



# BUILDING FARMLAND FLOOD RESILIENCE

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AND  
THE INTERVALE CENTER

&

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AND  
LAKE CHAMPLAIN SEA GRANT

# WHAT IS A WATERSHED?

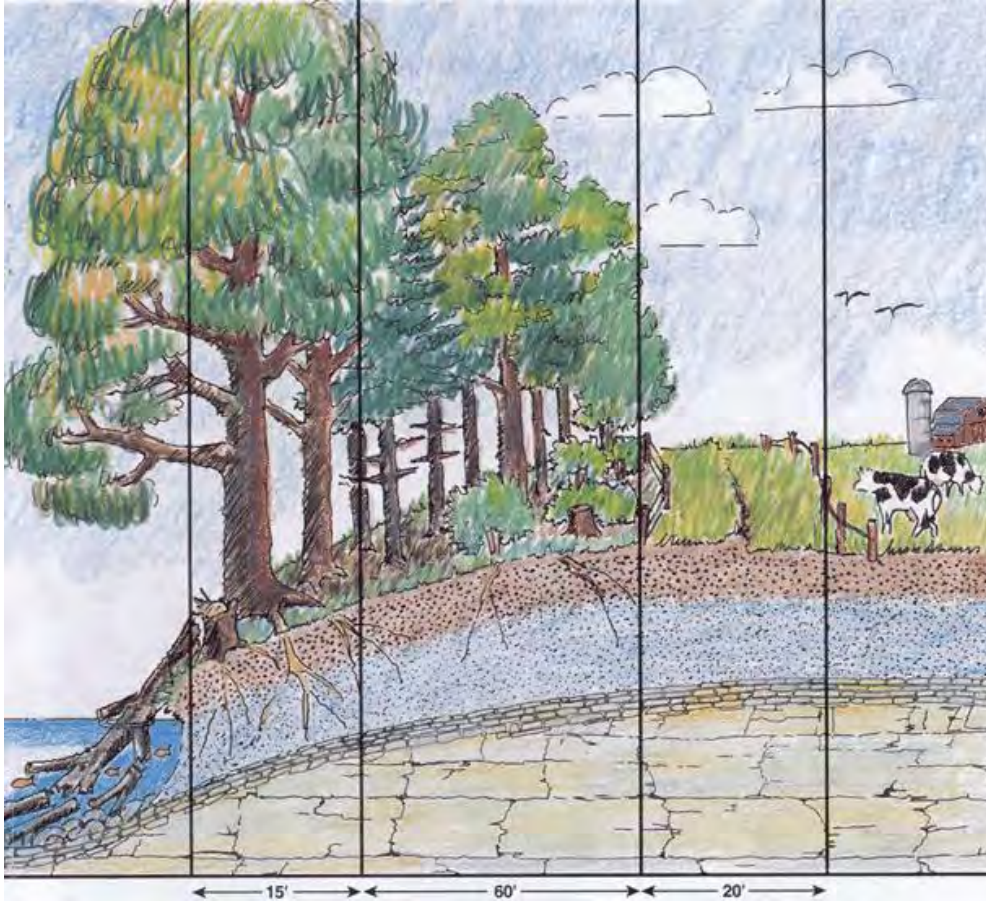
- A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place. – EPA
- Watersheds vary in size and scale:
  - Potash Brook
  - Winooski River
  - Lake Champlain
  - St. Lawrence River
- We all live in a watershed



*Produced by Lane Council of Governments*



# WHAT IS A RIPARIAN BUFFER?



- The forested landscape in between rivers and streams and human land use activities
- Ecotone: an area of great diversity where two habitats merge
- Historically contiguous with upland forests
- Currently they're fragmented and undersized



# WHAT ARE THE BENEFITS OF A BUFFER?





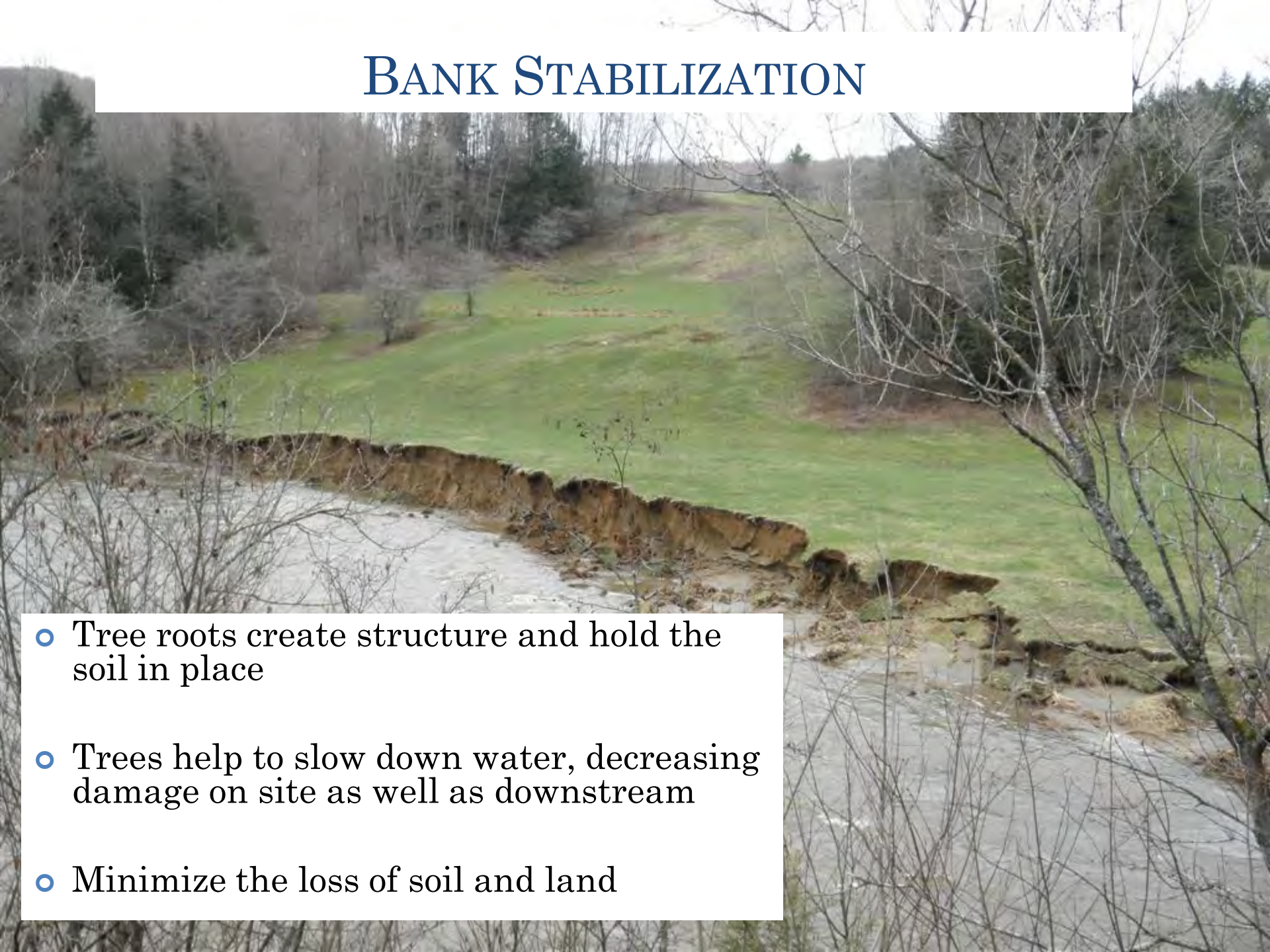
# HABITAT

- Terrestrial and Aquatic
- Migratory birds, insects, amphibians, mammals, fish...
- Food
- Cover





# BANK STABILIZATION

- 
- Tree roots create structure and hold the soil in place
  - Trees help to slow down water, decreasing damage on site as well as downstream
  - Minimize the loss of soil and land

# WATER QUALITY



- Reduce erosion
- Filter surface water containing excess nutrients, sediment and pollutants
- Reduce flow rates and increase storage
- Shading the waters helps to maintain cool in stream temperatures



# CREATING FLOOD RESILIENCY

- Damaged infrastructure
- Crop loss
- Loss of income
- Pollutants
- Erosion/Deposition
- Debris and clean up





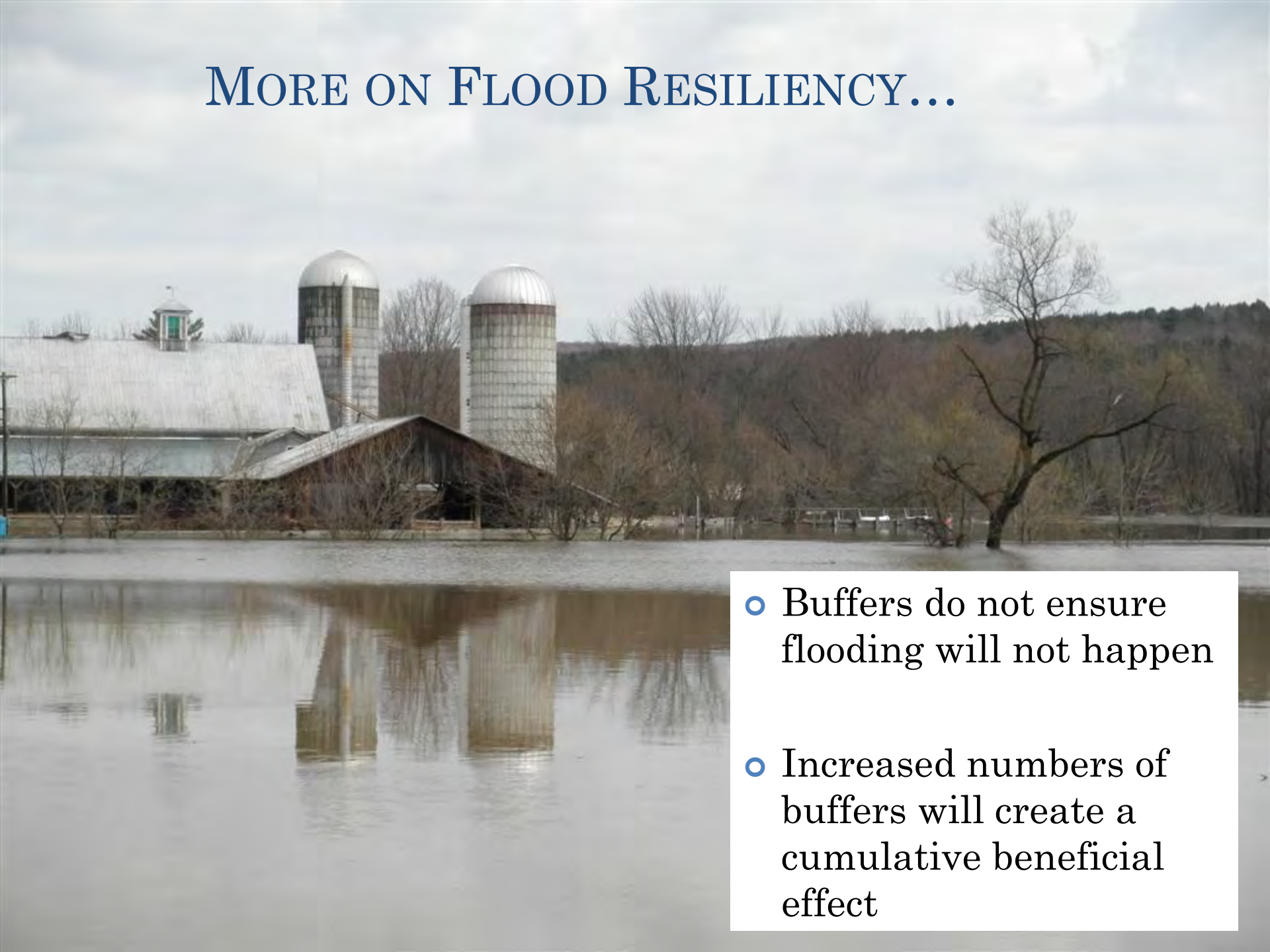
# MORE ON FLOOD RESILIENCY...

- On Site Benefits:
  - Protection from debris
  - Minimizes sediment deposition
  - Decreases the loss of soil and nutrients
- Watershed scale benefits:
  - Reduces flooding potential and severity
  - Decreased sediment and pollutant distribution





# MORE ON FLOOD RESILIENCY...



- Buffers do not ensure flooding will not happen
- Increased numbers of buffers will create a cumulative beneficial effect



HOW CAN WE RESTORE THESE BENEFITS?





# CHANGES IN LAND USE



Before spring planting - 2011

Hundreds of  
naturally seeded  
cottonwoods!



1 Year and four months later

Planted speckled alder



# TREE PLANTING



- Natural community and soils based planning
- Planting native trees and shrubs
- Assisting the site towards regeneration



# LIVESTOCK EXCLUSION

- Fencing
- Water systems
- Crossing structures





# INVASIVE PLANT MANAGEMENT

- Pre planting site preparation
  - Follow-up site maintenance
    - Mechanical control
    - Chemical control
- Strategic planting
- Frequent invaders:
  - Japanese knotweed
  - Reedcanary grass
  - Bindweed
  - Phragmites...





# SUCCESS...

...After



# BUFFER PROGRAMS

- Conservation Reserve Program (CRP)/Conservation Reserve Enhancement Program (CREP)



- Partners for Fish and Wildlife Program (PFW)



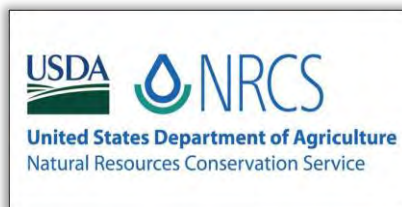
- Trees For Streams

- VTDEC River Management Program, River Corridor Easements



- Others

EQIP, Specialized Grant Programs, local initiatives...





# CRP/CREP

## U.S. DEPARTMENT OF AGRICULTURE & VERMONT AGENCY OF AGRICULTURE

### Practices

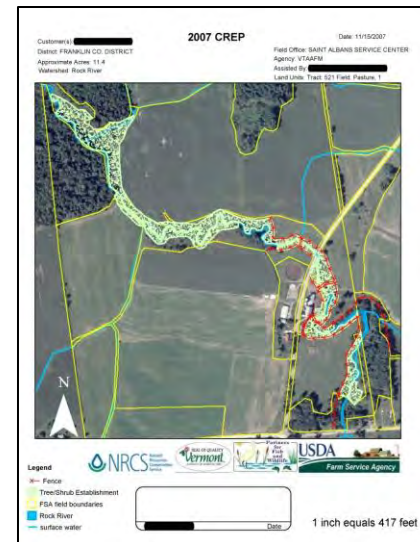
- Tree and Shrub Establishment/ Riparian Forest Buffer
- Livestock Exclusion Fencing
- Stream Crossings
- Water Systems

### Incentives

- Upfront signing incentive payment
- Annual Land rental payments
- Practice costs can be 100% covered

### Standards

- 15 year min. contract
- Minimum buffer width of 35 feet
- Unmanaged buffer



# PARTNERS FOR FISH AND WILDLIFE

## U.S. FISH AND WILDLIFE SERVICE



### Practices

- Technical Assistance
- Habitat Restoration
  - Riparian
  - Wetland
  - Fish Passage

### Standards

- 10 year min. contract
- Minimum buffer width of 35 feet
- Unmanaged buffer

### Incentives

- Technical assistance
- Financial assistance





# TREES FOR STREAMS

## Practices

- Education and Outreach
- Tree planting
- Volunteer/Community based
- Cost share opportunity

## Standards

- May vary across organizations
- Minimum buffer ?

## Incentives

- Some or all of the cost of material and labor is covered
- Allows flexibility to meet specific landowner/site needs



# CORRIDOR EASEMENTS

RIVERS PROGRAM  
STATE OF VERMONT DEC

## Practices

- Easement is based on river dynamics
- Maintain a 50 foot unmanaged buffer
- Cease all river channel manipulation activities (excavation, placement of fill, repairing or removing revetments or levees)

## Incentives

- Landowner sells development rights within the river corridor



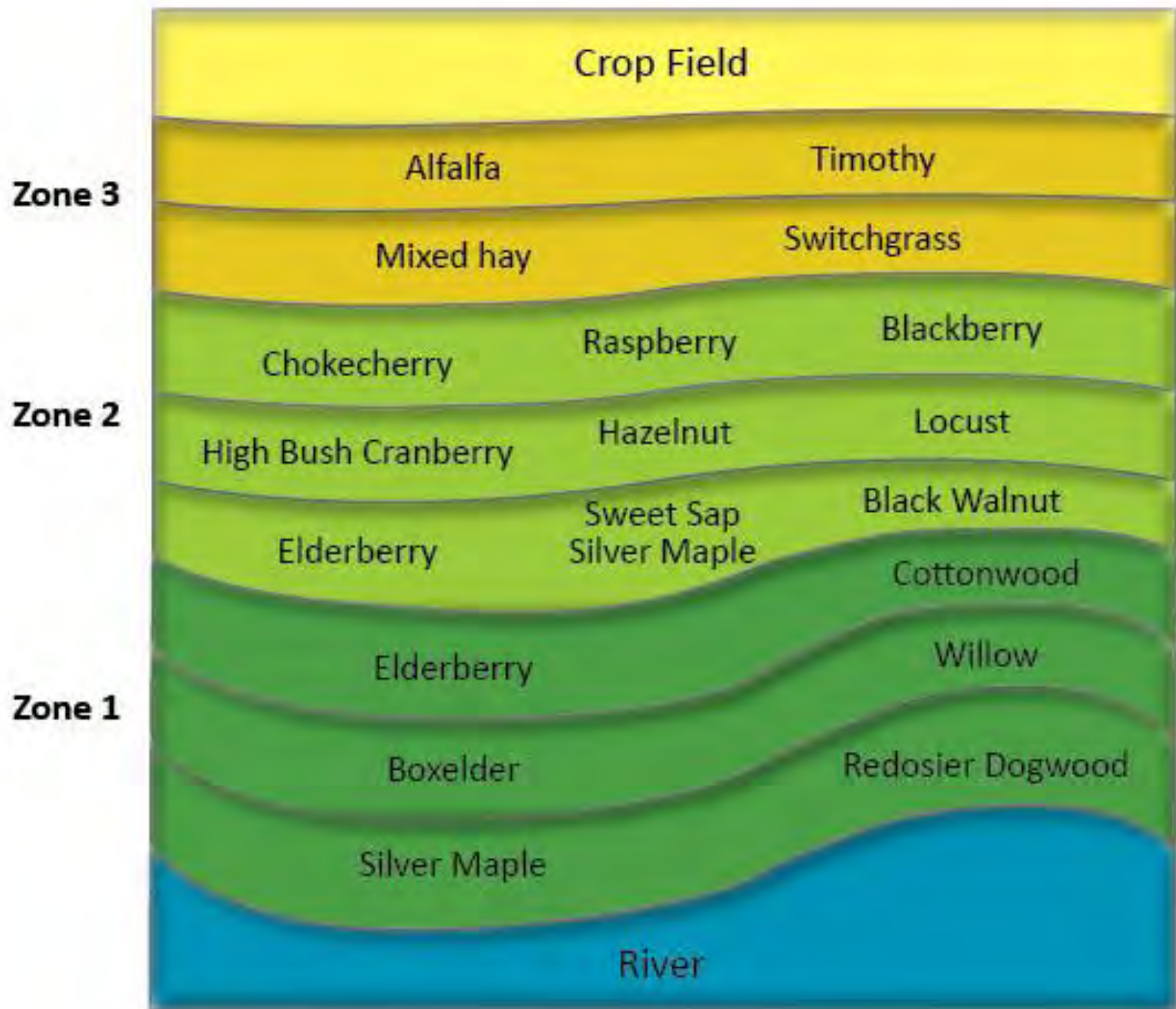


# GROWING IN YOUR BUFFER

- Practice:
  - Grow perennial crops like elderberry
- Incentives
  - Buffer provides ecological benefits *and* crops.



*John Hayden from The Farm Between*





An aerial photograph showing a river with a large debris field in the center. To the left is a large agricultural field with rows of crops. To the right is a residential neighborhood with houses and a road. The river flows from the top left towards the bottom right.

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