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2012

6th Lone Star Regional Native Plant Conference

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2012 Lone Star Regional Native Plant Conference



Nacogdoches, Texas
Stephen F. Austin State University
Pineywoods Native Plant Center

May 18-19, 2012

Proceedings
of the
6th Lone Star Regional Native Plant Conference

Hosted by
Stephen F. Austin State University
Arthur Temple College of Forestry and Agriculture
SFA Pineywoods Native Plant Center

Nacogdoches, Texas

May 18-19, 2012

ACKNOWLEDGMENTS

The Pineywoods Native Plant Center is proud to host the Sixth Lone Star Regional Native Plant Conference. Our theme this year is “Occupy Nature,” and we owe the vision for that to Janet Creech who never passes up an opportunity to be timely. Please thank the speakers for taking time to share with participants.

Dawn Stover, the SFA Mast Arboretum Research Associate for Ornamental Plant Evaluation, our conference coordinator, did a masterful job handling registration, program details and listening to my advice. She deserves a big round of applause for handling so much of the workload that goes into putting on a conference of this scale. She handled every detail of this conference—from communicating with speakers to handling all of the arrangements for lodging, rooms, meals, tours, transportation, and a myriad of other details—with intelligence and grace.

Peter Loos, a long-term supporter, friend, and volunteer for the PNPC, deserves special thanks for helping with four speakers and other program details. Greg Grant gets credit for advertizing the event. Elyce Rodewald and Barbara Stump were invaluable behind the scenes making sure things worked right. Barb gets the applause for putting the Proceedings together. Make sure you thank Trey Anderson, the on-the-ground Research Associate for the Pineywoods Native Plant Center, and all the PNPC student workers, for going beyond the call of duty to get the PNPC ready for this wonderful meeting.

TABLE OF CONTENTS

Welcome	5
 Presentations	
Clark, Dale—“Butterfly Gardening with Natives”	pdf
Cox, Paul—“Occupy Nature”—Keynote Speaker	8
Creech, David—“Let’s Occupy Nature with Cool Plants for a Hot Climate”	9
Grant, Greg—“Wild About Design”	15
King, Andrew—“Invasive Plants in the Landscape”	18
Loos, Peter—“An Exercise in Conservation/Restoration: The Stewart Ranch Story”	22
McBroom, Matthew, Yanli Zhang, David Creech—“Rain Gardens—Beautiful Solutions to Water Pollution”	25
Richter, Skip—“Natural Pest Control for the Landscape”	pdf
Shackelford, Julie—“Urban Wildscaping: Bringing Your Backyard to Life”	32
Spradling, Melanie—“Firewise Landscaping”	33
Van Kley, Jim—“Bogs of East Texas”	35
Williams, Hans—“Ecological Restoration: Longleaf Pine”	onv
 Workshops: Friday, May 18	
Allen, Charles—“Edible/Useful Native Plants”	40
Ferguson, John—“Soil Food Web”	47
Shaffer, Scott—“Rainharvesting for Native Landscapes and Plants”	48
 Field Trips: Friday, May 18	
Anderson, Trey—Matlock Hills/Colorow Creek	onv
Godwin, Will—Cave Springs and Gunnels Cave	onv
Keith, Eric—Scrapping Valley/Newton County	60
Peter Loos —Big Thicket	onv
Shackelford, Cliff—“Birding by Ear”	65
 Biographies of Speakers, Workshop Presenters, Tour Guides	 67

[Several presentations are pdf files, which are included in appendix files. Onv indicates files that will be added to our online version to be posted in June 2012.]



WELCOME TO THE SIXTH LONE STAR REGIONAL NATIVE PLANT CONFERENCE

Thank you for being part of the sixth Lone Star Regional Native Plant Conference and while you're here, please visit all of the wonderful gardens that are part of [SFA Gardens](#). Since 1985 the Gardens have grown from a small 1/4 acre patch on the south side of the SFA Agriculture building to 128 acres of on-campus property. The gardens boast an amazing diversity of plant life that has been accumulated through a network of friends, plant enthusiasts, nurserymen, and horticulture and arboreta research colleagues in the USA. There are four main garden areas—the SFA Mast Arboretum, the Ruby M. Mize Azalea Garden, the Pineywoods Native Plant Center and the Gayla Mize Garden. What makes SFA Gardens special is plants, people and plans!

The Mast Arboretum is a 10-acre garden along LaNana Creek at Stephen F. Austin State University, Nacogdoches, Texas. The Arboretum began in 1985 as a project of the first Landscape Plant Materials class taught by Dr. Dave Creech. Over the years, this garden has expanded into one of the most diverse collections of plants in the South. The Mast Arboretum is dedicated to acquiring, testing, introducing and promoting new plants for the landscape and nursery industry in the southern USA.

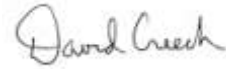
The SFA Pineywoods Native Plant Center (PNPC) is a 42-acre garden on the north end of the SFA campus dedicated in 2000. It's a unique mixture of uplands, mesic mid-slopes, and wet creek bottoms. The Tucker House serves as the central feature of the property, which is surrounded by native forest and gardens that celebrate the wonderful diversity of native plants in the region. Since 1996, endangered plant research has been a core research practice. We are in a capital campaign to build a Conservation Education Center at the PNPC, which will support our environmental education programs on-site, in all weathers and in a building that exhibits green building practices and environmental conservation practices.

The eight-acre **Ruby M. Mize Azalea Garden** is the result of a partnership of the SFA horticulture program and members of the Nacogdoches community, nurtured by several local families who believe beautiful gardens are an important part of community vitality and the education process. This garden was developed as a project of the SFA Mast Arboretum, and was begun in response to the wishes of Nacogdoches residents Mr. and Mrs. A. T. Mast, Jr. that the university beautifies its eastern entrance. It wasn't long until SFA alumna Dorothy Wisely lent a helping hand with an endowment for the garden. Construction began in an overgrown loblolly pine forest in the winter of 1997. Dedicated in April 2000, most of the plantings were completed 2 years later. Today, the garden contains 46 planting beds, 1.25 miles of universally accessible trails, and 50 benches. The garden features over 550 varieties of Rhododendron, 100 varieties of Camellia, two hundred plus Hydrangea varieties, and a wealth of other unique collections. After a decade in existence, the Ruby M. Mize Azalea Garden is a highlight of the annual Nacogdoches Azalea Trail. Special events each March include guided tours during azalea season, an annual Azalea Symposium, and a Little Princess Tea Party.

The Gayla Mize Garden was initiated in 2011 as the result of an endowment by SFA alumnus Ray Mize to honor his late wife Gayla Mize, a long time supporter of Nacogdoches Beautiful, SFA Gardens, and many other civic adventures in Nacogdoches. This garden is a part of the 68-

acre SFA Recreational Trails and Gardens, a project of the Arthur Temple College of Forestry and Agriculture. Preliminary collections of unique camellias and new native deciduous azaleas – and their hybrids – and numerous tree species are already planted, but the garden is still a work in progress. Enjoy!

Let's keep planting,

A handwritten signature in cursive script that reads "David Creech".

Dr. Dave Creech
Regent's Professor of
Horticulture and Professor
Emeritus

Presentations

Plants You Probably Haven't Heard of but Should Try Anyway
Paul Cox

- 1). Little Walnut, *Juglans microcarpa*
- 2). Mexican Myrtle, *Eugenia 'mexicana'*
- 3). *Bauhinia macranthera*
- 4). Fragrant Ash, *Fraxinus cuspidata*
- 5). Pyramid Bush, *Melochia tomentosa*
- 6). Hibiscus 'Charming', Hibiscus native hybrid
- 7). Texas Sycamore, *Platanus occidentalis* var. *glabrata*
- 8). 'Sentido' Montezuma Cypress, *Taxodium mucronatum* 'Sentido'
- 9). Viburnum 'William Robert', *Viburnum rufidulum* x *obovatum*
- 10). Western Haw, *Crateagus traceyii*
- 11). Mexican White Oak hybrids, *Quercus polymorpha* 'Hello Sailor'
- 12). *Agdestis clematidae*

COOL PLANTS FOR A HOT CLIMATE

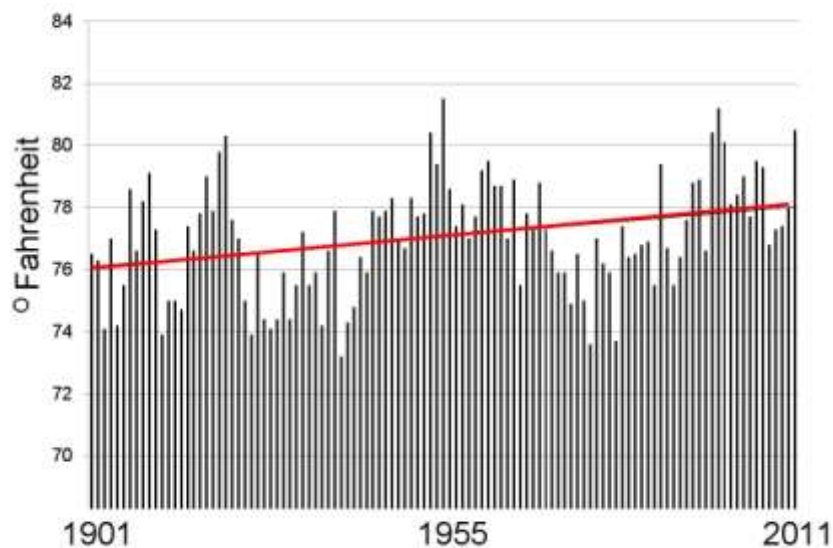
Dr. David Creech, Regents Professor of Horticulture
SFA Gardens, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State
University, Nacogdoches, TX 75962-3000
<http://sfagardens.sfasu.edu>

For over 25 years SFA Gardens has been planting and evaluating about as wide a range of plant materials as anyone could imagine. If we've been anything, we've been stubborn horticulturists. We've planted, evaluated, admired, propagated and distributed thousands of uncommon plants to homeowners, landscapers and nurserymen. After the last two years of heat and drought, it's time to sit back and recognize those Texas-tough plants we call the survivors.

The Texas Forest Service has estimated over ½ billion trees have died in Texas as the result of the 2010 and 2011 drought and heat. All of this misery got me to thinking. Just how hot and how dry have we been compared to the historic record? Well, I extracted data from SFA's nearby weather station and visited with Dr. Matthew McBroom of the Arthur Temple College of Forestry and Agriculture. I soon learned that when it comes to climate, it's complicated.

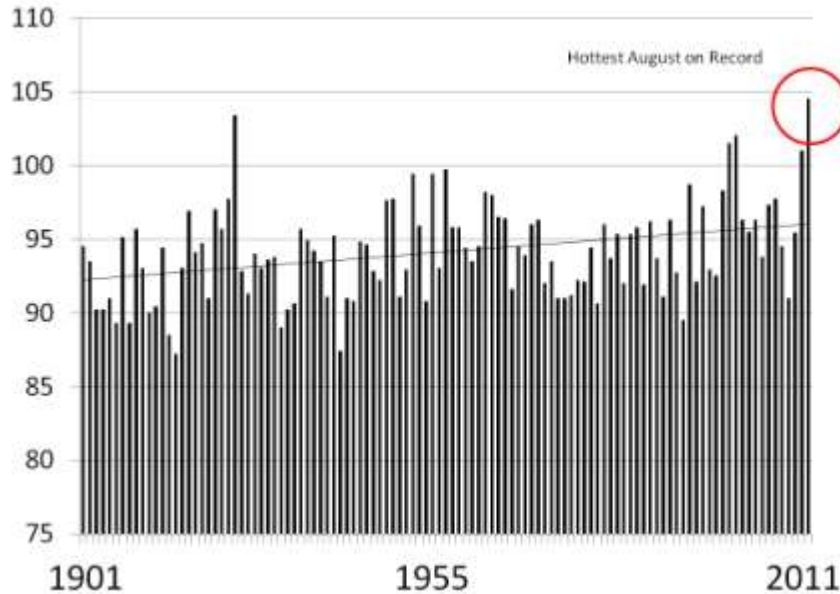
For rainfall, Nacogdoches normally receives 48 inches per year and if we look at data 1901-present, there's not much of a trend. It's pretty much a straight line. However, if we look at just the last 20 years, the story is different; there's been a steep decline in rainfall. We recorded only 25 inches in 2010 and 35 inches in 2011, with 10.5 inches of the latter falling in November and December. For rainfall, 2010 was the record dry year in the last 110 years of records for Nacogdoches, but 2011 was down the list as the 18th driest year on record – no doubt due to the good rains in November and December. So, are we getting drier? Maybe. What about temperatures? Well, if we look only at mean monthly maximums, 2011 was the third hottest year since 1901, but 1956 and 1999 were hotter (Figure 1).

Fig. 1. Average of Mean Monthly Maximum Temperatures since 1901



The regression line reveals increasing temperatures. The last twenty years suggests it's getting hotter faster. For example, August 2011 was the hottest month on record in Nacogdoches with an average mean maximum temperature of 104°F (Figure 1).

Fig. 2. Nacogdoches Mean Maximum Averages for the month of August



The latest USDA Hardiness Zone map has been released to the public and a careful scrutiny reveals that lines have moved north. While Nacogdoches used to be firmly planted in the middle of Zone 8 A/B . . . we are now in the middle of Zone 8B. Whether we embrace or reject climate change, the academic community of climate change scientists is warning us that the debate is over. There's more heat and drought in our future and being proactive makes sense. OK, I'm convinced – it's getting warmer.

Heat and drought have had a huge impact on the Texas nursery and landscape industry. As lakes dry up and wells go to sputtering, everyone suffers. Cities mandate water restrictions. Homeowners cut back on purchasing plants. Markets go south. Landscapers are in less demand. There's suddenly renewed interest in drought tolerant landscapes and there's a new term coined for the times - climate change friendly plants. While recent rains have cheered us up, there's every reason to think water is going to be a very big deal in the future. Texas is growing and so is water demand.

So, what to do?

First, let's recognize that there's a difference between a well established plant and one newly set. Plants just set in the landscape take a while to get their roots meshed well into the parent soil. It's easy to lose plants to drought when they're new, when the original well-aerated root ball makes up a big percentage of the entire root system. After a plant is well established and roots have made their way into the parent soil, drought resistance increases. They're just better able to mine for water and nutrients. Planting right makes a difference. The rules are pretty much the same anywhere you look. Plant in the fall. Dig a wide planting hole no deeper than the container depth. Go with a minimalist approach on soil amendments; research indicates that the

quicker the plant gets acclimated to the parent soil, the better. Give the plant some space. Closely set plants compete for sunlight, nutrients and water.

Second, select plants that make sense for the site. One step might be for East Texans to take a closer look at plants native to parts just a bit to the west. Since rainfall gets less and less as one moves from east to west across Texas, there's opportunity there. Choosing plants still native to Texas, but native to spots that get a bit less rain. Let's be proactive. Texas is destined for more people and water demand will no doubt increase. Many nurserymen have already embraced recapture and recycle. They are changing systems from sprinkler to micro-sprinkler, drip and spitter systems when they can – and when it seems economically prudent. Nurserymen are finding ways to reduce waste by better irrigation set timing, fine tuning substrates to hold more moisture, and changing crops to more heat and drought tolerant species.

Native plant enthusiasts are right. Native plants evolved here and have had thousands of years of selection to deal with this climate. Landscapers are evolving as well. There's a move to more heat and drought tolerant species. Here at SFA Gardens, where reducing water use is not just a wish, it's a City and University policy – our strategy calls for stretching out our sprinkler irrigation sets, watering only at night, fixing leaky valves and pipes promptly, switching to drip whenever and wherever we can. We'll keep records on water use garden by garden and pay attention to Class A pan data to guide us. Finally, we're here to pick the right plant and put it in the right spot.

Picking the right plants

The list of “cool” plants for a “hot” climate is a long one, but if you narrow things down a bit – native and drought resistant – then the choices become a little more manageable. So, when choosing trees, shrubs, or vines, here are a few that make the grade.

Oaks - Texas has a wide variety of oak species that call the state home and most are durable, drought resistant, and long lived. While it's true that the drought of 2010 and 2011 was exceptional, and many older patriarch oaks bit the dust, most survived. For drought resistant oak species, look west. With oak wilt a headline across the state, it's not surprising to find renewed interest in new oaks that endure. The “Mexico” oaks came through most Texas plantings with high marks in 2010 and 2011, but there's one we can count as a native that still deserves greater use. *Quercus polymorpha*, the Monterrey oak, is a Texas oak. It's a medium sized oak that is becoming increasingly popular in Texas landscapes. The species enjoys a wide range in Mexico on the Atlantic slope and can also be found in Guatemala. In 1992, *Q. polymorpha* was discovered in a small isolated box canyon along the Devil's River near Dolan Falls in Val Verde County. It's a Texas native. In cultivation, the tree reaches 60' tall and usually features an irregular form. Leaves are 2.4-5.1 in. long and 1.2-2.4 in. wide, and leaf shape can be highly variable. Acorns are .8-1.0 in. long, .5 in. in diameter, oblong, and are presented singly or paired on a short peduncle. Tolerant of a wide range of soil conditions, this species is now finding favor even in Europe.

There's another category of oaks making their mark in the trade: clonal oaks. While typically difficult to root, there are some clones that do. ‘Cathedral’ is perhaps the best of the clonal live oaks, *Q. virginiana*. *Q. phellos* ‘Hightower’ is a clonal willow oak of columnar form and uncommon beauty.

Bald cypress, *Taxodium distichum*, remains my favorite tree. Once established a few years, it's remarkably drought tolerant. While most bald cypress are seedlings, the clonal world is beginning to make a mark in the trade. While most are derived via grafting, the species can be rooted, particularly if the clone is young. SFA Gardens has one of the finest collections of bald cypress, Montezuma cypress and Pond cypress varieties in the USA. 'Cascade Falls' and 'Falling Waters' are two strongly weeping clones that make a dramatic accent in the landscape.

Sweetgum, *Liquidambar styraciflua* 'Slender Silhouette' is a new clone that is very fastigiate. It makes a singular candle-like statement in the landscape. Originally discovered in Tennessee by Don Shadow, this columnar clone should reach 60' tall and only five to six feet wide! While it still throws sweetgum balls, they don't fall far from the tree.

Maples, *Acer* species – Red maples, Chalk maples, Big tooth maples and Florida maples are tough as nails natives worth a place in the landscape wherever adapted. For more western climates in Texas, Big tooth may be a more logical choice because alkalinity issues define much of the range of maples in Texas.

Southern magnolia, *Magnolia grandiflora*, has more drought tolerance than one might suspect. There are over 100 varieties, brown backed or green backed leaves with varying degrees of form and flower size and number. Nothing says this is the Deep South more than a Southern Magnolia.

Redbuds, *Cercis* species, are another small tree adapted across a wide range of Texas. There are many new and exciting varieties in the trade. 'Merlot' and 'Ruby Falls' are two new ones from North Carolina State University's program. Developed by Denny Werner, both are magnificent small trees for the landscape.

Fringe Tree, *Chionanthus virginicus*, is an underutilized native with uncommon drought tolerance. Native to dry spots in Texas, it's difficult to find – but worth the effort.

Desert willow, *Chilopsis linearis*, is common in central and western portions of the state but does quite well in East Texas if provided with good soil drainage. While there are many varieties available, 'Bubba', a Paul Cox introduction, remains perhaps the best of the pack. SFA is home to the world's tallest 'Bubba'. Amazing drought tolerance, showy flowers and a manageable size.

Texas pistache, *Pistacia texana*, is an uncommon small statured deciduous tree in our region but has performed admirably for over twenty years. A preferred wildlife food.

Texas persimmon, *Diospyros texana*, is sometimes referred to as the Mexican persimmon. A great small statured tree that features outstanding bark once the tree has a little age. Deciduous in most years, this is an underutilized small tree in our region of Texas.

Plums – *Prunus mexicana*, *P. angustifolia*, *P. umbellata* – and many others. Showy in the spring with a small enough stature to fit most landscapes, ornamental plums are natives that can feed you and your wildlife neighbors. *P. angustifolia* 'Purple Pride' is a recent SFA Gardens release.

Eve's Necklace, *Sophora affinis*, is a great small native tree with good flower interest and black seed pods that hang well into the winter. Extremely drought resistant.

Mexican buckeye, *Ungnadia speciosa*, sports redbud like flowers, good fall color and interesting buckeye-like seed. Basically a very large shrub, this drought tolerant species has performed admirably outside of its more western habitats.

Texas mountain laurel, *Sophora secundiflora*, is almost a commodity in central and western portions of the state, but it does remarkably well elsewhere if given good soil drainage and full sun. Beautiful blue fragrant flowers are a key feature, but the evergreen glossy foliage is unusually crisp and clean. A white flowering form is rarely encountered but is quite striking.

Possumhaw, *Ilex decidua*, is one of our favorites. A small multi-stemmed small tree with several varieties in the trade, possumhaws are underutilized in East Texas landscapes. Red or yellow berried. 'Warren's Red' is perhaps the most common variety in the trade, but there's a real need to introduce varieties that sucker less from the ground and from the basal portion of the plant.

Yaupon, *Ilex vomitoria*, is a commodity known for durability, evergreen nature and its ability to tolerate heavy pruning and training. 'Scarlet Peak' is a new variety that is destined to replace 'Fleming's Upright' in the years ahead.

Oakleaf Hydrangea, *H. quercifolia*, is not native to Texas but it's nearby in Louisiana and it's such a superior landscape plant we mention it here. It has surprising drought resistance in our area, but only if soil drainage is superior. It finds the steep banks of Sara's branch at the Pineywoods Native Plant Center so comfortable it's taken to naturalizing along this stream, perhaps a first in Texas? We are evaluating a great list of oakleaf varieties and seedlings.

Viburnums are reliable and make great plants for the landscape. Rusty blackhaw, *Viburnum rufidulum*, and Arrowwood, *Viburnum dentatum*, are most well known. *Viburnum nudum*, Smooth withered Viburnum, is showy and durable. Paul Cox, formerly of the San Antonio Botanical Garden, has introduced two great plants that have performed well in landscapes - 'Lord Byron' and 'Sir Robert', and both are crosses of *V. obovatum* and *V. rufidulum*. While *V. obovatum*, Walter's Viburnum, is certainly popular and several varieties are available, we've found their suckering nature to be quite frustrating.

Cross vine, *Bignonia capreolata*, is one of our favorite native vines and we love Greg Grant's introduction, 'Helen Fredel'. With big flowers, glossy evergreen foliage and a tenacious habit, there's no better vine. 'Tangerine Beauty' is more readily available.

Carolina Yellow Jessamine, *Gelsemium sempervirens*, sports bright yellow flowers and evergreen foliage. This is another must have vine for the Texas landscape.

Trumpet creeper, *Campsis radicans*, is a tenacious vine that deserves respect for its ability to find its way any where it wants to go.

Native wisteria, *Wisteria frutescens*, is just so much better behaved than its Asian cousins it should be utilized much more. 'Amethyst Falls' is perhaps the most commonly encountered variety, but 'Dam B' and 'Memphis Blue' are in the trade.

Conclusion: The SFA Gardens website – <http://sfagardens.sfasu.edu> – has a section called [Plants](#) and it's here that we feature interesting new plants for Texas landscapes. Texas A&M University's Superstar program is packed with drought tolerant plant materials suitable for Texas landscapes - and there are many old favorites making a comeback. Our mantra for the years ahead is this: SFA Gardens will focus on acquiring, planting, evaluating and promoting a wide range of climate change friendly, heat and drought tolerant showy landscape plants for the region. We want to be ready. We're proactive. We're here to occupy nature with Texas-tough natives ready for a hotter and drier Texas.

Wild About Design

Greg Grant

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<http://sfagardens.sfasu.edu>

We all want beautiful landscapes, right? In addition to making our world look prettier, they also make us feel better. And of course it would be nice if we all used native plants which are generally more adapted, more regionally appropriate, and support local wildlife.

As much as I love flowers, when it comes to the landscape, the design is more important than the plants, native or otherwise. After all, it doesn't matter how pretty plants are. They have to be in the right place. Although I try not to be a landscape critic, it's painfully obvious driving up and down the roads of Texas that we aren't all trained in landscape design. And it's no wonder why. Have you looked at a landscape design book lately or sat through a design seminar? Who can remember all those rules? There are just too darn many! Why doesn't somebody offer remedial landscape design for beginners? I'm quite convinced that most folk can only remember as many things as they have fingers on one hand. And that's on a good day. Most days I can't remember what the string tied on ONE finger is for!

Any list of design rules that exceeds five is doomed to failure. I've listened to some experts extol the virtues of as many as a dozen "essential" landscape design principles and/or elements. What the heck is the difference between the two anyway? Some seem to be completely unnecessary while others are often duplications. Therefore I've come up with what I consider the five essential design principles that should be considered in all design. And when I say ALL design, I mean it. The rules are exactly the same whether you are doing landscape design, interior design, floral design, or fashion design.

So if you've got five fingers, why not learn these simple rules that will assist you throughout your natural life. Although I doubt that the fashion police are going to bust you for not following them, I'm convinced that you can't do good design without at least acknowledging that they exist. Give yourself a hand and start counting.

1. Balance. Balance is the equalization of visual weight from one area of the landscape to another. All landscapes should be balanced. Each angle that you view the landscape from should be "weighed" as if it were perched on a balance beam. If the majority of the plants and structures are all located on one side of the yard, then your landscape is probably out of balance. There are two general types of balance. Symmetrical (formal) balance is achieved by repeating the same arrangement of objects on one side of the landscape as the other, therefore creating a mirror image. This is most appropriate for formal designs and is obvious to most observers.

Asymmetrical (informal) balance is created by implying equal visual weight, while the same materials are not repeated in the same quantity or the same relative position on either side of the axis. In other words you might have a large tree on one side of the yard balanced out by a group of medium sized shrubs, a large mass of small shrubs, and a garden structure on the other

side of the yard. This type of balance is a bit trickier to understand, but if you visualized the balance beam it makes it easier.

2. **Scale** (*proportion*). Scale is the size relationship of the individual parts to the other parts, and the relationship of each part to the whole. In establishing scale within the landscape, the human being is the measure of all things. All aspects of the design must be in scale with people. This means no landscape for giants or elves! If your house and yard are big, you need big beds, big plants, and big masses. On the other hand, if you have a tiny home on a tiny lot, more diminutive plants and beds are in order.
3. **Dominance** (*focal point*). Dominance is the authority of one feature of a design composition to all other parts. Due to the dominant object's size, shape, texture, or location, all other parts of the composition are subordinate to it. This principle should be used sparingly. As a rule there should be only one dominant feature in each view. It's too hard to look more than one at a time. Most people try to cram a million focal points into every yard. This makes as much sense as wearing every piece of jewelry you own at the same time. Bold textures, bright colors, and fanciful objects often serve as focal points. Try to keep the area around them more subdued to help show them off. Another way to remember this is, for every "busy" thing you do you must accompany it with something plain, simple, or mundane to offset it.
4. **Repetition**. Repetition is the technique of using one feature, shape, color, or theme throughout a composition. I consider repetition to be THE MOST important design principle of all. If you can only remember one thing (on one finger) remember this one! The repetition of the element at different locations in the design provides a common tie or visual link among the various parts. Repetition helps establish unity or harmony. Repetition is achieved by minimizing the number of different elements and materials used in a design composition. Although it's very tempting, it's not a good idea to use every plant, color, and ornament you come in contact with at your local garden center. For example, choose one type of edging and go with it. Your yard shouldn't be a showroom for Home Depot! Think of a patchwork quilt held together by a common border and thread. Everybody seems to know to repeat colors, trim, and shapes in the house, but most gardeners seem to think there's a rule against using anything more than once outside. It's hard to visually digest a busy, haphazard landscape. It's best to think of everybody viewing your landscape from a moving car. As a rule, keep the overall concept simple and easy to understand. Oak Alley Plantation in south Louisiana basically has one color (green), one plant (live oak), planted in two straight lines leading to the white house, and it's one of the most photographed landscapes I've ever visited. As Momma used to tell me, "there's nothing wrong with being simple."
5. **Unity**. Unity is the harmonious relationship among all elements and characteristics of a design. Unity exists when all the pieces of a composition logically relate to one another. No element should seem out of place or inappropriate. This principle is a bit harder to explain. Basically, no matter what portion of the landscape you stand in, it should still feel like it belongs to the rest. I try to make sure not to use modern plastic in my old fashioned landscape because it looks out of place. If you follow rules 1-4, unity will happen on its own.

Some say rules are made to be broken. I'm not known for following many, myself. But I suggest you follow the five design principles that have been in practice for hundreds of years all over the world and are proven winners. And remember, it doesn't matter whether you are using native plants, exotic plants, or toothpicks; design is design.

Invasive Plants in the Landscape

Andrew King

“There must have been plenty of them about, growing up quietly and inoffensively, with nobody taking any particular notice of them.... And so the one in our garden continued its growth peacefully, as did thousands like it in neglected spots all over the world.... It was some little time later that the first one picked up its roots and walked.” (John Wyndham, *The Day of the Triffids*)

INTRODUCTION

According to executive order 13112 the term “invasive species” means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. The term “invasive plant” itself evokes passionate emotion in everyone from skilled horticulturists to recreational gardeners and even to those who don’t garden. The economic and ecological impacts of invasive plant species are astounding. While it has been estimated that only 0.1% of all plant species introduced outside of their native habitat become invasive (Williamson and Fitter, 1996), the latest estimates of the economic cost associated with these species in the U.S. is approximately \$35 billion per year (Pimental, 2000). Babbitt (1998) estimates that greater than 1.7 million acres of wildlife habitat in the U.S. are being invaded by non-native plant species each year. This invasion not only displaces native plant species in these areas but can also displace native wildlife and change the entire ecosystem in terms of water runoff and fire ecology.

The first records of non-indigenous plants arriving in the “new world” came as early as 1628 when the Endicott expedition included such species as “Wheat, rye, barley, oats.....peaches, plumes, filberts, cherries...” Unfortunately, two species that were imported during the expedition became either naturalized or invasive. Woad seed (*Isatis tinctoria*) did not naturalize in the northeast but has since become invasive in Utah and other arid areas of the U.S. while hemp seed (*Cannabis sativa*) has naturalized widely in the northeastern U.S. During these early days of importing exotic plant materials the vast majority of imports were food or fiber crops. The first recorded case of an ornamental crop escaping cultivation was yellow toadflax (*Linaria vulgaris*). John Josselyn first recorded the presence of yellow toadflax in the northeast in 1672 and by 1758 it had become invasive to that area. Since 1860, more ornamental plants have become invasive species than any other category of plant material. These invasive ornamentals were often spread initially by eager gardeners without any notion of the eventual nuisances they would become. Perhaps most famously (or infamously) Benjamin Franklin was the first to record the introduction of Chinese tallow tree into the U.S. In 1772 Franklin wrote to Dr. Noble Jones “I send also a few seeds of the Chinese tallow tree, which will, I believe, grow and thrive with you. 'Tis a most useful plant.” (Bell, 1966). Indeed, Franklin was correct on all accounts. Chinese tallow tree has been used as a source of vegetable tallow for candles, soaps and fuels and as oil used in everything from varnishes to medicines. It also however grew and thrived (emphasis on thrived) for Dr. Jones and everyone else between North Carolina and Texas. There is some question as to whether the Chinese tallow tree that Franklin sent to Jones was the same genetically as the invasive variety of today. The story is none-the-less interesting. Kartesz and Meacham (1999) estimate that since 1628 more than 2500 non-indigenous plants have become permanent in the U.S. While relatively few of these are invasive, they have done irreparable damage (in some cases) to whole ecosystems.

INVASIVENESS/INVASIBILITY

Over years the methods of releasing new plant materials have changed. There is now much more attention given to the potential of a plant to become invasive before that plant is made available to the public. A thin line exists however between plant materials that are hardy, stress-tolerant and vigorous (characteristics for which plant explorers and breeders select) and plant materials that are overly aggressive and potentially invasive. The process of trialing new plant materials for invasiveness is often difficult due to the lack of sufficient numbers or types of test sites. Certain traits such as quick seed dispersal or broad native range are red flags for potential invasive plants; however, these signs do not always predict invasiveness accurately. Since predicting whether new plant materials will become invasive is very difficult and even impossible in certain cases, invasion ecologists have begun studying invasibility. Invasibility focuses on the types of habitats that are most prone to invasion rather than the actual plants that are invading. For instance, riparian areas and islands have proven to be exceptionally prone to invasive plants while the native populations in areas such as mature forests, salt marshes and high montane habitats keep invasion at a minimum. The information gathered through the study of invasibility along with the new focus on selecting non-invasive plants will almost assuredly decrease the amount of invasive and potentially invasive plants released through the nursery industry in upcoming years.

INVASIVES IN THE LANDSCAPE

By law the United States Department of Agriculture (USDA) and Texas Department of Agriculture (TDA) are the only entities that have the authority to label terrestrial plants as noxious or invasive in Texas. In light of this fact, the following lists are meant to be functional rather than official, as a number of the following species do not appear on the federal nor state invasive or noxious species lists.

ORNAMENTALS

Ornamental crops are some of the worst of the invasive offenders in landscapes across the U.S. due to the fact that most of them were planted purposefully. These species have not only become significant nuisances and liabilities in our landscapes but also in natural areas all over the country.

Examples of ornamental crops that have escaped cultivation in East Texas include:

Arundo donax (giant reed)
Daucus carota (Queen Anne's lace)
Eichornia crassipes (water hyacinth)
Ligustrum sinense (Chinese privet)
Lolium multiflorum (annual ryegrass)
Lonicera japonica (Japanese honeysuckle)
Pyrus calleryana (Callery pear)
Rosa bracteata (Macartney rose)
Sapium sebiferum (Chinese tallow tree)
Wisteria sinensis (Chinese wisteria)

..

WEEDS

Perhaps the most pernicious invasive plants are weeds. Though the term weed is actually used to define any plant that is growing where it is not desired, it is commonly used to describe annual or perennial grass, sedge or broadleaf plants that seed prolifically and tend to germinate in profusion. Of the \$35 billion spent annually on invasive plant control, \$34 billion is spent on the control of weeds (\$26 billion on crop weeds, \$6 billion on weeds found in rangeland and \$1.5 billion controlling weeds in homes, gardens and golf courses) (Pimental, 2000).

Some of the most problematic weeds in the Pineywoods include:

Digitaria ischaemum (smooth crabgrass)

Digitaria sanguinalis (large crabgrass)

Paspalum notatum (bahiagrass)

Cynodon dactylon (bermudagrass)

Sorghum halepense (Johnsongrass)

Cyperus esculentus (yellow nutsedge)

Lamium amplexicaule (henbit)

Rumex crispus (curly dock)

AGGRESSIVE PLANTS

When considering invasives in the landscape, many of the plants that cause issues may not be truly invasive from an ecological standpoint. These plants can however invade a home landscape and thus cost the homeowner time and money to eradicate or control. Many of these plants are useful in inhospitable areas in the landscape in which other plants simply will not grow. When utilized, they should be monitored closely and seedlings should be eradicated.

Aggressive plants commonly sold/grown in East Texas include:

Ruellia brittoniana (Mexican petunia)

Phyllostachys aurea (golden bamboo)

Pistacia chinensis (Chinese pistache)

Ulmus parvifolia (Chinese elm)

CONCLUSION

Many of the invasive plants discussed herein are simply nuisances, while others are genuine threats to the native plants and ecosystems in and around our landscapes. It is important to be educated as to plant species within a particular region that should be eradicated, avoided or controlled in order to keep landscapes free of unnecessary pressures and allow the native populations that exist to thrive.

CITATIONS

Babbitt B. 1998. Statement by Secretary of the Interior on invasive alien species. National Weed Symposium, Bureau of Land Management Weed Page; 8–10 April 1998; Denver, CO.

Bell, M. 1966. Some notes and reflection upon a letter from Benjamin Franklin to Noble Wimberly Jones October 7, 1772. Privately printed at The Ashantilly Press, Darien, Georgia.

Kartesz, J. T. & C. A. Meacham. 1999. Synthesis of the North American Flora, ver. 1.0. North Carolina Botanical Garden, Chapel Hill.

Pimental, D., L. Lach, R. Zuniga, D. Morrison. 2000. Environmental and Economic Costs of Nonindigenous Species in the United States. *BioScience*. 50(1): 53-65.

Williamson, M., A. Fitter. 1996. The varying success of invaders. *Ecology*. 77: 1666–1670.

Wyndham J. 1951. *The Day of the Triffids*. Ballantine Books, New York, NY.

An Exercise in Conservation/Restoration: The Stewart Ranch Story

Peter M Loos

In 2003 Peter and Cassandra Loos returned to Nacogdoches County so that Cassandra could be closer to aging family members and settled in at the family farm in Chireno which is 387 acres on the south end of town. The property has been in the family since the 1830's but for the purpose of this paper I begin with 1841 when Samuel Martin Flournoy settled in Nacogdoches County. I begin with Sam's arrival as that is a definitive time from which the property has been continuously in family hands. The land has been utilized in many ways over the years mostly for agrarian purposes. I will mainly focus on current and future plans which involve conservation, preservation, and restoration. Over the generations last names have changed starting with Atkinson and has included Konkrite (names associated with county records for the property), Flournoy, Gray, Metteurer, Wilson, Garrett, Flournoy again, and currently Stewart and Loos.

To give an idea of usage over the years I include below a general time line.

1830-1900: Agricultural crops to include food crops and cotton with some livestock.

1900-1930: Cotton became primary crop during this period; but, by 1930 there was a switch back to food crops particularly ribbon cane, and portions of the land were left fallow which returned to timber.

1930-1950: Early in this period of continued food crops/livestock usage, the timber was harvested to support the war effort and by 1950 was predominantly cattle with some poultry production.

1950-2000: The 78 acres south of Polysot Creek remained fallow and became what the family now calls the "backwoods," though there was a salvage harvest on a portion of it after a tornado in the early 1990's. The rest of the land was utilized for cattle and poultry production with 8 poultry houses at its peak in the 80's and 90's.

2000-present: Poultry was discontinued and the land is only being utilized by cattle and wildlife.

2003: The Cass and Peter Loos move in and initially stay with status quo. By 2005 the land ownership falls to Cassandra and her brother Carleton, and it is decided that for the future the land needs to be preserved and ultimately include conservation of a portion of the property initially to include the "backwoods and some quantity of current pasture land and possibly a portion of a 5-acre Tank Pond."

The backwoods is a wonderful mixed hardwood and mixed hardwood pine habitat and includes the only bluff located along Polysot Creek. The site includes examples of the following habitat types: Beech/Maple Mesic slopes; Oak/Hickory Mesic Forest; Baygall Seep; and Mesic Creek. There are numerous ephemeral species found in this part of the land to include *Trillium spp.*: Wake Robin (*Peduncularis Canadensis*), Wood Betony (*Silene subciliata*), Tall Catchfly, Solomon Seal, Green Dragon, Cardamine, several Violet species, several species of Fern, and several species of *Ranunculus*. Overstory species include (but are not limited to) Water Oak (*Quercus nigra*), Overcup Oak (*Quercus lyrata*), Southern Red Oak (*Quercus falcate*), Willow Oak, (*Quercus phellos*), Chinkapin Oak (*Quercus muhlenbergia*), White Oak (*Quercus alba*), Southern Sugar Maple (*Acer barbatum*), Red Maple, Black Hickory (*Carya texana*), Nutmeg Hickory, Water Hickory (*Carya aquatica*), Beech (*Fagus grandiflora*), American Holly (*Ilex opaca*), Southern Magnolia (*Magnolia grandiflora*), Sweetbay Magnolia (*Magnolia virginiana*), Green Ash, and some Loblolly Pine (*Pinus taeda*). Understory trees include Mexican Plum (*Prunus Mexicana*), Flatwoods Plum (*Prunus umbellata*), Paw Paw (*Asimina triloba*), Dwarf

Paw Paw (*Asimina parviflora*), Green Hawthorn (*Crataegus viridis*), Little Hip Hawthorn (*Crataegus spathulata*), Parsley Hawthorn (*Crataegus marshallii*), Farkleberry (*Vaccinium arborea*), Sweetleaf/ Horse Sugar (*Symplocos tinctoria*), Hoptree/Wafer Ash (*Ptelea trifoliata*), Red Bud (*Cersis Canadensis*), Fringe Tree (*Chionanthus virginica*), Dogwood (*Cornus florida*), Rusty Black Haw Viburnum (*Viburnum rufidulum*), Hornbeam (*Carpinus caroliniana*), and Hop Hornbeam. The shrub layer includes Arrowwood Viburnum (*Viburnum dentatum*), Possumhaw Viburnum (*Viburnum nudum*), Mapleleaf Viburnum (*Viburnum acerifolia*), Beautyberry/ French Mulberry (*Callicarpa Americana*), Piedmont Azalea (*Rhododendron canescens*), Virginia Sweetspire (*Itea virginica*), Yaupon (*Ilex vomitoria*), Spice Bush (*Lindera benzoin*), Strawberry Bush (*Euonymus americanus*), Coralberry (*Symphoricarpos obiculatus*), Deerberry (*Vaccinium staninum*), Blueberry (*Vaccinium sp.*); and Coralbean/ Mamou (*Erythrina herbacea*).

In 2011 an attempt was made to introduce Kentucky Lady Slipper (*Cypripedium kentuckiense*) in this area in 3 locations; the 2011 drought may have doomed the attempt, but only time will tell. Discussion continues about possibly introducing/re-introducing several other appropriate species in the “backwoods” to include Pyramid Magnolia (*Magnolia pyramidata*), Silky Camellia (*Stewartia malacodendron*), Shortleaf Pine and Longleaf Pine as well as others. Non-Native Invasive Species (NNIS) are a concern but not as big a problem as elsewhere on the property; but diligence will be necessary to be sure they do not become an issue along a pipeline easement created in 2010 that runs through the back of the “backwoods.”

The pastures that comprise most of the rest of the property (to include the area along the north side of Polysot Creek) also have a number of native plant species, particularly along the creek which are referred to by the Stewart/Loos family as the “North Bottom” and the “South Bottom” and include Cabbageleaf Giant Coneflower (*Rudbeckia maxima*), Spring Lady Tresses (*Spiranthes vernalis*), Missouri Ironweed (*Vernonia missouriensis*), Eastern Gama Grass, Bushy Bluestem, Broomsedge bluestem, and several species of *Rannunculus*. The stand of Giant Coneflowers in the “North Bottom” has been a popular spot to visit during past Lone Star native Plant Conferences. In the future we hope to add a number of appropriate grasses not currently present to include: Switch Grass, Big Bluestem, Little Bluestem, and Indian Grass. Most activity currently focuses on trying to eradicate/reduce NNIS particularly McCartney Rose, Chinese Tallow, Privet, and Chinaberry. Locust is also a problem in both bottoms. We currently are enrolled in a program with USF&W to help address this problem, again focusing primarily on the bottomland pastures.

There is also a 5-acre tank pond on the property as well as a shallow spring-feed pond (less than an acre) and also a small seasonal pond in the North Bottom. Existing aquatic plants include Soft Rush (*Juncus effuses*), Zig Zag Iris (*Iris brevicaulis*), Lizard’s Tail, and several species of sedge (*Carex spp.*). Twenty-one (21) containerized (1-gallon) Neches River Mallow, *Hibiscus dasycalyx* (supplied by Dr. David Creech and SFASU) were planted in 2001 at the large tank pond with only 15 still viable by 2004; but, as of my writing this paper there are 25 individuals present. Several other plants were introduced to this habitat to include Pickerel Weed, Spider Lily, Powdery Thalia (did not survive after 2 winters), *Canna flaccida* (didn’t survive the drought of 2011), *Iris Virginica*, Giant Blue flag Iris, and copper Iris. It also appears the White Water Lily did not survive the drought. Spider Lily was also introduced to the shallow spring-fed pond. Currently we are trying to eradicate the aggressive invasion of Tallow at the shallow spring-fed pond. Once that is accomplished, there are plans to introduce additional aquatic species.

Ultimately, it is the goal of Carleton Flournoy Stewart and Peter M. Loos to create a permanent Conservation Easement on approximately 50 percent of the property and will include the “back-woods,” “south bottom,” and the “high ground” located south of the 5-acre pond, and will also include the shallow spring-fed pond. The NNIS problem will most likely continue to need attention for generations to come, though the hope is we will be down to Tallow and Privet by the time the next generation takes control, which so far includes Carleton’s (and Jennifer’s, his wife) son Ian Conner Stewart. It is also hoped that other appropriate native species can be introduced to the property in the future to include as many Oak species as is appropriate, as well as additional ephemerals such as Bloodroot, Bellwort, additional *Trillium* species, and Wild Comfrey. (Cassandra and Carleton’s father always dreamed of having an Oak collection here.) Other herbaceous plants will be introduced in both woodland and open settings to include orchids amongst other plants. There are also hopes to add other shrub and small tree species as appropriate. This endeavor started as tribute to those that came before us and as a way to conserve a part of family history for future generations, a legacy to be proud of; but for me, it’s also a lasting legacy for his best friend and a tribute to the person that to date I spent half of my life with and who worked tirelessly on past Lone Star Regional Native Plant Conferences, Cassandra Gray Stewart Loos..... This is for you, Cass!

Rain Gardens – Beautiful Solutions to Water Pollution

Dr. Matthew W. McBroom, Dr. Yanli Zhang, and Dr. David Creech
Arthur Temple College of Forestry and Agriculture,
Stephen F. Austin State University

“I am a dry man whose thirst is praise
of clouds, and whose mind is something of a cup.
My sweetness is to wake in the night
after days of dry heat, hearing the rain.” – **Water** by Wendell Berry

Abstract

Stormwater runoff is a leading cause of water quality degradation in the United States. Urbanization increases impervious surfaces in a watershed resulting in higher runoff volumes per unit of rainfall. There are several consequences of increased runoff including accelerated soil erosion and increasing nonpoint source pollutants (suspended solids, nutrients, bacteria, and metals) entering water courses, streams, rivers and lakes. Stormwater management rain gardens have been shown to be effective for reducing both additional runoff and pollutant loads. While serving as a runoff biofilter, rain gardens can also be integrated into the landscape to enhance the beauty and diversity of urban parks and recreation areas. In addition, rain gardens provide an opportunity to demonstrate the importance of maintaining healthy ecosystems and water resources management. This paper reports on rain garden designs, construction, and efficacy and discusses the rain garden project at the Pineywoods Native Plant Center at SFASU.

What is a Rain Garden?

Rain gardens are landscape features that are built to capture, store, and filter storm runoff. Rain gardens use shallow depressions to slow runoff waters and spread this water out over an area. This drop in velocity allows sediments and debris to settle out of runoff waters. This water then soaks into the soil of the rain garden. Plant roots take up the water, thus reducing the concentrations of nutrients and metals. Soil transformation of these pollutants also can occur. Rain gardens also provide habitat for birds, butterflies, and beneficial insects. They can also reduce water usage in the landscape, particularly when appropriate native plants are established in them. Finally, rain gardens are beautiful, and add to the aesthetic appeal of a landscape.

Rain gardens are often confused with treatment wetlands. While these two systems may have similar goals, namely, the treatment of stormwater runoff, they perform this function quite differently. Rain gardens are designed so that the water soaks into the ground within a couple of days. Water does not permanently pond on the surface of a rain garden, unlike a treatment wetland. This means that soils are not anaerobic for long periods of time. This allows for a greater diversity of plant materials in rain gardens. On soils where internal drainage may be limited (clay subsoils for example), artificial drainage through under-drain pipes may be necessary to prevent a rain garden from turning into a seasonally flooded wetland.

Rain Garden Construction

The first step in rain garden construction is the proper sizing. It is important that the rain garden is not too small for the amount of anticipated runoff from impervious surfaces like roofs, roads, or parking lots. If the rain garden is too small, its treatment efficacy will be overwhelmed. For a rain garden that will have four feet of treatment depth in East Texas, a general rule of thumb would be about 1,000 square feet of rain garden area for every acre drained, assuming that that acre has less than 30% impervious cover. For areas with larger amounts of impervious cover, greater area would be needed. Also, if the rain garden's depth of permeable soil (sand) is much less, then the garden area would also have to be increased. The rain garden should be located so that natural drainage will allow the storm runoff waters to flow into the garden, and so that it will drain. Frequently flooded areas like flood plains should be avoided. Treatment wetlands may be a better option in floodplains.

Rain gardens typically are constructed by first excavating low permeability sub-soils. In areas where more permeable sands occupy the top four feet or so, this excavation may not be necessary. Excavation for a rain garden typically involves removal of clay subsoil material to a depth of 2- 4 feet (Figure 1). Next, perforated pipe can be installed to allow water to drain out of the bottom once it has filtered through the plant material and soil. A pea gravel jacket should be placed around the pipe to facilitate drainage, to a depth of around 6-8 inches (Figure 2). Filter fabric is then placed above to gravel to act as a root barrier and to finer sediments from entering the pea gravel. Next, 2-4 feet of sand is added. Above this, 3-6 inches of mulch are needed. The final component, the appropriate native plants, can then be established. It may be necessary to construct a small berm around the downhill side of the garden, to prevent runoff waters from running over the surface of the garden without infiltrating through the soil. Ponding depth should be at a maximum of 6 inches on the top of the rain garden surface immediately following large rain events. For extreme storm runoff events, an over flow spill way can be built so that the containment berms are not damaged. Plant material can include native grasses, herbs, shrubs, and trees. Fertilization should be minimal, to keep the gardens healthy, but since one of their chief functions is nutrient uptake, excess fertilization should be avoided.

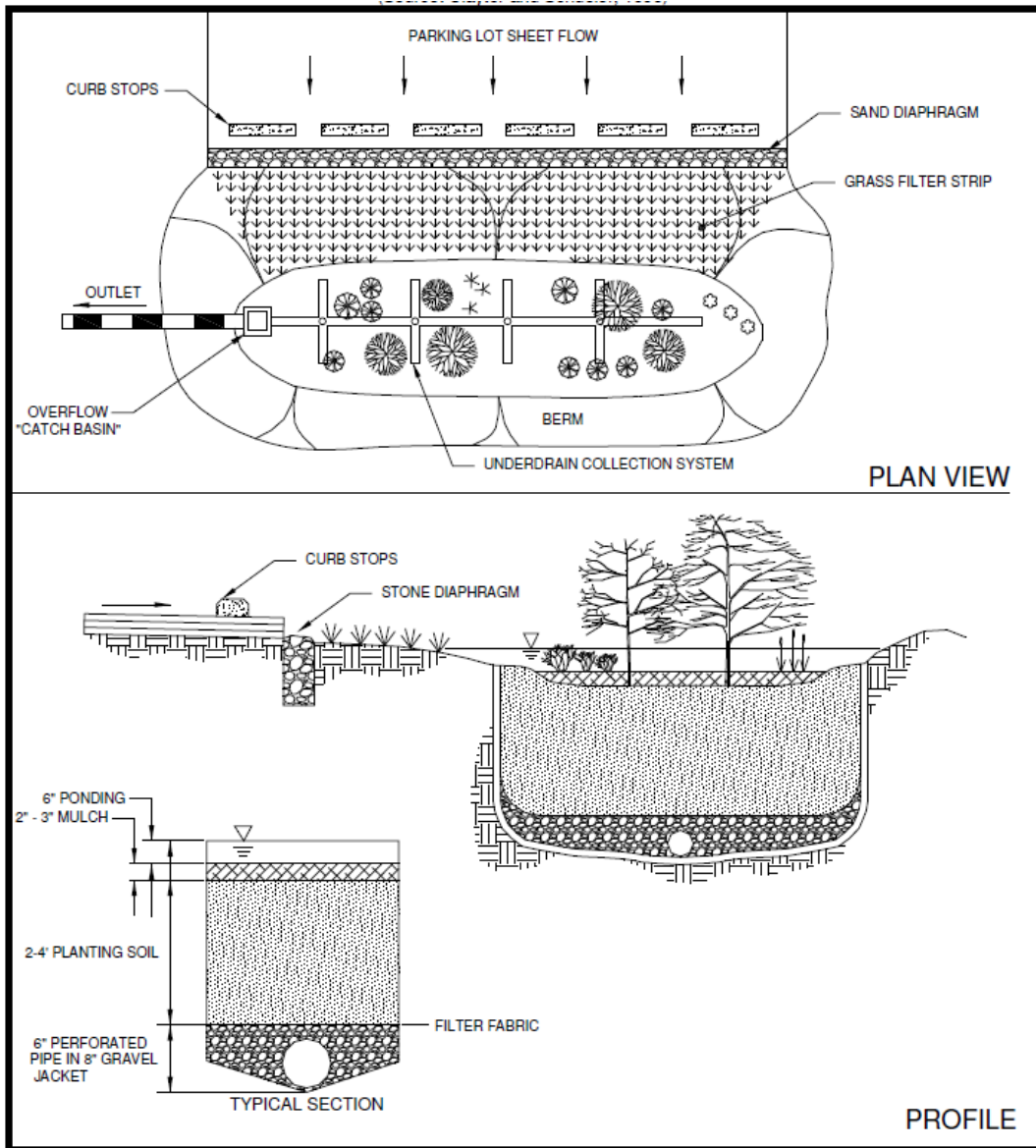


Figure 1. Schematic of the structure of a storm water management rain garden (From Claytor and Schueler, 1996).



Figure 2. Excavation for PNPC rain garden. Notice the clay soil that has to be removed and replaced by more permeable sands for the filtration to be most effective. Photo by Yanli Zhang.



Figure 3. Spreading pea gravel on drainage pipes. The pipes were encased in about 8 inches of pea gravel to allow for adequate drainage, and then were covered by filter fabric. Photo by Yanli Zhang.

Rain Gardens and Water Quality

Stormwater runoff is a leading cause of water quality degradation in the United States (USEPA, 1990). Urbanization increases impervious surfaces in a watershed resulting in higher runoff volumes per unit of rainfall. There are several consequences of this. First, increased runoff results in increased flooding in urban areas. In addition, additional flows increase channel erosion in stream channels. This degrades instream habitats like pools, riffles, and runs for channels by deepening, widening, and scouring. Combined, this increased runoff increases overall nonpoint pollutants from impervious surfaces. These pollutants include suspended solids, nutrients, bacteria, and metals (Brown et al., 1999).

Several urban best management practices (BMPs) have been proposed for dealing with this additional runoff (Figure 4). One of these BMPs, the stormwater management rain garden, has been shown to be effective in reducing pollutant loads (Dietz and Clausen, 2005; Dietz and Clausen, 2006; Yang et al., 2009; Wadzuk et al., 2010). Furthermore, rain gardens reduce total stormflow as well as prolong beneficial base flows where other urban BMPs like detention basins only treat stormwater (Yang et al., 2009). Rain gardens are not only effective for treating water quality and quantity problems, they also can be integrated into the landscape to enhance the beauty and diversity of urban parks and recreation areas, and at the same time, provide educational functions. Rain gardens can also maintain pollutant mitigation efficacy for numerous years (Wadzuk et al., 2010).



Figure 4. Rain Gardens work! Muddy water goes in, clear water comes out. Photos by Yanli Zhang.

Pineywoods Native Plant Center Rain Gardens

Three rain gardens have been constructed on the PNPC at SFASU (Figure 5). This cooperative project between the PNPC and the SFASU Waters of East Texas (WET) Center is in keeping with the sustainability mission of the PNPC and SFA Gardens by improving the water quality of storm runoff coming from the Tucker house and from adjacent properties (Raguet Elementary

and SFA Music Preparation). These rain gardens will not only enhance the beauty of the PNPC, but they will also enhance the water quality of Sara's Branch flowing through the PNPC. These gardens will also serve as a showcase and educational opportunity for sustainable water management. Finally, they will provide teaching and research opportunities for SFA students.

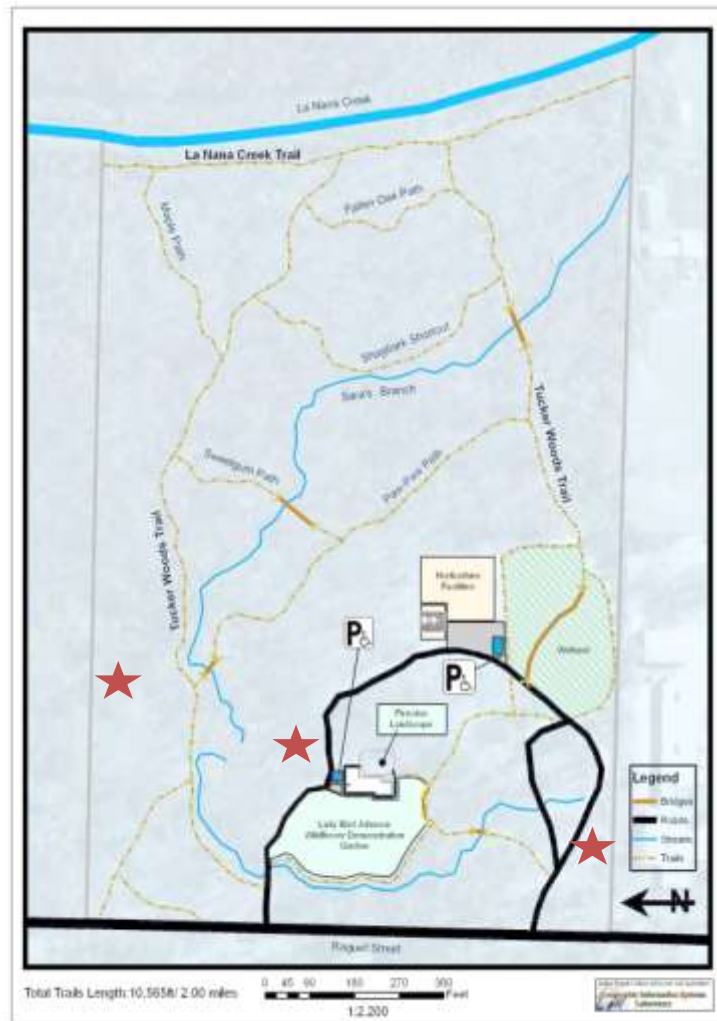


Figure 5. Location of three stormwater management rain gardens at the Pineywoods Native Plant Center, 2900 Raguet Street.

References

- Brown, S., S. Shrestha, and S.J. Riley, 1999. The Allocation of Resources to Stormwater Pollution Control. IAHS Publication, Wallingford, Oxfordshire, pp. 381-389.
- Claytor, R.A., and T.R. Schueler, 1996. Design of Stormwater Filtering Systems. Center for Watershed Protection, Chesapeake Research Consortium, Silver Spring, MD.
- Dietz E.M. and J.C. Clausen, 2005. A Field evaluation of rain garden flow and pollutant treatment. *Water, Air, and Soil Pollution*, 167, 123 - 138

Dietz E.M. and J.C. Clausen, 2006. Saturation to improve pollutant retention in a rain garden. *Environmental Science & Technology*, 40(4), 1335 – 1340

Yang H. D.C. Florence, E.L. McCoy, W.A. Dick and P.S. Grewal, 2009, Design and hydraulic characteristics of a field-scale bi-phasic bioretention rain garden system for storm water management, *Water Science and Technology*, 59(9): 1863 - 1872

Wadzuk, B.M., M. Rea, G. Woodruff, K. Flynn, and R.G. Traver, 2010. Water quality performance of a constructed stormwater wetland for all flow conditions. *Journal of the American Water Resources Association*, 46(2): 385-394.

Urban Landscaping: Bringing Your Backyard to Life

Julie Shackelford

Urban landscapes are often devoid of the native vegetation that once provided food and shelter to its wild inhabitants. With good advice from experts and lots of trial and error, Ms. Shackelford has attempted to create small native habitats in her urban backyard – first in Austin and now at her home in Nacogdoches – by providing food, water and shelter for wildlife. With her focus on planting vegetation for butterflies, bees and birds, she discussed how to deal with some of the challenges she has encountered (weeds, drought, lots of shade and clay soils) as well as the successes, in particular which plants and other habitat features attract birds and other wildlife. Julie’s no-fail plants include Turk’s Cap (*Malvaviscus drummondii*), native Lantana, American Beautyberry (*Callicarpa americana*), and Passionvine (*Passiflora incarnata*). She has high hopes for button bush (*Cephalanthus occidentalis*), and Mexican Plum (*Prunus mexicana*). Brush piles, dead tree snags and a good bird bath are also essential to providing good backyard urban habitat.

Brush pile

Snags

Mulch

Part shade

Bird bath

Nest boxes

Cats indoors

Weeds

Bird list

What failed – oak leaf hydrangea, full sun plants in shady spots

What works – lantana, turks cap, beauty berry, coral honeysuckle

Future – buttonbush, Mexican plum, water feature

Firewise Landscaping
Melanie Spradling
WUI Specialist, Texas Forest Service

Texas Wildfire Response—2011
November 15th, 2010-October 31, 2011

- 350 days
- 30,547 fires
- 3.9 million acres
- 2,946 homes lost
- 39,413 homes saved

Rural settings are popular, but... It is still a fire environment.

What makes the difference?

- Defensible space
- Or the lack of...

Use fire-resistant construction and landscaping

Defensible Space

What is it?

- 30-foot space, lean, clean, and green
- Breaks up the horizontal and vertical continuity of vegetation
- Selection of fire resistant plants for landscaping

How to create defensible space

- Remove any dead vegetation
- Remove or prune vegetation next to windows
- Choose plants that have a low flammability (high moisture content)

Landscape Plants

Low flammability plants often have or are:

- Broad, moist leaves
- Loose branching pattern
- Deciduous plants
- Self-pruning
- Slow growth
- Healthy plants

Landscape Plants

High flammability plants often have or are:

- Dense, dry leaves
- Needle or grass-like leaves
- Evergreen plants
- Retain dead leaves/branches

Fast growth
Unhealthy plants

Isolate Landscaping Beds

Create Fuel Breaks

Use sidewalks, gravel paths, driveways

Set your gardens back from the house so YOU can enjoy them!

Gravel walkway, raised rock planter

Gravel spacer (doubles as a splash guard for house)

Windows unobstructed by vegetation

Groundcovers

Choose those less than 12" tall

Plant fire-resistant varieties

Keep the dead cut away

Mow during dormancy

Use as an alternative to grass

Trees

Plant hardwoods

Plant for growth when planting

Limb the trees up to 5 feet

Shrubs

Plant low-growing (2 feet tall or less) near structures

Avoid planting volatile shrubs near windows, decks, or wood fences

Modify shrubs with rock mulch and other vegetation

Maintenance

Irrigate around the house

Keep grass and groundcovers short (especially in winter)

Prune and rake all dead matter from flowerbeds, shrubs, groundcovers

Rake and remove leaves, pine straw

Replace dead plants

Firewise can be Beautiful!

Questions?

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“Bogs” of East Texas

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- a) East Texas 'bogs' are not true bogs
- b) What are east Texas 'bogs'? =herbaceous seeps
 - Sandy soils
 - Water
 - Fire
- c) Where to find 'bogs’
- d) 'Bog' vegetation
 - the Mainstays
 - the Stars
- e) Growing ' bog' plants

Strictly speaking there are no bogs in east Texas -or all of Texas for that matter! This is not because of the current drought, even though it did its damage. It is not because of human impact on the land or even global warming. It is simply the result of Nature!

A true bog is defined as a peatland formed in a deep organic soil of partially decomposed plant material (peat) often derived largely from *Sphagnum* species mosses. Peat accumulation is made possible by extremely slow decomposition rates commonly due to water saturation, cold temperatures, and low pH (Richardson 2000). True bogs are largely watered directly by rainfall (ombrotrophic) with only minimal water coming from stream flow, overland runoff, or groundwater and as a result they are acidic and nutrient poor. These conditions resulted in the development of a specialized flora which includes carnivorous plants such as *Drosera* sp. (sundews) and *Saracennia* sp. (pitcher plants). Most bogs are found in the north temperate and boreal zones. They can account for vast acreages in portions of Canada, Alaska and Siberia. Peatlands of this type do not exist in Texas.

The ecosystems in east Texas and nearby western Louisiana that have been called 'bogs' are so named because they include plants that are similar or related to those of northern bogs and because they too have water-saturated acid soils. But this is where the similarity ends. They exist in a much warmer climate, and are mainly watered by groundwater rather than rainwater Van Kley (2006), Nixon & Ward (1986). While *Sphagnum* mosses maybe present, little peat accumulates and a sandy mineral soil is generally within a few inches of the surface. More appropriate names for these local ecosystems are 'herbaceous seeps' or 'pitcher plant seeps' (although not all examples support pitcher plants). Similar ecosystems occur in other areas of the Gulf and Atlantic coastal plain from Texas to the Carolinas (Folkerts 1982).

Specific conditions for three factors: soil, water, and fire are necessary for pitcher plant seeps. The soils of both the surrounding landscape and the the seep itself are sandy. Rain water rapidly

infiltrates through the deep sands of the surrounding uplands. When it reaches a restrictive layer such as clay, shale, or sandstone (often sandstones of the Catahoula formation at their contact with the sandy Willis Formation), groundwater will collect above that layer. Where this layer outcrops or comes near the soil surface, a spring or seep forms, resulting in soil that is nearly permanently saturated with nutrient-poor sand-filtered spring water- thus mimicking some of the conditions (low nutrients, acidity, saturation) found in the peat soils of northern bogs. These conditions are rather different from those of the rest of the east Texas landscape. As a result, the seep flora is distinct from other local plant communities. Seeps most often occur on hillsides, lower slopes adjacent to a stream valley, and in the headwaters of small streams. They are usually small in size, generally 5 acres or less (Bridges & Orzell 1989).

Another essential factor is fire. Historically, herbaceous seeps were embedded in upland longleaf pine woodlands-- plant communities dominated by *Pinus palustris* (longleaf pine) with a ground layer of *Schizachyrium scoparium* (little bluestem) and other herbaceous plants. Lightning strikes caused low intensity surface fires to burn these areas as often as once every 2-3 years (Frost 1993). Vegetation in embedded seeps would be burned by these fires encroaching from the adjacent pine stands. The fires inhibited woody vegetation, resulting in a plant community largely dominated by sedges, grasses, mosses, pitcher plants and other herbaceous plants. MacRoberts & MacRoberts (1991, 2001, etc.) have published numerous floristic descriptions of local herbaceous seeps, mainly in nearby western Louisiana.

In the absence of fire, pitcher plant seeps will succeed to a forested seep community (often called a baygall or bay swamp) dominated by *Magnolia virginiana* (sweetbay), *Acer rubrum* (red maple), and other trees or shrubs. Historically, forested seeps prevailed in larger seep areas, stream valleys, and areas topographically low on the landscape where fire frequency was low while herbaceous seeps occurred higher on the landscape where they were in contact with flammable pine uplands. During the past century as result of human settlement and fire control efforts, many herbaceous seeps also succeeded to forested seeps or were destroyed by human activity (Folkerts 1982). While never common on the landscape because of the specialized conditions required, herbaceous seeps and the plants that depend on them have become rare.

Many surviving herbaceous seeps are on public lands with prescribed burn programs. Good local examples are in the southern part of Angelina National Forest in the Boykin Springs area and along the highway 63 corridor. Others occur in the southern portion of Sabine National Forest and in the Big Thicket National Preserve. Excellent examples exist in Louisiana's Kisatchie National Forest, particularly on the Calcasieu and Kisatchie Ranger Districts. A particularly good example is Cooter's Bog on the Vernon Unit of the Calcasieu Ranger District.

While showy or interesting plants like orchids, sundews and pitcher plants may be the ones first noticed when visiting an herbaceous seep, the dominant plants in most east Texas seeps are sedges (especially *Rhynchospora* species) and grasses (especially *Dichanthium dichotomum*). *Sphagnum* species mosses, while generally not peat forming, may cover portions of a seep like a spongy carpet. Seeps are the only habitat in east Texas for clubmoss (*Lycopodiella adpressa*). Shrubs tend to be small and widely scattered in a properly fire-maintained seep but may include *Morella cerifera* (wax myrtle), *Persea borbonia* (redbay), *Viburnum nudum* (possumhaw), and *Toxicodendron Vernix* (poison sumac). Trees are generally limited to widely scattered longleaf pine, *Magnolia virginiana* (sweetbay), and *Nyssa biflora* (swamp tupelo). Herbaceous seeps can be very species rich. Mac Roberts and MacRoberts (1991) found a mean of 99 taxa in a floristic

survey of three Louisiana hillside seepage 'bogs'; Nixon & Ward (1986) found a mean of 103 taxa per seep in a study of six east Texas 'bogs'.

The leading visual role in many herbaceous seeps is played by *Saracennia alata*, the carnivorous yellow pitcher plant, Texas' only native *Saracennia* species. With an attractive yellow-green color in both flower and foliage, it also may turn a beautiful rusty red in the fall. Other attractive seep species include the carnivorous *Drosera brevifolia* (sundew) and *Pinguicula pumila* (butterwort), *Calopogon tuberosus* (grass pink orchid), (*Eriocaulon* sp. (pipeworts), *Helianthus angustifolius* (swamp sunflower), and *Aletris aurea* (sunnybells). Rare plants include *Platanthera integra* (yellow fringeless orchid), *Rhynchospora macra* (large beaksedge), and *Rudbeckia scabrifolia*, a coneflower only known from a few east Texas 'bogs'. One of my favorites is *Rhynchospora latifolia* (white top). Taller than it's equally attractive relative (*R. colorata*) which is found mostly near the coast, this sedge represents a formerly wind pollinated lineage that evolved showy white bracts to attract pollinators to the tiny flowers in the central cluster of spikelets much in the same way as poinsettias and dogwoods.

A number of herbaceous seep plants have ornamental potential, both as unusual 'conversation plantings' such as sundews, butterworts, and pitcher plants, and as showy specimen plants like bog comeflower, white top, and swamp sunflower. Some, for example pitcher plants, cone flowers, sunflowers and sedges, may be rather easy to propagate. Others such as the orchids are not. Gardeners interested in seep plants face two challenges: first, plant material is difficult to obtain. It is unethical and generally illegal to 'pillage' a seep on public lands, although there may be opportunities to collect small amounts of seed. Many species are unknown to the garden trade or are not available. Second, most species found in herbaceous seeps are habitat specialists and require very specific conditions. As a starting point, the well publicized methods for growing venus flytraps (*Dionaea muscipula*), which are native to similar environments in the Carolinas, may be appropriate for many local herbaceous seep plants.

To conclude, I would like to issue a challenge to our local Pineywoods Native Plant Center. Let's establish an herbaceous seep garden! In addition to showcasing these beautiful but rare plants it might also enable us to develop better techniques for growing these species and provide a future source for local gardeners.

Literature cited

Bridges, E. L., and S. L. Orzell. 1989. Longleaf pine communities of the West Gulf Coastal Plain. *Natural Areas Journal* 9(4):246-263.

Folkerts, G.W. 1982. The Gulf coast pitcher plant bogs. *American Scientist* 70: 260-267.

Frost, C.C. 1993. Four centuries of changing landscape patterns in the longleaf pine ecosystem. Pp. 17-43 In S.M. Hermann, ed. *Proceedings of the 18th Tall Timbers Fire Ecology Conference, The longleaf pine ecosystem: ecology, restoration, and management*. Tall Timbers Research Station, Tallahassee, FL.

MacRoberts B.R., and M.H. MacRoberts. 1991. Floristics of three bogs in western Louisiana. *Phytologia* 70(2):135-141.

- MacRoberts M.H, and B.R. MacRoberts. 2001. Bog communities of the west Gulf coastal plain: a profile. Bog Research Papers in Botany and Ecology, No. 1, Bog Research, Shreveport, LA.
- Nixon, E. S., and J. R. Ward. 1986. Floristic composition and management of east Texas pitcher plant bogs. Pp. 283-287 in D. L. Kulhavy and R. H. Conner, eds. Wilderness and natural areas in the eastern United States: a management challenge. Center for Applied Studies, School of Forestry, Stephen F. Austin State University, Nacogdoches, TX. Pp 283-287.
- Richardson C.J. 2000. Freshwater wetlands. *In*. Barbour and Billings, 2000. North American terrestrial vegetation 2nd ed. Cambridge University Press, Cambridge.
- Van kley, J.E. The Vegetation of the Pineywoods. *In*. Diggs, G.M., Jr., B.L. Lipscomb, M.D. Reed, and R.J. O'Kennon. 2006. Illustrated Flora of East Texas Volume I. Center for Environmental Studies, Austin College, Sherman, Texas and Botanical Research Institute of Texas (BRIT), Fort Worth, Texas. Sida, Botanical Miscellany 26.

Workshops

EDIBLE/USEFUL PLANTS

From: *Edible Plants of the Gulf South*

by Allen, Allen and Winters, 2005

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EDIBLE PLANTS

Scientific Name	Common name	part used
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<i>Acer spp.</i>	Maple	inner bark, seeds, & leaves
<i>Allium spp.</i>	Onions	bulbs & leaves
<i>Alternanthera philoxeroides</i>	Alligatorweed	leaves
<i>Amaranthus spp.</i>	Amaranth	seeds, shoots, & leaves
<i>Ambrosia</i>	Ragweed	seeds
<i>Amelanchier arborea</i>	Service Berry	fruits
<i>Amphicarpaea bracteata</i>	Hog Peanut	underground fruits
<i>Apios americana</i>	Ground Nut	tubers
<i>Arisaema dracontium</i>	Green Dragon	corms
<i>Arisaema triphyllum</i>	Jack in the Pulpit	corms
<i>Arundinaria gigantea</i>	Cane/Bamboo	shoots & seeds
<i>Asclepias spp.</i>	Milkweed	flower buds, leaves, & fruits
<i>Asimina triloba</i>	Pawpaw	fruits
<i>Brasenia schreberi</i>	Water Shield	leaves, mucilage, roots
<i>Callicarpa americana</i>	French Mulberry	fruits
<i>Callirhoe spp.</i>	Wine Cup	roots & leaves
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	stem tips, leaves, seeds, roots
<i>Cardamine spp.</i>	Native Water-Cress	leaves
<i>Carya spp.</i>	Hickory Nut	fruits
<i>Castanea pumila</i>	Chinquapin	seeds
<i>Celtis spp.</i>	Hackberry	fruits
<i>Centella erecta</i>	Centella	leaves
<i>Cerastium spp.</i>	Mouse-Eared Chickweed	leaves
<i>Cercis canadensis</i>	Red Bud	young pods & flowers
<i>Chenopodium album</i>	Lamb's Quarters	seeds & whole plant
<i>Chionanthus virginica</i>	Fringe Tree	fruits
<i>Cichorium intybus</i>	Chicory	roots, leaves, flowers
<i>Cirsium spp.</i>	Thistle	roots, leaves, & pith
<i>Claytonia virginica</i>	Spring Beauty	leaves & corms
<i>Commelina spp.</i>	Day Flower	shoots
<i>Corylus americana</i>	hazelnut	seed
<i>Crataegus spp.</i>	Hawthorn	fruits
<i>Cryptotaenia canadensis</i>	wild chervil	leaves, seed
<i>Cyperus esculentus, rotundus</i>	Chufa/Nut Grass	tubers
<i>Dalea candida, purpurea</i>	Prairie Clover	roots
<i>Diospyros virginiana</i>	Persimmon	fruits
<i>Duchesnea indica</i>	wild strawberry	fruits
<i>Eclipta prostrata</i>	Eclipta	tips
<i>Elaeagnus spp.</i>	Elaeagnus	fruit, seed
<i>Erodium cicutarium</i>	Stork's Bill	leaves, stems, roots
<i>Fagus grandifolia</i>	Beech	bark, leaves, & fruits
<i>Foresteria acuminata</i>	Swamp Privet	fruits
<i>Fraxinus spp.</i>	Ash	fruits

<i>Galium aparine</i>	Bedstraw	tips
<i>Gaylussacia spp.</i>	huckleberry	fruit
<i>Gleditsia triacanthos</i>	Honey Locust	fruits
<i>Halesia diptera</i>	Silver Bell	fruits
<i>Helianthus spp</i>	Sunflower	seeds, tubers
<i>Hemerocallis fulva</i>	Day Lily	flower buds
<i>Impatiens capensis</i>	Touchmenot	seeds
<i>Ipomoea spp.</i>	Morningglory	leaves, stem tips, roots
<i>Iva annua</i>	Sumpweed	seeds
<i>Juglans nigra</i>	Black Walnut	fruits
<i>Krigia dandelion</i>	False Dandelion	tubers
<i>Lactuca spp.</i>	Wild Lettuce	leaves
<i>Lamium spp</i>	Henbit	tips
<i>Laportea canadensis</i>	Wood Nettle	stem tips, leaves
<i>Lepidium virginicum</i>	Peppergrass	shoots
<i>Lespedeza spp.</i>	Lespedeza	leaves
<i>Liatris spp.</i>	Blazing Stars	corms
<i>Liquidambar styraciflua</i>	Sweetgum	resin
<i>Lonicera japonica</i>	Japanese Honeysuckle	flowers, leaves, buds
<i>Lycopus spp.</i>	Bugleweeds	tubers
<i>Malus (Pyrus) angustifolia</i>	Crab Apple	fruits
<i>Medeola virginiana</i>	Indian Cucumber	rhizome
<i>Mitchella repens</i>	Partridgeberry	fruits
<i>Mollugo verticillata</i>	Carpet Weed	plant
<i>Morus spp.</i>	Mulberry	fruits
<i>Myriophyllum spicatum</i>	Water Milfoil	roots, leaves
<i>Nelumbo luteum</i>	Water Chinquapin	young leaves, seeds &
rhizomes		
<i>Nuphar spp.</i>	Splatterdock	rhizomes & seeds
<i>Nymphaea spp.</i>	Water Lily	leaves & rhizomes
<i>Nyssa spp.</i>	Black Gum	fruits
<i>Oenothera biennis</i>	Evening Primrose	leaves & roots
<i>Opuntia spp.</i>	Cactus	fruit, stem, seeds
<i>Oxalis spp.</i>	Wood Sorrel	roots & leaves
<i>Passiflora incarnata</i>	May Pop	fruits
<i>Peltandra virginica</i>	Arrow Arum	seed, flowering stem,
rhizome		
<i>Perilla frutescens</i>	Perilla	leaves, flower clusters,
seeds		
<i>Photinia pyrifolia</i>	Red Chokecherry	fruit
<i>Phragmites communis</i>	Reed	rhizome tips & seeds
<i>Phyllostachya aurea</i>	Yellow Bamboo	stem tips
<i>Physalis spp.</i>	Groundcherry	fruits
<i>Phytolacca americana</i>	Pokeweed	leaves
<i>Pinus spp.</i>	Pines	seeds
<i>Plantago spp.</i>	Plantain	leaves
<i>Platanus occidentalis</i>	Sycamore	sap
<i>Podophyllum peltatum</i>	Mayapple	fruit
<i>Polygonatum biflorum</i>	Solomon's Seal	rhizomes & stem tips
<i>Polygonum spp.</i>	Knotweed/Smartweed	shoots & seeds
<i>Poncirus trifoliata</i>	Trifoliolate Orange	fruit
<i>Pontederia cordata</i>	Pickernel Weed	shoots & seeds
<i>Populus deltoides</i>	Cottonwood	inner bark, seeds, sap,
leaves		
<i>Portulaca oleracea</i>	Purslane	leaves & seeds
<i>Proboscidea louisianica</i>	Unicorn Plant	fruit, seeds
<i>Prunus angustifolia</i>	Chickasaw Plum	fruit
<i>Prunus americana & umbellata</i>	Wild Plum (Sloe)	fruit
<i>Prunus serotina</i>	Blackcherry	fruit

<i>Psoralea spp.</i>	Sampson's SnakeRoot	root
<i>Pteridium aquilinum</i>	Bracken Fern	fiddleheads & rhizomes
<i>Pueraria lobata</i>	Kudzu	root, young stem & leaves
<i>Pyracantha coccinea</i>	Firethorn	fruit
<i>Quercus spp.</i>	Oak	acorns
<i>Rhexia virginica</i>	Meadow Beauty	tubers & leaves
<i>Rhus spp.</i>	Sumac	fruit
<i>Rosa spp.</i>	Rose	petals, hips, & seeds
<i>Rubus spp.</i>	Blackberry	fruits & stem tips
<i>Rumex spp.</i>	Dock	leaves
<i>Sagittaria spp.</i>	Wapato/Arrowhead	tubers
<i>Sambucus canadensis</i>	Elderberry	fruit, flowers, & stem tips
<i>Sassafras albidum</i>	Sassafras	leaves
<i>Scirpus spp.</i>	Bulrush	rhizome, stem, seed, pollen
<i>Smiliciana racemosa</i>	False Solomon's Seal	fruit, leaves, stem tips,
roots		
<i>Smilax spp.</i>	Saw Brier	tubers & shoots
<i>Sonchus spp.</i>	Sow Thistle	leaves
<i>Stachys floridana</i>	Woundwort	tubers
<i>Stellaria media</i>	Chickweed	leaves
<i>Symplocos tinctoria</i>	Horsesugar	leaves
<i>Taraxacum officinale</i>	Dandelion	rootstock & leaves
<i>Tilia spp.</i>	Basswood	inner bark & young buds
<i>Tradescantia spp.</i>	Spiderwort	shoots
<i>Trifolium spp.</i>	Clover	young leaves, flower buds
<i>Trillium spp.</i>	Trillium	young leaves
<i>Tripsacum dactyloides</i>	Eastern Gamma Grass	fruits-seeds
<i>Typha latifolia</i>	Cattail	stem tips, rhizomes, inflorescence &
pollen		
<i>Ulmus rubra</i>	Slippery Elm	inner bark
<i>Urtica spp.</i>	Stinging Nettle	leaves
<i>Uvularia spp.</i>	Bellwort	leaves, stem tips, rhizomes
<i>Vaccinium spp.</i>	Blueberry, Huckleberry	fruits
<i>Valerianella radiata</i>	Corn Salad	leaves
<i>Viburnum spp.</i>	Possum haw	fruits
<i>Viola spp.</i>	Violet	leaves & flowers
<i>Vitis spp.</i>	Grapes	tendrils, leaves, & fruits
<i>Yucca spp.</i>	Beargrass/Yucca	root, fruit, flowers
<i>Zizania aquatica</i>	Wild Rice	seeds
<i>Zizaniopsis miliacea</i>	Rice Cut Grass	rhizome tips

SPICE PLANTS

Scientific Name	Common name	part used
<i>Allium spp.</i>	Onion	leaves, bulbs
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	roots, seeds
<i>Cardamine bulbosa</i>	Spring Cress	rootstock
<i>Celtis spp.</i>	Hackberry	pits
<i>Centella erecta</i>	Centella	leaves
<i>Chenopodium ambrosioides</i>	Mexican Tea	whole plant
<i>Cryptotaenia canadensis</i>	Wild Chervil	leaves
<i>Geum canadense</i>	White Avens	roots
<i>Juniperus virginianum</i>	Juniper, Cedar	fruits
<i>Lepidium virginicum</i>	Peppergrass	seeds
<i>Lindera benzoin</i>	Spice Bush	leaves & fruits
<i>Magnolia spp.</i>	White Bay, Magnolia	leaves, flowers
<i>Monarda spp.</i>	Bee Balm	whole plant
<i>Myrica cerifera</i>	Wax Myrtle	leaves
<i>Perilla frutescens</i>	Perilla	leaves, flower clusters, seeds
<i>Persea palustris</i>	Red Bay	leaves
<i>Polygonum spp.</i>	Knotweed/Smartweed	leaves
<i>Poncirus trifoliata</i>	Trifoliolate Orange	fruit peels
<i>Prunus serotina</i>	Black Cherry	fruit
<i>Pycnanthemum spp.</i>	Mountain Mint/Sage	whole plant
<i>Sassafras albidum</i>	Sassafras	roots & leaves
<i>Trifolium spp.</i>	Clover	flowers
<i>Yucca spp.</i>	Beargrass/Yucca	flowers
<i>Xanthoxylum clava-herculis</i>	Toothache Tree	fruits

TEA/DRINK PLANTS

Scientific Name	Common name	part used
<i>Ceanothus americanus</i>	New Jersey Tea	leaves
<i>Chenopodium album</i>	Lamb's Quarters	whole plant
<i>Cyperus spp.</i>	Chufa/Nut Grass	tubers
<i>Dalea candida, purpurea</i>	Prairie Clover	leaves
<i>Diospyros virginiana</i>	Persimmon	leaves
<i>Elaeagnus spp.</i>	Elaeagnus	fruit
<i>Galium spp.</i>	Bedstraw	whole plant
<i>Gleditsia triacanthos</i>	Honey Locust	seed pulp
<i>Hamamelis virginiana</i>	Witch Hazel	leaves
<i>Ilex opaca</i>	American Holly	leaves
<i>Ilex vomitoria</i>	Yaupon	leaves
<i>Ilex spp.</i>	Holly	leaves
<i>Juniperus virginiana</i>	Juniper, Cedar	twigs
<i>Laportea canadensis</i>	Wood Nettle	leaves
<i>Lespedeza capitata</i>	Lespedeza	leaves
<i>Lindera benzoin</i>	Spicebush	leaves & twigs
<i>Lonicera japonica</i>	Japanese Honeysuckle	flowers, leaves, buds
<i>Magnolia virginiana</i>	White Bay	leaves
<i>Monarda spp.</i>	Oswego Tea	leaves
<i>Monarda fistulosa</i>	Wild Bergamot	leaves
<i>Morus spp.</i>	Mulberry	young stem tips
<i>Myrica cerifera</i>	Wax Myrtle	leaves
<i>Oxalis spp.</i>	Wood Sorrel	leaves
<i>Pinus spp.</i>	Pines	needles
<i>Plantago spp.</i>	Plantain	leaves
<i>Polygonum spp.</i>	Smartweed/Knotweed	leaves
<i>Poncirus trifoliata</i>	Trifoliolate Orange	fruit
<i>Prunus serotina</i>	Black Cherry	fruit
<i>Pueraria lobata</i>	Kudzu	flowers
<i>Pycnanthemum spp.</i>	Mountain Mint	whole plant
<i>Rhexia virginica</i>	Meadow Beauty	leaves & stems
<i>Rhus copallina</i>	Sumac	fruits & flowers
<i>Rubus spp.</i>	Blackberry	young stem tips
<i>Rumex spp.</i>	Dock	leaves
<i>Sambucus canadensis</i>	Elderberry	flowers
<i>Sassafras albidum</i>	Sassafras	roots
<i>Solidago odora</i>	Sweet Goldenrod	leaves & flowers
<i>Stellaria media</i>	Chickweed	leaves
<i>Taraxacum officinale</i>	Dandelion	leaves
<i>Tilia spp.</i>	Basswood	flowers & leaves
<i>Trifolium spp.</i>	Clover	flowers
<i>Ulmus spp (rubra)</i>	Elm	inner bark
<i>Urtica spp.</i>	Stinging Nettle	leaves
<i>Viola spp.</i>	Violet	leaves, flowers
<i>Vitis spp.</i>	Grapes, Muscadines	fruits, sap

COFFEE PLANTS

Scientific Name	Common name	part used
<i>Cichorium intybus</i>	Chicory	root
<i>Cyperus esculentus</i>	Chufa/Nut Grass	tubers
<i>Diospyros virginiana</i>	Persimmon	seeds
<i>Fagus grandifolia</i>	Beech	fruits
<i>Galium aparine</i>	Bedstraw	seeds
<i>Gleditsia tricanthos</i>	Honey Locust	seeds
<i>Helianthus spp.</i>	Sunflower	seed-shells
<i>Quercus spp.</i>	Oak	acorns
<i>Rumex spp.</i>	Dock	seeds
<i>Taraxacum officinale</i>	Dandelion	rootstock
<i>Ulmus spp. (rubra)</i>	Elm	inner bark

MISCELLANEOUS USE PLANTS

Scientific Name	Common name	part used	Use
<i>Arundinaria gigantea</i>	Cane/Bamboo	stem	fishing poles,
flutes,			
<i>Arundinaria gigantea</i>	Cane/Bamboo	stem	whistles, pipe stems,
baskets			
<i>Asimina triloba</i>	Pawpaw	bark	rope, cloth
<i>Ceanothus americanus</i>	New Jersey Tea	roots	dye
<i>Erodium cicutarium</i>	Stork's Bill	roots	chewing gum
<i>Hamamelis virginiana</i>	Witch Hazel	twigs	divining
rods			
<i>Impatiens capensis</i>	Touchmenot	whole plant	poison ivy
cure			
<i>Liquidambar styraciflua</i>	Sweet Gum	resin	chewing gum
<i>Myrica cerifera</i>	Wax Myrtle	berries	candles,
soaps			
<i>Nyssa spp.</i>	Black Gum	twigs	toothbrush
<i>Phytolacca americana</i>	Pokeweed	berries	dye
<i>Sambucus canadensis</i>	Elderberry	stems	popgun
barrel			
<i>Sassafras albidum</i>	Sassafras	twigs	toothpicks
<i>Silphium laciniatum</i>	Compass Plant	resin	chewing gum
<i>Symplocos tinctoria</i>	Horsesugar	leaves, twigs	dye
<i>Ulmus rubra</i>	Slippery Elm	inner bark	string
<i>Urtica spp.</i>	Stinging Nettle	roots	dye
<i>Yucca spp.</i>	Beargrass/Yucca	leaves	string

“Soil Food Web” or “Building Healthy Soils” Abstract

John Ferguson

Part 1: We will have an overview of a new model of soil science and fertility management called the “Soil Food Web”. It explains how biological (organic) methods work and how they save you time and money in your gardening projects by preventing many problems. The biological methods are sustainable; greatly reduce water requirements and other problems, eliminate air and water pollution and lower total management costs.

Part 2: We will discuss common mulches, compost and soil amendments and how they affect “The Soil Food Web” and thus plant health and growth. This section will cover why some types of mulches attract fire ants or other types of mulch will cause increased disease and pest problems in plants.

Recommended reading:

Teaming with Microbes, A Gardener’s Guide to the Soil Food Web, Revised Edition, by Jeff Lowenfels & Wayne Lewis, Timber Press, 2006, ISBN-13:978-1604691139

This is the most complete book on the market about biological methods in horticulture. It is written in a very easy to understand, non technical format with lots of pictures illustrating the latest research in soil science. It is written for any gardener and landscaper as an introduction that explains why organic methods work so well and how they help a person save time and money.

The book is written in two parts. The first part is an easy to understand very basic presentation on the science of soil biology. The second part takes the ideas and concepts on the Soil Food Web that were introduced in part one and applies them to solving problems in our yards and gardens. Subjects covered range from taking care of our soil, to compost and mulch choices. Also included is information on compost teas to natural weed control. Each plant group from lawns and turfgrass, to annuals and vegetables, to shrubs perennials and trees are covered. This book is ***Highly Recommended*** for all gardeners, landscapers or anyone taking care of a lawn or garden.

**Rainharvesting
For Native Landscapes and Plants**

**Forecasting Water Requirements & Water Supply
+
Pricing a RWH System
("Do you want to do-it-yourself or hire someone?")**

**Presented by:
Scott Shaffer, Texas Water Savers Co.
&
The Rainharvest School**

Estimating Rainwater “Demand” for My Native Landscape – An Arizona Model

Using the Bur Oak as a “#3 “water use” tree, I assume:

1. “normal precipitation conditions in Prescott, Arizona can be based on 2000-2005 annual actual total rainfalls that ranged from 15.43” to 17.78” with one exception (2002 @ 7.17”)
2. at level 3, I want to provide 12” per year of supplemental water (“high-end”)
3. I use planning standard of 0.62 gallons =1” of water on 1 square foot of soil
4. I have 10 bur oak trees that have each been planted 10’ from one another thinking that the mature canopy of each tree is a 5’ diameter so that each bur oak occupies a 5’ x 5’ area (25 sq.ft)

Then:

The annual supplemental water requirement for each bur oak is:

$$\begin{aligned}
 12'' \text{ sup. Water "target"} \times .62 \text{ gal/1'' standard} &= 7.44 \text{ gal./sq. ft. / year} \\
 7.44 \text{ gal/sq.ft./yr.} \times 25 \text{ sq.ft./1 bur oak} &= 186 \text{ gallons of water /year/ tree} \\
 \text{"Say"} &= 190 - 200 \text{ gallons} \\
 \text{For 10 mature bur oak trees} &= 1,900 - 2,000 \text{ gallons of cistern water}
 \end{aligned}$$

CONCLUSION:I need to plan on using 190 - 200 gallons of supplemental water each year, for each mature bur oak to keep the tree alive during years when total annual rainfall is 15” – 18”. And because July, August and September are typically Texas’ hottest months, I want to have a higher percentage of the total annual supplemental water requirement available on July 1.

If I want 75% of the 1,900 – 2,000 gallons “set aside/guaranteed” for 10 mature bur oak trees for July-Sept., I need between 1,425 and 1,500 gallons in my RWH cistern on July 1 for supplemental watering for 10 mature burr oak trees.

Plant	Water Use	Number of Plantings	July-Sept. Water
Desert Olive (shrub)	#2	10 mature desert olives	930 gallons
Little Bluestem (grass)	#1	10 plantings	465 gallons
Verbena (perennial)	#1	10 plantings	465 gallons
For 30 plantings			1,860 gallons

SUMMARY:

In this “model” mature landscape (10 bur oak, 10 desert olive, 10 little bluestem and 10 verbena) you will need a 4,000-gallon RWH cistern.

Sources:

“Low Water Use Drought Tolerant Plant List,” Official Regulatory List for the Arizona Department of Water Resources, Prescott Active Management Area (November 2006)
Texas Water Savers Co. and The Rainharvest School, La Grange, Texas (2012)

DISCLAIMER

The numbers above were developed by the Plant List Advisory Committee whose six members were described as having more than 50 years’ experience growing and maintaining landscapes in the Prescott, Arizona area. Prescott, Arizona. Further, Prescott is located at a much higher altitude than Nacogdoches with significantly lower humidity than Nacogdoches, Texas. The numbers shown are intended as a “model” for how to begin thinking about RWH system design for landscape and native plant applications

Approximate Annual Water Requirements for Vegetable Gardens
Tucson, Arizona Example

50-square feet	3,180 gallons
100 square feet	6,360 gallons
200 square feet	12,720 gallons

Source:
Rainwater Harvesting for Drylands – Vol. 1 (appendix 4), Brad Lancaster, 2006

Estimating Total Landscape Water Demand
For Rainharvesting System Design

Annual Estimate
Arizona Model
2012

Trees, Shrubs, Grasses and Perennials (10 Bur Oak, 10 Desert Olive, 10 Little Bluestem, 10 Verbena)	+	4,000 gallons
Vegetable Garden (10' x 10')	=	6,360 gallons
TOTAL ANNUAL RWH Demand		10,360 gallons

How Much Rainwater
Could I Have Caught Last Year—
Catching in Nacogdoches, Texas

July 1, 2010-June 30, 2011 (rainfall total)
31.34" (*)

How much rain would I have been able to catch and have available on July 1, 2010 (assuming I did not use any RWH between July 1, 2010 and June 30, 2011):

<u>Roof area of:</u>	<u>Approximate RWH (**)</u>
1000 sq. ft. roof	17,000 gallons
2,000 sq.ft.	34,500
3,000 sq.ft.	51,000
4,000 sq. ft.	69,000

Sources:

(*) Arthur Temple College of Forestry, Monthly & Annual Rainfall (1991-2011)

(**) Texas Water Savers Co.

The Rainharvest System We Are Talking About

It's a "Wet" System

(i.e., ties at least two roof sections together by underground, connected PVC pipe)

includes:

Gutter transitions & downspouts (*)

PVC water distribution lines (underground)

Wet system drain

First-flush diverter

Cistern pad

Cistern

Cistern water level monitor

Pump pad

Pump

Rainwater spigot

(*) does not include gutters or gutter screen

Cistern Options & Prices
April, 2012

<u>Gallon Capacity</u>	<u>Material</u>	<u>Price (*)</u>
2,500 gal.	corrugated metal	\$1,700
4,100	polyethylene ("plastic")	\$1,975
5,000	fiberglass	\$4,516
6,500	plastic	\$3,571
10,000	plastic	\$5,190
10,000	fiberglass	\$6,899
9,927	steel/bladder	\$7,700

(*) prices do not include delivery, tax, custom bulkheads or cistern pad

Sources:
Pioneer; PlatsticMart-com; LFM; Texas Metal Cisterns

Rainharvesting for Native Plants & Landscapes

Putting it all together – What we've really been talking about.

- #1 rainwater is free;
- #2 but catching and storing RW is not – D-I-Y can cut costs, or “pro” can do it for you – either way it's not “cheap” if we are talking about significant rain harvesting;
- #3 “plastic” cisterns are normally least expensive, steel w/bladder the most expensive;
- #4 if you want to RWH for the kind of landscape described, you would need (based on Arizona plant list) about 7,200 gallons of water in your cistern on July 1 (4,000 for trees/shrubs, perennials, grasses and another 3200 gal for 50-square foot vegetable garden);
- #5 The price difference (estimated) between D-I-Y and “Turnkey” Construction

“Do – It – Yourself”

\$5,000 - \$6000 for 8,000 gal. plastic cistern system

\$6,500 – 7,000 for 8,500 gal. fiberglass system

\$7,000 – 8,000 for 10,000 gal. steel system

“Turnkey”

Approximately twice the prices shown above

- #6 Great reasons to do RWH: higher water quality; can control erosion; is an environmentally responsible land management practice; can be very enjoyable
- #7 The “Bottom line” = Three Questions:
 - a. How much native landscape do you want to supply with rainwater?
 - b. How much money do you want to spend?
 - c. How much of the work do you want to do?

Sources

Arizona Department of Water Resources, Prescott Active Management Area, "Low Water Use Drought Tolerant Plant List – Official Regulatory List for the Arizona Department of Water Resources, Prescott Active Management Area," November, 2006, www.azwater.gov

Arthur Temple College of Forestry and Agriculture, Monthly and Annual Rainfall (1991-Oct. 2011) for Nacogdoches, Texas, forestry.sfasu.edu

BlueScope Water, Austin, Texas (512-389-1099)

Hildebrant, Charles, Mountain Path Landscaping, Telephone Interview, April, 2012

L.F.Manufacturing, Giddings, Texas (800-237-5791)

Monthly total precipitation, Prescott, Arizona, (1898-2006), www.wrcc.dri.edu

Plastic Water Tanks, www.Plastic-Mart.com (866-310-2556)

Rainwater Harvesting for Drylands – Vol. 1. "Example Plant Lists and Water Requirement Calculations for Tucson, Arizona," Appendix 4, pg. 136.

Schalau, Jeff, University of Arizona, Yavapai County Cooperative Extension, Telephone Interview April 2012

Texas Metal Cisterns, www.texasmetalcisterns.net (512-565-0875)

Field Trips

***Matlock Hills/Colorow Creek
Trey Anderson***

Coming with the online version!

Big Thicket
Peter Loos

Coming with the online version

***Cave Springs and Gunnels Cave
Will Godwin***

Newton County (*Yucca Cernua*) Field Trip List—Eric Keith

Acer	rubrum	ACERACEAE	red maple
Yucca	cernua	AGAVACEAE	weeping or nodding yucca
Rhus	copallina	ANACARDIACEAE	wing rib sumac
Rhus	toxicodendron	ANACARDIACEAE	poison ivy
Sanicula	canadensis	APIACEAE	Canada sanicle
Ilex	vomitorea	AQUIFOLIACEAE	yaupon holly
Sabal	minor	ARECACEA	Dwarf palmetto
Asclepias	tuberosa	ASCLEPIADACEAE	butterfly milkweed
Ambrosia	bidentata	ASTERACEAE	two toothed ragweed
Baccharis	halimifolia	ASTERACEAE	eastern baccharis
Coreopsis	lanceolata	ASTERACEAE	lance leaf coreopsis
Echinacea	sanguinea	ASTERACEAE	purple cone flower
Erigeron	stigosus	ASTERACEAE	prairie fleabane
Iva	angustifolia	ASTERACEAE	narrowleaf sumpweed
Silphium	radula	ASTERACEAE	rosinweed
Vernonia	texana	ASTERACEAE	Texas ironweed
Campsis	radicans	BIGNONIACEAE	trumpet creeper
Heliotropium	tenellum	BORAGINACEAE	pasture heliotrope
Lobelia	appendiculata	CAMPANULACEAE	earleaf mayapple
Lonicera	japonica	CAPRIFOLIACEAE	Japanese honeysuckle
Viburnum	dentatum	CAPRIFOLIACEAE	arrow wood viburnum
Hypericum	hypercoides	CLUSIACEAE	St. Andrews cross
Cornus	florida	CORNACEAE	flowering dogwood
Nyssa	sylvatica	CORNACEAE	black gum
Juniperus	virginiana	CUPRESSACEAE	eastern red cedar
Diospyros	virginiana	EBENACEAE	common persimmon
Vaccinium	arboreum	ERICACEAE	farkleberry
Cercis	canadensis	FABACEAE	red bud
Erythrina	herbacea	FABACEAE	coral bean
Gleditsia	tricanthos	FABACEAE	honey locust
Quercus	falcata	FAGACEAE	southern red oak
Quercus	nigra	FAGACEAE	water ioak
Quercus	stellata	FAGACEAE	post oak
Aesculus	glabra	HIPPOCASTANACEAE	Ohio buckeye
Carya	tomentosa	JUGLANDACEAE	mockernut hickory
Sassafras	albidum	LAURACEAE	sassafras
Smilax	bona-nox	LILIACEAE	saw greenbriar
Smilax	smallii	LILIACEAE	Smalls greenbriar
Yucca	louisianensis	LILIACEAE	Louisiana yucca
Gelsemium	sempervirens	LOGANIACEAE	Carolina jessamine
Magnolia	grandiflora	MAGNOLIACEAE	southern magnolia
Magnolia	pyramidata	MAGNOLIACEAE	pyramid magnolia
Pinus	taeda	PINACEAE	loblolly pine
Pinus	echinata	PINACEAE	short-leaf pine
Pinus	palustris	PINACEAE	long-leaf pine
Chasmanthium	sessiliflorum	POACEAE	sessile flowered chasmanthium
Panicum	flexile	POACEAE	wiry witchgrass
Schizacharium	scoparium	POACEAE	little bluestem
Crataegus	marshallii	ROSACEAE	parsley hawthorn

Rubus	louisianus	ROSACEAE	Louisiana blackberry
Bumelia	lanuginosa	SAPOTACEAE	woollybucket bumelia
Penstemon	laxiflorus	SCROPHULARIACEAE	pink penstemon
Vitis	aestivalis	VITACEAE	summer grape
Vitis	rotundifolia	VITACEAE	muscadine grape

Scrappin' Valley Field Trip Plant List—Eric Keith
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Acer	rubrum	ACERACEAE	red maple
Mollugo	verticillata	AIZOACEAE	Indian chickweed
Froelichia	floridana	AMARANTHACEAE	Florida snakecotton
Rhus	copallina	ANACARDIACEAE	wing rib sumac
Rhus	toxicodendron	ANACARDIACEAE	poison ivy
Rhus	vernix	ANACARDIACEAE	poison sumac
Asimina	parviflora	ANNONACEAE	dwarf pawpaw
Sanicula	canadensis	APIACEAE	Canada sanicle
Ilex	vomitorea	AQUIFOLIACEAE	yaupon holly
Sabal	minor	ARECACEAE	Dwarf palmetto
Asclepias	amplexicaulis	ASCLEPIADACEAE	blunt leaf milkweed
Asclepias	tuberosa	ASCLEPIADACEAE	butterfly milkweed
Asplenium	platyneuron	ASPLENIACEAE	ebony spleenwort
Ambrosia	psilostachya	ASTERACEAE	western ragweed
Baccharis	halimifolia	ASTERACEAE	eastern baccharis
Echinacea	sanguinea	ASTERACEAE	purple cone flower
Erigeron	stigosus	ASTERACEAE	prairie fleabane
Marshallia	tenuifolia	ASTERACEAE	marshallia
Rudbeckia	grandiflora	ASTERACEAE	rough coneflower
Rudbeckia	scabrifolia	ASTERACEAE	bog coneflower
Silphium	radula	ASTERACEAE	rosinweed
Vernonia	texana	ASTERACEAE	Texas ironweed
Carpinus	caroliniana	BETULACEAE	blue beech
Ostrya	virginiana	BETULACEAE	eastern hophornbeam
Campsis	radicans	BIGNONIACEAE	trumpet creeper
Woodwardia	areolata	BLECHENACEAE	netted chain fern
Lobelia	appendiculata	CAMPANULACEAE	earleaf mayapple
Viburnum	dentatum	CAPRIFOLIACEAE	arrow wood viburnum
Viburnum	nudum	CAPRIFOLIACEAE	possumhaw viburnum
Hypericum	hypercoides	CLUSIACEAE	St. Andrews cross
Tradescantia	hirsutiflora	COMMELINACEAE	hairy spiderwort
Tradescantia	reverchonii	COMMELINACEAE	Reverchon's spiderwort's
Cornus	florida	CORNACEAE	flowering dogwood
Nyssa	sylvatica	CORNACEAE	black gum
Juniperus	virginiana	CUPRESSACEAE	eastern red cedar
Pteridium	aquilinum	DENNSTAEDTIACEAE	tailed bracken fern
Diospyros	virginiana	EBENACEAE	common persimmon
Rhododendron	canescens	ERICACEAE	hoary azalea
Vaccinium	amoenum	ERICACEAE	largecluster blueberry
Vaccinium	arborescens	ERICACEAE	farkleberry
Vaccinium	elliottii	ERICACEAE	Elliot blueberry
Vaccinium	stamineum	ERICACEAE	dewberry
Vaccinium	virgatum	ERICACEAE	rabbiteye blueberry
Croton	argyranthemus	EUPHORBIACEAE	silver croton
Cercis	canadensis	FABACEAE	red bud
Erythrina	herbacea	FABACEAE	coral bean
Fagus	grandifolia	FAGACEAE	American beech
Quercus	falcata	FAGACEAE	southern red oak
Quercus	incana	FAGACEAE	bluejack oak
Quercus	margaretta	FAGACEAE	sand post oak
Quercus	marilandica	FAGACEAE	blackjack oak

Quercus	nigra	FAGACEAE	water ioak
Quercus	stellata	FAGACEAE	post oak
Hamamelis	virginiana	HAMAMELIDACEAE	common witch hazel
Liquidambar	styraciflua	HAMAMELIDACEAE	sweetgum
Aesculus	glabra	HIPPOCASTANACEAE	Ohio buckeye
Carya	tomentosa	JUGLANDACEAE	mockernut hickory
Physostegia	digitalis	LAMIACEAE	false dragonhead
Pycnanthemum	albescens	LAMIACEAE	white bracted mountain mint
Sassafras	albidum	LAURACEAE	sassafras
Smilax	bona-nox	LILIACEAE	saw greenbriar
Smilax	laurifolia	LILIACEAE	laurel greenbriar
Smilax	smallii	LILIACEAE	Smalls greenbriar
Yucca	louisianensis	LILIACEAE	Louisiana yucca
Gelsemium	sempervirens	LOGANIACEAE	Carolina jessamine
Lycopodium	carolinianum	LYCOPODIACEAE	Carolina clubmoss
Lycopodium	prostratum	LYCOPODIACEAE	creeping clubmoss
Rhexia	mariana	MELASTOMATAACEAE	Maryland meadow beauty
Mirabilis	albida	NYCTAGINACEAE	four o' clock
Osmunda	cinnamonea	OSMUNDACEAE	cinnamon fern
Osmunda	regalis	OSMUNDACEAE	royal fern
Pinus	taeda	PINACEAE	loblolly pine
Pinus	echinata	PINACEAE	short-leaf pine
Pinus	elliottii	PINACEAE	slash pine
Pinus	palustris	PINACEAE	long-leaf pine
Andropogon	gerardii	POACEAE	big bluestem
Chasmanthium	sessiliflorum	POACEAE	sessile flowered chasmanthium
Schizacharium	scoparium	POACEAE	little bluestem
Sorghastrum	elliottii	POACEAE	slender Indiangrass
Crataegus	marshallii	ROSACEAE	parsley hawthorn
Rubus	louisianus	ROSACEAE	Louisiana blackberry
Bumelia	lanuginosa	SAPOTACEAE	woollybucket bumelia
Sarracenia	alata	SARRACENIACEAE	yellow pitcher plant
Penstemon	laxiflorus	SCROPHULARIACEAE	pink penstemon
Selaginella	arenicola	SELAGINELLACEAE	Sand selaginella
Thelypteris	kunthii	THELYPTERIDACEAE	widespread maiden fern
Vitis	aestivalis	VITACEAE	summer grape
Vitis	rotundifolia	VITACEAE	muscadine grape
Athyrium	filix-femina	WOODSIACEAE	southern lady fern
Xyris	ambigua	XYRIDACEAE	yelloweyed grass
Xyris	baldwiniana	XYRIDACEAE	Badwin's yellow eyed grass
Xyris	difformis	XYRIDACEAE	southern yelloweyed grass
Xyris	drummondii	XYRIDACEAE	Drummond's yelloweyed grass
Xyris	scabrifolia	XYRIDACEAE	rough yelloweyed grass

**BIRDING BY EAR WORKSHOP:
SOME TOOLS FOR LEARNING BIRDSONG ON YOUR OWN
Cliff Shackelford,
Texas Parks and Wildlife Department**

AUDIO (instructional):

- Birding by Ear: Eastern and Central North America (Peterson Field Guides; Houghton Mifflin)
- Birding by Ear: Western North America (Peterson Field Guides...)
- More Birding by Ear: Eastern & Central North America (Peterson Field Guides...)
- Bird Song Ear Training Guide: Who Cooks for Poor Sam Peabody? Learn to Recognize the Songs of Birds from the Midwest and Northeast States (by John Feith; produced by Caculo; yes this CD will apply in Texas)

AUDIO (reference-style):

- Stokes Field Guide to Bird Songs : Eastern Region (Little, Brown Adult)
- Stokes Field Guide to Bird Songs : Western Region (Little, Brown Adult)
- A Field Guide to Bird Songs: Eastern and Central North America (Peterson Field Guides)
- Western Bird Songs (Peterson Field Guides)

BOOKS:

- Don Kroodsma's "The Singing Life of Birds" (2005; Houghton Mifflin Press; 482 pp w/ CD)
- Don Stap's "Birdsong: A Natural History" (2005; Schribner Press; 272 pp)

SOFTWARE (with sound and quizzes):

- Thayer Birding Software
- National Audubon Society Interactive CD-ROM Guide to North American Birds

WEB SITES (with sound):

- www.whatbird.com
- <http://macaulaylibrary.org/index.do>
- www.birds.cornell.edu/AllAboutBirds
- www.mbr-pwrc.usgs.gov/bbs/song.html

WEB SITES (no sound; list of mnemonics & phonetics):

- <http://www.fernbank.edu/Birding/mnemonics.htm>
- <http://www.stanford.edu/~kendric/birds/birdsong.html>

*Biographies—
Speakers, Workshop
Presenters, Tour
Guides*

Biographies of Speakers, Workshop Presenters, and Field Trip Guides

Dr. Charles Allen is a Senior Research Associate with Colorado State University stationed at Fort Polk, Louisiana. He is a retired Professor of Biology from the University of Louisiana at Monroe and a charter member of the Louisiana Native Plant Society (LNPS). He served as President of LNPS from 1995-1997 and has organized and led many field trips throughout Louisiana. He is the coauthor of “*Louisiana Wildflower Guide*”, “*Edible Plants of the Gulf South*”, “*Trees Shrubs and Woody Vines of Louisiana*”, and “*Grasses of Louisiana*, 3rd ed”. He has presented “Wildflower, Butterfly, Landscaping, and Edible and Useful Plants” to many groups from garden clubs to native plant enthusiasts and others from the Carolinas to Texas. He and his wife Susan own and operate Allen Acres B and B, a nature-oriented paradise in west central Louisiana where he organizes and leads many field trips in the vicinity. He has published a number of articles in professional journals and is currently preparing the genus *Stylisma* for the *Flora of North America* and assisting in a flora of Newton County, Texas, and Vernon Parish, Louisiana. (native@camtel.net or www.nativeventures.net)

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Trey Anderson has been the Pineywoods Native Plant Center’s Research Associate at Stephen F. Austin State University since June, 2009. He has a degree in Horticulture with a strong minor in Forestry and a lifelong emphasis on native plants and their habitats. He has worked in various natural resource positions in east Texas and Louisiana where he has honed his plant identification skills. He worked as a Wetland Ecologist/GIS Analyst for Castilaw Environmental Services, LLC performing wetland delineations, environmental assessments, environmental inspections, and many more relevant tasks. He has also worked as a Range Training Land Assessment (RTLTA) Technician for Fort Polk military bases conservation department where he worked under botanist Dr. Charles Allen, conducting research to find damage done to the longleaf pine forests by military activities, while also conducting studies on rare, endangered and sensitive plants found in the area. His professional aspirations are to be an accredited ecologist who is a leader in the field of environmental conservation, plant preservation, and native landscape design materials and principles. treyanderson@sfasu.edu

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Dale Clark has been fascinated by butterflies and moths ever since he was a child, Dale Clark turned a lifelong passion into a livelihood. In 1995 he quit his full-time “real job” and created *Butterflies Unlimited*, a butterfly farm south of Dallas, TX where he began raising Texas native butterflies to sell to live butterfly exhibits at zoos all across the country, offering more than 50 species. That same year he also co-founded the Dallas County Lepidopterists’ Society, a local organization which allows people in the Dallas/Fort Worth area to gather who share an interest in butterflies by going on monthly field trips. As if herding thousands of caterpillars on “the ranch”

wasn't enough to keep him busy, in 2006 he became the editor of the *News of the Lepidopterists' Society*, the international newsletter of one of the oldest organizations in existence (est. 1947) devoted to the study of butterflies and moths. (daleclark@dallasbutterflies.com)
Go to <http://www.dallasbutterflies.com> for more information on the Dallas Lepidopterists' Society.

Paul W. Cox, B.S. & M.S. Botany Stephen F. Austin State University, is senior author *Texas Trees-A Friendly Guide*, winner of two awards, now in 9th printing; senior author McMillen's *Texas Gardening Wildflowers*; contributing author *Woody Plants of the Western Gulf Region*.

He served at the San Antonio Botanical Garden 32 years in various capacities including Acting Director. He is the proud father of six children ranging in ages from 32 to 3-1/2, and three grandchildren. He is currently retired and serving as 'Stay-at-Home Dad'.
(pcoxfamily@sbcglobal.net)

Dr. Dave Creech, Regent's Professor and Professor Emeritus, has been at Stephen F. Austin State University, Nacogdoches, Texas, since September, 1978. He currently leads the charge of the seven garden-enthusiastic staff of SFA Gardens. This Arthur Temple College of Forestry and Agriculture horticultural resource has grown from a small spot on the south side of the Agriculture building in 1985 to over 128 acres of diverse garden collections. SFA Gardens is the umbrella for adventuresome horticulture at the SFA Mast Arboretum, Ruby M. Mize Azalea Garden, Pineywoods Native Plant Center, Gayla Mize Garden, SFA Recreational Trails and Gardens, and the LaNana creek corridor that ties everything together. (dcreech@sfasu.edu)

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<http://sfagardens.sfasu.edu>

John Ferguson has over 30 years of business experience. He founded and owns Natural Waste Solutions, Inc. dba Nature's Way Resources, as Houston-based composting and recycling company that specializes in high quality compost, mulch, and soil mixes. He holds a MS degree in Physics and Geology (SFA 1982), and is a licensed Soil Scientist in Texas. He has won many awards in horticulture and environmental issues. He has represented the composting/recycling industry in the Houston/Galveston Area Council for Solid Waste for over 16 years. His personal garden has been featured in several gardening books and *Better Homes and Gardens* magazine, and his business has been recognized in the Wall Street Journal for the quality and value of the products. He recently won the Houston Chronicle's Ultimate Award for the finest quality compost in the Houston region made from recycled materials. In 2008 he won a Keep Houston Beautiful-Mayor's Proud Partner Award for Environmental Education.
He is a member of the Physics Honor Society and many professional societies. He is co-author of *Organic Management for the Professional* by Howard Garrett, John Ferguson, and Mike Amaranthus, which covers modern sustainable methods in horticulture, agriculture, landscaping,

and turf management. He has written many papers that are on his company's website:
www.natureswayresources.com .

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Dr. William Godwin, Associate Professor and Curator of the East Texas Natural History Museum at Jarvis Christian College in Hawkins, Texas, is an entomologist with a BS in Biology (SFA, 1992) and a PhD in Entomology (Texas A& M, 2002). Professor Godwin teaches general biology and environmental science at Jarvis Christian College. His research specialization is *scarabaeidae* (scarab beetles) and endangered species. He is also curator of the 10,000 items in the East Texas Natural History Museum in Frost Hall at the college. (wgodwin@jarvis.edu); 903-730-4890 x 2128

Greg Grant is a horticulturist, conservationist, writer, and seventh generation Texan from Arcadia, Texas. He has degrees in floriculture and horticulture, both from Texas A&M University and has attended post graduate classes at Louisiana State University, North Carolina State University, and Stephen F. Austin State University. He is author of *Texas Fruit and Vegetable Gardening* (2012-Cool Springs Press) and *In Greg's Garden-A Pineywoods Perspective on Gardening, Nature, and Family* (2010-Kindle), and co-author of *Heirloom Gardening in the South-Yesterday's Plants for Today's Gardens* (2011, Texas A&M Press), *Texas Home Landscaping* (2004-Creative Homeowner) and *The Southern Heirloom Garden* (1995). He also writes the popular "In Greg's Garden" column for *Texas Gardener* magazine, contributes regularly to Neil Sperry's *Gardens* magazine, and writes a monthly gardening blog for Arbor Gate Nursery (aborgate.com). He serves as a part time research associate for garden outreach at Stephen F. Austin State University's SFA Gardens in Nacogdoches, Texas.

He has past experience as a horticulturist with the SFA Pineywoods Native Plant Center, Mercer Arboretum, and San Antonio Botanical Gardens, an instructor at Stephen F. Austin and Louisiana State universities, an award winning horticulturist with the Texas Agricultural Extension Service, director of research and development at Lone Star Growers, and on the staff of Nacogdoches Gardens and The Antique Rose Emporium.

Greg has introduced a number of successful plants to the Texas nursery industry including: Blue Princess verbena, dwarf pink Mexican petunia, Gold Star esperanza, Laura Bush and VIP petunias, John Fanick phlox, Stars and Stripes pentas, Pam's Pink honeysuckle, Lecompte vitex, Henry and Augusta Duelberg sages, Big Momma and Pam Puryear Turk's Cap, Peppermint Flare Hibiscus, and the Marie Daly and Nacogdoches (Grandma's Yellow) roses. He was presented the Superior Service Award by the Texas Agricultural Extension Service and the Lynn Lowery Memorial Award by the Native Plant Society of Texas for horticultural achievement in the field of Texas native plants.

He has traveled extensively to hundreds of botanical gardens throughout the United States and Europe and has given over one thousand entertaining lectures. He is a graduate of the Benz School of Floral Design, a member of the Garden Writers Association of America, and a lifetime

member of the Native Plant Society of Texas, the Southern Garden History Society, the Texas Bluebird Society, and the Big Thicket Association. His garden, farm, and plant introductions have been featured in a number of magazines and newspapers including *Texas Gardener*, *Texas Live*, *Texas Co-op Power*, *Woman's Day*, *Farm and Ranch News*, *The Dallas Morning News*, *The San Antonio Express News*, and *The Houston Chronicle*

Greg lives in deep East Texas in his grandparent's restored dogtrot farmhouse, where he tends a small cottage garden, a patch of sugar cane, a flock of laying hens, and over one hundred bluebird houses. (grantdamon@sfasu.edu)

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Eric Keith received his Bachelor of Science degree in Environmental Science from Stephen F. Austin State University in 1995. He has worked as Project Manager at Raven Environmental Services, Inc., for the last 14 years where he has specialized in endangered species management and regulatory processes, ecological assessments, wetland regulations, and vegetation monitoring using his extensive knowledge of the North American flora. Prior to working at Raven, he worked three years at the Environmental Division of Fort Polk Military Reservation as a botanist intern where he gained extensive knowledge of plant ecology and identification.
(keith@ravenenvironmental.com)

Raven Environmental
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Andrew King is a fourth generation horticulturist. His great grandfather began his family's nursery in 1915 in Tenaha, TX. Since then it has been in continuous operation under the direction of his grandfather and father. Andrew received a B.S. in horticulture from Stephen F. Austin State University in 2004. He then earned a M.S. in horticulture from Texas A&M University in 2010, studying the different facets of propagating baldcypress. He is currently a Ph.D. student at Texas A&M working on characterizing stress-tolerance in select native groundcovers. Andrew and his wife Alisa make their home in College Station, Texas. (aking@ag.tamu.edu)

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Peter Loos is the owner/operator of Ecovirens, located in Chireno, Texas. He is a botanist by love, a horticulturist by trade, and a plant ecologist in his spare time. His professional experiences in various fields of the horticulture industry as well as his M.S. from Stephen F. Austin State University have greatly contributed to his extensive knowledge of gulf Coast native plants and related ecological issues. He is unyielding in his promotion of bio-diversity throughout our environment and is an active member in many conservation and green industry organizations. (cyrilla@myinu.net)

Ecovirens
PO Box 520
Chireno, Texas 75937-0520

Dr. Matthew McBroom has a passion for all things water-related, from sailing and SCUBA diving to fishing and canoeing. Dr. McBroom is an Associate Professor of Hydrology and a Research Scientist at the Waters of East Texas (WET) Center at the Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University. Dr. McBroom's research interests include how to conduct land management while minimizing the impacts on water resources. He has published numerous technical and scientific articles on water quality and the use of best management practices for water quality. Dr. McBroom teaches courses in hydrology, water resources management, and wood science. He is a certified forester with the Society of American Foresters (SAF) and serves on the Forest Science and Technology Board for that organization. He received the National Young Forester Leadership award from SAF in 2011. (mcbroommath@sfasu.edu)

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Robert "Skip" Richter, County Extension Agent in Horticulture –Texas AgriLife Extension Service. Skip received his master's degree in Horticulture from Texas A&M University. He has been with the Texas AgriLife Extension Service for 24 years in Montgomery, Travis, and Harris Counties.

He has helped develop a variety of environmental gardening programs including Extension's "Don't Bag It" yard waste recycling programs, the Composting for Kids educational web page, and the Grow Green environmental education program which educates Austin residents on landscaping practices that protect water quality.

His media experience includes gardening columns and articles for newspapers and magazines, an internet column for the National Gardening Association, and a weekly segment on the "Central Texas Gardener" television program. He also created a television segment called "Gardening with Skip". Many of these brief gardening segments can be seen on his "Gardening with Skip" YouTube channel. (richter@ag.tamu.edu)

Texas AgriLife Extension Service
3033 Bear Creek Drive; Houston, Texas 77084

281- 855-5600

Cliff Shackelford was born in Dallas, Cliff is a 7th generation Texan. He started birdwatching at the age of nine in the late 1970s. He holds both a B.S. and an M.S. degree in biology from SFA and follows in the footsteps of his paternal grandparents who both started SFA in 1940 before WWII. Cliff's thesis was on habitat characteristics of woodpeckers. Cliff is the statewide Nongame Ornithologist for the Texas Parks and Wildlife Department where he's been employed for 15 years. Cliff is the first author of the book *Hummingbirds of Texas* that was published by Texas A&M University Press in 2005 and revised in 2009. He also has authored about 60 publications on birds and birding with over a dozen appearing in peer-reviewed journals. His personal travels have taken him throughout the Western Hemisphere where collectively he has visited 7 different Latin American countries. He and his wife, Julie, also a biologist, and their two young children live in Nacogdoches. (clifford.shackelford@tpwd.state.tx.us)

Texas Parks and Wildlife Department
506 Hayter St.
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Julie Shackelford began dabbling in gardening when she and her husband purchased their first home in Austin in 1999. Since then, she has learned just enough to be dangerous. When her family moved to Nacogdoches in 2007, Julie took on the task of transforming large portions of the yard into bird and butterfly gardens. When she is not out pulling weeds, Julie works as the Texas Programs Director for The Conservation Fund, where she has been since 2004. Julie is involved in all facets of land conservation projects throughout the state, including evaluation of potential project locations, fundraising, real estate, partner support, outreach and project promotion. Julie received her Master's degree from Duke University in Forestry and Environmental Studies and a B.A. in Biology from Carleton College in Minnesota. (julieshackelford@conservationfund.org)

The Conservation Fund
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Scott Shaffer started Texas Water Savers Co. in March 2009 in La Grange, Texas with his wife Debbie, after helping home builder and long-time friend Ken Hakemack build a whole-house rainharvest system (RWH) for a couple that spends winters in La Grange and summers in Minnesota. One thing led to another and TWS now offers weekend classes teaching students of all ages and abilities how to build their own RWH systems during weekend classes (Saturday/Sunday) at The Rainharvest School in La Grange.

In 2011 TWS completed four different rainharvest systems at its office in La Grange and may be the only private water company in the state to be testing this many different systems daily and monitoring rainwater quality as part of an on-going rainwater quality research program.

They encourage anyone interested in rainharvesting to come to their school and learn how to do-it-yourself. But some folks prefer to have someone else do the construction, so TWS also designs and builds rainharvesting systems used to provide supplemental water for livestock and

landscapes as well as whole-house systems providing 100% of families' daily water needs. The company installs water treatment equipment (softeners, iron removal units, reverse osmosis equipment) across a 5-county service area and is the Colorado River Watch Network Monitor in La Grange for LCRA (Lower Colorado River Authority). Scott is licensed by TCEQ (Texas Commission on Environmental Quality) as a class III water treatment specialist.

Finally, twice each year they sponsor ½-day water conferences at McKinney Roughs, an LCRA nature preserve between Bastrop and Austin where they bring the best and the brightest to talk about and demonstrate practical ways we can all improve water quality. The next event, August 18, 2012, will focus on explaining LCRA's recently developed test designed specifically for rainwater analysis. (s.o.shaffer@gmail.com)

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1823 Loehr Road
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Melanie Spradling graduated from Texas A&M University in 2009 in Agricultural Leadership and Development. She began working for the Texas Forest Service in January 2011 as a Wildland Urban Interface Specialist I in Lufkin. She has been involved in a number of fires around the state as a Public Information Officer and has assisted in several Post-Fire Assessment Case Studies. (mspradling@tfs.tamu.edu)

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Dr. James Van Kley joined the Biology faculty at SFA in the fall of 1993 after completing a Ph.D. in Forest ecology at Purdue University. He is originally from Grand Rapids, Michigan. He received his B.S. degree from Calvin College (Grand Rapids Michigan), and his M.S. degree from Central Michigan University. Dr. Van Kley is a plant ecologist whose research projects include developing a classification of forest ecosystem types for the west Gulf coastal plain and monitoring changes in local ecosystems resulting from the invasion of non-native species such as giant salvinia, water hyacinth, alligator weed, Chinese privet, and Chinese Tallow tree. He is also curator of the SFA Biology Department herbarium and has developed a large on-line image gallery of native east Texas plants.

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Dr. Hans M. Williams, PhD (Auburn, 1989), MS, Forestry (Clemson 1983), BS, Forestry (Purdue, 1980), CF, Associate Dean and Nelson Distinguished Professor of Forestry, Arthur Temple College of Forestry and Agriculture. Dr. Williams joined the SFA faculty in 1993 as an assistant professor of forestry and was promoted to associate professor and awarded tenure in 1999. Since 2003, he has held the highest academic rank of professor, teaching undergraduate and graduate courses in forest ecology, tree physiology, environmental assessment, wetlands

functional assessment, and urban forestry. He was appointed associate dean of the college in the Fall 2009 semester.

Dr. Williams' research emphases include the physiological response of planted pine and bottomland hardwood seedlings to environmental stresses, forested wetlands delineation and functional assessment, and forested wetlands restoration. He also serves as the urban forestry student adviser.

Prior to his service at SFA, Williams was employed as a wetlands ecologist for the U.S. Army Corp of Engineers Waterways Experiment Station in Vicksburg, Mississippi, where he conducted research in woody plant flood tolerance and wetland reforestation.

The professor was named a finalist for the SFA Foundation Achievement Award in 1996, 1998 and 2006. Other honors include: the College of Forestry and Agriculture Teaching Excellence Award in 1998, 2002 and 2005; the Kenneth Nelson Distinguished Professorship in 2004; and three performance commendations from the Department of the Army in 1991, 1992 and 1993. His professional memberships include the Society of American Foresters, the International Society of Arboriculture and the Texas Forestry Association. (hwilliams@sfasu.edu)

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