

Healing *in the* Hill Country

A Guide to Flood Recovery

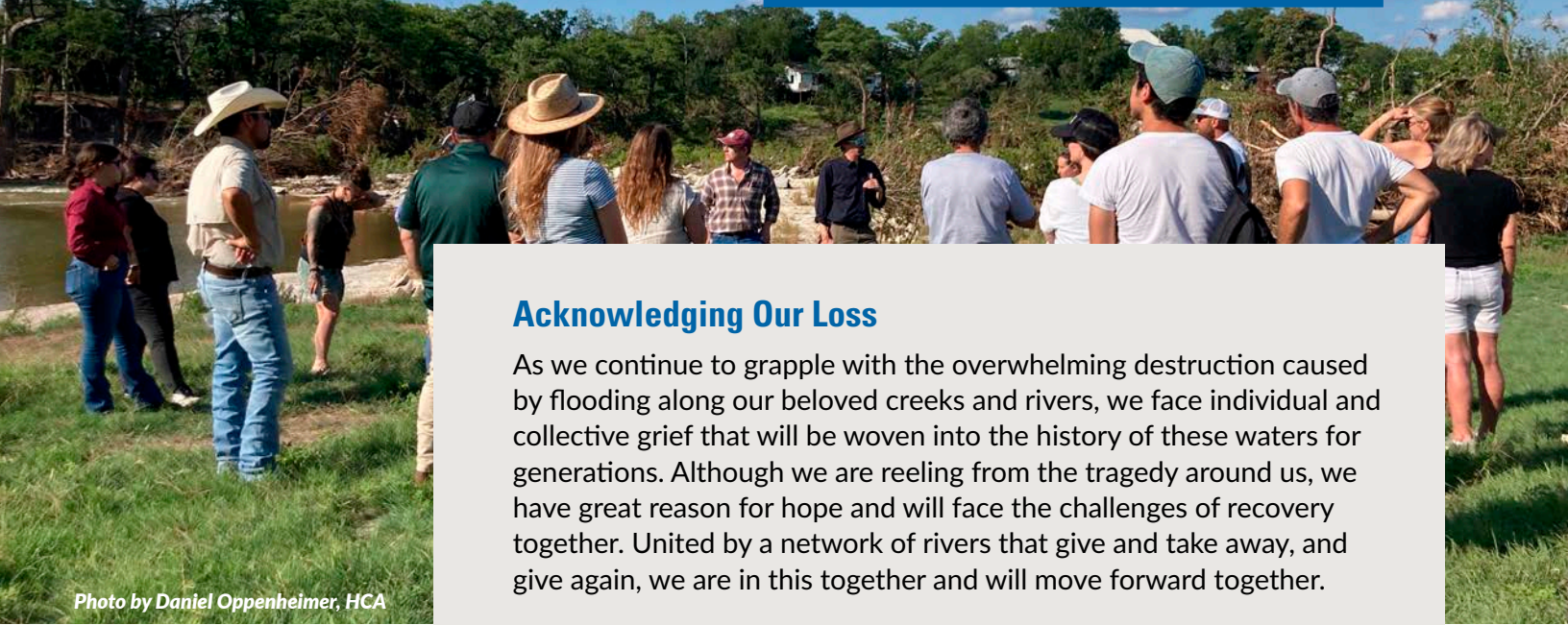


Photo by Daniel Oppenheimer, HCA

Community members standing in the riparian zone along the Guadalupe River to discuss flood recovery.

Acknowledging Our Loss

As we continue to grapple with the overwhelming destruction caused by flooding along our beloved creeks and rivers, we face individual and collective grief that will be woven into the history of these waters for generations. Although we are reeling from the tragedy around us, we have great reason for hope and will face the challenges of recovery together. United by a network of rivers that give and take away, and give again, we are in this together and will move forward together.

These rivers have drawn generations of humans to gather, play, work, and live. These rivers are where dreams have been made and crushed, but by working together, we can once again embrace these waters with renewed respect, wonder, and hopefulness of what is to come. Following great floods, new cathedral cypress will sprout and grow, new beauty will emerge, and new memories will be made along the banks of our creeks, streams, and rivers.

This guide seeks to provide helpful recommendations to aid in the healing of these waterways and their adjacent riparian areas. Informed by collective wisdom from various individuals, organizations, agencies, and experiences from other floods, these recommendations can help landowners chart a way forward in helping to heal the land and rivers that they love and care for. And as we watch these rivers heal, they will help us to heal.

Better Than Before

As strange as it now seems, these rivers can actually be better than they were before if we cooperate with river-wise recovery. But we must let each river be what it naturally wants to be, resisting the urge to impose heavy-handed measures. Our job as river stewards is to understand and appreciate what a natural riparian landscape looks like and to see the beauty and utility of it. We must learn to find balance and see a river differently than before.



Photo by Steve Nelle

Large wood embedded in the channel along with healthy trees, grasses and sedges helps slow down the water and stabilize banks when rivers and creeks experience normal flood events.

Thinking Like a River

Before proper riparian restoration can take place, it's important to understand basic river dynamics and to work in harmony with the natural laws of a river.

Most floods are less destructive in nature. These lesser floods—which typically occur once every five to fifty years—are important and essential to a river. Such floods recharge the alluvial water table, scour out pools, form new banks and bars, and create improved floodplain areas where floodwater can spread out and soak in. In short, floods help keep rivers healthy and balanced, which in turn enhances water quality, base flow, fish and wildlife habitat, and recreational use. A river literally engineers itself with each flood by cutting some soil material from one place and depositing it in another. This is all part of the natural process of a river. Rivers are dynamic, not rigid; they must be allowed to move back and forth within their valley, and their meander patterns naturally change over time.

For these normal and frequent floods, dense natural vegetation, boulders, and large woody material help to buffer the forces and dissipate the energy of the floodwaters. They help reduce erosion and stabilize the channel and banks. The power of the water during these more common and frequent floods is generally constructive, not destructive; however the constructive benefits can only accrue if we allow dense stream-side (i.e. riparian) vegetation to grow and allow natural woody debris to do its job.

Rare and gigantic floods are major reset events. No amount of strong trees or healthy riparian condition can offset floods of this magnitude. These massive floods force us to respect our rivers and give us the opportunity to rethink how we manage riparian property in the future. When experiencing this reset, healthy riparian areas are more resilient than intensively managed landscapes and tend to recover more quickly.

River and Riparian Stewardship

Stewardship means taking responsibility to be a conscientious caretaker of something that is entrusted to us. River stewardship means accepting the obligation to be joint caretakers of a shared river. These inner stewardship ethics are what guide and motivate landowners to do the hard and careful work of riparian restoration.

Since no parcel is isolated from the land upstream and downstream, everything one does on their land affects others. Therefore, river stewardship is complex and every landowner must jointly consider the rippling effects of every action. Below are some activities that can help the recovery process. However, they should not be construed to be hard and fast recommendations to be applied uniformly. Each section of river is different and each landowner will have different goals and on-the-ground conditions.

Ways to Heal Your Land

- ✦ **Slow down.** Let the river heal itself. Sometimes restraint is the very best form of recovery management. Stand back and watch and study the healing process.
- ✦ Avoid intense mechanical manipulation of the land. **Tread lightly.**
- ✦ **Leave the land rough and irregular.** Do not smooth, scalp or manicure the surface.
- ✦ **Seek balance** when cleaning up. Maintain targeted access to picnic tables, walking paths, and fishing docks, but allow dense riparian vegetation to grow in between these areas.
- ✦ **Reduce excess wood and natural debris selectively,** carefully, and by hand where possible, making sure to leave enough wood to do its job. After cleanup, wood should be left intact on one-third or more of the bank and floodplain area. These will be the areas where you will likely see the best recovery.
- ✦ Excess wood and natural debris can be relocated to nearby barren areas where it is needed or can be chipped or mulched and used elsewhere on the property. **Consider using woody material as a resource** (e.g. brush berms, thin layers of mulch, protective barriers around plantings) before defaulting to piling and burning.
- ✦ **Leave every living tree and shrub,** even injured ones, many of which will recover. They can be trimmed and pruned next year if needed. For now, let them grow.
- ✦ **Plant native Hill County bald cypress** as thickly as you can afford, ideally about 10 feet apart at the water's edge. Planting more, smaller trees is better than planting fewer, larger trees. Do not plant East Texas cypress or Montezuma cypress.
- ✦ **Plant riparian sedges and grasses,** like Emory sedge, spikerush, sawgrass, scouring rush and white-top sedge, at water's edge and in between planted cypress.
- ✦ **Allow new riparian trees and shrubs,** like seedling sycamore, baccharis, buttonbush, black willow, and boxelder, to grow as thickly as possible for the first several years. These are essential to the healing process and will set the stage for other desirable plants to establish.
- ✦ **Manage herbivory.** Control and management of deer, exotics, pigs, beaver and livestock is important for good survival of new riparian vegetation.
- ✦ **Monitor for and control invasive plant species** like Arundo, china-berry, bastard cabbage, ligustrum, tree of heaven, and others. While these plants may offer some initial soil stability, they can hinder long term biodiversity and can ultimately destabilize the ecosystem. These invasive species are most easily controlled when they are young and first establishing.
- ✦ **Plant native switchgrass** seed on any exposed land at the rate of four pounds per acre.
- ✦ If you have access to other Hill Country riparian areas, **collect seeds** of sycamore, cypress, and buttonbush and distribute those seeds near the water's edge.

Lessons from the Blanco

In 2015, the Blanco River experienced a major reset flood. In the aftermath, many landowners and contractors were involved in restoring riparian areas. The lessons they learned apply directly to other major floods in different watersheds, and can help landowners and others with real world experience. Here's some advice from a few peers along the Blanco.



Photo by Ryan McGillicuddy, TPWD

Five Lessons

From Bill Johnson, Halifax Ranch

1. Respect the river. Do not rebuild in the 500-year floodway.
2. Allow native riparian vegetation to grow back naturally.
3. Sycamore is extremely important for recovery and will establish naturally in many places.
4. Clean up excess woody debris in key recreational locations but retain woody debris in most areas where it assists in recovery.
5. Over-pumping and de-watering is just as damaging to the river as the floods.

"Respect the river."

- Bill Johnson, Halifax Ranch



Seven Lessons

From Tracy DiLeo, Landowner

1. Don't overly clean up downed wood - it serves as rebar to the banks and floodplain.
2. Plant sedges along the bank, which will develop strong, deep roots to hang onto soil.
3. Make friends with the first plants that show up after a flood, even if they are carrying burrs and you dislike them immensely. They are the first stages of recovery, and will be succeeded by better plants over time. Be patient.
4. If you have a particular swimming hole or favorite recreation area, invest your dollars and energy there to hasten recovery. Patience and time will take care of the rest.
5. The bigger diameter cypresses we planted were felled by beavers. Stick with saplings and small plugs of sedges.
6. After the Memorial Day 2015 flood, we got hit by another big flood on Halloween 2015 - and much of our work was undone. Be prepared for setbacks.
7. Regardless of what setbacks might occur (beavers, exotic grazers, another flood, drought), do not give up. We just kept working our plan despite nature's blows.

"Regardless of what setbacks might occur, do not give up."

- Tracy DiLeo, Landowner

Ten Lessons

From Paul Plata,
Contractor and Project Manager

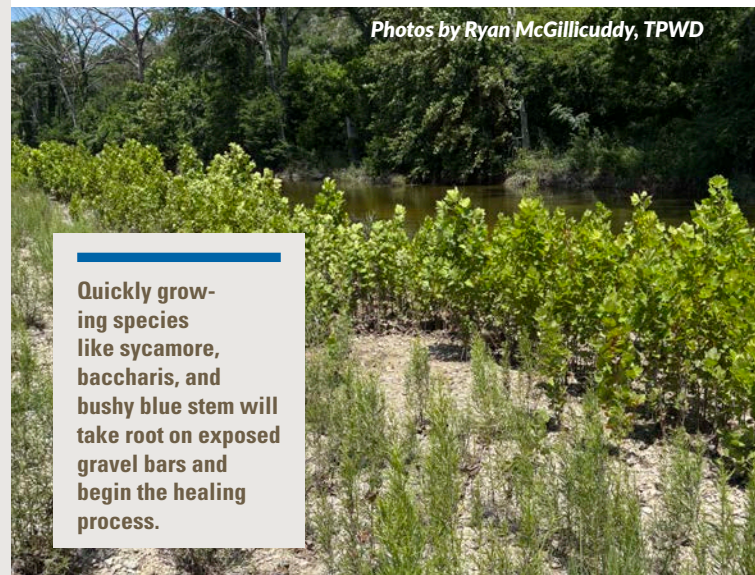
1. Accept help when available, including paid, volunteer or from government agencies. However, realize you may sometimes know more than them, especially if they are outsiders.
2. Plant sedges and cypress as close as possible to the known consistent water level. If current water levels are still high, delay planting until water levels return to their seasonal low average level.
3. At water's edge, Emory sedge and sawgrass can make an immediate and long-term impact on recovery. Either locally harvested or 4" pots work well in consistently moist areas.
4. Protect all trees from browsers such as deer, aoudad, beaver and livestock. Cages will be washed away. We used adjustable plastic tree protectors.
5. Stick with native trees, shrubs and forbs from your area. If volunteer groups plant trees in your area without proper irrigation and protection, loss will be high. Planting depth is crucial. If planted too deep, the trees will struggle and eventually die. Good intentions don't always produce good results.
6. Trees planted in gravel bars will struggle without a water source. Finding spots with deep soil increases the likelihood of success. Depending on the soil type, trees planted away from the river edge may require two to three deep waterings per week until established.
7. Mulch all trees generously.
8. Tree seed was collected and dispersed when possible: cypress, buttonbush and sycamore.
9. Seeding of switchgrass on bare gravel bars was moderately successful. Transplanting eastern gamagrass was successful wherever it could be watered until established.
10. I saw the best results when nature was in charge. Trees emerged where only bare gravel and dirt remained. I saw buried trees re-sprout. I saw naturally dispersed sycamore seeds grow many times faster than trees that were greenhouse grown.



Dead wood left on site provides habitat, helps stabilize the bank, and protects sprouting trees. Note the thriving cypress saplings.

"I saw the best results when nature was in charge."

- Paul Plata, Contractor & Project Manager



Photos by Ryan McGillicuddy, TPWD

Quickly growing species like sycamore, baccharis, and bushy blue stem will take root on exposed gravel bars and begin the healing process.



“Rivers will heal naturally if we allow the process to take place.”

Key Messages

- ✦ Rivers and their adjacent riparian areas will heal naturally, if we allow the process to take place.
- ✦ Human intervention can hasten or hinder the healing process.
- ✦ Denser vegetation and wider bands of dense vegetation promote better healing.
- ✦ Dead woody material of all sizes promotes better healing. Large wood is especially important.
- ✦ Refrain from heavy-handed floodplain and bank manipulation.
- ✦ Strive for a more river friendly landscape, more natural and less manicured.
- ✦ Where cleanup is necessary, find a balance of targeted access and swaths of vegetation.
- ✦ Observe and document your riparian recovery with written accounts and photos.
- ✦ Be patient and expect setbacks. Allow a river to heal at its own pace and in its own way.
- ✦ There will be scabs, scars, broken and deformed trees—all of this is natural.
- ✦ A flood-impacted river will be beautiful again but perhaps beautiful in a different way.

Key Resources

[Woody Debris Management: A Balanced and Selective Approach](#)

[Cleaning Up after the Flood: Guidelines to Protecting Long-Term River Health on a Hill Country Landscape](#)

[Tips & Tidbits for Hill Country Landowners: Grow Zones and Targeted Access Along Creeks & Rivers](#)

[Tips & Tidbits for Hill Country Landowners: Riparian Planting and Materials Resource Guide](#)

[Restoration Design Guidelines for Hill Country Riparian Areas](#)

[Your Remarkable Riparian](#)

[Building Community Resilience with Nature-Based Solutions](#)

[USDA Emergency Conservation Program](#)

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