Rain Gardens: Plant selection

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Timeline:

Steps

1. PLANNING & DESIGN
   - Location
   - Soil Test
   - Calculate

2. CONSTRUCTION
   - Images of construction work

3. PLANT SELECTION & INSTALLATION
   - Images of plant selection and installation

4. MAINTENANCE
   - Images of maintenance work

Photo: kirklandwa.gov
Planning: Inundation Zones

ZONE 1
For plants in the wettest area of the rain garden

ZONE 2
For plants on the side slopes that can tolerate occasional standing water

ZONE 3
For plants that prefer drier conditions

Planning: Understanding Soil Texture

Whiting, D., Card, A., Wilson, C. Moravec, C., Reeder, J..
Managing Soil Tilth, Texture, Structure and Pore Space.
Colorado Master Gardner Program 2011,
Colorado State University Extension. CMG GardenNotes #213.
Planning: Soil Texture

Sand

Clay

Pore Space

good drainage

poor drainage

http://www.tulane.edu/~sanelson/eens1110/groundwater.htm

Planning: Soil Tests

- Used to determine:
  - texture – amount of clay, sand, silt
  - amounts of nutrients available in soil for plant use.
- Tests can include recommendations on amounts of plant nutrients needed for plant health.
- Soil tests are easy and relatively inexpensive.
- Available through:
  - County Extension office, refers you to Texas A&M
  - Texas A&M Soil Testing Lab, [www.soiltesting.tamu.edu](http://www.soiltesting.tamu.edu), $10 - $84/sample
  - Private testing labs (e.g., Texas Plant and Soil Lab in Edinburg, TX) [www.texasplantandsoillab.com](http://www.texasplantandsoillab.com)
  - Direct purchase (provide own bag and mailing box)
  - Return mailer kit $103 includes soil composition, available soil nutrients, extracted available micronutrients, report with recommendations. More specialized tests are available (more expensive)

Soil Sample: it’s a simple process
Planning:
Exposure/Sun/Shade
Climate: Rainfall - extremely variable, comes in bursts

Annual Rainfall
Average: ~32”
High: 64.68” (1919)
Low: 11.52” (1954)

Temperature: Getting warmer, longer

Warmest years have all been since 1999.
Record high: 112, 2000 and 2011
Record 100+ days: 90 in 2011 from May 4 to October 2


Plan to fail!
Plant Selection

- Plants are an *essential* component – they filter and clean stormwater & soil
- They stabilize the soil

Source: Intechopen.com
Plant Selection

- Plants are an *essential* component – they filter and clean stormwater & soil

**Stormwater Filter**

**ROADSIDES, PARKING LOTS**

- Nutrients
- Petroleum PAHs
- Metals

Held in soil/plants:
- Metals
- Phosphorus
- POPs

If plants are harvested:
- Some metals
- Some Phosphorus
- Nitrogen

PAHs = Polycyclic aromatic hydrocarbon.
POPs = Persistent Organic Pollutants.

Source: Kennen & Kirkwood, *Phyto*
Plant Selection

- Use Native or adapted plants
- Use Drought-tolerant plants –
  - Austin rain gardens are dry 90+% of the time

Plants use different strategies to gather moisture & nutrients

70-80% of root structure in top 2’ of soil

Source: R. Kourik, Understanding Roots
Plant Selection

- Plants with *fibrous* root systems are very beneficial (e.g., bunch grasses, sedges)

- Plant roots will maintain and increase porosity
Plant Selection

- Diversity of plant types:
  - Type: small trees, shrubs, perennials, bunch grasses, groundcover
  - Leaf Retention: evergreen, semi-evergreen, deciduous
Native and Adapted
Landscape Plants

an earthwise guide for Central Texas
Plant Selection: Other

Native Plants
About NPIIN
Bibliography
Botanical Glossary
Drought Resources Center
How To Articles
Image Gallery
Mr. Smarty Plants

NATIVE PLANT DATABASE
Welcome to the latest edition of the Native Plants Database where you can explore the wealth of native plants in North America. Use the options below to search for 8,494 native plants by scientific or common name or choose a particular family of plants.

For non-native or introduced species, please visit the USDA Plants Database.

Recommended Species Lists

BENEFIT
Use Ornamental: Showy, Attractive, Color, Pocket prairie, Perennial garden, Wildflower meadow
Use Wildlife: This species is palatable to deer and numerous species of birds who eat the seeds. It is also a useful wildlife cover plant. Nectar Bees, Nectar Butterflies
Conspicuous Flowers: yes
Attracts: Birds
Nectar Source: yes
Deer Resistant: Moderate

VALUE TO BENEFICIAL INSECTS
Special Value to Native Bees
Special Value to Honey Bees

This information was provided by the Pollinator Program at The Xerces Society for Invertebrate Conservation.

Characteristics

All durations

Bloom Characteristics
Bloom Time: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
Bloom Color: White, Red, Pink, Orange, Yellow, Green, Blue, Purple, Violet, Brown, Black

Leaf Characteristics
Leaf Arrangement: Alternate, Opposite
Leaf Retention: Deciduous, Evergreen, Semi-evergreen

Size Characteristics
Height: 0-1 ft, 1-3 ft, 3-6 ft, 6-12 ft, 12-36 ft, 36-72 ft, 72-100 ft, More than 100 ft.

Dry - soil does not exhibit visible signs of moisture
Molst - soil looks and feels damp
Wet - soil is saturated with water
Plant Selection: Plants

Pros:
• Plant anytime if supplemental water available;
• Instant;
• Cost – more expense upfront

Cons:
• Girdled or circling roots
• Availability limited seasonally, market demand

Pros:
• Element of surprise
• Healthier plants

Cons:
• Limited planting window
• Need to be protected, watered
• Slow germination, slow growth – can be 2-3 years for full complement of species

Pros:
• Healthier plants
• Inexpensive

Cons:
• Limited planting window
• Limited availability
• Must plant immediately

Local Seed Sources:
• Native American Seed
• LBJ Wildflower Center
• Wildseed Farms

Photo: L. Sherman, City of Austin

Photo: Native American Seed
Planting Design:

for Clayey Zone 1: tolerate inundation, poor drainage:

- Switchgrass
- Indian grass
- Inland sea oats
- Eastern gamagrass
- Meadow sedge
- Fall obedient plant
- Blue Mistflower
- Frog fruit
- Turk’s Cap
- Dwarf palmetto
- Wax myrtle

Photos: www.wildflower.org
Plants for Sandy Zone 1 or Zone 2:
Upland or tolerate inundation with better drainage:

- Autumn sage
- Big Muhly
- Gulf Muhly
- Maximillian sunflower
- Meadow sedge
- Pigeonberry
- Sideoats Grama
- Yucca sp.
- Turk’s Cap

Photos: www.wildflower.org, gulfcoastprairielcc.org
Plant Installation

- Choose, space, and install plants with their mature size in mind.
- Right plant, right place. Overly large plants can require more maintenance later.
- If rain garden is near a road, sidewalk, driveway – make sure that mature plants:
  - will not block viewers for drivers, pedestrians, cyclists;
  - will not grow over roads, sidewalks to impede travel.

<table>
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<th>Tools and Materials Checklist</th>
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| **PLANTS**
  - (Emergents, Perennials, Grasses, Groundcovers, Shrubs, and Trees) |
| **SHOVEL(S)** |
| **SMALL HAND TOOLS**
  - (Dibbles, Planting Bars, Weeding Knives—
    for Planting Tubes and Bare-Root Emergents) |
| **WHEEL BARROW** |
| **RAKE** |
| **MULCH**
  - (Shredded Wood or Chipped Wood) |
| **WATER** |
| **STONES/ROCK** |

Plant Installation

- Avoid planting in the root zones of existing trees. Most are shallow (8-24”) & extensive.

- Be mindful of overhead and underground utilities. Call before you dig!

Source: Robert Kourik

Source: Austin Energy
Plant Installation: spacing, layout

Layout plants per their mature size

OR

Do maintenance later
Plant Installation: mulch

Coarse-ground hardwood mulch

Avoid using finely ground mulch – it floats and washes to the sides.

Avoid rubber mulch.

Avoid dark colored mulch – increases soil heat.

3” of mulch

Pecan shell mulch

Pea gravel mulch

River rock

Photo: austinlandscapesupplies.com

Photo: www.kellermaterial.com

Photo: austinlandscapesupplies.com

Photo: longhornlawnsaustin.com
Plant Installation: irrigation

Supplemental water is essential to get plants acclimated to new home – from pampered to roughing it.

Nursery Plants – constantly watered, pampered
Plant Installation: irrigation

Water for plant establishment – at least 1 year

Water after installation through hot months

Follow Austin Water Conservation mandates

MANY WAYS TO WATER
Opportunities - Pollinators:

Pollinators = bees, butterflies, birds, bats.

“...managed honeybee colonies have seen annual losses of 42.1%, and there has been a 90% decline in the monarch butterfly population” (National Strategy to Promote the Health of Honey Bees and Other Pollinators, U.S. government report, 2015)

“Pollinators, most often honeybees, are also responsible for one in every three bites of food we take...” (National Strategy to Promote the Health of Honey Bees and Other Pollinators, U.S. government report, 2015)

Rain Garden Pollinator plant list for Central Texas

Small Trees:
- Cherry (Prunus)
- Anacacho Orchid (Bauhinia lunarioides)
- Anacua (Ehretia anacua)
- Arroyo Sweetwood (Myrospenum sousanum)
- Carolina Buckthorn (Frangula caroliniana)

Woody Shrubs:
- Rose (Rosa)
- Turk’s Cap (Malvaviscus arboreus)

Herbaceous:
- Goldenrod (Solidago)
- Asters (Aster)
- Sunflower (Helianthus)
- Violets (Viola)
- Sedges (Carex)
- Black-eyed Susan (Rudbeckia)
- Iris (Iris)
- Evening Primrose (Oenothera)
- Milkweed (Asclepias) *expensive, not readily available
- Verbena (Verbena)
- Penstemon (Penstemon)
- Phlox (Phlox)
- Bee balm (Monarda)
- Little Bluestem (Schizachyrium)
- Cardinal flower (Lobelia)
- Mealy Blue Sage (Salvia farinacea)

THIS LIST IS NOT ALL INCLUSIVE
Opportunities - Aesthetics: Formal

Formal rain garden, Piedmont Retreat, Virginia

Source: Low Impact Development Center, Inc. lowimpactdevelopment.org

Photo: Mike Stog \ mkestog.com
Opportunities - Aesthetics:

Informal + Naturalized

Solvita Townhomes, Harmon Ave.

Bellamy Residence

Color Graphics Source: Low Impact Development Center, Inc.
lowimpactdevelopment.org
Photos: John Gleason
Opportunities - Aesthetics:

Fit with Topography

Photo: Susan Kenzle, City of Austin
Case Study: One Texas Center rain gardens

- Constructed & planted in 2012
- Irrigated for 1 year
- Gets regular maintenance: trash and leaf collection; mulching; weeding

Source: WPD, City of Austin
Case Study: One Texas Center rain gardens

Performs well for 2-3 years.
Consistently performs well.

Pollinator plant: butterflies &/or bees

Source: S. Kenzle, City of Austin
Case Study: One Texas Center rain gardens

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Pollinator plant: butterflies &/or bees

Source: S. Kenzle, City of Austin
Steps

1. Planning & Design
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3. Plant Selection & Installation

4. Maintenance
Some plants do not do well. Many are not long-lived or do not seed or spread. Some succumb to drought.

Photos: S. Kenzle, City of Austin
Thank you for attending

Questions?

Discussion