Riparian Forest Buffer

... a CORE conservation practice
Presentation Objectives

- Define riparian forest buffer
- Describe benefits and functions
- Explain basic design considerations
- Complete a design exercise
A riparian forest buffer is an area of trees and shrubs located adjacent to streams, lakes, ponds, and wetlands.
Benefits and Functions

- Intercepts sediment, nutrients, pesticides and other materials in surface runoff
- Reduces nutrients and other pollutants in shallow sub-surface water flow
- Provides food and cover for wildlife including beneficial insects
- Lowers water temperatures by shading
- Slows out-of-bank flood flows
Benefits and Functions - con’t ...

- Provides litter fall and large woody debris needed by aquatic organisms
- Tree and shrub roots increase bank and shoreline stability
- Diversifies farm enterprise - timber, wood fiber, horticultural products
- Improves aesthetics, land values, reduces taxes in some locales
Limitations

- May intercept only part of subsurface flow pollutants
- Undesirable animals and plants may be attracted
- Cropping acreage reduced
- Requires additional management (forest/tree)
- Marketing infrastructure needed for tree products
Design

- **Location**

  Riparian forest buffers are located adjacent to permanent or intermittent streams, lakes, ponds, wetlands, and seeps. The natural or irrigated potential for the site must support woody plants (trees or shrubs)
Design

- **Layout** - "configuration" or "extent"
  - Investigate the natural potential or historical extent of the riparian zone … then factor in current-day changes to hydrology and water tables
  - For streams, one or both sides may need treatment
Design

- Layout - “width”
  - Width is measured perpendicular to the shoreline or streambank (on the horizontal), begins at the normal water line, and extends to the riparian-upland ecotone as indicated by year-long or seasonal soil wetness, geomorphology, or floodplain topography.
Generalized buffer widths ...

(Castelle et al, 1994)
Minimum widths ... Three-Zone Concept

- **Zone 1** ≥ 15 feet (habitat/shade)
- **Zone 2** ≥ 20 feet (water quality)
- **Zone 1+2** ≥ 35’ (small streams)
- **Zone 1+2** ≥ 30% of floodplain or 100’ (large streams)
An area created to control concentrated flow or mass soil erosion that would degrade zones 1 and 2. A variety of practices may apply such as Critical Area Planting, Mulching, Use Exclusion and, last but not least, Filter Strip.
Design

Layout - “length” and “area”

- *Length* is measured parallel to the shoreline or bank and can be set minimally at two times its width (based on total of both sides).
- Consider extending to the full length of the water body, water course, or ownership ... or **beyond** to connect forest-to-forest.
- *Area* (acreage) is a function of average *length* and *width*.
Plant materials - species selection

- Adapted to site and purpose
- Locally native; compatible growth and shade tolerances
- Specialty species for specific needs
- Consider natural regeneration
- Multiple functions
Plant materials - stock, handling ...

- Stock can be bareroot, container, cuttings ...
- Sufficient size to establish during first season
- Shrubs <10’ ht. at 20 yrs = 3-6’ spacing
- Shrubs/trees 10-25’ ht. = 5-8’ spacing
- Trees >25’ ht. = 8-12’ spacing
- Plant during optimum period of soil moisture and temperature
• Can hand or machine plant as long as roots are properly positioned and “firmed up”
**Site preparation**

- Woody plants will rarely survive and establish quickly if planted or naturally regenerated in competitive vegetation.
- Individual planting sites must be free of obstructions to allow proper planting.
- Can use hand, machine or chemical removal of competitive vegetation and debris.
- Restrict disturbance of between-plant areas.
Temporary storage

- Make no assumptions about planting stock -- thoroughly check for dry roots, mold, pests, excessive temperatures
- Arrange with vendor to replace damaged stock
- Keep roots moist, cool (34-38°F in temperate climates); synchronize delivery and out planting; plant as soon as possible
- Use a heel-in bed for longer temporary storage
Operation and maintenance

- Keep the buffer working ... for functionally and for products
- Periodic, close-up inspections
- Replacement of dead or dying stock
- Continued use exclusion, prescribed grazing, etc.
- Consider harvesting for maintaining plant/forest vigor and function
Buffers must be part of the system!

- **Cropland** - e.g., filter strip, nutrient management, pest management, tillage, wildlife practices
- **Grazing land** - e.g., prescribed grazing, pasture and hay planting, filter strip, nutrient management, use exclusion, fencing, trough or tank, wildlife practices
- **Bank stabilization** - e.g., streambank and shoreline protection, critical area planting, use exclusion, fencing, wildlife practices
Consider the system needs

of the following scenes/sites --

Consider ...

- can one practice do the job?
- are multiple functions valuable?
- if so, what are the core practices?
One practice? Multiple values? Core practices?

Site 1

Build a system!
One practice? Multiple values? Core practices?

Site 2

Build a system!
One practice? Multiple values? Core practices?

Site 3

Build a system!
One practice? Multiple values? Core practices?

Site 4

Build a system!
One practice? Multiple values? Core practices?

Build a system!

Site 5
One practice? Multiple values? Core practices?

Site 5 - three years later

Build a system!
Summary

- *Riparian forest buffers* help protect soil, improve air and water quality, enhance habitat and aesthetics, conserve biodiversity, increase economic diversity
- *Conservation buffers* allow farmers and ranchers to express their commitment to conservation