

‘Ivory Palace’ Rose (low tolerance)

TEXAS A&M AGRILIFE EXTENSION

rticulture.tamu.edu/earthkind/plantselector/

Texas A&M AgriLife Extension

Aggie Horticulture Netv Search

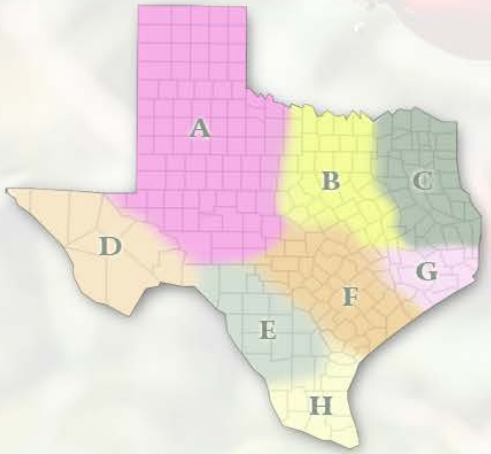
Aggie Horticulture | Academics | Fruit & Nut | Vegetable | Earth-Kind® | Master Gardener | JMG® | Small Acreage | Search

Earth-Kind® Landscaping

Earth-Kind® Plant Selector

Select your general region on the map or use the region list. You can also find your zone by searching with your zip code. The next page will allow you to search for plants by specific characteristics.

The Earth-Kind Plant Selector **DOES NOT** provide information concerning the potential invasiveness of landscape plants, though plants with a high Earth-Kind Index value will generally be more "aggressive" in their growth habit than plants with a lower value. See About Invasiveness for more information.



Zip Code

Please enter the Texas zip code in which you reside to find your region.

Search by Zip Code

Region

Please select the Texas region you reside in below.

Please select a region... Search by Region

Additional Considerations

- Making Plant Selections
- About Invasiveness

More Resources

- Earth-Kind®
- Urban Landscape Guide

Texas A&M AgriLife Extension

Earth-Kind®
Landscaping

Search for Plants in Region H - Rio Grande Valley

To find all listed plants click search with no search criteria entered. Plants will be ordered by those most well adapted to your region.

Enter the following information for each plant. Use the specific categories defined. *Photos are not available for all plants at this time.*

Common name:

Growth Habit

Habit or plant use: perennial

Exposure

☐ sun ☑ partial sun ☑ shade

Blooming

Flower color:

Bloom period: ☐ spring ☑ summer ☐ fall ☐ winter

Leaf Character

☐ annual ☑ herbaceous perennial ☐ deciduous ☐ evergreen ☐ semievergreen

Search All Plants

Search by Earth-Kind Index

Search for and return all plants based on any criteria provided. May return plants that are not well adapted for your region.

Quick List (Plants rated 8 or higher)

Generate a listing of all plants in your area with Earth-Kind indexes of 8 or greater and with any of the criteria above.

Generate Quick List

Select a different region

Earth-Kind®
Landscaping

Plants found for Region H - Rio Grande Valley

Results 1 to 20 (46)
First Previous **1** 2 3 Next Last

Photo	Scientific Name	Common Name	Earth-Kind Index
	Plumbago auriculata	Blue Plumbago	10.00
	Sedum spectabile	Showy Stonecrop Sedum	10.00
	Pennisetum setaceum	Annual Fountain Grass	10.00
	Malvaviscus arboreus	Giant Turk's Cap	9.00

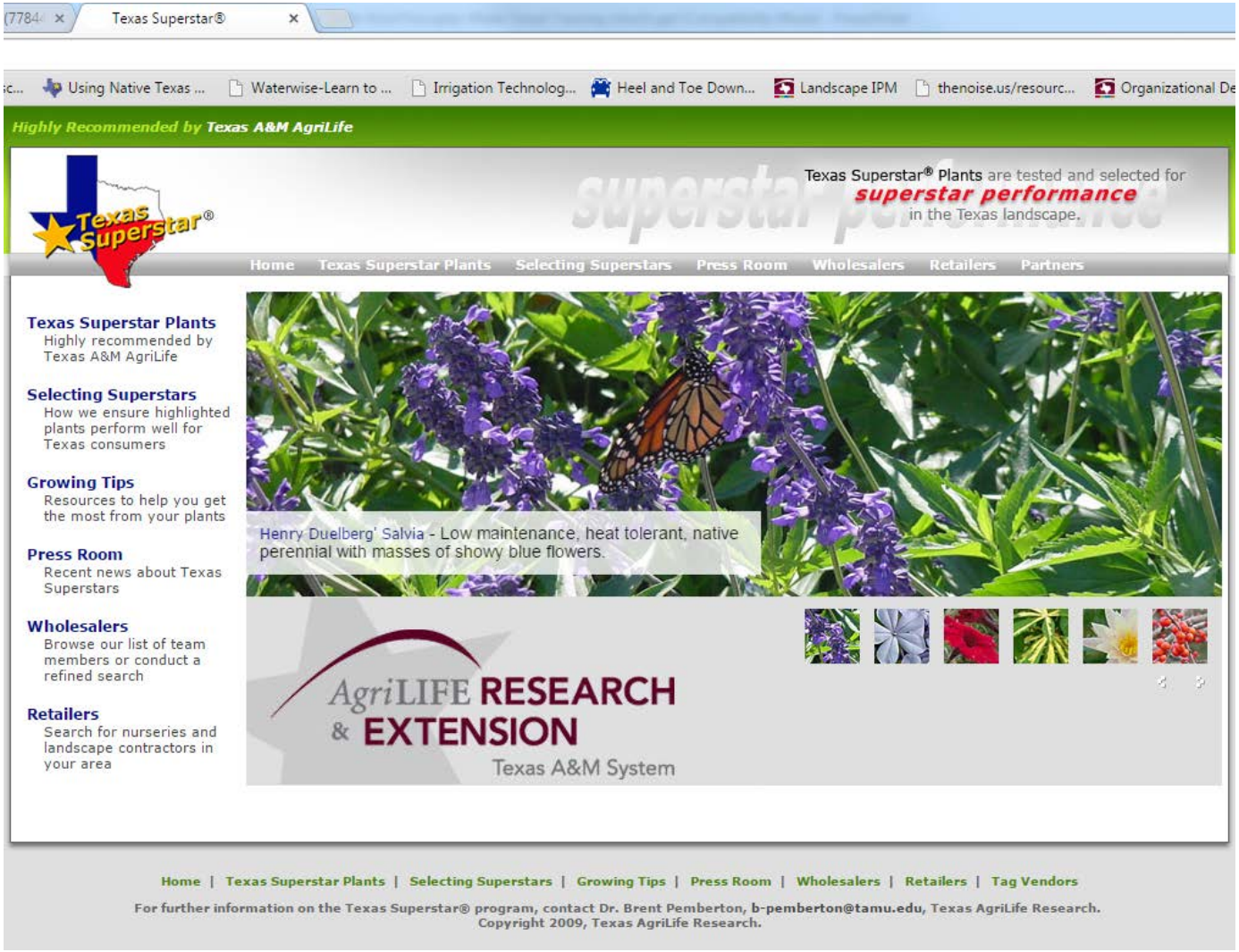
Earth-Kind®
Landscaping

Giant Turk's Cap

Click on image(s) for full screen view.

Common Name	Giant Turk's Cap
Scientific Name	*Malvaviscus arboreus*
Family Name	Malvaceae
Description	Giant Turk's Cap is a subtropical perennial or woody shrub often planted as a summer annual in cooler regions. The dark green leaves contrast with the large drooping red blossoms..
Plant Habit or Use:	warm season annual,perennial,small shrub,medium shrub,tropical
Exposure:	sun,partial sun
Flower Color:	bright red, rarely white
Blooming Period:	spring,summer,fall
Fruit Characteristics:	red berry-like fruit, wildlife food
Height:	7 ft to 9 ft in subtropics, smaller as an annual
Width:	3 ft to 4 ft, spreading over time
Earth-Kind® Index:	9.00 * Explanation of the Earth-Kind® Index • **Heat Tolerance:** High Heat Tolerance • **Water Requirements:** Low Water Use • **Soil Requirements:** Low Soil Requirements • **Pest Tolerance:** Medium Pest Resistance • **Fertility Requirements:** Low Fertility Requirements * Explanation of the individual indices.
USDA Hardiness Zones:	9,10,11
Additional Comments:	Less cold and shade tolerant than M. arboreus var. drummondii, but leaves do not distort in sunny locations.

Texas Superstar® Program



TEXAS A&M AGRILIFE EXTENSION

Rainwater harvesting

Texas A&M AgriLife Extension

Efficient irrigation

- Drip irrigation, micro-irrigation
- >90% efficiency (50%-70% sprinkler)
  - Low-volume emission
  - Point-source application
  - Targeted delivery

- ✓ Reduced foliar disease incidence
- ✓ Less problems with salinity damage
- ✓ Lower weed pressure

TEXAS A&M AGRILIFE EXTENSION

Many forms


http://www.senninger.com/senninger-products/nursery-greenhouse/spray-stakes/


http://www.irrigation-arrosage-enrouleur.com/en/produits/micro-sprinkler-system_3-15.htm


http://www.irrigationdirect.com/dd-sr180s


http://www.igin.com/article-785-low-volume-irrigation-comes-into-its-own.html


http://www.extension.org/pages/61493/drip-irrigation-system#.UR5ordaOKM4


http://www.rainbird.com/homeowner/products/drip/MicroBubblers.htm


http://brightonreticulation.com/blog/category/drip-irrigation/

TEXAS A&M AGRILIFE EXTENSION

“But what if I already have sprinklers?”

Water: making less go farther

- Cycle-and-soak irrigation
  - Split up run times into multiple, shorter ones

*ALL PLANTS NEED REGULAR WATER UNTIL ESTABLISHED!

  - Water these individually

- Water more deeply, less frequently
  - 1” penetrates 6 inches into clay, 12” into sand

- Judge watering needs in the morning

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Watering priorities in a drought

- Area closest to home
  - Fire protection
  - Slab protection from shrink/swell

- Large trees
  - Difficult to replace
  - Most valuable plants in landscape

Checking for problems

- Irrigation evaluation / audit

- Drip irrigation:
  - Cuts/holes in hoses (rodents)
  - Clogged emitters

- Sprinklers
  - Misaligned/damaged/missing heads
  - Catch test for uniformity and determining run time

Benefits of Organic Mulch Use

- ✓ **Limiting of evaporation loss (25%-30%)**
- ✓ **Soil temperature modification**
- ✓ **Inhibition of weed germination**
- ✓ **Erosion and runoff mitigation**
- ✓ **Improvement of soil structure**
- ✓ **Continuous, slow-release nutrient supply**
- ✓ **Avoidance of foliar disease**

TEXAS A&M AGRILIFE EXTENSION

Effective mulch usage

- 3 to 4 inch layer under plant canopy
- Maintained year-round

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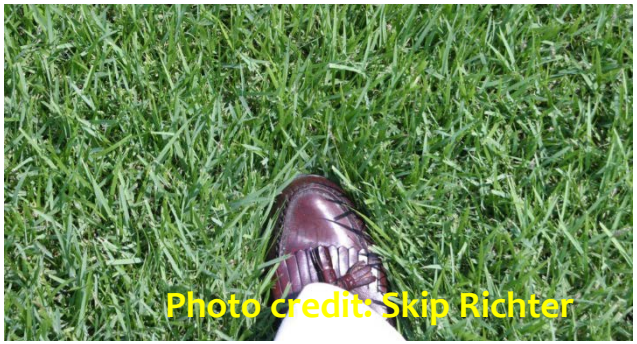
Sound Maintenance Practices

- Recycling waste as mulch / compost
- Mulching of lawn clippings
- Maintaining taller grass height
- Fertility supplement based on testing
- Integrated Pest Management (IPM)



TEXAS A&M AGRILIFE EXTENSION

Landscape IPM Strategies

- Cultural:
  - Plant selection and plant spacing
  - Fertility management
- Mechanical and physical:
  - Altering of pest's environment
  - Removal of infected / infested material
  - Physical removal of pests
- Biological:
  - Conservation: careful [or no] use of chemicals
  - Augmentation: addition / release of biological agents
- Careful selection of chemicals
  - Avoiding use of broad-spectrum

TEXAS A&M AGRILIFE EXTENSION

Thank You!

Earth-Kind.
Texas A&M AgriLife Extension

TEXAS A&M AGRILIFE EXTENSION

Other Resources:

http://aggie-horticulture.tamu.edu/

http://aggie-horticulture.tamu.edu/earthkind/

http://texassuperstar.com/

http://urbanlandscapeguide.tamu.edu/

http://ipm.tamu.edu/

http://rainwaterharvesting.tamu.edu/

http://itc.tamu.edu/Drip%20Project.php

Texas A&M AgriLife Extension