

Lake Shoreline Stabilization, Reservoir Management & Maintenance



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Management - Maintenance - Products

By: Johnny Foster

Problem Identification

- Lake shorelines are extremely dynamic
 - They move due to fluctuating water levels
 - They erode
 - They are biologically active
- Shorelines are extremely important
 - Recreational access
 - Aesthetics: public and private
 - Pollutant collection and treatment
 - Vegetative diversity
 - Wildlife habitat
- Shoreline modifications are extremely regulated

Shoreline Characteristics to Consider

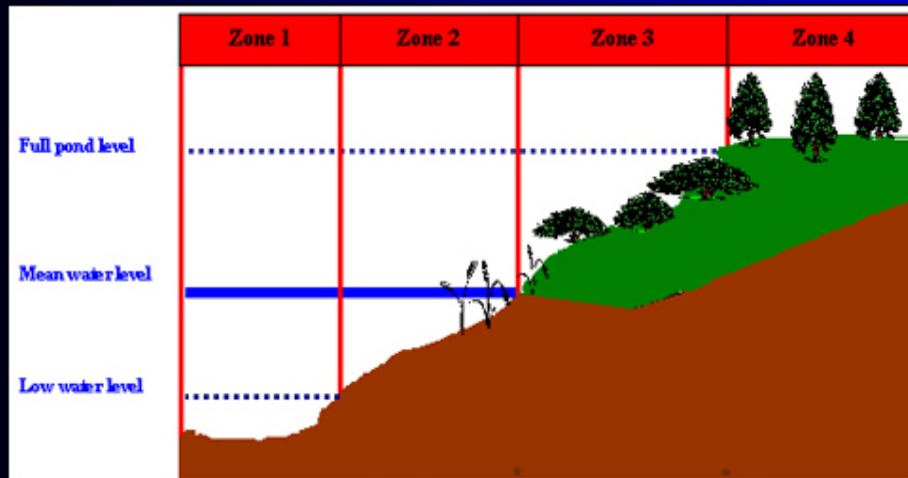
- Water level: high, low and mean
- Existing vegetation
- Wave energy (boat or wind generated)
- Shoreline slope (above and below water)
- Shoreline soil type and condition
- Amount of sunlight exposure
- Shoreline utilization

Vegetation Is Your Friend



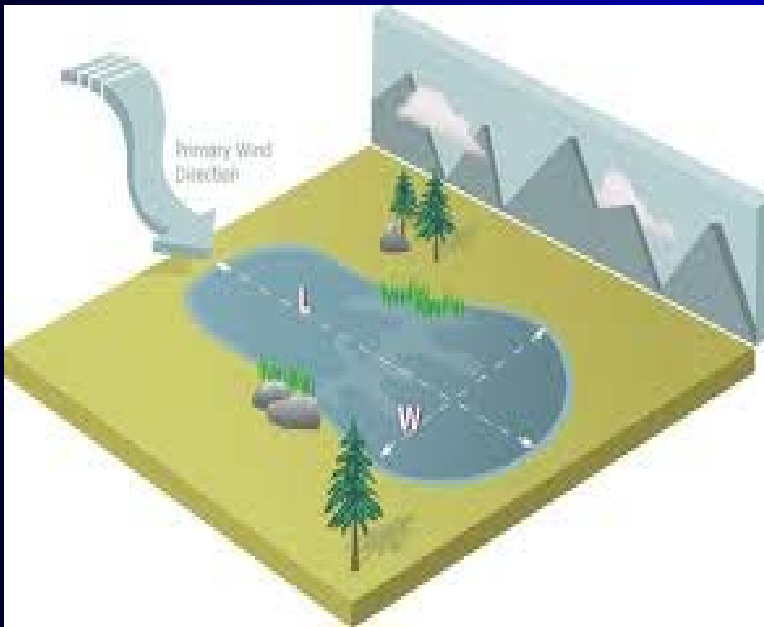
- Usually need to save existing vegetation
- Native vegetation is preferred
- Non-native vegetation may be invasive or not survive
- Planting vegetation may help if done correctly

Water Level Fluctuations in the Riparian (Vegetative) Zone



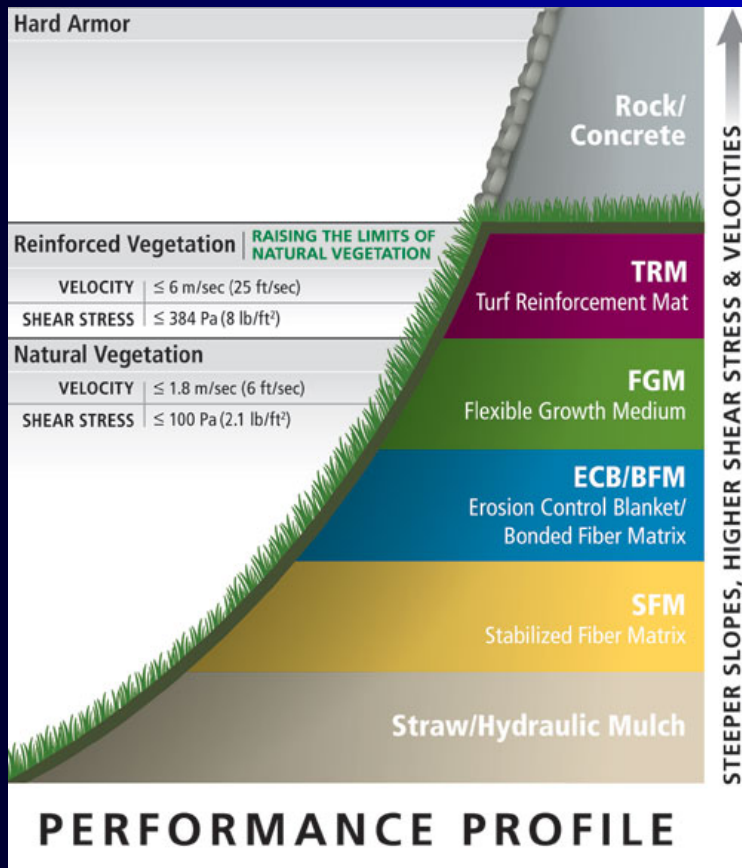
- Zone 1: Submersed aquatic zone
- Zone 2: Emergent zone
- Zone 3: Shrub zone is underwater briefly
- Zone 4: Terrace zone is not underwater long but may be saturated

Wave Energy Impacts Stabilization Choice



- Bigger waves usually cause more erosion
- Consider fetch
- Consider depth
- Consider prevailing wind speed
- Consider boat traffic

Stabilization Technique Must Consider Slope



- Steeper slopes generally mean more erosion
- Steeper slopes mean fewer appropriate options

Shoreline Soils Impact Stabilization Options



- Organic material
- Clay
- Silt
- Sand
- Gravel
- Rock

Stabilization Choice Should Consider Maintenance



- Hard structures are expensive and deteriorate over time
- Vegetative and bio engineered options typically improve over time

Before Starting a Project



- Define goals and objectives
- Obtain approval
- Develop multidisciplinary design
- Prepare budget
- Choose contractor

Stabilization Techniques



- Hard structures
 - Bulkheads and seawalls
 - Revetments
- Soil bioengineering
 - Live Staking
 - Breakwater systems
- Vegetation
 - Alone
 - Reinforced

Hard Structures

- Excessive wave action
- Soil unsuitable for vegetation
- Inadequate sunlight
- Excessive shoreline slope



Bulkheads and Seawalls



- Vertical structures parallel to shoreline
- Often concrete, vinyl, steel or wood
- Toe may need stabilization because of redirected waves

Revetments (Rip-rap)



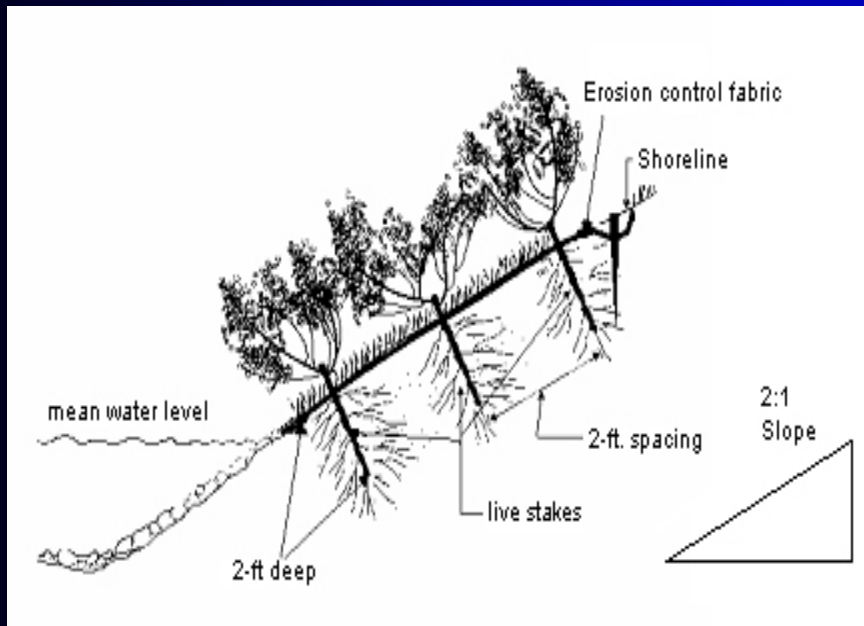
- Protective structures of rock, concrete or other materials intended to fit the slope of the shoreline
- Useful in shaded areas or poor soil areas
- May be used in combination with vegetation or hard structures

Soil Bioengineering



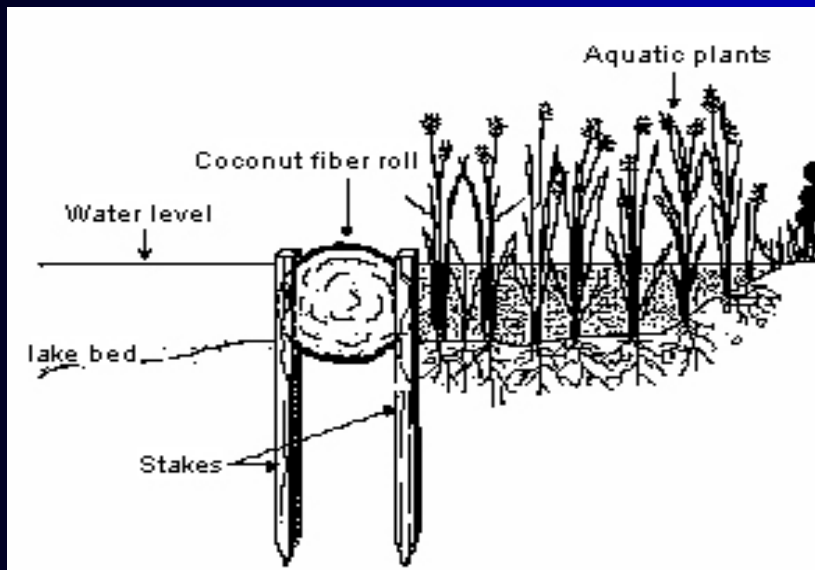
- Uses live plants as structural components
- Resists erosion and sloughing
- Steep slopes must be terraced
- Productive for wildlife

Live Staking



- Live rooted cuttings inserted into shoreline
- Improves over time
- May be combined with fabric for immediate protection
- Stakes typically 3' long and 1" diameter
- Installed during dormant season

Breakwater Systems



- Coconut fiber rolls break waves so emergent vegetation can be planted
- Plants should be actively growing, native species and protected from wildlife

Vegetation



- Usually least expensive
- Add to existing plants
- Flat slopes no more than 3:1 best
- Suitable soil, light and protection necessary
- Expect some re-planting
- Rafts and pre-planted mats available

Vegetative Shelf



- Repair erosion before planting
- Maintain design width and slope
- Keep water level consistent
- Choose plants carefully
- Repair animal damage

Dredging & Sediment Removal



- Excavation vs. pumping
- Access and disposal are issues
- Experience and expertise important
- Expensive and disruptive

Maintenance



- Inspect often
- Fix problems quickly
- Control invasive plants
- Budget for maintenance
- Provide access

QUESTIONS?



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