

Recommendations for Riparian Restoration on Town Creek, Blanco, TX.
TPWD, The Nature Conservancy, and Hill Country Alliance

Watershed Characterization

Town Creek is an approximately 3-mile long ephemeral stream that flows generally southward from its headwaters north of the City of Blanco to its confluence with the Blanco River in the downtown area. It maintains a natural bed and bottom for most of its course, with the exception of an approximately 600-linear foot concrete channelized segment that stretches from Elm Street to Highway 281 (Main St.). Downstream of Highway 281 Town Creek runs through public property and Bindseil City Park for approximately 800 linear feet (LF), after which it stretches for approximately 250 LF through private property and Blanco State Park before it's confluence with the river.

The segment downstream of Highway 281 is experiencing moderate erosion and widening. This is likely the result of several compounding factors, including upstream watershed buildout, accelerated velocities where water exits the channelized segment, and activities such as mowing within the riparian area, which reduces the diversity of vegetation in favor of turf-like species with shallow root systems less capable of resisting erosive forces. Blanco citizens and members of the Keep Blanco Beautiful group contacted TPWD, The Nature Conservancy, and the Hill Country Alliance for recommendations and assistance in restoring this segment of the creek.

For purposes of this report the segment of Town Creek downstream of Highway 281 has been divided into three priority zones based on immediacy of need and the identified resources available for restoration (see Figure 1). Priority Zone 1 lies in the middle portion of the segment and stretches for approximately 400 LF through Bindseil City Park from the vehicular bridge at Pecan Street to a culverted sidewalk crossing. Priority Zone 2 is the most upstream section of the segment and flows directly behind businesses on 3rd Street, stretching for approximately 200 feet from a laundromat to the vehicular bridge at Pecan Street. Priority Zone 3 is the most downstream portion of the segment and stretches for approximately 160 feet through Bindseil City Park from the culverted sidewalk crossing to where the city property ends.

Objective

Restore and beautify the native riparian corridor along Town Creek in downtown Blanco in a manner that provides for both recreational uses and ecological functions, including stream stability, erosion control, flood mitigation, wildlife habitat, and water quality.

Recommendations

The creek and riparian area show signs of instability and declined function, as evidenced by the following:

- Mowing and foot traffic up to the creek's edge, reducing root depths and stream channel stability
- Stream channel widening
- Low plant species diversity in the riparian area
- A lack of multiple age classes of native tree and shrub species
- A lack of structure in the channel, such as wood or large rock that can slow down erosive forces
- The presence on non-native invasive species such as Johnson grass, *Ligustrum chinaberry*, and Chinese tallow
- Gully formations in Priority Zone 1 where water exits a culvert of the municipal storm sewer system and flows across the park, and between Priority Zones 1 and 3 where a sidewalk crosses the stream.

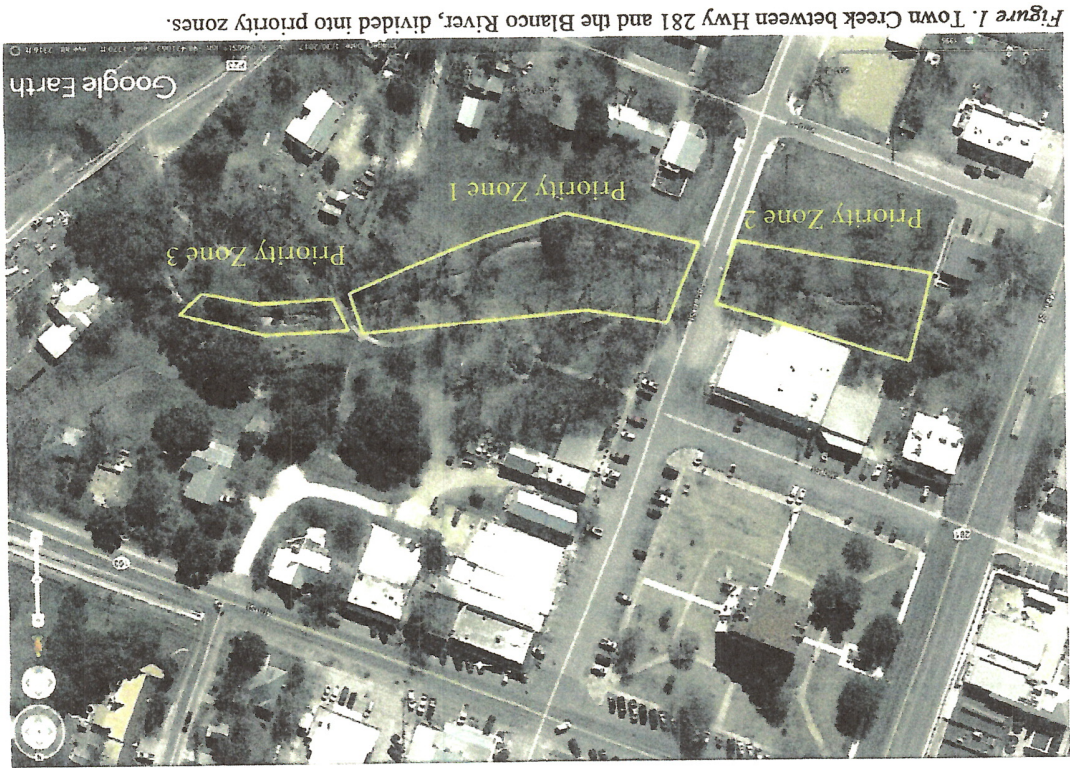


Figure 1. Town Creek between Hwy 281 and the Blanco River, divided into priority zones.

-Establishment of a "grow zone" along the creek's edge, where mowing is restricted and deep rooted native riparian plants can thrive. While a grow zone with a minimum width of 30 feet on each bank provides the optimum suite of functions, a width of even 5-10 feet will provide some degree of bank stabilization, wildlife habitat, and filtering of runoff for water quality. Grow zones may be allowed to develop on their own simply by ceasing mowing and controlling invasive species. Alternatively, seed can be broadcast or transplants can be installed if the city would like to jumpstart restoration, increase species diversity, or create a more manicured appearance. The grow zone should be clearly marked by signage in order to inform the public that the city is being proactive, and also to ensure that maintenance crews do not unintentionally intrude into the area. A border could also be created with limestone, logs, split rail fencing, or other natural looking material. Please

restoration and maintenance measures:

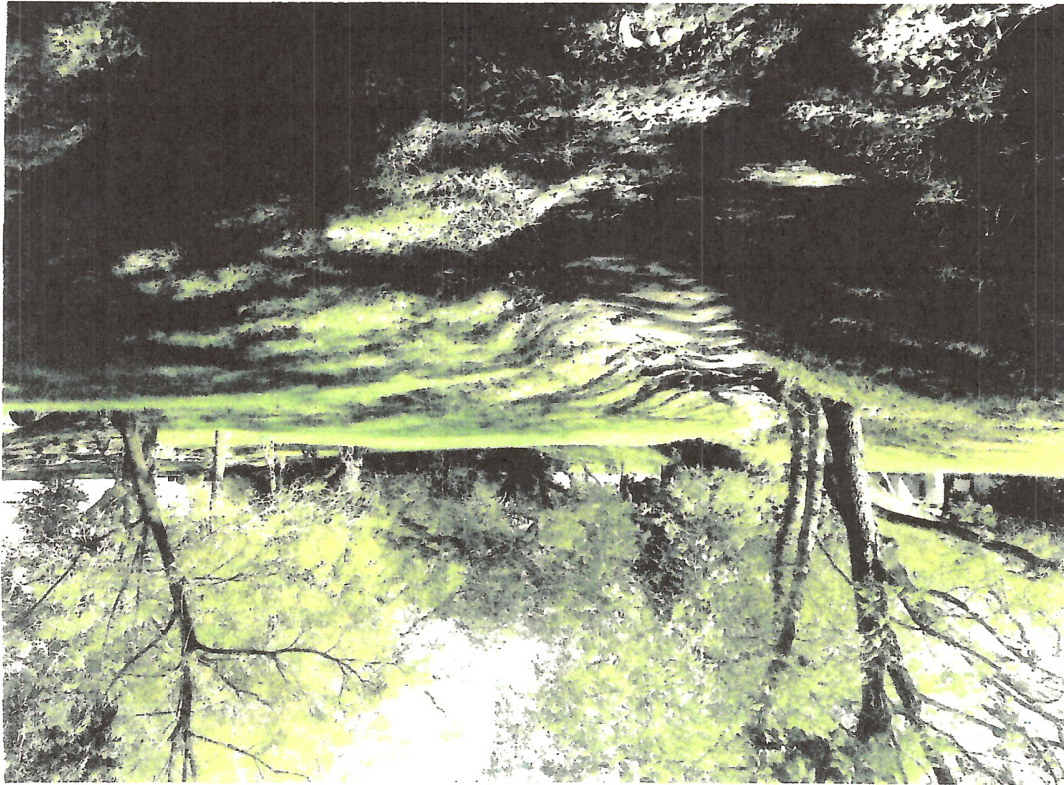
TPWD, The Nature Conservancy, and Hill Country Alliance recommend the following

With public amenities such as picnic tables, gardens, and a sidewalk/trail, Priority Zone 1 is the most intensively used section of Town Creek, hosting daily users as well as larger public events, concerts, holiday celebrations, etc.

sidewalk crossing

Priority Zone 1: Bindsell City Park from the Pecan Street Bridge down to culverted

Figure 2. Mowed riparian area and channel instability in Bindsell City Park, Priority Zone 1.



refer to the attached planting list from Blanco Design Guidelines developed by the Lady Bird Johnson Wildflower Center and TPWD. The entire set of guidelines are also available at the link below. For seed a good mix is available from Native American Seed Company, called the Riparian Recovery Mix. A link to this product is also provided below. Willow cuttings/stakes from trees on site could also be planted in the fall and winter.

-Targeted access points could be created which lead to the creek and should be spaced at least 50 feet apart with the grow zones in between. The access points should be no more than 20 feet wide. Blue Hole Regional Park in Wimberley is an excellent example of providing access to the water's edge while maintaining a native riparian area in between.

-To the extent practicable, leave limbs and large woody material in the creek. These provide structure, trap sediment, and help to build the banks of streams that have previously widened from erosion.

-Contact TPWD to develop a plan for managing invasive species.

-Install small bioswales (aka "rain gardens") to slow runoff at the storm sewer culvert and also where erosion is occurring near the culverted sidewalk crossing between Priority Zones 1 and 3. See link below for more information on rain gardens.



Figure 3. Targeted access points interspersed with riparian buffers at Blue Hole Regional Park, Wimberley, TX. Hardscaping would not be necessary along Town Creek, as use would not be as intensive. Photo courtesy of Design Workshop, Inc.

Priority Zone 2: From laundromat to the vehicular bridge at Pecan Street

Town Creek faces unique constraints in this area. Water velocities are increased as a result of the concrete channelized section upstream and the stream is in a state of disequilibrium, with the channel downcutting and moving laterally within its banks. This has created channel braiding along a short segment and could lead to further widening. Stress is being

exerted on the outside bend (left bank) where a historic wall runs the length of this segment between the channel and the back side of the buildings on 3rd Street. Long term fixes to channel stability may require engineering solutions, which would necessitate consultation with the U.S. Army Corps of Engineers 404 permitting program for any channel work, as well as the Texas Historic Commission for activities which may affect the wall. However, passive management strategies could be employed immediately to enhance this segment and make it more resistant to erosive processes and further widening.

TPWD, The Nature Conservancy, and Hill Country Alliance recommend the following restoration and maintenance measures:

-While an intact riparian area is in place along the right bank, it could be widened by an additional 5-10 feet. The grow zone should be clearly marked by signage and a passive border should be installed, as recommended for Priority Zone 1 above. This section contains a plentiful amount of Virginia wild-rye, which could serve as a seed source for the other zones downstream. Seed should be collected and broadcast in mid to late fall.

-Targeted access points could be created to the same specifications as recommended for Priority Zone 1.

-To the extent practicable, leave limbs and large woody material in the creek as recommended for Priority Zone 1.



Figure 4. Channel braiding and widening in Priority Zone 2, just downstream of a channelized concrete section of Town Creek. Historic rock wall on the left of the channel.

Priority Zone 3

This segment faces constraints in the form of more fragmented land ownership, as city lands transition to private and state ownership. Stakeholders have indicated that restoration of this segment is important, but wish to use resources first on the upstream segments more frequently accessed by the public. Channel widening is moderate to severe downstream of the sidewalk, and a gully has formed between the sidewalk and creek where sheet flow is accelerated by the sidewalk and short vegetation on the slope. This zone also contains the highest concentration of invasive woody species, primarily *Ligustrum*.



Figure 5. Gully formation in Priority Zone 3.

TPWD, The Nature Conservancy, and Hill Country Alliance recommend the same restoration and maintenance measures for this zone as Priority Zone 1. A bioswale/rain garden could be installed on the slope above the gully to slow sheet flow.

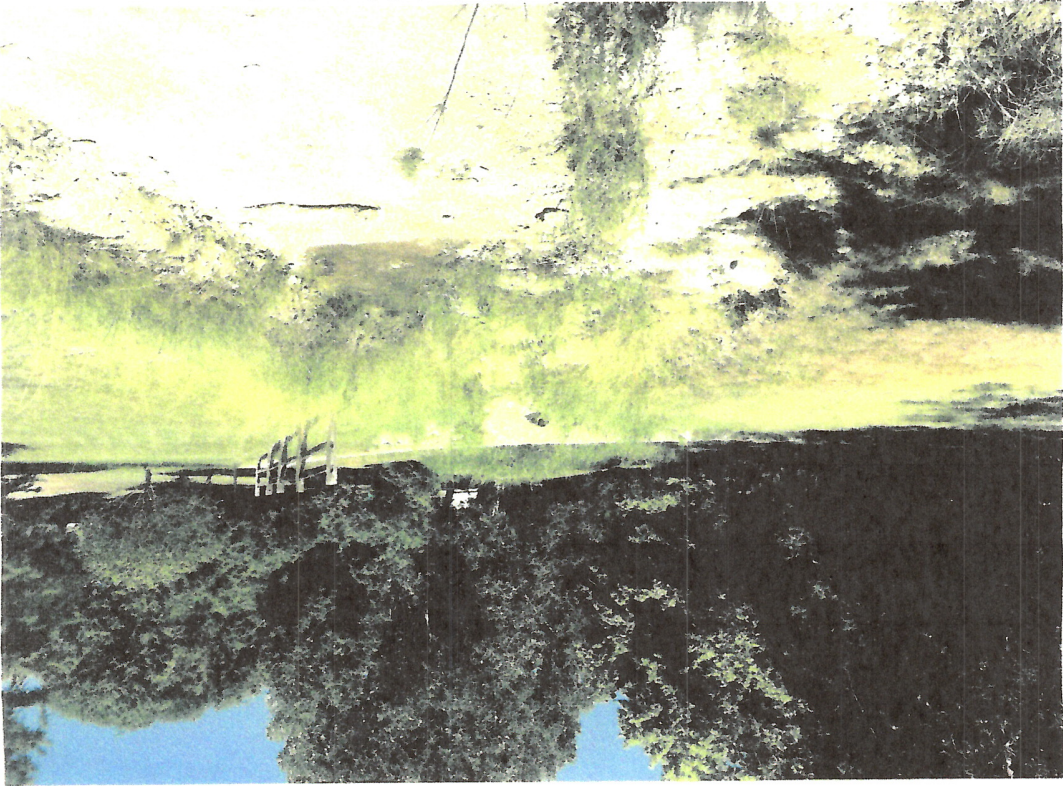


Figure 6. Mowed riparian area and channel instability/widening in Priority Zone 3.

Additional Resources

-Blanco Design Guidelines:

https://tpwd.texas.gov/publications/nonpwpdpubs/media/blanco_river_design_guidelines_2016.pdf

2016.pdf

-Blue Hole: <http://www.designworkshop.com/projects/blue-hole.html>

-Austin Grow Zones: <http://www.austintexas.gov/creekside>

-Rain Gardens for Stormwater Management:

<http://water.tamu.edu/files/2013/02/stormwater-management-rain-gardens.pdf>

-Native American Seed Company, Riparian Recovery Mix:

http://www.seedsource.com/catalog/detail.asp?product_id=4506

-Your Remarkable Riparian: <http://texasriparian.org/resources/your-remarkable-riparian/>

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appendix c
plant list - riparian buffer

Ferns		Grass/Grass like						
Species	Scientific name	Wetland Indicator	Stability Rating	Colonizer	Shade tolerant	Habitat	Ornamental value	
Maidenhair fern	<i>Adiantum capillus-veneris</i>	FACW	5		Yes	Yes	Yes	
Horsetail	<i>Equisetum laevigatum</i>	OBL	6		Yes	Yes	Yes	
River fern	<i>Thypteris ovata</i>	FAC	6		Yes	Yes	Yes	
Bushy bluestem	<i>Andropogon glomeratus</i>	FACW	5	Yes	Yes	Yes	Yes	
Emory sedge	<i>Carex emoryi</i>	OBL	9	Yes	Yes	Yes	Yes	
Inland seaots	<i>Chasmanthium latifolium</i>	FAC	5	Yes	Yes	Yes	Yes	
Sawgrass	<i>Cladium mariscoides</i>	OBL	9			Yes	Yes	
Flat sedge	<i>Cyperus</i> sp.	FACW	5	Yes		Yes	Yes	
Spikerush	<i>Eleocharis</i> sp.	OBL	6			Yes	Yes	
Lindheimer muhly	<i>Muhlenbergia linheimeri</i>	FAC	7			Yes	Yes	
Switchgrass	<i>Panicum virgatum</i>	FAC	8-9			Yes	Yes	
Knottgrass	<i>Paspalum distichum</i>	FACW	6	Yes		Yes	Yes	
Rustysed paspalum	<i>Paspalum langei</i>	FAC	5-6		Yes	Yes	Yes	
White top sedge	<i>Rynchospora colorata</i>	FACW	6			Yes	Yes	
Eastern gamagrass	<i>Tripasacum dactyloides</i>	FAC	9			Yes	Yes	

Trees/Shrubs

Species	Scientific name	Wetland Indicator	Stability Rating	Colonizer	Shade tolerant	Habitat value	Ornamental value
Indigobush	<i>Amorpha fruticosa</i>	FACW	7	Yes	Yes	Yes	Yes
Roosevelt weed	<i>Baccharis neglecta</i>	FAC	4	Yes	Yes	Yes	Yes
Brickellbush	<i>Brickellia</i> sp.	UPL	6		Yes	Yes	Yes
Pecan	<i>Carya illinoensis</i>	FAC	6		Yes	Yes	Yes
Sugar hackberry	<i>Celtis laevigata</i>	FAC	5-6		Yes	Yes	Yes
Buttonbush	<i>Cephalanthus occidentalis</i>	OBL	8		Yes	Yes	Yes
Desert willow	<i>Chilopsis linearis</i>	FACU	6		Yes	Yes	Yes
Roughleaf dogwood	<i>Cornus drummondii</i>	FAC	6		Yes	Yes	Yes
Green ash	<i>Fraxinus pennsylvanica</i>	FACW	6		Yes	Yes	Yes
Possumhaw	<i>Ilex decidua</i>	FACW	6		Yes	Yes	Yes
Little walnut	<i>Juglans microcarpa</i>	FAC	6-7		Yes	Yes	Yes
Black walnut	<i>Juglans nigra</i>	FACU	6		Yes	Yes	Yes
Turkscap	<i>Malvastrum arboreus</i>	FAC	6		Yes	Yes	Yes
Retama	<i>Parkinsonia aculeata</i>	FACW	6		Yes	Yes	Yes
Sycamore	<i>Platanus occidentalis</i>	FAC	6		Yes	Yes	Yes
Eastern cottonwood	<i>Populus deltoides</i>	FAC	7	Yes	Yes	Yes	Yes
Flame-leaf sumac	<i>Rhus lanceolata</i>	FAC	7		Yes	Yes	Yes
Arroyo willow	<i>Salix exigua</i>	FACW	7	Yes	Yes	Yes	Yes
Black willow	<i>Salix nigra</i>	FACW	7	Yes	Yes	Yes	Yes
Bald cypress	<i>Taxodium distichum</i>	OBL	9		Yes	Yes	Yes
Cedar elm	<i>Ulmus crassifolia</i>	FAC	6		Yes	Yes	Yes

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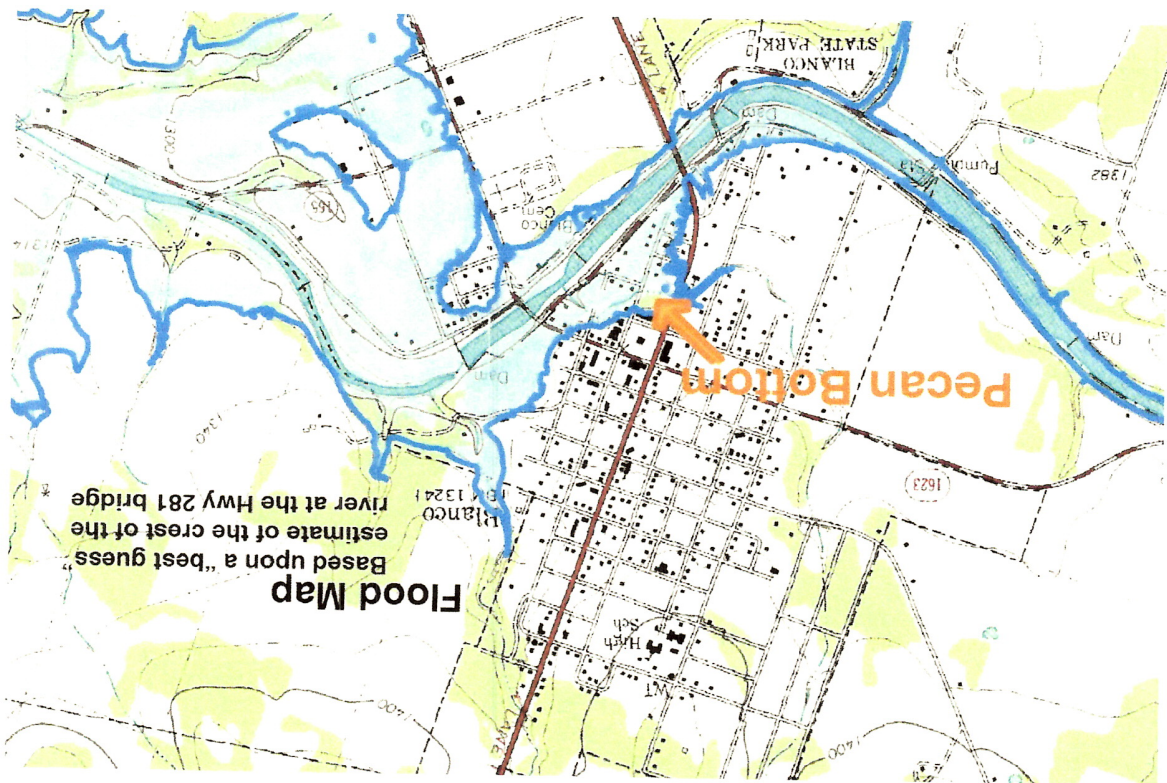
Forbs		Shrubs					
Species	Scientific name	Wetland Indicator	Status	Colonizer	Shade tolerant	Habitat value	Ornamental value
Spiny aster	<i>Aster spinosa</i>	FACW	8			Yes	Yes
Gregs mistflower	<i>Conoclinium greggii</i>	FACW	5		Yes	Yes	Yes
Cardinal flower	<i>Lobelia cardinalis</i>	FACW	3-4		Yes	Yes	Yes
Water primrose	<i>Ludwigia</i> sp.	OBL/FACW				Yes	Yes
Nimblewill	<i>Muhlenbergia schreberi</i>	OBL				Yes	Yes
Frogfruit	<i>Phyla nodiflora</i>	FACW	4		Yes	Yes	Yes
Drummond's wild petunia	<i>Ruellia drummondiana</i>	FACW				Yes	Yes
Lindheimer senna	<i>Senna lindheimeriana</i>	UPL	6-7		Yes	Yes	Yes
Tall goldenrod	<i>Solidago altissima</i>	FACW	6-7		Yes	Yes	Yes
Plateau goldeneye	<i>Viguiera dentata</i>	UPL	5			Yes	Yes
American beautyberry	<i>Calliandra americana</i>	FACU			Yes	Yes	Yes
Cenizo	<i>Leucophyllum candidum</i>	FACU			Yes	Yes	Yes
Agarita	<i>Mahonia trifoliolata</i>	UPL			Yes	Yes	Yes
Turks cap	<i>Malvastrum arborescens</i>	FAC			Yes	Yes	Yes
Pigeonberry	<i>Rivina humilis</i>	FAC			Yes	Yes	Yes
Palmetto	<i>Sabal minor</i>	FACW			Yes	Yes	Yes
Tropical sage	<i>Savina coccinea</i>	FACW			Yes	Yes	Yes
Mealy bluesage	<i>Savina farinacea</i>	FACW			Yes	Yes	Yes
Heartleaf skullcap	<i>Scutellaria ovata</i>	FACU			Yes	Yes	Yes

Shortgrasses

Species	Scientific name	Wetland Indicator	Status	Colonizer	Shade tolerant	Habitat value	Ornamental value
Curly mesquite	<i>Hilaria belangeri</i>					Yes	Yes
Texas grama	<i>Bouteloua rigidiset</i>					Yes	Yes
Blue grama	<i>Bouteloua gracilis</i>					Yes	Yes
Buffalograss	<i>Bouteloua dactyloides</i>		FACU			Yes	Yes

Tallgrasses

Species	Scientific name	Wetland Indicator	Status	Colonizer	Shade tolerant	Habitat value	Ornamental value
Big bluestem	<i>Andropogon gerardi</i>		FACU			Yes	Yes
Silver bluestem	<i>Bothriochloa laguroides</i>		FACU	Yes		Yes	Yes
Canada wildrye	<i>Elymus canadensis</i>		FACU	Yes	Yes	Yes	Yes
Prairie wildrye	<i>Elymus virginicus</i>		FACU	Yes	Yes	Yes	Yes
Green sprangletop	<i>Leptochloa dubia</i>		FACU	Yes		Yes	Yes
Little bluestem	<i>Schizachyrium scoparium</i>		FACU		Yes	Yes	Yes
Indiangrass	<i>Sorghastrum nutans</i>		FACU			Yes	Yes



Estimated crest on Memorial Day, 2015

A concerned group of citizens has formed in response to the choice of the site "Pecan Bottom" for the proposed Veterans Memorial. They are concerned that placing the Memorial there would detract from both the use of the property as a flood water retention field and the beauty, sustainability and maintainability of the Memorial. This group is comprised of members of other local organizations such as Keep Blanco Beautiful, Legion Post Blanco Historic Cemetery Association, Blanco County Master Naturalists, Blanco County Master Gardeners, the Blanco Historical Commission and Friends of the State Park. They obtained the pro bono services of Patricia Michael, a designer who instructs homeowners on site design for The University of Texas at the Ladybird Johnson Wildflower Center. <https://informal.utexas.edu/instructors/patricia-michael>

Patricia Michael looked at the site and had this to say: "The difference between the height of this land and the downtown buildings that back up to the creek is significant. A curved wall as drawn on the existing design for the memorial will throw water at an angled force onto the steep bank that backs the buildings [Oak Creek Cafe, On The Square and Cranberries] and can further threaten the foundation of those buildings."

Michael adds, "I would add nothing to speed up the current during an event of water rise, or change it's angle. Just keep the junk out of the stream bottom. Concreting the stream bottom would speed up the water and the because of the difference of the heights of the two banks, the concrete would erode the edges in a matter of just a few wet years."

"A problem I see with the design of the 7 foot wall and its placement next to the fill wall at the laundry is that the current in a large rain event will be channeled between the two walls eroding both of them. The trees planted so close to both walls will heave and crack both walls. It is a shame that the laundry filled so much floodway. In my experience, without really a very large foundation beam engineered to river bottom standards, a fill building does not last long. We can already see the effects on the wall toward the park."

An example of another recent investment in our community that was located in a flood prone area was noted by Sarah Garrett in the Letter to the Editor of last week. Here Jennifer Oines, Treasurer of Friends of Blanco State Park, tells the story: "Those of us active in the Friends of Blanco State Park group learned a hard lesson about building in floodplains. We were one truckload of dirt away from completing a one-of-a-kind nature play-scape in the park when the Memorial Weekend flood of 2015 washed one and a half years of volunteer labor and almost \$42,000.00 worth of materials away. Since the park was closed for several months after the flood for cleanup and restoration, many may not know about the multi-story "beaver dam" of debris that the flood stacked where Town Creek meets the Blanco River inside the park. It took special engineering and equipment to remove it."

Connie Baron writes that she has walked the River and town creek with "Riparian Experts from Texas Forestry Service, TFPWD, Lady Bird Wildflower Center, Hill Country Alliance, Nature Conservancy, USDA, Nueces River Authority and Tree Folks. As a Master Naturalist since 2009, my focus has been on water systems and their protection. I have also had input from other Master Naturalists who specialize in riparian rehab. The message is consistent and simple---(1) stop mowing near the banks (at least I have been able to get that done to some extent), (2) plant native plants specific to riparian regions for bank stabilization and upland water capture, (3) NO (none, nada, nix,) impervious cover added to the land. In other words "Plant it, don't Pave it!"

Patricia Michael drew up a quick plan for Pecan Bottom has a riparian green space for our town.

patriciamichaeldesign.com

Michael notes: "There are thousands of similar river bottom fields along the Blanco that could enhance their owner's experience by being planted in pecan groves, native wildflowers, understory trees and shrubs. We lost a lot of old trees in the last floods. Our trees are changing because of warmer temperatures and lowering the groundwater levels by having many wells. A lot of the old cypresses are dying off. See: <http://www.mn.com/earth-matters/wilderness-resources/blogs/great-tree-migration-under-way-warming-climate> e. We can do a better job of planting new trees to protect the old ones. The truth of the matter is that the best use of this land is served with native trees and plants."

There are other locations being explored for the current Memorial plan, such as this one noted by Irene cage on Monday the 22nd of May, "I know the Gem of the Hills board has offered space on the property. It would be a nice addition to the North Side of town." Also, the Blanco Historic Cemetery Association has proposed that the cemetery be considered as a possible site for the Veterans Memorial (Anon. Board Member).

