

July 2019

Beetle Banks

By: Howard Nemerov

(Increase beneficial bug populations while improving aquifer absorption.)

How would you like to help reduce flooding in your neighborhood, restore groundwater, and provide a home for beneficial insects, thereby reducing insecticide usage? Accomplish this win-win-win by building a beetle bank.

Aquifers are geologic formations “capable of producing groundwater for households, municipalities, industry, farms, and ranches.”¹ The Bureau of Economic Geology at the University of Texas notes:

*Aquifers are a critical part of the water cycle. Rainwater that falls on land can (1) evaporate, (2) be taken up by plants, (3) run off into streams, or (4) seep underground through soil, sediment, and rocks. The fraction of the water that moves into the groundwater is called recharge.*²

A main feature of beetle banks is bunchgrasses: native prairie grasses whose roots often reach 8 –14 feet into the soil, providing living channels for rain to find its way into the aquifer.³ This process is called infiltration, without which aquifers would be unable to recharge and wells would dry out.⁴ As extensive bunchgrass roots absorb rainfall and enhance infiltration, less rainfall runs off, reducing flooding.

The Texas Water Commission notes:

Research has shown that central Texas rangelands with abundant cover of deep-

(Continued on page 4)

Choosing to Build a Keyhole Garden

By: Mariana Hobbs



Cedar Creek Park Keyhole Garden April 15, 2019

The concept of a raised and round garden with a wedge cut from it is nothing new. It has been used successfully all over the world for a very long time. When looking at it, it quickly becomes apparent that it is easy to plant, easy to access, and very efficient.

Major concerns for growing food start with no good soil and little available water. Keyhole gardens are very efficient at holding on to small amounts of water and the soil is created when building the garden. Using many varieties of compostable materials and constructing a compost-filled, cylindrical circle of chicken wire to sit in the middle are the winning combination.

(Continued on page 2)

Inside this issue:

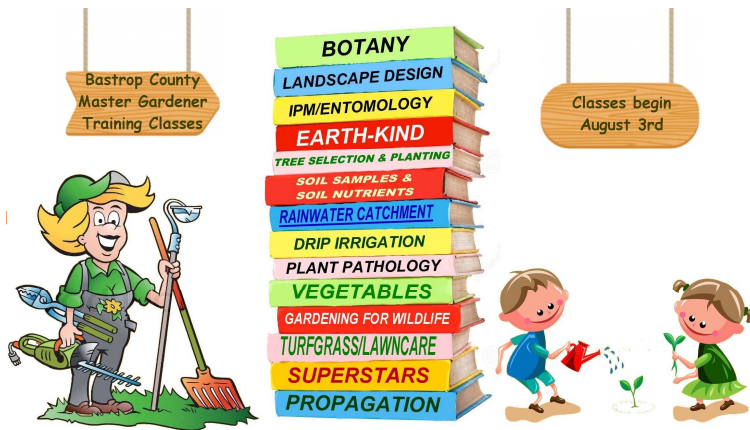
Beetle Banks	1
Choosing to Building a Keyhole Garden	1-2
Upcoming Events & Training	2
A Conversation with Marianna	3
Beetle Banks	4-6

(Continued from page 1)

The garden is rained on and if additional water is needed, it is watered through the cylinder and that distributes the water evenly and leaches the nutrients from the compost on to the plants.

The design can vary considerably and the materials used to form the circle can be just about anything you want it to be. At the Cedar Creek Butterfly garden, we have planted herbs and are excited to see it work. A winter vegetable garden would be perfect for it and that may be the option we choose for the Fall.

(Continued on page 3)



Upcoming opportunities for Advanced Master Gardener Training

Save the Dates!

- August 13–15, 2019 **Vegetables**
Bexar County, in San Antonio, TX
- September 9–12, 2019 **Entomology**
Williamson County, in Georgetown, TX
- October 17–19, 2019—**Greenhouse Management**
Tarrant County, in Fort Worth, TX

For additional details visit: <https://txmg.org/master-gardener-training/training10/training5/specialist>



Upcoming Events

- **July 8**
Lunch & Learn: Bees—by Blinderhund Ranch
11:30 AM–12:30 PM
Bastrop County Court House / Downstairs
804 Pecan Street, Bastrop
- **July 16**
2nd Annual City of Bastrop Boards,
Commissions and Volunteer Fair
6:30 PM–8:00 PM
<http://www.cityofbastrop.org/volunteerfair>
- **July 16**
Master Gardener General Meeting
Speaker: MG Howard Nemerov
Topic: Benefits of Beetle Banks
5:30 PM for snacks and socializing
6:00 PM–7:00 PM
Open to the public
- **July 20**
Information session in Bastrop
About the Fall 2019 BCMG Training Class
10:00 am–11:00 am
Bluebonnet Electric Cooperative
- **August 3**
BCMGA Master Gardener Classes Begins
August 3, 9:00 am–1:00 pm
Bluebonnet Electric Co-op HQ on Hwy 21E
155 Electric Ave. Bastrop, Tx

Please check out website for full details.
<https://txmg.org/bastropcounty/>
And like us on [Facebook](#)

(Continued from page 2)

Here is an interesting article for more information

<https://www.texascooppower.com/texas-stories/nature-outdoors/keyhole-gardening>

Marianna Hobbs is the lead for the Cedar Creek Park Butterfly Garden. She is both a Master Gardener and Master Naturalist.

A conversation with Marianna

She was born and lived in Galveston and, aside from a short stint in California, she's been in Texas all her life. The last 20 years she's been a resident of Bastrop. All her roots are southern.

She attributes her love of gardening to her mother who always had a garden and produced a lot of food. "Mom used a lot of pesticides back then, but I'm on an organic path.

"I could be in the garden doing something every day. It's so rewarding to grow your own food.

"Gardening in Galveston was easy. You can plant anything there and it would grow really well. In Texas you have to work for it." She lived near the beach and found a wooden fence kept the salt off her garden. "I had the best vegetable garden in my life and it was my first one. The yield was so good. I haven't grown a cucumber properly since I left there."

She is especially fond of wildflowers—all sorts—but her favorites are coreopsis. About half of her gardening space is natural wildflower fields. She makes pathways through them rather than mowing to enjoy the naturalness of the garden.

Do you have a special plant you are re-

ally proud of? "Yes, I've had a huge Hawaiian Bird of Paradise since 1976 from when my dad died. We lived in Houston then and I brought it with me here. It made it through the fires and it makes me very happy."

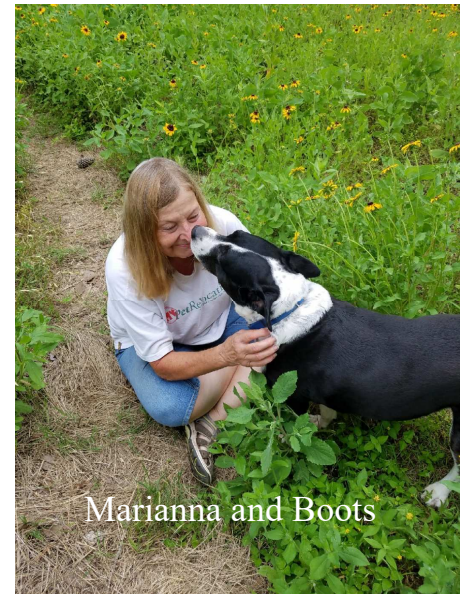
She credits her father for her Master Naturalist side. "My dad used to take us for hikes. He was very nature inclined on everything." She says, "When you go for a hike with a Master Naturalist, you don't get far because you are looking at the dirt, the tree bark, the wildflowers, scat, everything. There is so much more to learn about each one of these and I'm curious about everything.

"I love reptiles and amphibians, really all living things. I've been known to stop to help a turtle across the road. I want to save everything. Even the brown recluse spider. Leave it alone. Move away from it. It's doing more good where it is."

Marianna is also an avid DIYer and collector of items to recycle. She loves to paint, sand, stain, stencil, and generally repurpose good items that may have found their way to the road side.



At home in her wildflower garden.



Marianna and Boots

(Continued from page 1)

*rooted tall and midheight bunchgrasses, such as little bluestem, Indiangrass and sideoats grama, are better able to absorb rainfall and hold soil than rangelands dominated by shallow-rooted shortgrasses, such as common curlymesquite and buffalograss.*⁵

Urban development and conversion to croplands has reduced Texas native grass populations by 35%.⁶ By converting open soil to pavement and roofed structures, development creates runoff, flooding, and water quality issues.⁷ Converting part of your landscape to beetle banks ameliorates these environmental changes, providing infiltration sites where they're needed most.

Native bunchgrasses don't spread and become invasive like Bermuda and other turfgrasses. They also contribute to pollinator habitat, hosting larvae of many Skipper and Satyr butterflies. For example, *Sorghastrum nutans* (Indiangrass) is a larval host to the Pepper-and-Salt Skipper butterfly;⁸ *Bouteloua curtipendula* (Sideoats Gramma) hosts numerous Skipper butterfly larva.⁹

As the name implies, beetle banks provide shelter for ground beetles, which eat bugs like caterpillars that destroy your food crops.¹⁰ According to the East Multnomah (Oregon) Soil and Water Conservation District:

Beetle banks are berms planted with bunch grasses to provide habitat for predatory ground beetles. Beetle banks reduce pest pressure and the need for insecticides, while also helping suppress crop weeds!

By including native flowering annuals, perennials, and shrubs, your beetle bank provides nectar sources for beneficial insects like Syrphid Flies, which eat aphids, caterpillars, and thrips.¹²

Building a Beetle Bank



This street-side soil gets hammered each summer by Central Texas sun. Unimproved since the property was developed in 1942, it remained in its native clay loam state. Beetle bank construction began October 2018.

Beetle banks need to be 12–16 inches above grade, so amending this soil accomplished two goals: improve tilth and elevating, which enhances shelter and overwinter protection for beneficial insects.¹³

After trenching a foot deep, I added branches to attain these goals more easily without importing soil. Hügelkultur is the practice of digging a trench, then filling it with tree limbs.

This buried wood:

- Provides a long-term organic matter source during decomposition.
- Serves as a sponge, providing water to plant roots during hot, dry spells.
- Recycles carbon and nutrients from your yard back into your soil.¹⁴

(Continued on page 5)

(Continued from page 4)

The original clay was unusable, except perhaps for making pottery. After a rain, I slipped around while working the bed, indicating a high clay level. Before backfilling the lowest layer, I mixed it with composted fall leaves, wood chips and rabbit manure. Rabbit manure added NPK and other nutrients, to offset the high-carbon wood chips and branches. When mixed, this layer comprised about 50% clay loam, 35% leaves, 10% rabbit manure, 5% wood chips.

The second layer received less carbon and more organic matter, since it's closer to the root zone for new plants. High-carbon inputs like wood chips tie up soil Nitrogen, causing nutrient deficiency for growing plants. Clay creates heavy soil, inhibiting root penetration that can stunt growth or leave plants less drought and heat resistant. Native plants need their roots to go deep. The second soil layer mixed about 40% clay loam, 50% leaves, and 10% rabbit manure. Comparing the second picture (layer 2) to the first picture, the clay in picture 1 is tan, where the high-organic amended soil in layer 2 is a darker brown.



The third layer got the highest organic matter mix: about 25% clay loam, 25% leaves, 25% compost, and 25% rabbit manure. It's planting-ready, but I decided to mulch and let it settle over winter.



Adding all the organic amendments means a finished bed over a foot above grade, as shown in the last picture, taken six months after building the bed. This beetle bank features three native grasses: *Sorghastrum nutans* (Indiangrass), *Bouteloua curtipendula* (Sideoats Grama), and *Bothriochloa laguroides* ssp. *Torreyana* (Silver Beard Grass). Non-native annuals (*Asclepias curassavica* and *Tithonia rotundifolia*) provide temporary shelter, larval hosts, and nectar until fall planting season, when this bed becomes 100% native. Natives *Verbesina encelioides* (Cowpen Daisy) and *Helianthus maximiliani* (Maximilian's Sunflower) hold down the near and far ends, respectively, with *Salvia greggii* (Autumn Sage) providing contrasting color and texture in the middle.

Do you have a space where native plants could provide shelter and nectar for beneficial insects? Where native grasses could provide infiltration points for rainwater, making your neighborhood less flood-prone? Where water-hogging lawns could be replaced with a hardy, drought-tolerant landscape? Beetle banks could be your solution.

¹“Texas Aquifers.” Texas Water Development Board. Accessed May 23, 2019. <http://www.twdb.texas.gov/groundwater/aquifer/index.asp>

²Susan D. Hovorka and Alan R. Dutton. “Aquifers of Texas 2001 (Revised 2004).” Bureau of Economic Geology, University of Texas at Austin. Accessed May 21, 2019. <http://www.beg.utexas.edu/UTopia/images/pagesizemaps/aquifer.pdf>

³Becky Harlan. “Digging Deep Reveals the Intricate World of Roots.” National Geographic, October 15, 2015. Accessed May 23, 2019. <https://www.nationalgeographic.com/photography/proof/2015/10/15/digging-deep-reveals-the-intricate-world-of-roots/>

(Continued on page 6)

- ⁴“Infiltration and the Water Cycle.” U.S. Geological Society. Accessed May 23, 2019. https://www.usgs.gov/special-topic/water-science-school/science/infiltration-and-water-cycle?qt-science_center_objects=0#qt-science_center_objects
- ⁵“Management Guidelines for Endangered and Threatened Species of the Edwards Aquifer.” Texas Water Commission. Accessed May 21, 2019. https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_0013_edwards_aquifer_species_mgmt.pdf
- ⁶Brian Hays, Matthew Wagner, Fred Smeins and R. Neal Wilkins. “Restoring Native Grasslands.” Extension Education in Austin County. Accessed May 23, 2019. <https://austin.agrilife.org/agriculture/crops-soil/restoring-native-grasslands/>
- ⁷“Protecting Water Quality from Urban Runoff.” United States Environmental Protection Agency. Accessed May 23, 2019. https://www3.epa.gov/npdes/pubs/nps_urban-facts_final.pdf
- ⁸“Sorghastrum nutans.” Lady Bird Johnson Wildflower Center. Accessed May 23, 2019. https://www.wildflower.org/plants/result.php?id_plant=SONU2
- ⁹“Bouteloua curtipendula.” Lady Bird Johnson Wildflower Center. Accessed May 23, 2019. https://www.wildflower.org/plants/result.php?id_plant=BOCU
- ¹⁰Rick Minzenmayer and Chris Sansone. “Predaceous Ground Beetles, Caterpillar Hunters and Bombardier Beetles.” Texas A&M AgriLife Extension. Accessed June 9, 2019. <https://agrilifeextension.tamu.edu/library/landscaping/predaceous-ground-beetles-caterpillar-hunters-and-bombardier-beetles/>
- ¹¹“Building Beetle Banks.” East Multnomah Soil & Water Conservation District. Accessed May 21, 2019. <https://emswcd.org/building-beetle-banks/>
- ¹²“Syrphid Fly.” Texas A&M AgriLife Extension, January 13, 2018. Accessed June 9, 2019. <https://texasinsects.tamu.edu/syrphid-fly/>
- ¹³“Beetle banks.” Game & Wildlife Conservation Trust. Accessed June 11, 2019. <https://www.gwct.org.uk/farming/advice/sustainable-farming/beetle-banks>
- ¹⁴Adam Russell. “Hügelkultur: the mound method for home gardeners.” Texas A&M AgriLife Extension. Accessed June 9, 2019. <https://today.agrilife.org/2018/01/13/hugelkultur-mound-method-home-gardeners/>

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