

# 'Soft' Stream Bank Stabilization Techniques in Response to Boat Wake Erosion

**UF** | UNIVERSITY of  
**FLORIDA**

Anna Cathey  
acathey@ufl.edu



Ex. A woven willow wall  
<http://www.riverworks.co.uk>

# Soft versus Hard Options

- **Hard stabilization techniques** utilize foreign materials such as riprap, concrete, and gabions and are often 'over engineered' prohibiting natural changes in the course of the river.
- **Soft stabilization techniques** make use of native vegetation and form living structures that not only preserve the bank and prevent erosion but also provide habitat and natural areas for wildlife.

## Hard Stabilization

- **Pros:**
  - Durable
  - Easy installation
- **Cons:**
  - Foreign materials
  - Not 'living' & static
  - Expensive



## Soft Stabilization

- **Pros:**
  - Living and self propagating
  - Native materials
  - Can be cheaper
- **Cons:**
  - May require more expertise for installation
  - More uncertainty



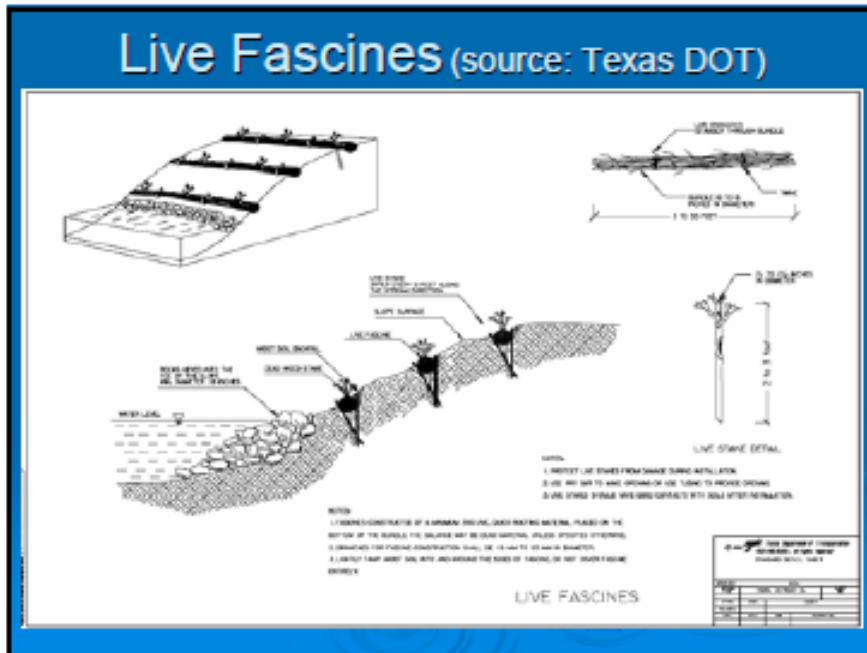
# There are many 'Soft' Stream Bank Stabilization Options

- Live Stakes
- Wattling or Live Fascines
- Brush layering
- Branch packing
- Live Cribwall
- Live Grating
- Joint Planting
- Vegetative Geogrids
- Brush Mattress
- Tree Revetment
- Log and Rootwad Revetment
- Dormant Post Planting
- Coconut Fiber Rolls, Jute Logs,
- Coir Rolls
- Vegetative Rock Gabions
- Woven willow walls

In the following slides I will detail a few of these techniques that may be more appropriate for erosion from boat wakes.

# Live Fascines

- Long bundles of live woody vegetation are buried in a stream bank in shallow trenches parallel to the stream.
- The plant bundles sprout and develop a root mass that will protect the stream bank from erosion.
- Live Fascines are sometimes used to stabilize lake shorelines with shallow slopes. The lines of vegetation placed parallel to the contour of the shore can break up the erosive force of small waves.



# Erosion Control Matting with Rock Toe

- Matting is laid across the banks, seeded underneath, & anchored with a rock toe. Often live stakes are placed through the matting.
- This is a good option if the banks are not too steep

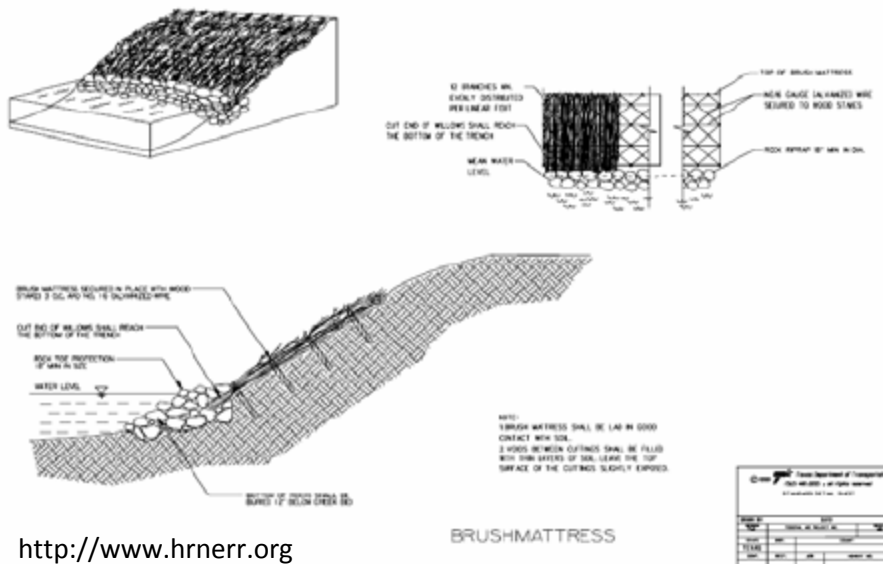




# Brush Mattresses

- A layer (mattress) of interlaced live branches placed on a bank face, often with a live fascine and/or rock at the base.
- The mattress and the live fascines are held in place with wire or twine, live stakes, and dead stout stakes
- This is a good option if bank is not too steep. High environmental value, moderate cost and complexity.

## Brush Mattress (source: Texas DOT)



<http://www.hrnerr.org>

## Brush Mattress

(source: USDA Engineering Field Handbook 1996)



# Willow Mats

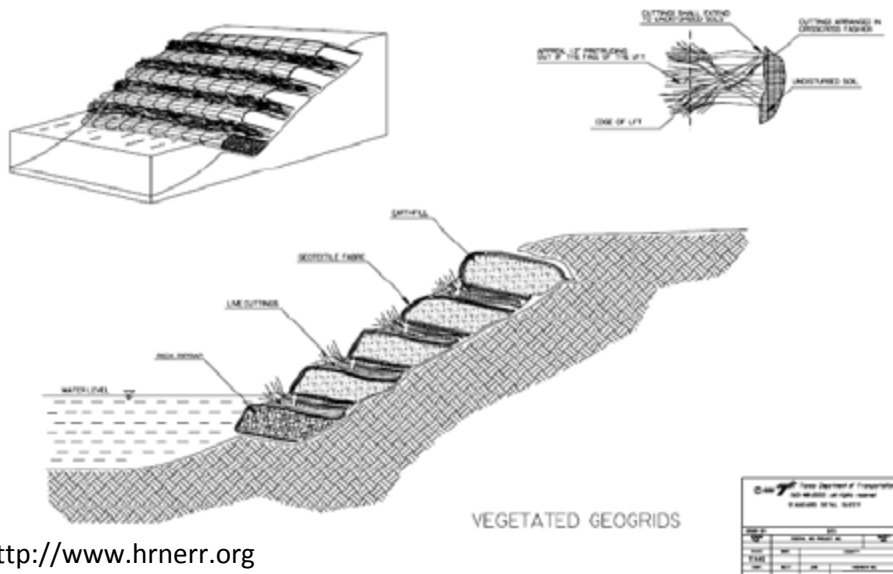
- Willows are woven into a living mat that secures the bank. Here a rock toe is used for additional stability.
- Good option if:
  - Willows are abundant
  - bank is not too steep



# Vegetated Geogrids

- Alternating layers of live branch cuttings and compacted soil with geotextiles wrapped around each soil lift.
- Good option when the bank is too steep for brush layering

## Vegetated Geogrids (source Texas DOT)



<http://www.hrnerr.org>

## Vegetated Geogrids (source: Sotir and Fischenich 2003)



Figure 6. A VRSS structure immediately after construction



Figure 7. Established VRSS structures



# Tree Revetment

- Made by anchoring trees along a stream bank.
- The trees slow the current along the bank; this decreases erosion, deposits sediment within the tree branches. The deposited material forms a seed bed in which the seeds of river trees can grow.
- This is not a 'living' technique but promotes recruitment of stabilizing vegetation
- Very inexpensive.

