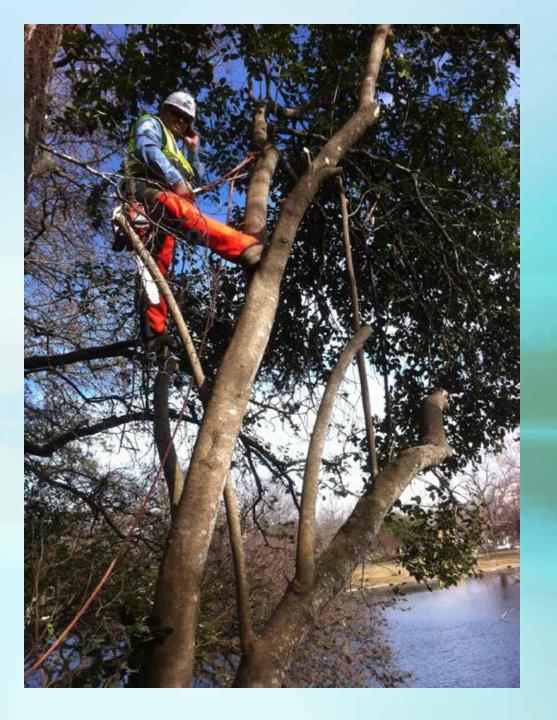
San Marcos River Riparian Habitat conservation. 2013



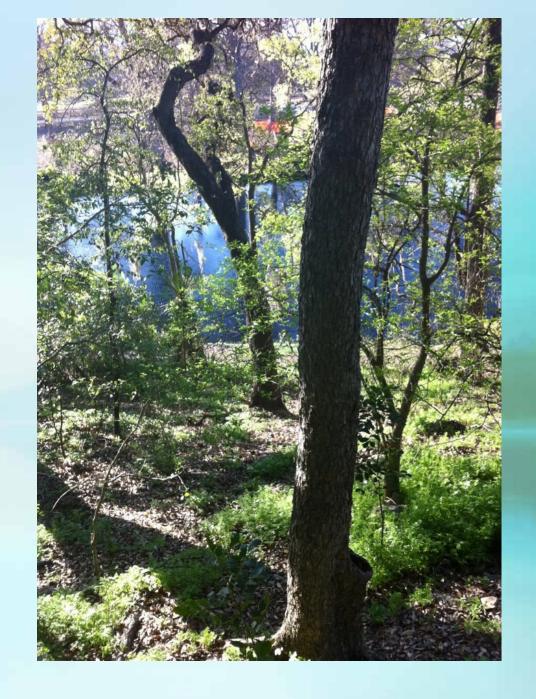
Ligustrum Removals

Spring lake restoration.

San Marcos 2012



"The relationship between forests and rivers is like father and son." Gifford Pinchot, 1905



Raphael Zon: forest and water in the light of scientific investigation US forest Service. 1912

Forests equalize flow.

Watershed Forestry

- The US Forest Service defines watershed forestry as the use of forests and forestry practices to protect, restore, and sustain water quality, water flow, and watershed health and condition.
- By preserving forests and implementing forestry practices on a watershed basis, it is possible to achieve cumulative water quality benefits as well as low cost, long term solutions to nonpoint source pollution problems.

Useful Websites:

- www.forestsforwatersheds.com
- www.cwp.org
- www.fs.fed.us

The Role of Forests in a Healthy Watershed

Forests greatly influence the health of a watershed by providing the following benefits:

- Reduction of stormwater runoff and flooding
- Increases soil infiltration rate and recharges ground water
- Improves regional air quality
- Reduces stream channel erosion

- Improves soil and water quality
- Provides habitat for terrestrial and aquatic wildlife
- Reduces summer air and water temperatures.
- Increases regional rain volumes

Veramendi park



Bicentennial park



San Marcos River: Inside City Limits



Endangered species: Texas Wild rice



Factors of influence

Negative

- watershed is urbanized: flows are concentrated and vegetated buffers are greatly reduced:
- River is dammed: silt build up in waterways
- Invasive species are established
- Wildlife is imbalanced, public use is extreme: under grazing becomes a problem and trampling of banks damages vegetation and compacts soil.

Positive

- restore vegetated buffers: plant
- control erosion: plant on contour
- Remove invasive plants and establish riparian vegetation
- Establish access points and restrict access: plants?

Philosophy of riparian plantings

Long term vision of habitat conservation requires a sustainable approach.

Correcting the factors responsible for the imbalance allows for long term impact. Using nature as model, restoring a riparian ecosystem with a focus on plant and soil management as green infrastructure is a priority.

Plants as natural infrastructure

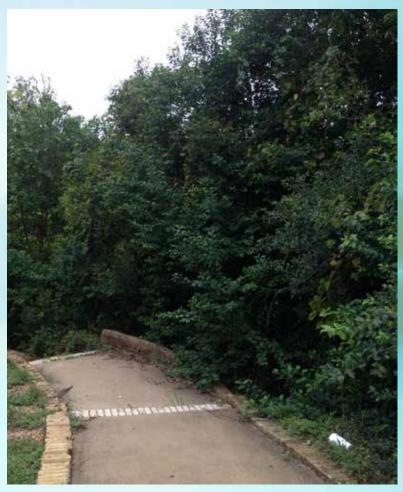
Proper plantings can serve for

- Restrictive access
- Wildlife food
- Erosion control
- Habitat!
- Bio filtration
- Aesthetic appeal

Woody plants are the biggest tool in this toolbox!

Invasive density?

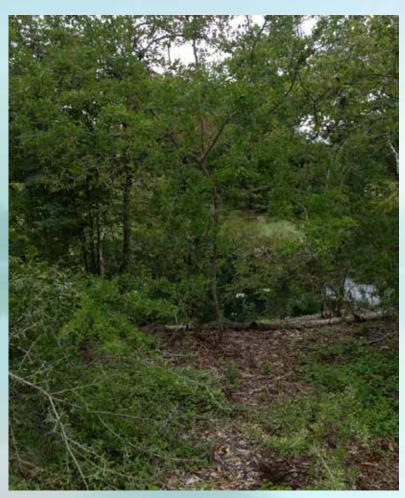




Sessom Creek, SM River Tributary. Non performing watershed.



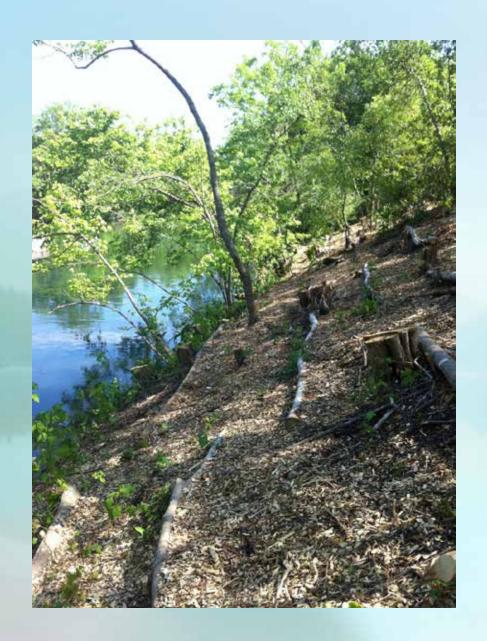
Remaining vegetation after invasive removal





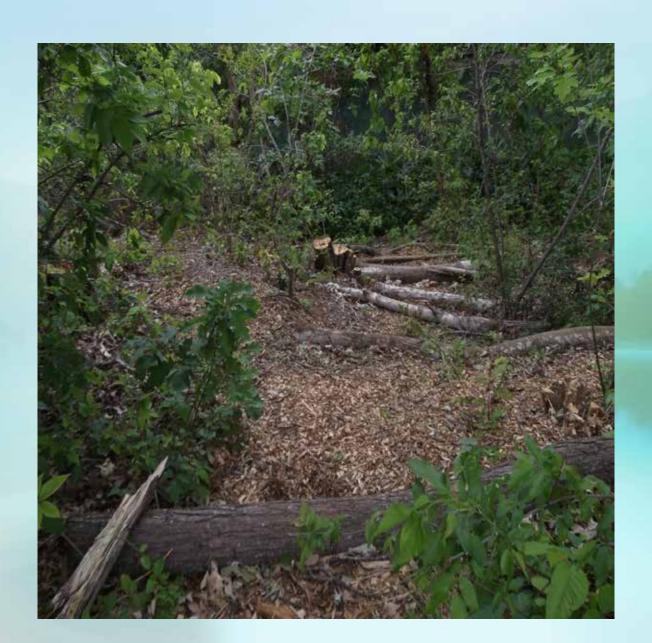
Sustainable Erosion Control







Habitat Restoration: San Marcos River





Restrictive plantings?



Non restrictive:

Roughly Dogwood. Switch grass Sea Oats

Restrictive access:

Thicket forming
Aggressive
Thorny
Poisonous
woody

Adding restrictive access plantings





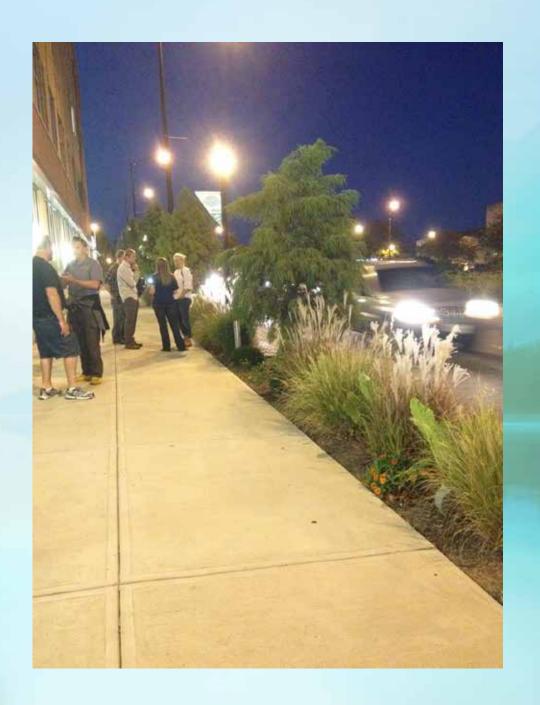
Right plant at the right place

Beautyberry, turks cap and fragrant mimosa may be native but they do not belong in a stream channel.



Right plant at the right place

Freshly planted Bald cypress and elephant ears downtown in Illinois. Riparian?



Long term watering: "Think outside the pipe"

Grey infrastructure does not play well with others



Restrictive access plantings





Outreach





Opportunities: Education



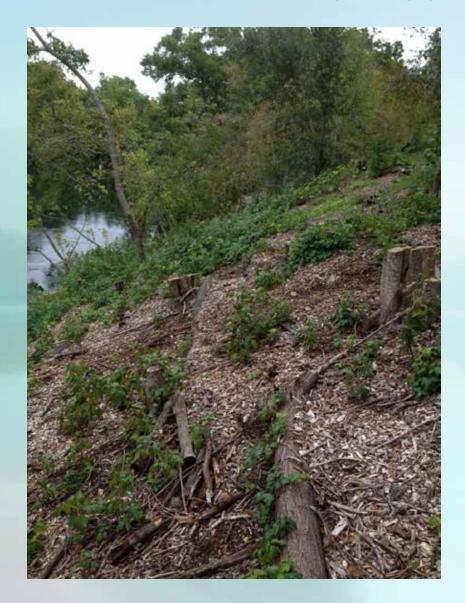


Plantings establishment





Maintenance





New plants establishment lessons

- •95% success for plantings up to April. Starting April, success rate lowers rapidly.
- •Larger plants need longer to establish and are more expensive...
- •Plant availability: growing takes time. Restrictive access plant stock is not common in the market: plan Ahead!
- Have a water source.

More...

- Some areas funnel too much water and it is out of the scope of work to fix it
- Established vegetation will need to adjust also!

Established vegetation problems include:

New wind exposure

New light exposure, risk of sunscald

Invasive seed stock is much more aggressive and needs to be kept in check several years.

Helping hand



In a nutshell...

- 1. DATA: depth of plantings needed
- 2. DATA: density of invasive plants
- 3. DATA: make up and density of existing vegetation and seed bank
- 4. Specify erosion control needs based on 1 and 2.
- 5. Specify quantity based on 1-2-3
- 6. Specify make up of plants based on 3 by using wetness indicator, stability rating
- 7. Identify establishment guidelines: water-fencing-timeframe. 2 years minimum
- 8. Allow for flexible contracting timeline to leverage weather events, stock and appropriate planting timing.
- 9. Maintain!