Visualizing Collaborative Conservation

A picture is really worth a thousand words!

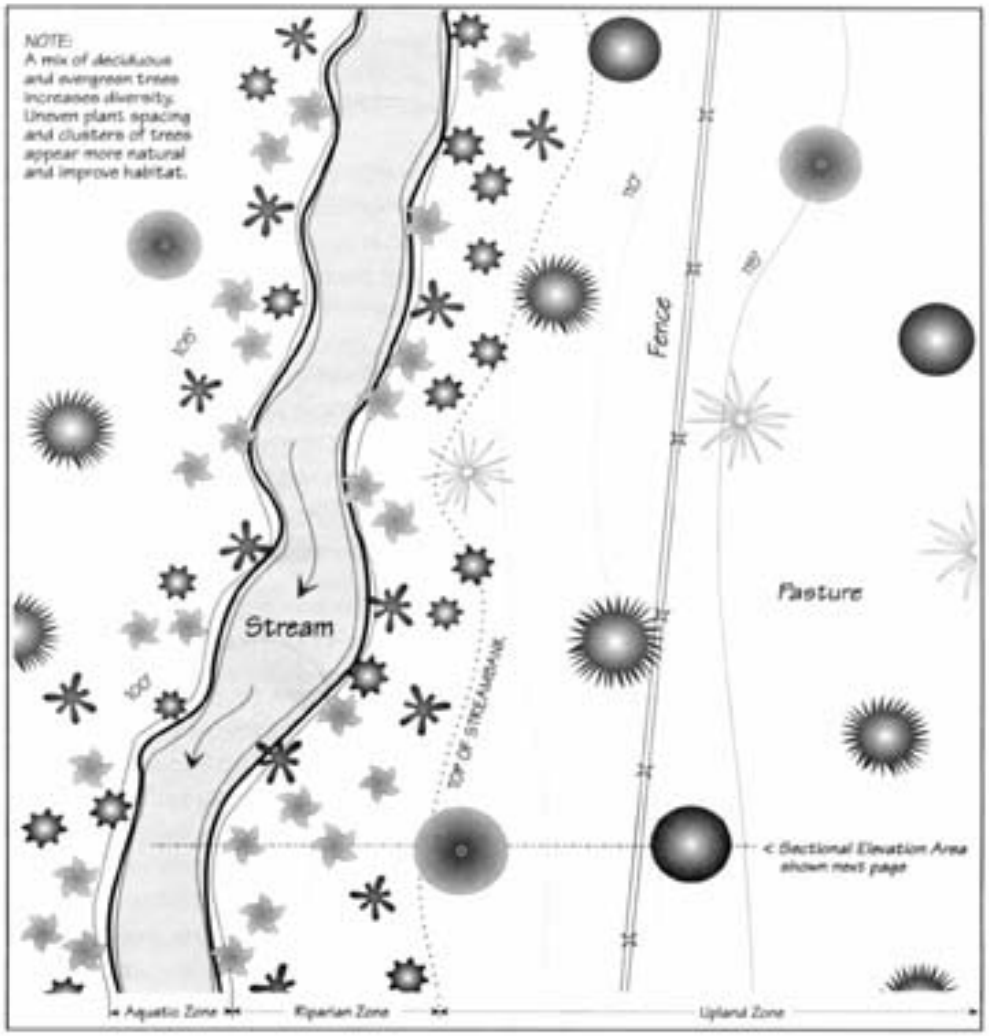
Gary Bentrup
USDA FS/NRCS National Agroforestry Center

USDA National Agroforestry Center

A partnership of NRCS

The discovery of tools


NRCS
TYPICAL BRIDGE SECTION



LEGEND:

Trees	Shrubs
Cottonwood	Willow
Vine Maple	Red-osier Dogwood
Douglas Fir	Oceanospray
Western Redcedar	

0 5 10 feet


NRCS

Potential Tasks for Simulations

- Planning tool to present alternatives
- Training aid to convey management
- Visual impact analysis tool for public meetings
- A construction aid for contractors
- Marketing tool for new programs

Benefits of Visual Simulations

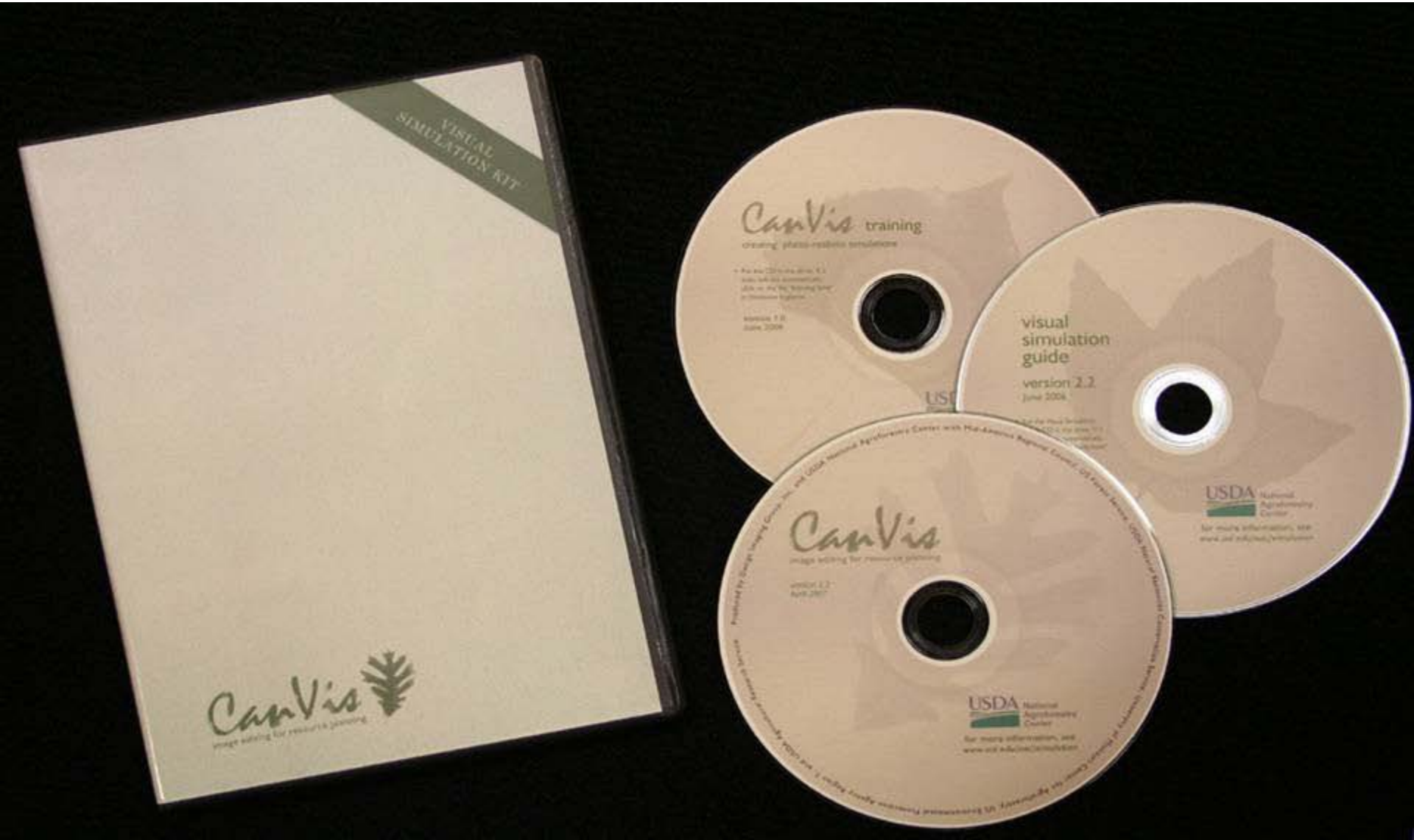
- Promote better understanding
- Increase involvement in planning
- Create shared vision

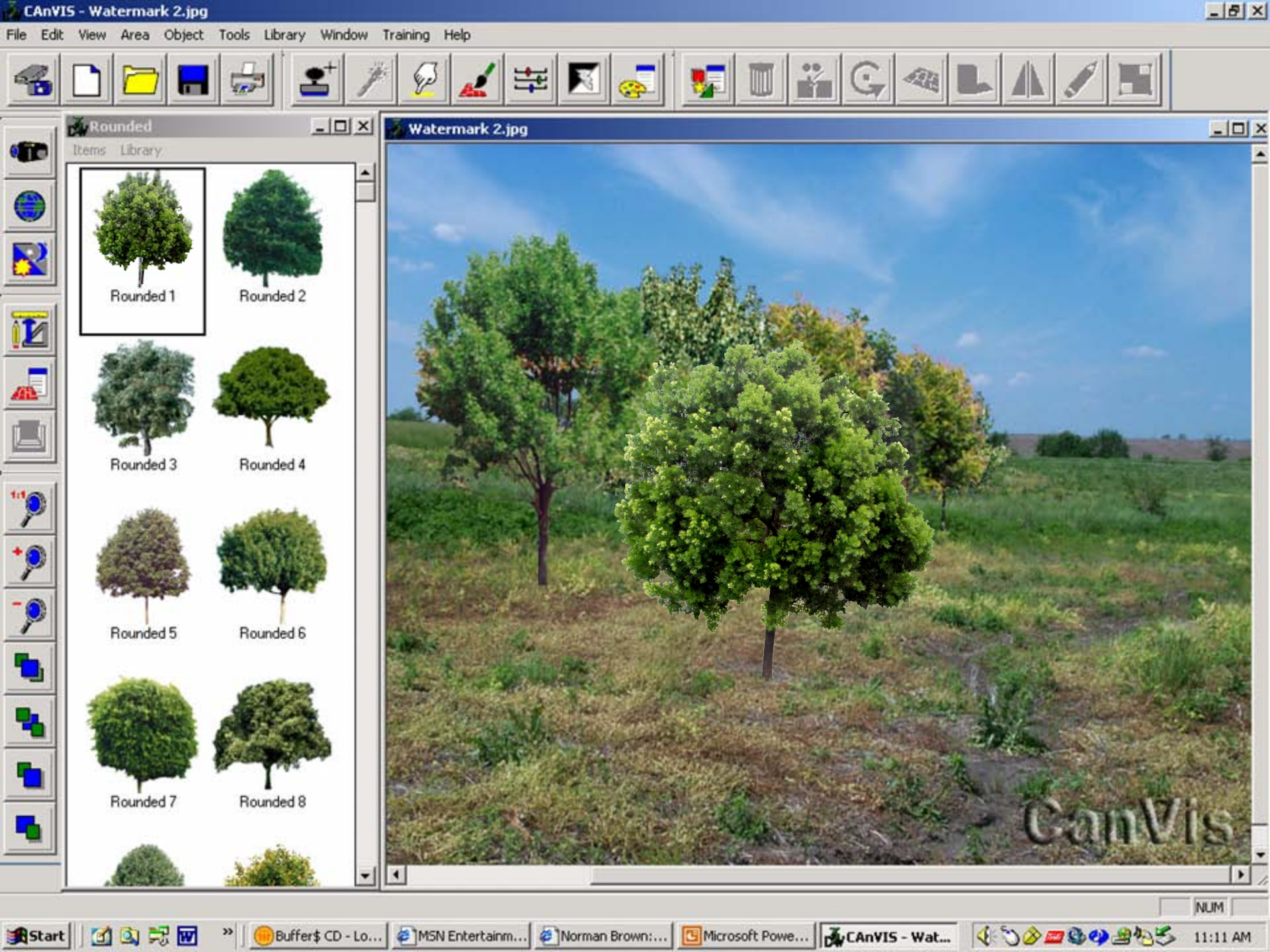
Increased Ownership

Limitations and Pitfalls

- Requires attention to scale and location of objects
- Represents a snap-shot in time
- Dynamic landscapes

CanVis Visual Simulation Kit




CAnVIS - Watermark 2.jpg
File Edit View Area Object Tools Library Window Training Help
Rounded
Items Library
Rounded 1
Rounded 2
Rounded 3
Rounded 4
Rounded 5
Rounded 6
Rounded 7
Rounded 8
Watermark 2.jpg
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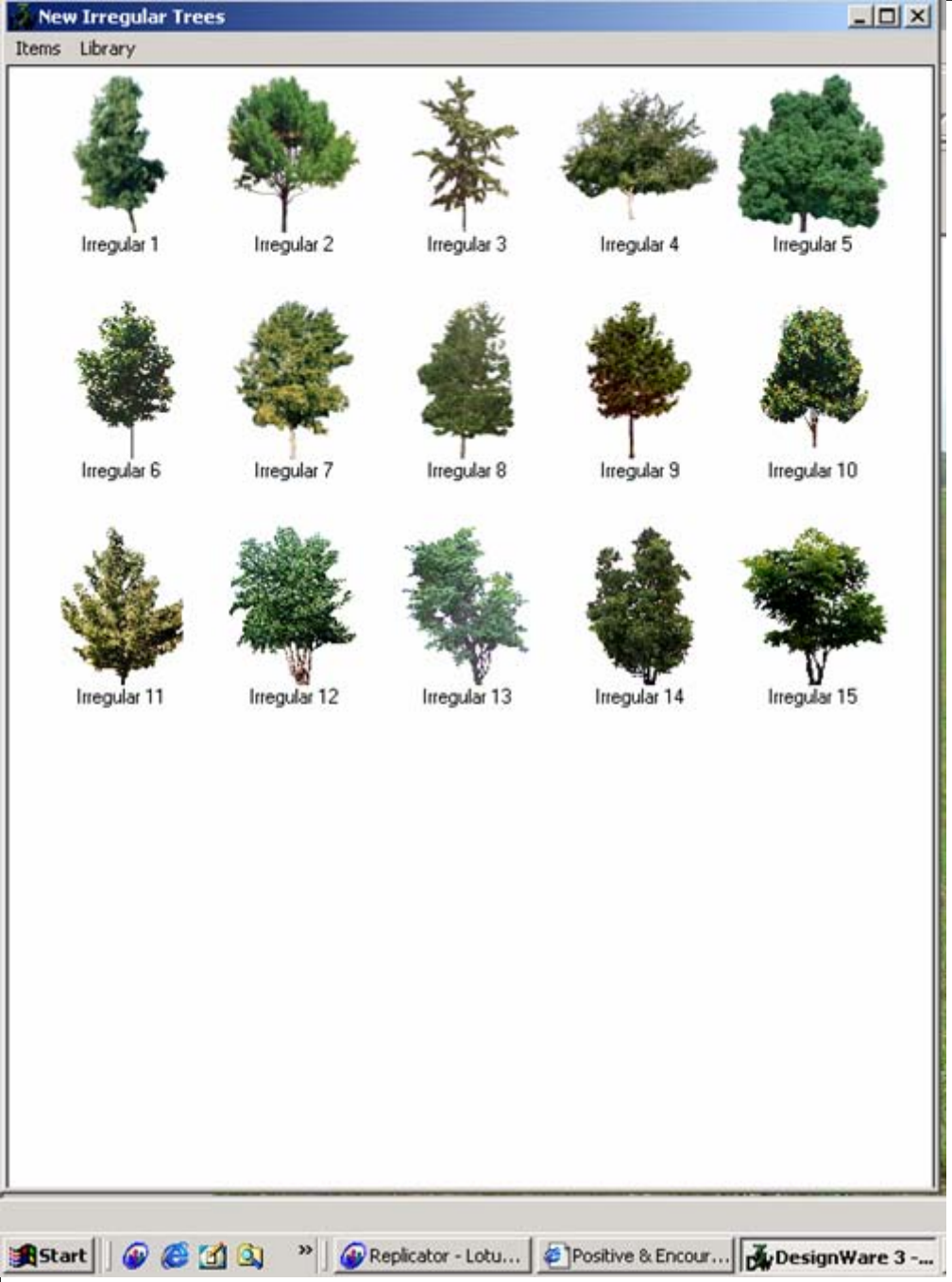
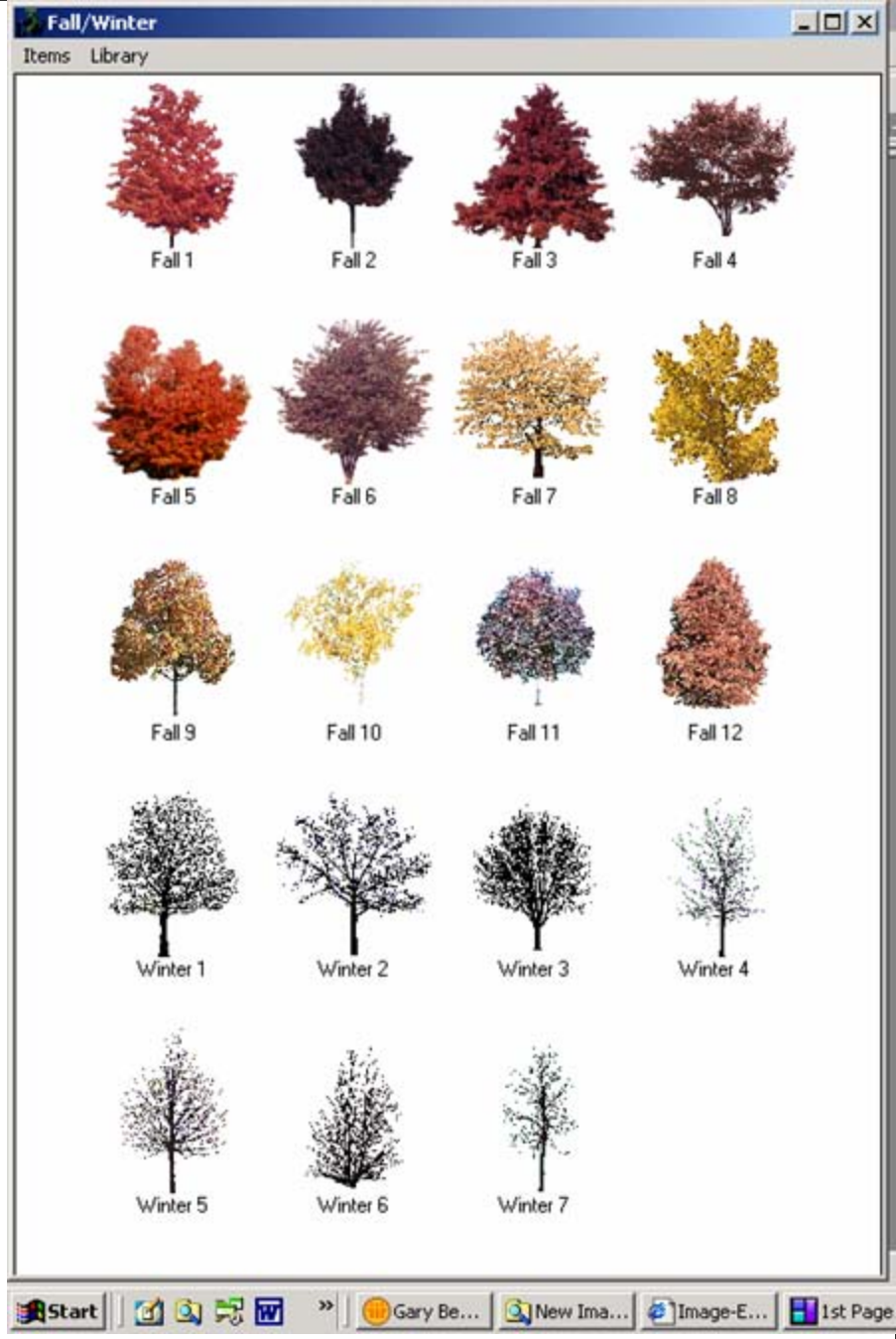

New Irregular Trees
Items Library
Irregular 1
Irregular 2
Irregular 3
Irregular 4
Irregular 5
Irregular 6
Irregular 7
Irregular 8
Irregular 9
Irregular 10
Irregular 11
Irregular 12
Irregular 13
Irregular 14
Irregular 15
Start
Replicator - Lotu...
Positive & Encour...
DesignWare 3 -...


Fall/Winter
Items Library
Fall 1
Fall 2
Fall 3
Fall 4
Fall 5
Fall 6
Fall 7
Fall 8
Fall 9
Fall 10
Fall 11
Fall 12
Winter 1
Winter 2
Winter 3
Winter 4
Winter 5
Winter 6
Winter 7
Start
Gary Be...
New Ima...
Image-E...
1st Page

New Evergreen Trees

Items Library


Evergreen 1


Evergreen 2


Evergreen 3


Evergreen 4


Evergreen 5


Evergreen 6


Evergreen 7


Evergreen 8


Evergreen 9


Evergreen 10


Evergreen 11


Evergreen 12


Evergreen 13


Evergreen 14


Evergreen 15


Evergreen 16


Evergreen 17


Evergreen 18


Evergreen 19

NUM

Start | The Es... | SUNY-... | MSN E... | Dave ... | NAC N... | Renam... | Desig... | 2:52 PM

Young Trees

Items Library


Young Tree 1


Young Tree 2


Young Tree 3


Young Tree 4


Young Tree 5


Young Tree 6


Young Tree 7


Young Tree 8


Young Tree 9


Young Tree 10


Young Tree 12


Young Tree 13


Young Tree 14


Young Tree 15

Agricultural

Items Library


Corn


Cow


Field Margin


Sheep


Horse


Sorghum


Tractor 1


Tractor 2


Chemical Application


Manure Spreader


Fence 3

Fence 4


Fence 5


Fence 2


Pasture-Gate


Farm Gate


Solar Panel


Wind Generator 1


Wind Generator 2


Stock Tank


Pickup

Start Gary Be... New Ima... Image-E... 1st Page...


People
Items Library
Bird Watchers
Child Digging
Child
People 1
People 2
People 3
People 4
People 5
Woman
Campers
Bike Riders 1
Bike Riders 2
Fisherman 1
Fisherman 2
Hunter
Photographer
Start
Gary Be...
New Ima...
Image-E...
1st Page...


Evergreen 1
Evergreen 2
Evergreen 3
Evergreen 4
Evergreen 5
Evergreen 6
Evergreen 7
Evergreen 8
Evergreen 9
People
Items Library
Bike Riders 1
Child
Child Digging
Campers
Hunter
Fisherman 1
Fisherman 2


Bioengineering - 3 years Growth

USDA National Agroforestry Center

Visual Simulation Guide

Table of Contents

Editing Example #2: Riparian Buffer

- STEP 1: Getting Organized
- STEP 2: Select The Background Image
- STEP 3: Develop Editing Strategy
- STEP 4: Edit Image
- STEP 5: Saving and Generating Output

STEP 1: Getting Organized

Training Lessons

The lessons are arranged into several modules and should be completed in sequence. Select the Module icon below to open the lesson directory.

Module 1: Basic Image Editing Tools
Introduces the basic image editing skills needed to create a simulation.

Module 2: Creating A Believable Simulation
Uses the skills learned in Module 1 to create an accurate and realistic looking simulation.

Module 3: Planning A Simulation Project
Provides a framework to produce a natural resource simulation.

Tools for Collaborative Conservation

GIS Assessments

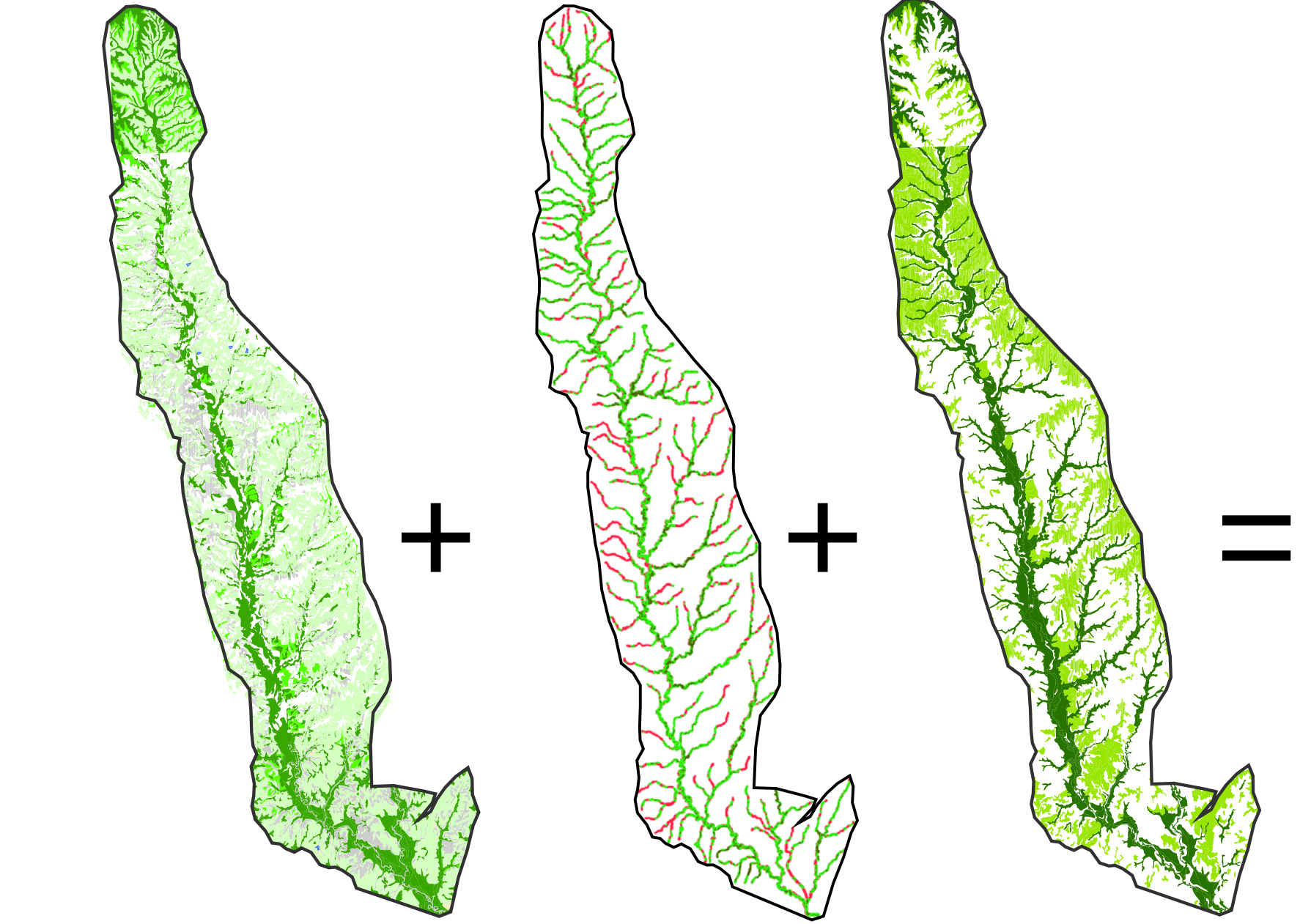
Buffer$

Buffer Width Tool

Design Guidelines

Planning Publications

www.unl.edu/nac/


+
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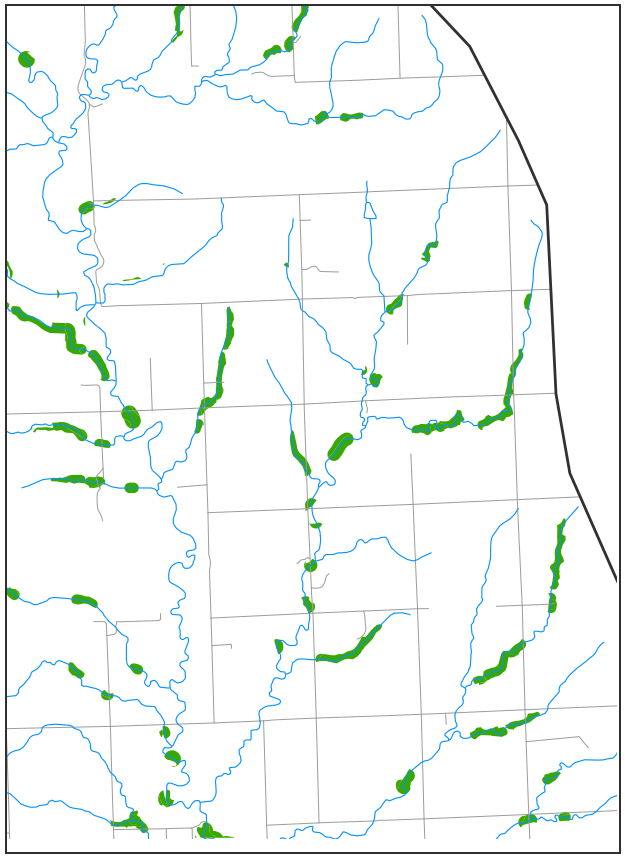
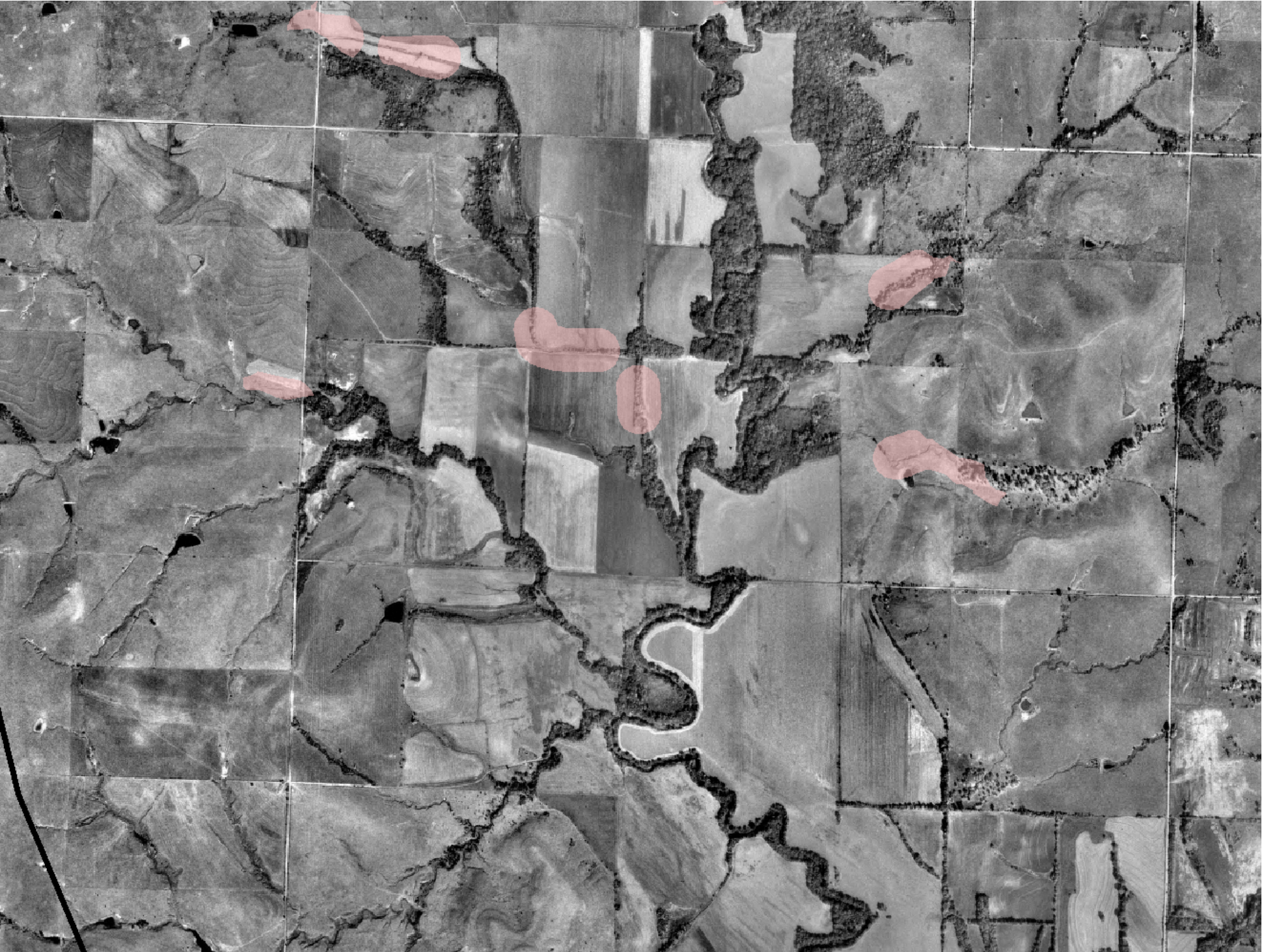
Water Quality
Riparian Connectivity
Economic Products

Multiple Objectives

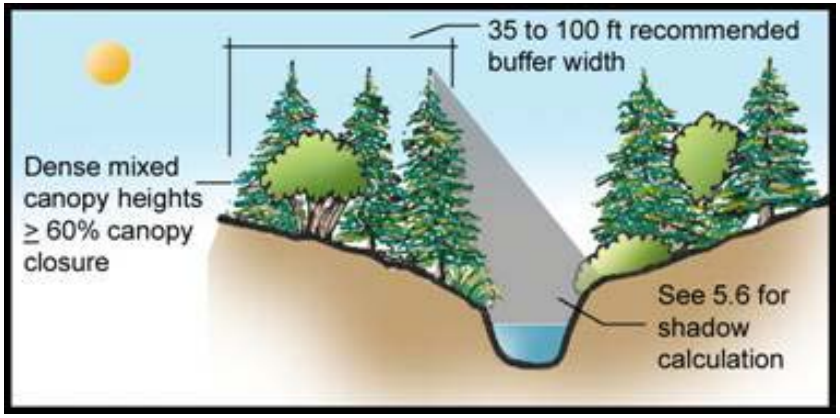
Locations where plantings can:

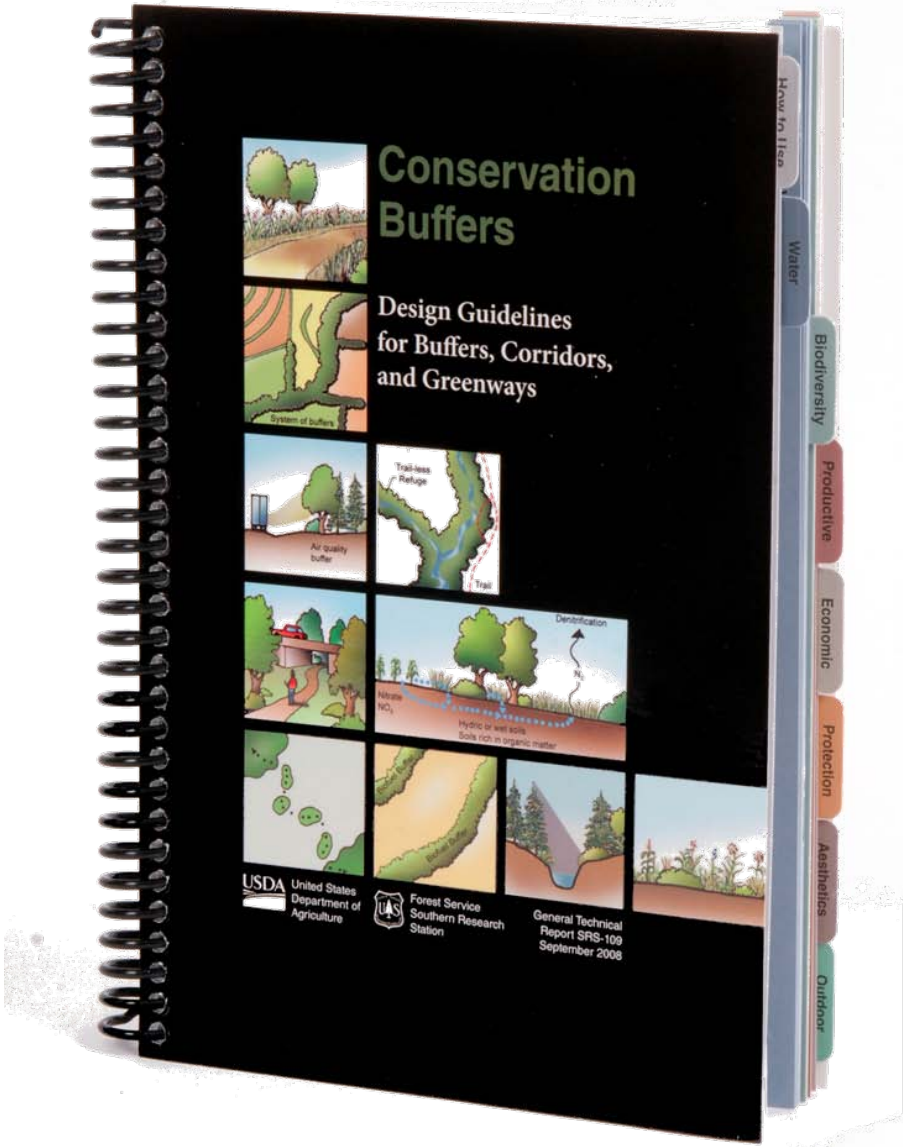
1. Protect and improve water quality
2. Provide an alternative ag. product
3. Restore riparian corridors for wildlife habitat and movement





Planning & Design Guidelines

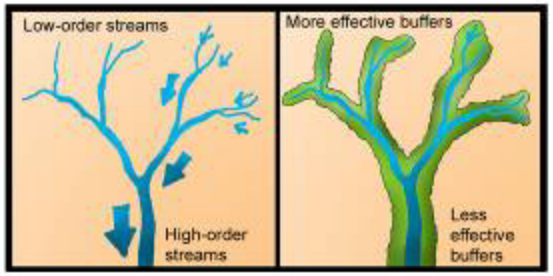




Over 1,400 references

Over 80 design guidelines

www.bufferguidelines.net

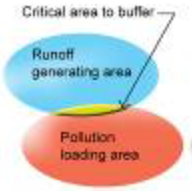


1.4 Target buffers in watersheds

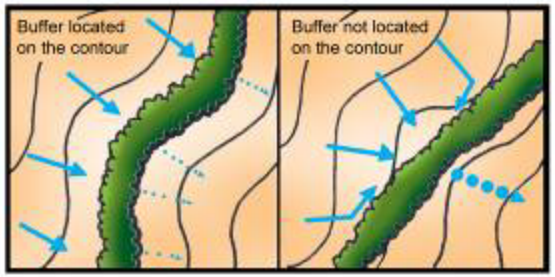
Water quality buffers will be more effective in some areas than in others. Targeting buffers to areas that have high pollutant loads and suitable characteristics for pollutant removal will generally have the greatest benefit on water quality.

General targeting considerations

- Riparian buffers will often be more effective along small or low-order streams than larger or high-order streams since most water delivered to channels from uplands enters along low-order streams.
- Groundwater recharge areas, ephemeral channels, and other areas where runoff collects are important areas to buffer.
- In some regions, surface runoff is generated primarily from areas that become saturated during storms. Where these runoff source areas correspond to a pollution loading area, such as a cultivated field, these areas should be buffered.

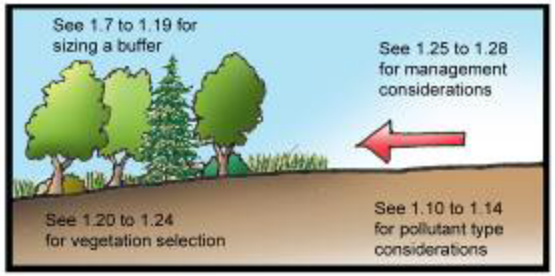


- Surface runoff from cultivated areas is higher where slopes are steeper and soils are finer-textured. These areas are important to buffer.
- GIS are useful for conducting landscape-scale assessments to target buffers.



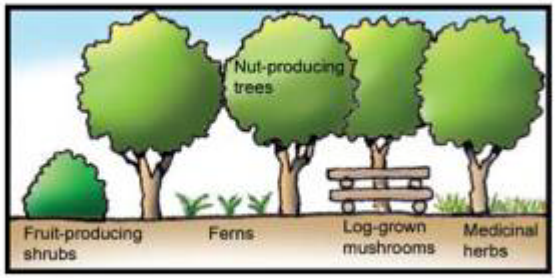
1.5 Arrangement near sources

Buffers should be located as close as possible to the pollution source and should be placed along the contour to promote shallow flow across the buffer. If the contour is not closely followed, a buffer may increase concentration of runoff flow and reduce buffer effectiveness. Grass barriers can help spread out concentrated flows (see section 1.21).



1.6 Buffer site design

Important design elements for any buffer include its size, the kind of vegetation it contains, and how it is managed. Each of these elements is dictated by site factors including pollutant type and load, the buffer's capacity to trap and transform these pollutants and the desired level of pollution reduction. Use the figure above as a road map to guidelines on site design.



4.3 Multi-story cropping in buffers

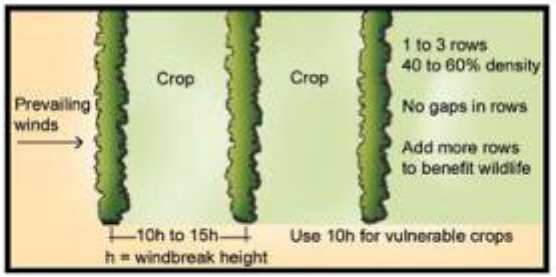
Useful and marketable products can be grown under tree buffers (see table).

Key design considerations

- Select plants that provide multiple benefits.
- Use plants that provide short and long-term products.
- Avoid plants that compete for same resources.
- Utilize the different canopy layers to increase options.
- Avoid plants that compromise other buffer objectives.

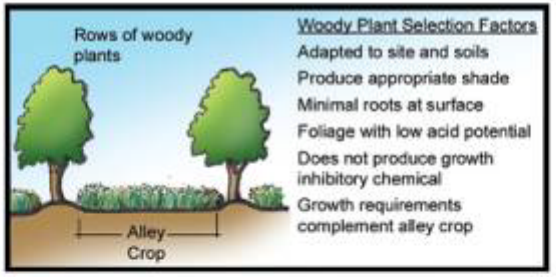
Potential Products to Grow in Buffers

Canopy Layer	Plant/Product
Overstory	Nut-producing trees (e.g., pecans, hazelnut, hickory, pine nuts), Timber (e.g., oak, walnut, maple), Biofuels (e.g., poplar)
Midstory	Syrups (e.g., maple, boxelder), Bark (e.g, cedar, birch), Evergreen boughs, Other wood-derived products (e.g., cedar bedding, oils)
Shrub Layer	Decorative woody florals (e.g., curly willow, red twig dogwood, holly), Berries (e.g., wild plum, juneberry, currants)
Herbaceous Layer	Medicinal herbs (e.g., ginseng, black cohosh, bloodroot), Culinary herbs (e.g., mints, basil), Decoratives (e.g., beargrass, salal, ferns)
Root Zone	Fungi (e.g., truffles, morels)
Vertical Layer	Climbing berries (e.g., raspberry), Climbing vines (e.g., bittersweet), Log-grown mushrooms



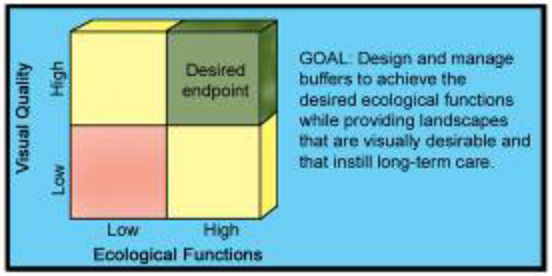
4.4 Windbreaks and crop yields

Windbreaks can increase amount and quality of crop yields by reducing erosion, improving microclimate, retaining moisture, and reducing crop damage by high winds. If prevailing winds are from two directions, windbreaks on two sides may be required. To encourage even distribution of snow across a field for soil moisture, use a density of 30 to 40 percent.



4.5 Alley cropping

Alley cropping is the cultivation of crops grown in between rows of woody plants. Key design considerations include selecting woody plants that provide marketable products, crop timing and management, crop sunlight requirements, and size of farm equipment as it affects spacing requirements. The alley crop can be changed as tree canopy closes over time.



6.5 Developing an ecological aesthetic

Many people, regardless of background, prefer similar visual elements in the landscape. Some of these include:

Commonly preferred visual elements

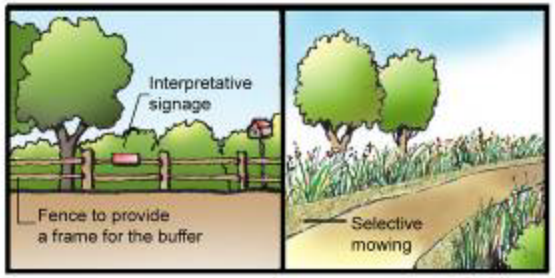
- Waterscapes (e.g., lakes, meandering streams)
- Manicured landscapes
- Savanna or park-like landscapes
- Trees in scale with surrounding features
- Absence of dead and downed wood
- Clean waterways with no or limited woody debris
- Large mature trees and trees with broad canopies
- Spaces defined by edges (e.g., pasture bordered by woods)

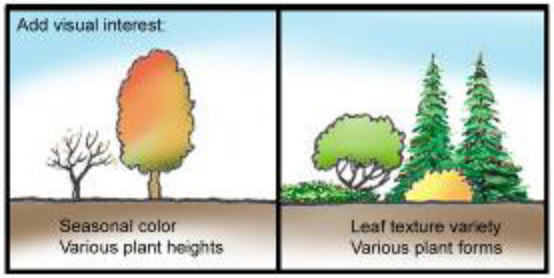
Some of these visual elements are not desirable for achieving goals such as water quality and wildlife habitat. Naturalistic landscapes providing valuable ecological functions are often viewed as untidy and undesirable, while manicured landscapes with limited ecological functions are perceived as demonstrating stewardship and are visually desirable.

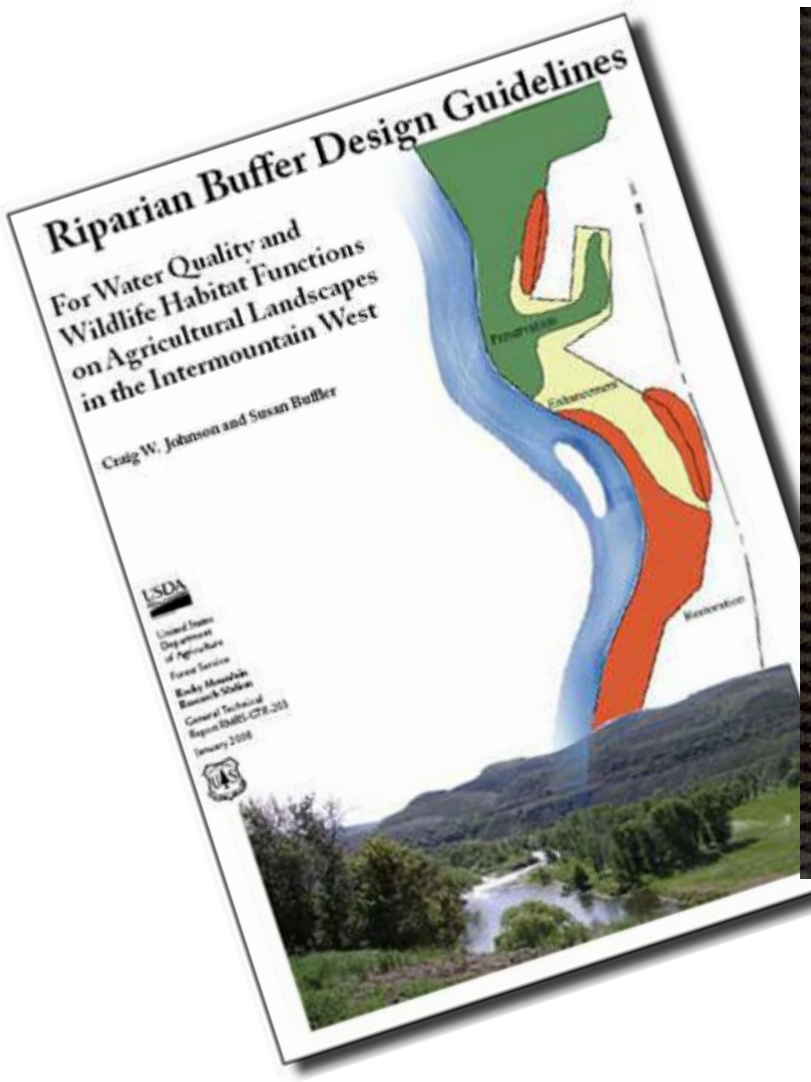
The challenge is to design buffers that achieve the desired ecological functions while providing landscapes that are visually desirable and that instill long-term commitment. The next page provides strategies for addressing this challenge.

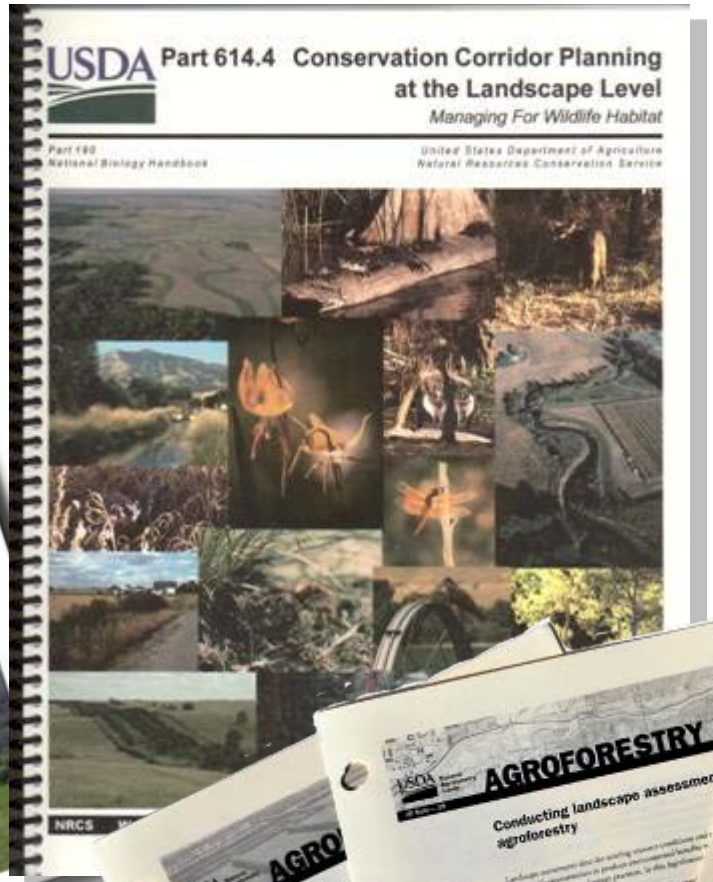
Strategies for enhancing visual preference of buffers

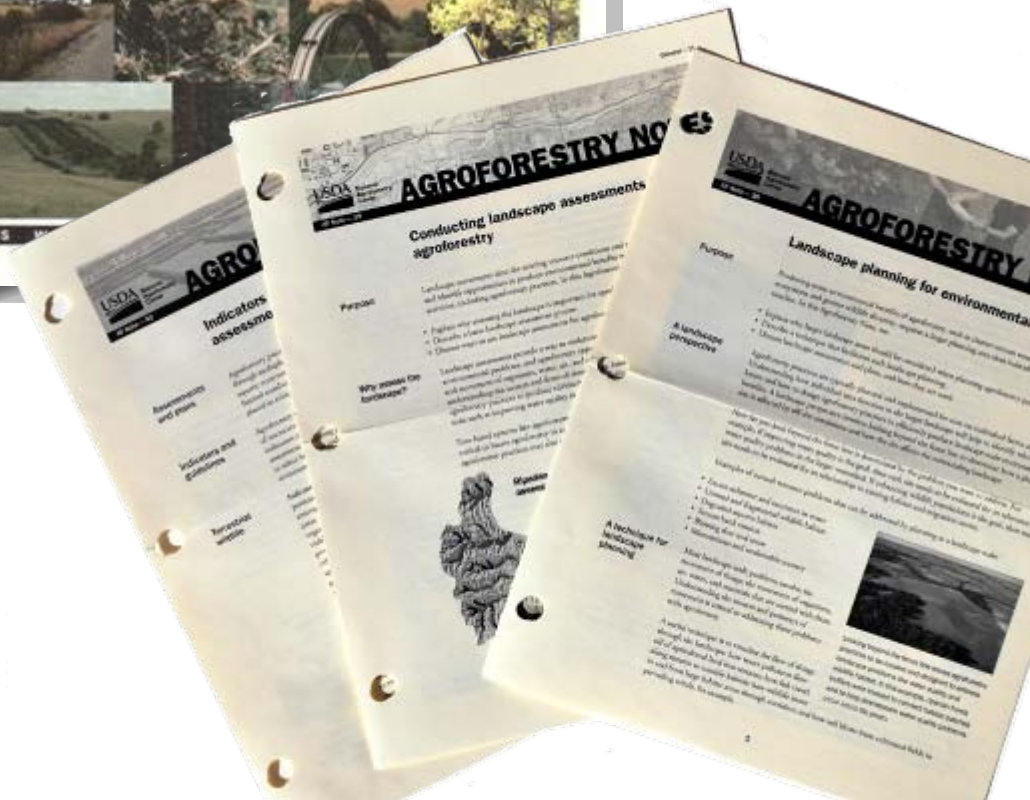
- Design the part of the buffer viewable by the public to be visually pleasing while the interior can be designed to achieve the desired ecological functions.
- Use selective mowing to indicate stewardship without greatly reducing the ecological functions.
- Provide visual frames to contain and provide order around the buffer (e.g., wooden fence).
- Use interpretative signage and education programs to increase awareness and preference.
- Enhance visual interest and diversity by increasing seasonal color and by varying plant heights, textures, and forms.
- Provide simple habitat improvements such as nesting boxes and feeders. Wildlife usually increases visual preference.
- Use bold planting patterns to indicate a designed landscape.





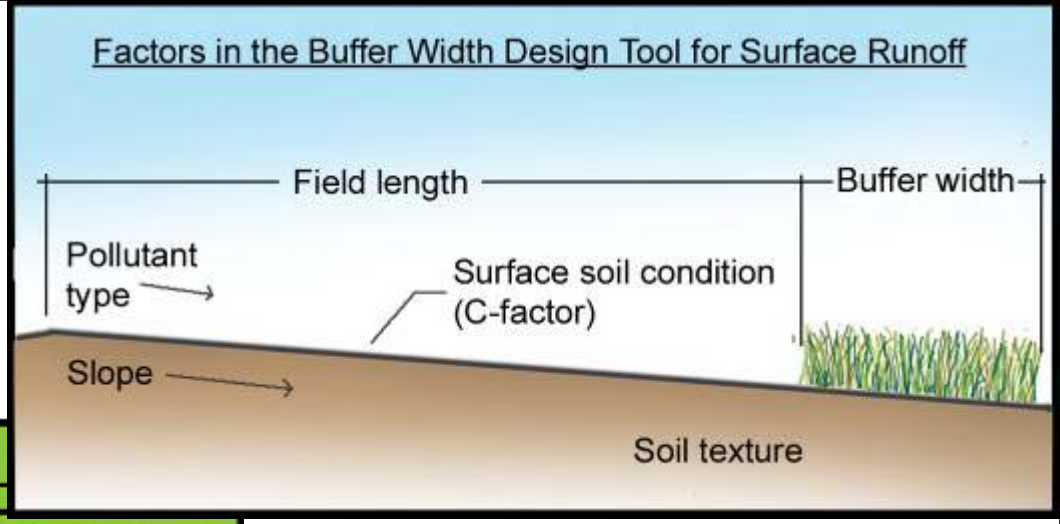


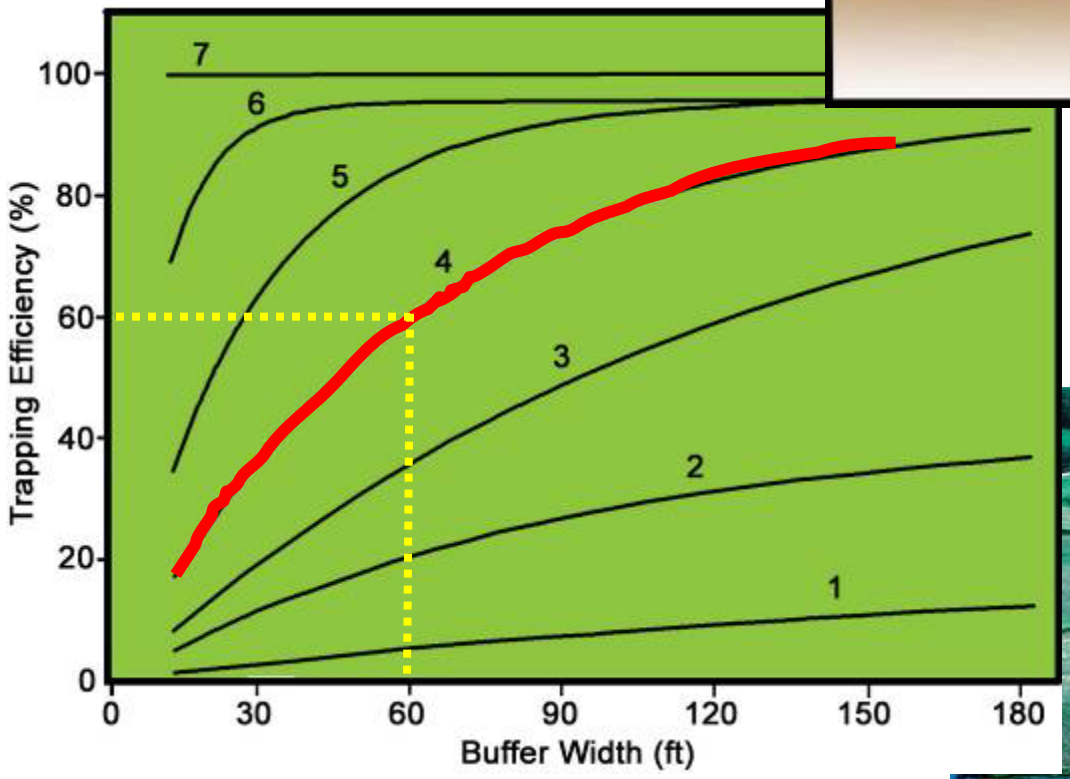


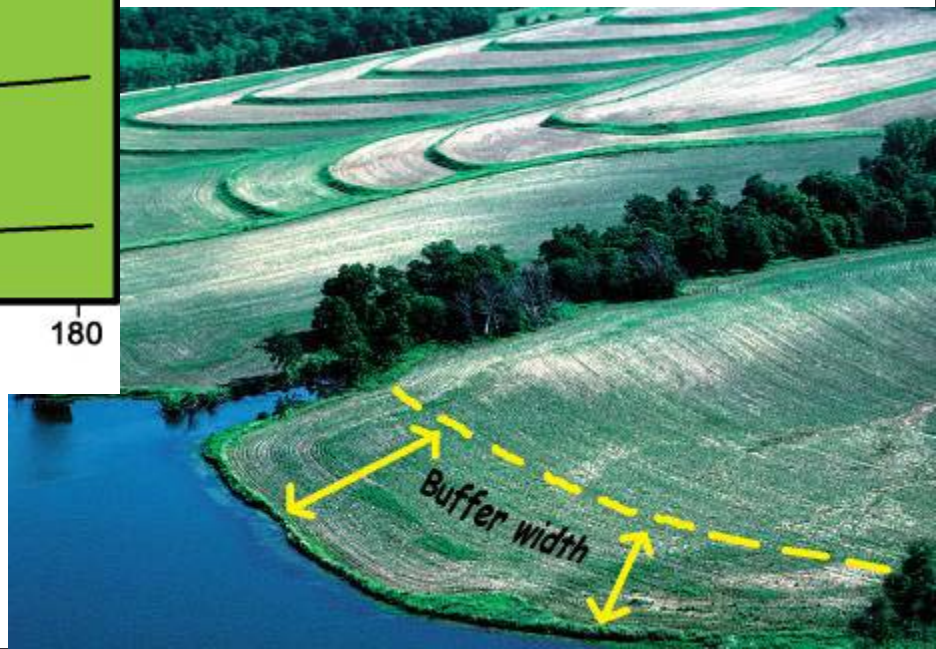


Planning & Design Guides

Buffer Width Tool







(Dosskey et al. 2008)

Microsoft Excel - Buffer$ 2.0.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

Buffer$

Version 2.0 - April 2007

Cost-Benefit Analysis

This sheet compares profits derived from an area in a conservation buffer versus crop production. Begin by entering the required data in the white boxes. Scroll down to enter the quantities for the various costs of establishing the buffer. Complete the analysis by entering the benefits or revenues to be derived from the buffer. Select the Payment Calculator button to access a sheet to calculate CCRP payments if necessary. The summary compares the annual profits derived from these two alternatives.

Main Menu

Plant Schedule

Payment Calculator

Print Page

Additional Graphs

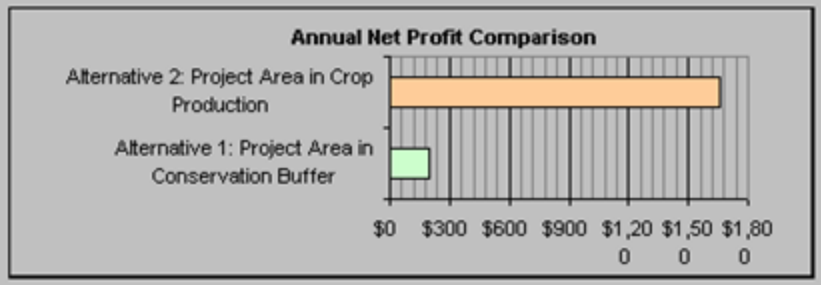
Other Values

Select the Additional Graphs button for pie graphs of the analysis. The Other Values button provides information on the additional benefits that buffers can provide.

Alternative 1: Project Area in Conservation Buffer	
Discount Rate:	3.00%
Project Lifespan (yrs):	15
Project Area (acres)	2.52

Alternative 2: Project Area in Crop Production	
Crop Name:	Corn
Expected Yield (bu/acre):	170
Expected Price ($/bu):	$5.70
Estimated Crop Subsidy ($/acre):	$10
Crop Production Costs ($/acre):	$320

Summary: Annual Net Profit Comparison	
Alternative 1: Project Area in Conservation Buffer	$198
Alternative 2: Project Area in Crop Production	$1,661



Scroll down to input costs/benefits for the conservation buffer

Main Menu | Inst. Videos | Plant Schedule | Cost Benefit | Other Values | Removal | Payment Calculator | Description | Other Tools | Graphs | PlantList | Soil Ty

Draw AutoShapes

Ready NUM

Start | Gary Be... | Class M... | Bentrup... | Souther... | Windstr... | Buffer$ | Micros... | 2:12 PM

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