

Shoreline Restoration and Stabilization

Results of a bioengineering pilot study on Lake Austin 2009-2013



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Historic recreational use....

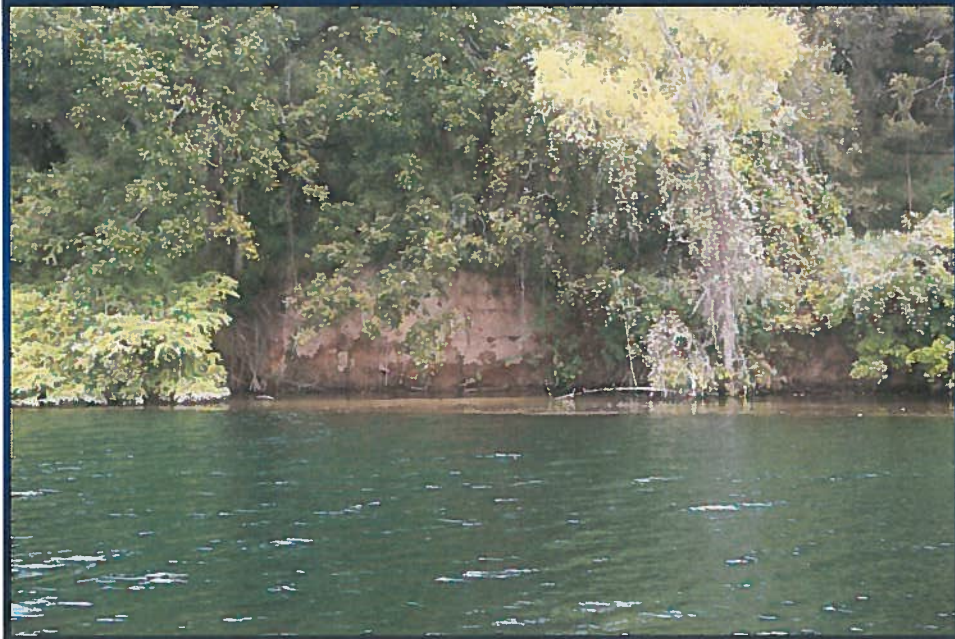


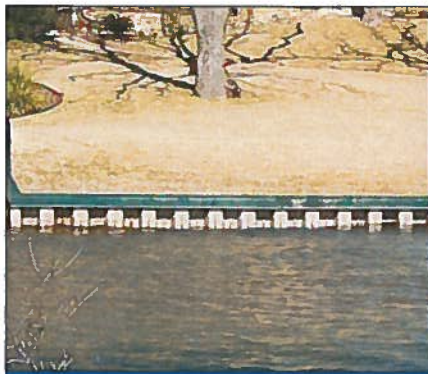
...was modest

However, current recreational use can be...



Intense wave action can destabilize shorelines





Bulkheads

Code and Criteria
changes of 2010

Old
New

Requires:

Slope
Vegetation
Natural materials



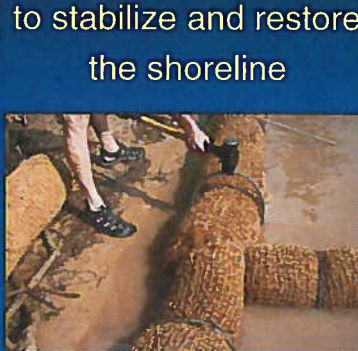
Even better than that:
Imagine a stable shoreline without a bulkhead!



ERM pilot project: Test a bioengineering approach using biodegradable coir logs and wetland plants to stabilize and restore the shoreline



Coir logs



UV resistant zip ties



4ft rebar "staples"



Plantings



American water-willow
(*Justicia americana*)



American bulrush
(*Scirpus americanus*)



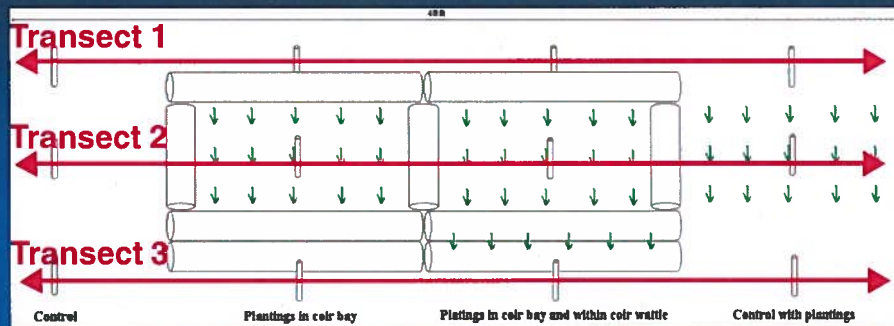
Pickerelweed
(*Pontederia cordata*)



September 2009



Experimental Design



Data collection:

- Measure depth to substrate of exposed PVC gauges
- Plant Survival (presence/absence)
- Coir log integrity observations
- Photographs



Coir Bay with plantings



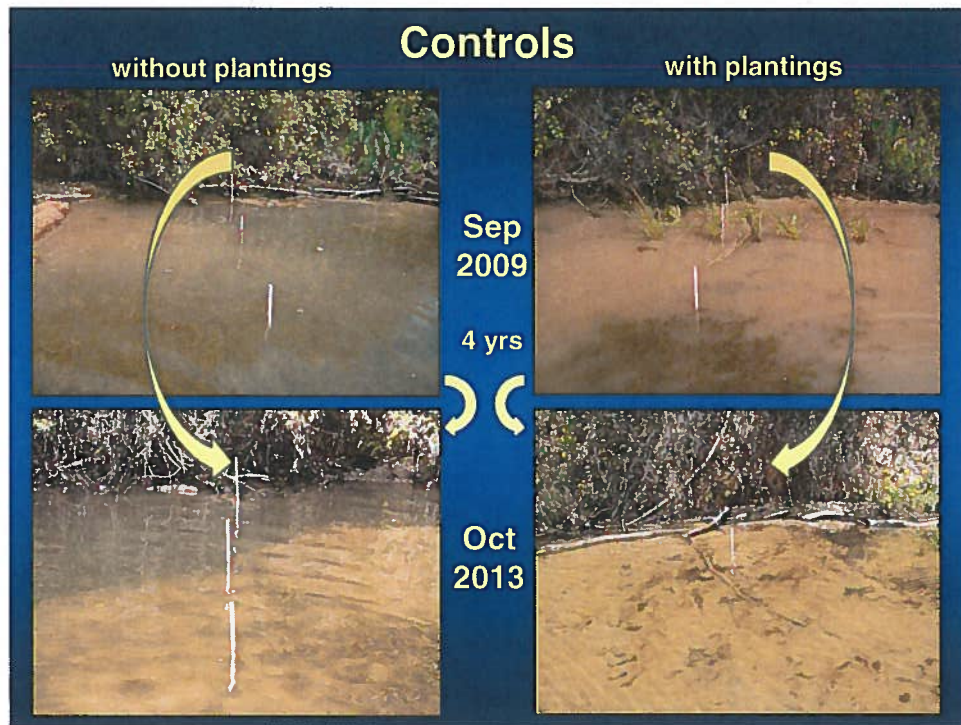
Sep
2009

4 yrs



Oct
2013



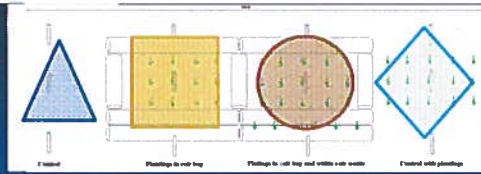


Statistical Analysis*

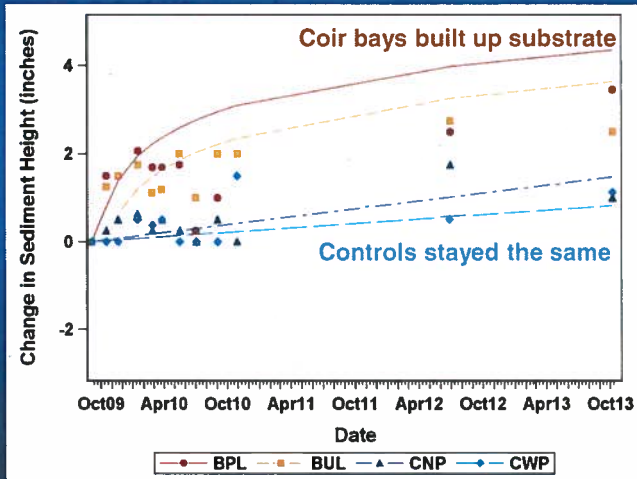
- ✓ Significant difference in all substrate levels over time
- ✓ Significant difference between control and treatment
- ✓ Results between bays at sites were statistically the same
- ✓ Results between controls at sites were statistically the same
- ✓ Statistical difference between coir and controls

* Two-way ANOVA, Tukey multiple comparisons, and regression analysis

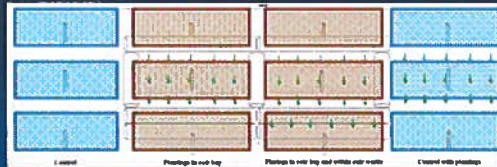
Regression analysis by treatment



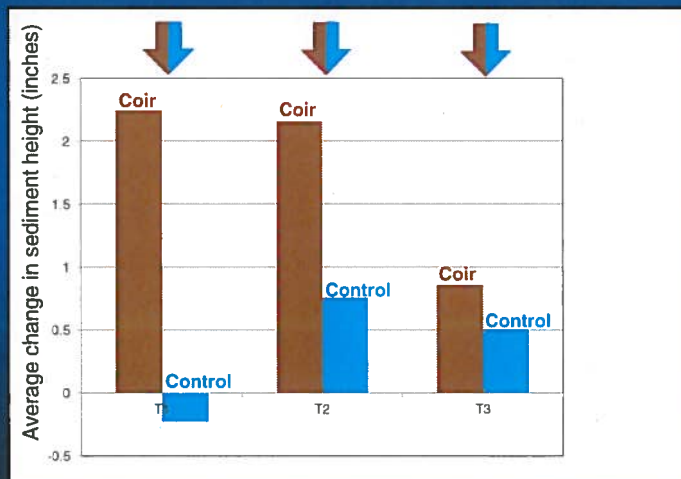
Average values for all sites



Results by transect and treatment



Transect 1
Transect 2
Transect 3



Results plantings

remaining after 4 yrs

Pickereelweed



in control = none
in coir bay = none

American bulrush



in control = none
in coir bay = none

American water-willow

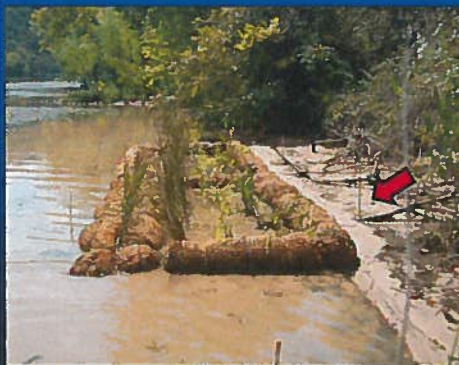


in control = avg 50 stems/bay !!!
in coir bays = avg 247 stems/bay !!!

Findings:

In Lake Austin:

- Coir logs with plantings can retain sediment and provide stability for shoreline, plants and colonization by other plants
- American water-willow is an appropriate plant for remediation
- After 4yrs coir logs remain even in a high wave-action zone



Before:

Eroding shoreline
Few plant species
Exposed shoreline

After:

Shoreline stabilized (and increased!)
Diverse plant community
Vigorous plants covering shoreline



Field Guide for Central Texas Wetland Plants

Central Texas Wetland Plants



WATERSHED
PROTECTION

For download (high resolution, slow download)

ftp://ftp.ci.austin.tx.us/wre/Wetland_Guide_Print/FinalWetlandGuide_Print_v2.pdf



Web friendly (low resolution, fast) version:

<http://draft.austintexas.gov/sites/default/files/files/Watershed/riparian/WetlandGuide.pdf>