



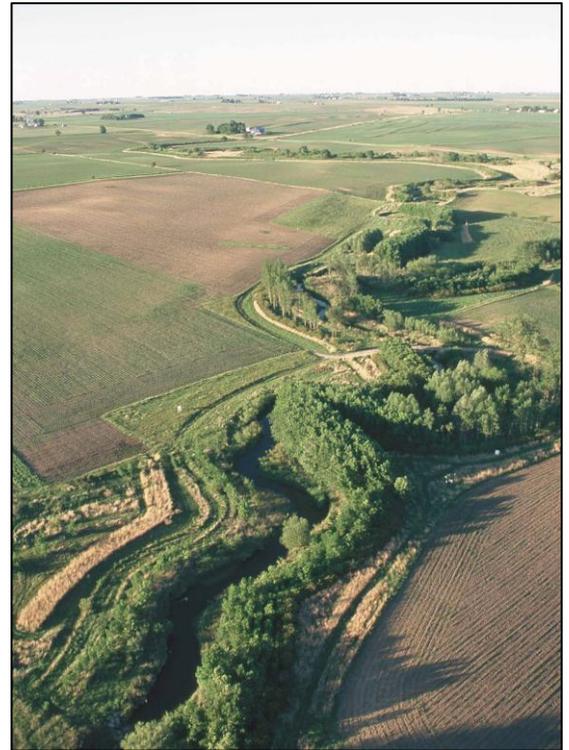
## AGROFORESTRY IN MINNESOTA FACTSHEET SERIES #4

# Riparian Forest Buffers

### WHAT ARE RIPARIAN BUFFERS?

Strips or multiple-row plantings of trees, shrubs, grasses and forbs along rivers, streams, lakes and wetlands. They are planted along water bodies to prevent pollutants from agricultural runoff to enter the water as well as to enhance wildlife habitat and to create potential income for the landowner from conservation easements and income from harvesting the wood and various plants in the buffer.

In Minnesota, forested buffers are best suited for landscapes that were originally forested or wooded, as opposed to prairie landscapes. The width, layout and plant composition of forested riparian buffers vary depending on floodplain characteristics, landowner goals and conservation program requirements.



### Environmental Benefits

- Protects water quality by reducing the amount of sediment, excess nutrients, pesticides and other pollutants entering streams, ditches, lakes, wetlands and other surface water.
- Reduces excess nutrients and other chemicals in shallow groundwater flows.
- Slows flood waters and reduces stream water volume.
- Helps stabilize stream banks and shorelines through root absorption.
- Provides shade, shelter and food for fish and other aquatic species; shade is especially important for cold-water species.
- Provides habitat and travel corridors for diverse plants and animals especially birds, reptiles and others that require water with adjacent woods.

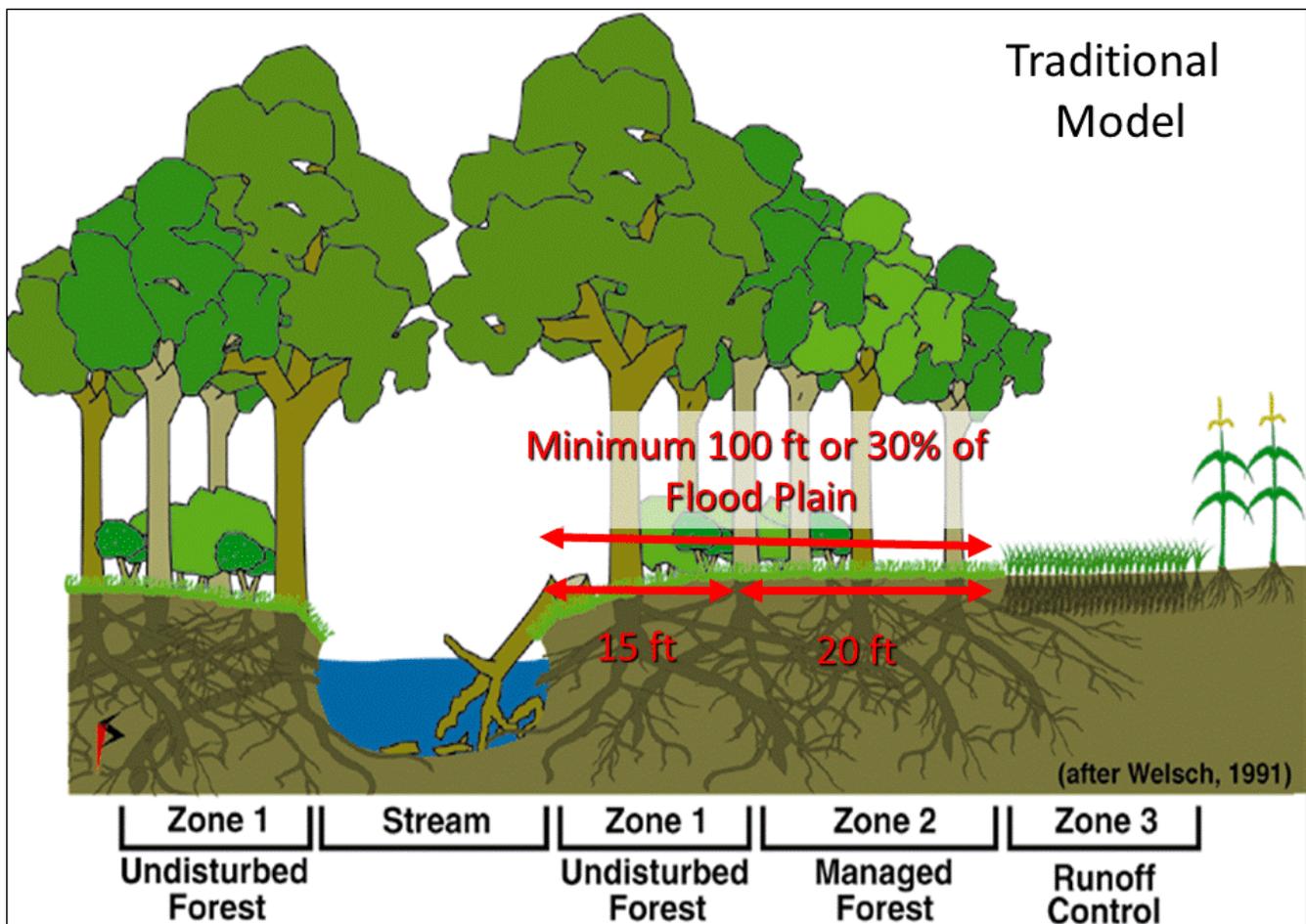
### Practical Benefits

- Provides woodland recreational opportunities such as fishing, hunting, birding, hiking and camping.

- Provides opportunities for additional income from timber, firewood and specialty woodland products such as nuts, berries, mushrooms, medicinal plants and decorative floral materials such as flowers, boughs, stems and vines.
- Creates a highly visible sign of good stewardship, especially along recreational streams.
- Straightens irregular fields, keeps farm machinery away from steep banks and avoids the need to plant end-rows where crop yields are often lower due to soil compaction.
- Provides a barrier against nearby dust, odor, noise or light pollution.
- Adds scenic beauty and may increase property values.
- Provides habitat for important pollinator species that many crops rely.

### HOW DO I DESIGN A RIPARIAN BUFFER?

The most common design for a riparian buffer includes three zones: an unmanaged woody zone nearest the stream which is followed by a woody zone that can be managed for income and is bordered by a zone of grasses that may include forbs (see figure below). In Minnesota, forested riparian buffers are at least 35 feet wide but range up to 100 feet or wider for water quality purposes and up to 600 feet wide for wildlife habitat purposes.



Source: National Agroforestry Center

## VEGETATION SELECTION

The vegetation you select should match your goals. The table shown below can help in selecting shrub, grass, or tree varieties.

Benefits	Grass	Shrub	Tree
Stabilize bank erosion	Low	High	High
Filter sediment	High	Low	Low
Sediment	High	Low	Low
Aquatic habitat	Low	Medium	High
Range/pasture/prairie wildlife	High	Medium	Low
Forest wildlife	Low	Medium	High
Economic products	Low	Medium	High
Flood protection	Low	Medium	High

Source: Iowa State

## Functions of component species

### Trees

- Vertical structure/habitat
- Improve soil infiltration/tilth
- Standing nutrient storage
- Intercept subsurface pollutants
- Carbon storage
- Strong woody roots/banks
- Stream shading/in-stream food

### Shrubs

- Vertical structure/habitat
- Multiple-stems - trap debris
- Woody roots
- Little stream shading

### Native Grasses

- Wildlife habitat/cover/forage
- Sediment removal from runoff
- Improve soil infiltration/tilth
- No stream shading/ detritus
- Keep out invasive species

## INCOME OPPORTUNITIES

Long-term income from a riparian buffer may include:

- High value hardwoods such as Walnut, Oak and Maple
- Hybrid Poplars grown for pulp wood, sawlogs or biomass
- Nuts and Berries from trees and woody shrubs (may be short term 2-15 years).

Short-term income opportunities:

- Decorative Woody Florals - ready in two years
- Berries from woody shrubs.

Conservation easements are another way to receive payments from the state. In cooperation with county Soil and Water Conservation Districts and the USDA Natural Resource Conservation Service, programs compensate landowners for establishing native vegetation on marginal or highly erodible lands.

## ADDITIONAL RESOURCES

<http://www.extension.umn.edu/environment/agroforestry/>

<http://nac.unl.edu/publications/agroforestrynotes.htm>

<http://www.centerforagroforestry.org/pubs/>

## NEED FOR INFORMATION?

Contact Diomy Zamora at [zamor015@umn.edu](mailto:zamor015@umn.edu) or 612-626-9272 or Gary Wyatt at [wyatt@umn.edu](mailto:wyatt@umn.edu) or 507-389-6748.

## PHOTO SOURCES

Center for Agroforestry – University of Missouri and National Agroforestry Center

