

# Forest Seminar Series: Working Buffers Webinar

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# Welcome!

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We will begin promptly at 7:00 PM.

*Please use the chat to let us know from where you are tuning in*



PennState Extension

# Introduction to Working Buffers-

## *The Buffers You Can Eat!*

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9 April 2024



# Cathryn Pugh

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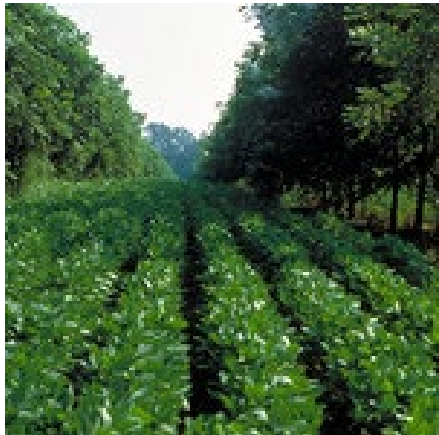
## Areas of Expertise:

- Agroforestry
- Non-timber Forest Products
- Native Plant Education
- Youth Education



# Agroforestry Practices

Alley Cropping



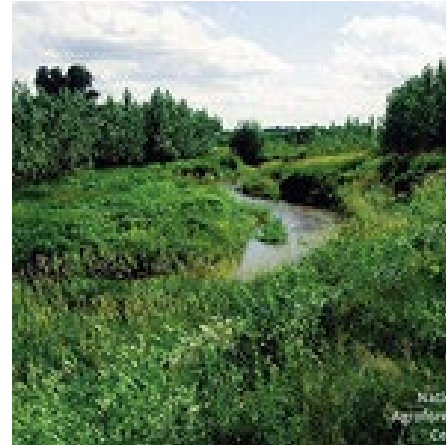
Silvopasture



Windbreaks



Riparian Buffers



Forest Farming



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~43%

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Of rivers and stream miles in the US have excess  
nutrients



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# Riparian Buffers

## Multifunctional Buffers: Edible and Floral Plants

## Water Quality Effects of Multifunctional Working Buffers for Seasonally Wet Farmland

This event has passed.

## Developing Business Models for Working Forest Riparian Buffers

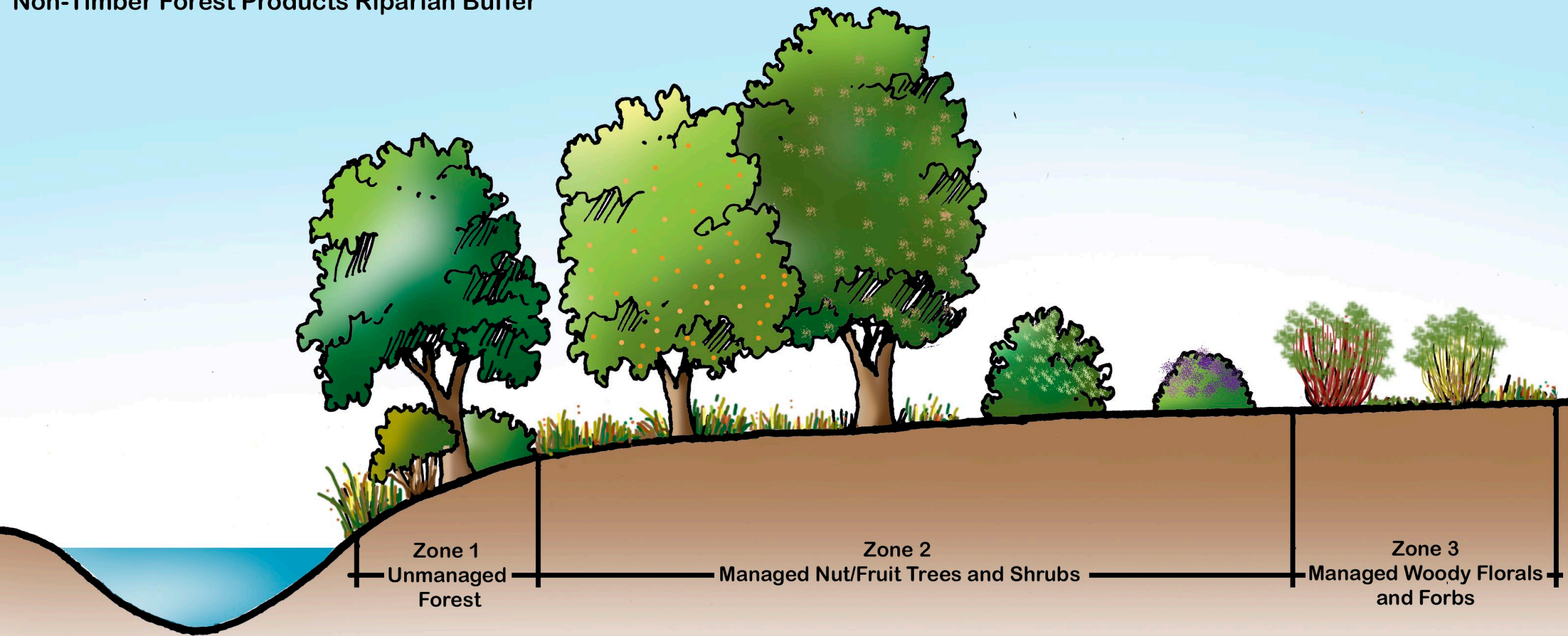
[VIEW WEBINAR RECORDING](#)

ARTICLES

## Multifunctional Riparian Forest Buffers: More Than Just Trees

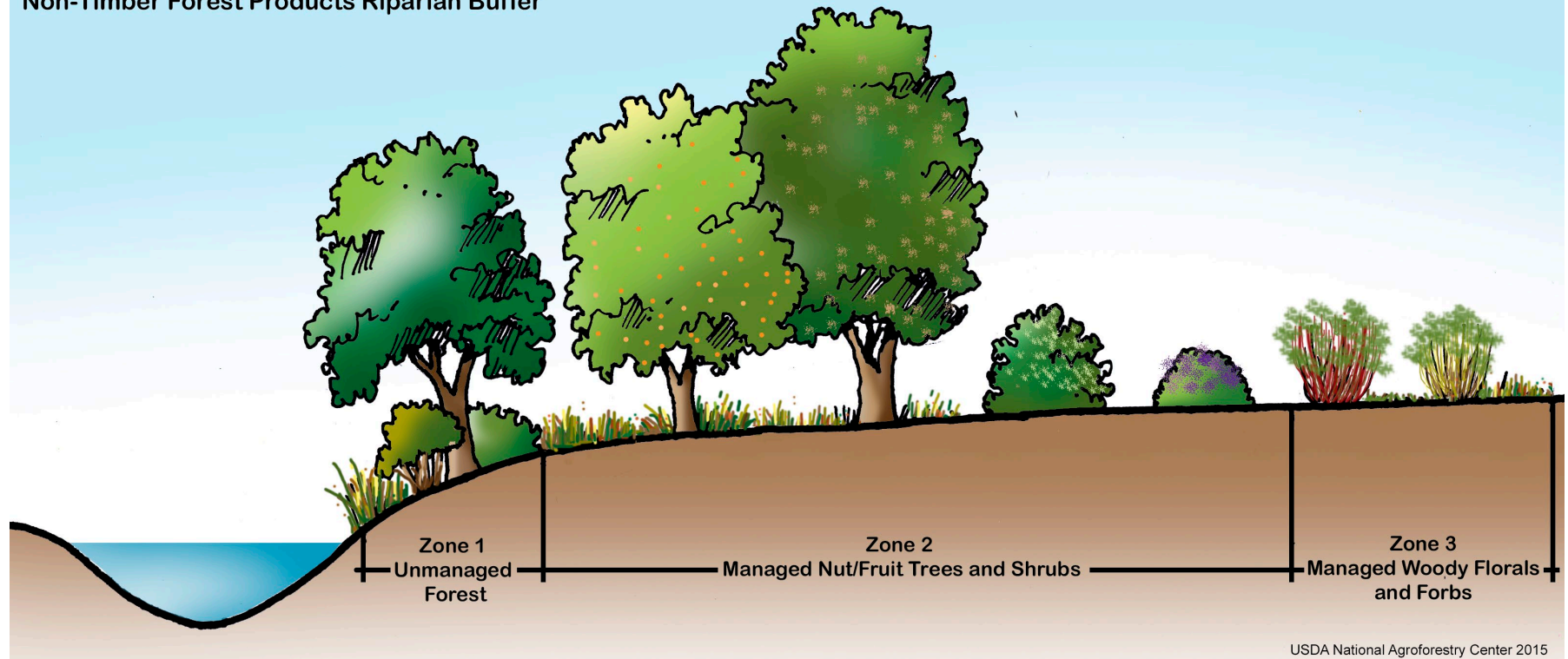
The Agroforestry Buffers Frontier: Planting “extreme” agroforestry buffers to improve water quality and farmers’ bottom lines

# Non-Timber Forest Products Riparian Buffer



USDA National Agroforestry Center 2015





# Installation & Maintenance

## Multifunctional Riparian Forest Buffers



**PennState Extension**

Travis Wingard, Extension Educator

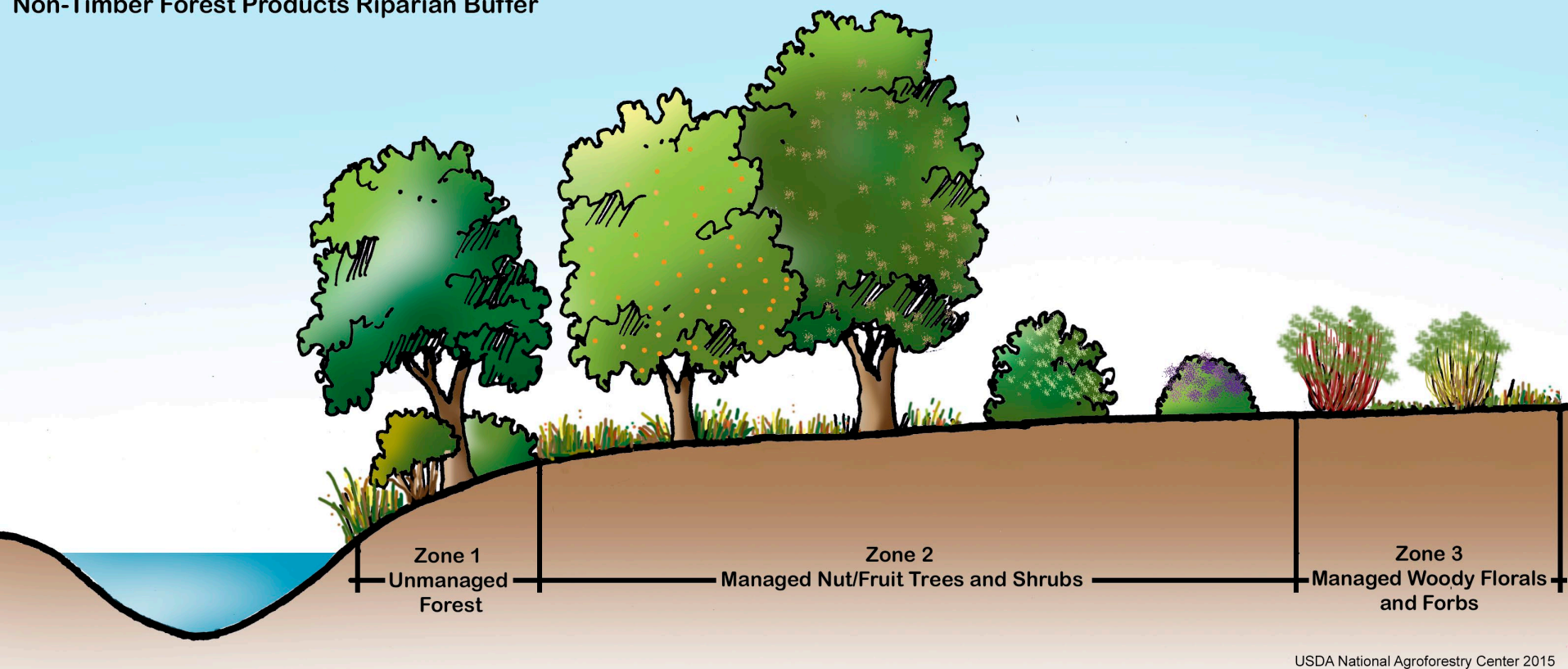
# What is a *multifunctional* riparian forest buffer?

- “A riparian forest buffer that provides opportunities for harvesting products such as nuts, berries, woody florals, forbs, and potentially woody biomass” – DCNR
- Achieve both conservation and production benefits



# What we'll be covering:

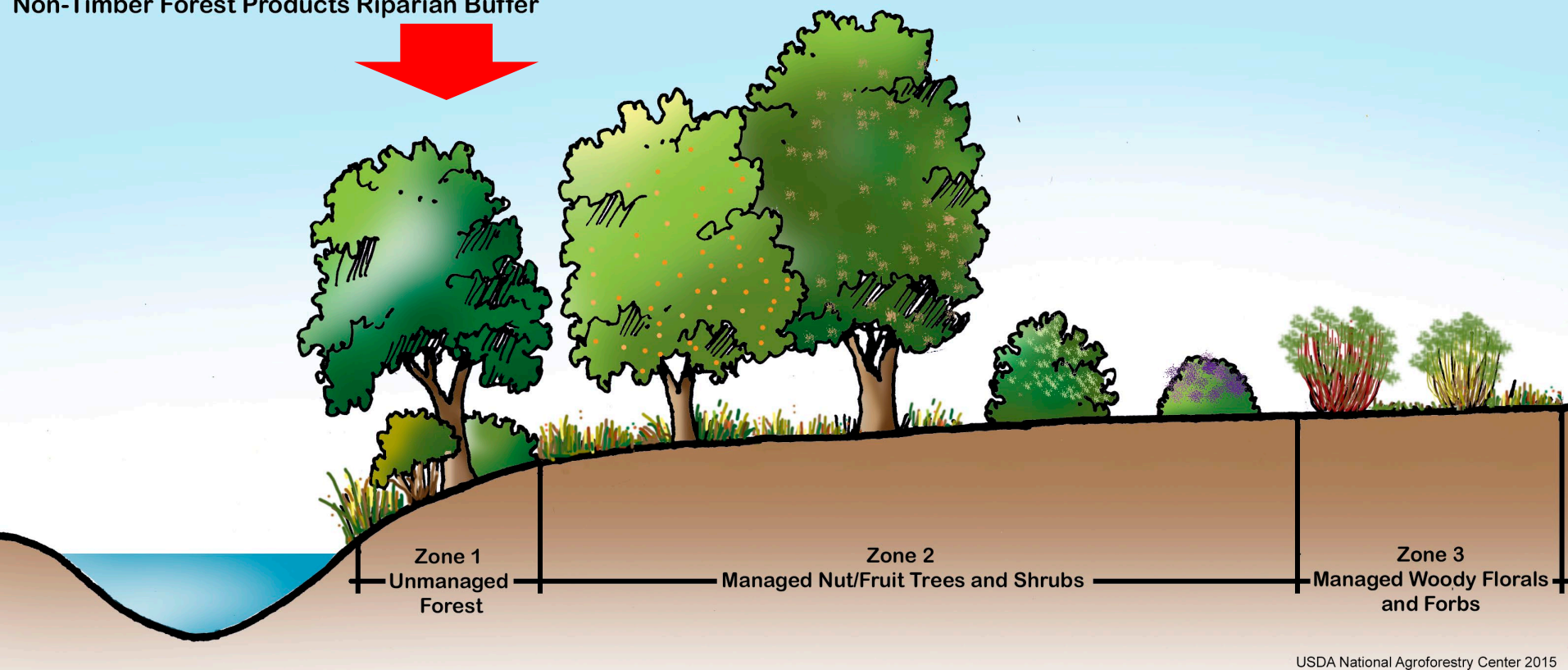
- What is installed in the three multifunctional riparian forest buffer (MRFB) zones.
- Maintenance suggestions for the three MRFB zones.
- A few examples of native & non-invasive species for each MRFB zone.



USDA National Agroforestry Center 2015

## Multifunctional Riparian Buffer Design

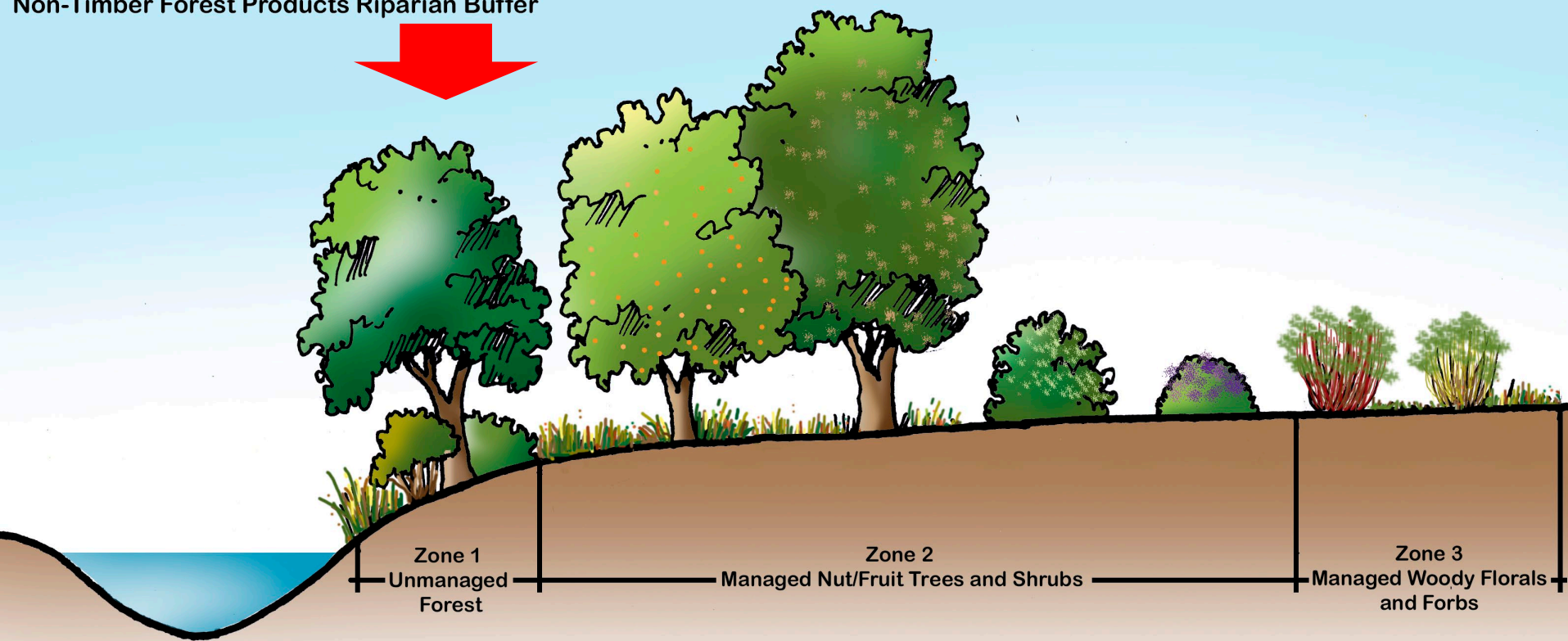
- Zone 1: Unmanaged Forest
- Zone 2: Managed Nut/Fruit Trees & Shrubs
- Zone 3: Managed Woody Florals & Forbs



# Multifunctional Riparian Buffer Design

## Zone 1: Unmanaged Forest

- From stream edge to 15 feet
- Native riparian forested trees and shrubs
- No harvesting zone
- Great candidate for live-staking



USDA National Agroforestry Center 2015

## Establishment and Maintenance

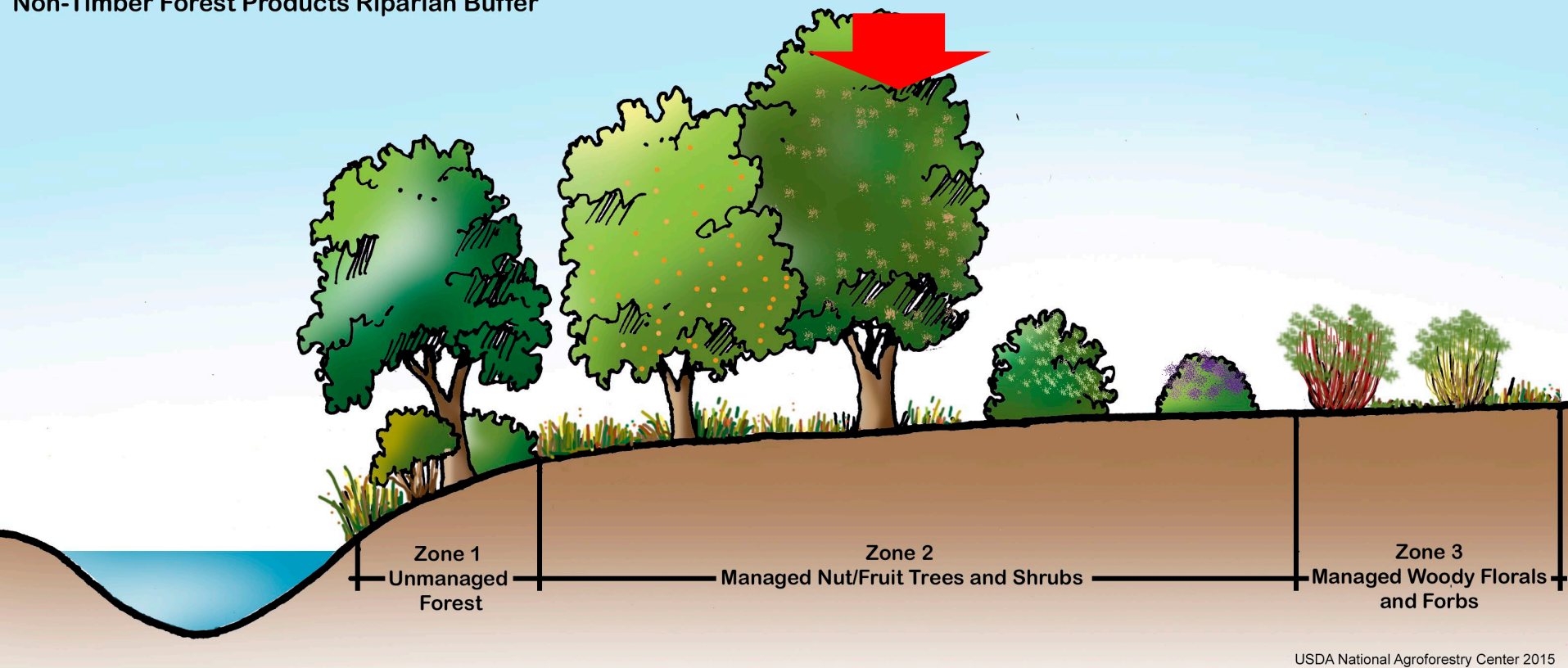
### Zone 1: Unmanaged Forest

- Herbicide use allowed, but should be minimized
- Spacing and density varies
- Bare root seedlings, containerized stock, direct seeding

# Example of Multifunctional Buffer Plants: Zone 1

- Silver maple
- Red maple
- Box Elder
- River Birch
- Sycamore
- Black Willow
- Swamp White Oak
- Pin Oak
- Red Osier & Silky Dogwood





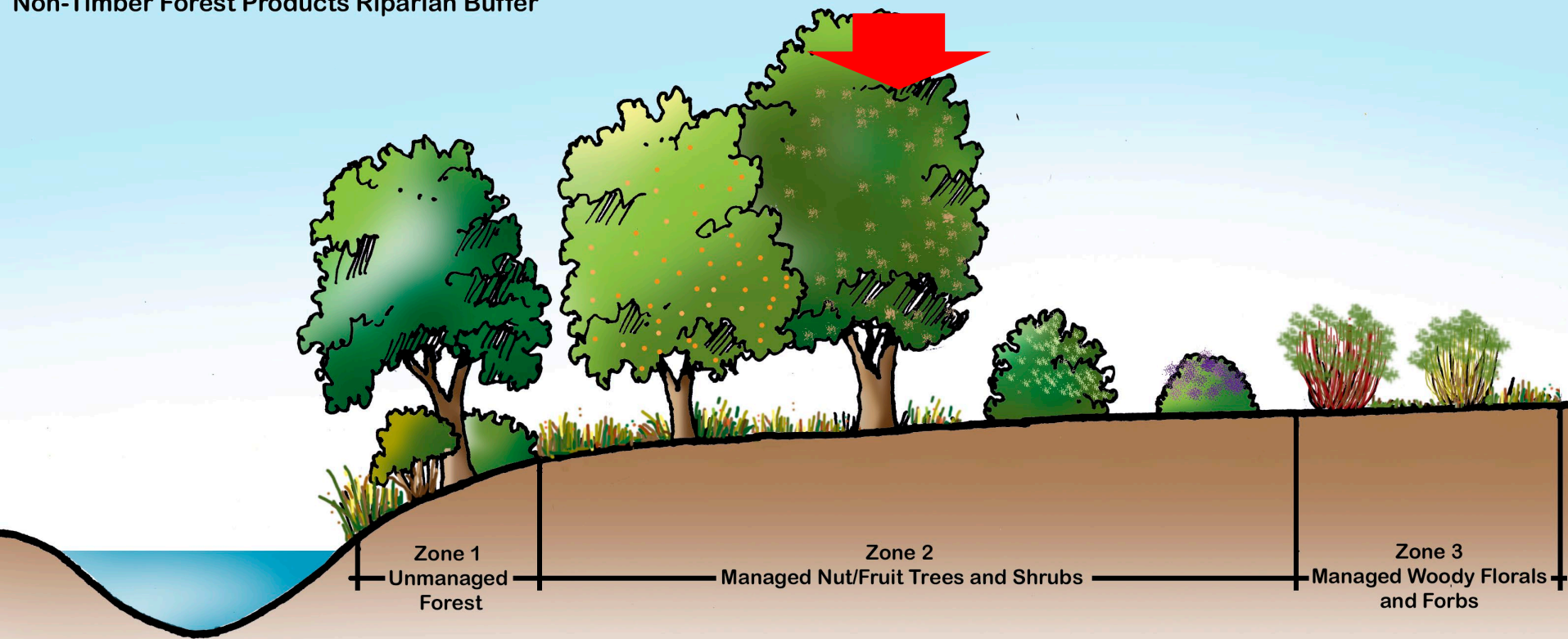
USDA National Agroforestry Center 2015

# Multifunctional Riparian Buffer Design

## Zone 2: Managed Nut/Fruit Trees & Shrubs

- From edge of Zone 1 to 20 – 35 ft+
- Fruit and nut trees and shrubs
- Mechanical harvesting allowed





USDA National Agroforestry Center 2015

## Establishment and Maintenance

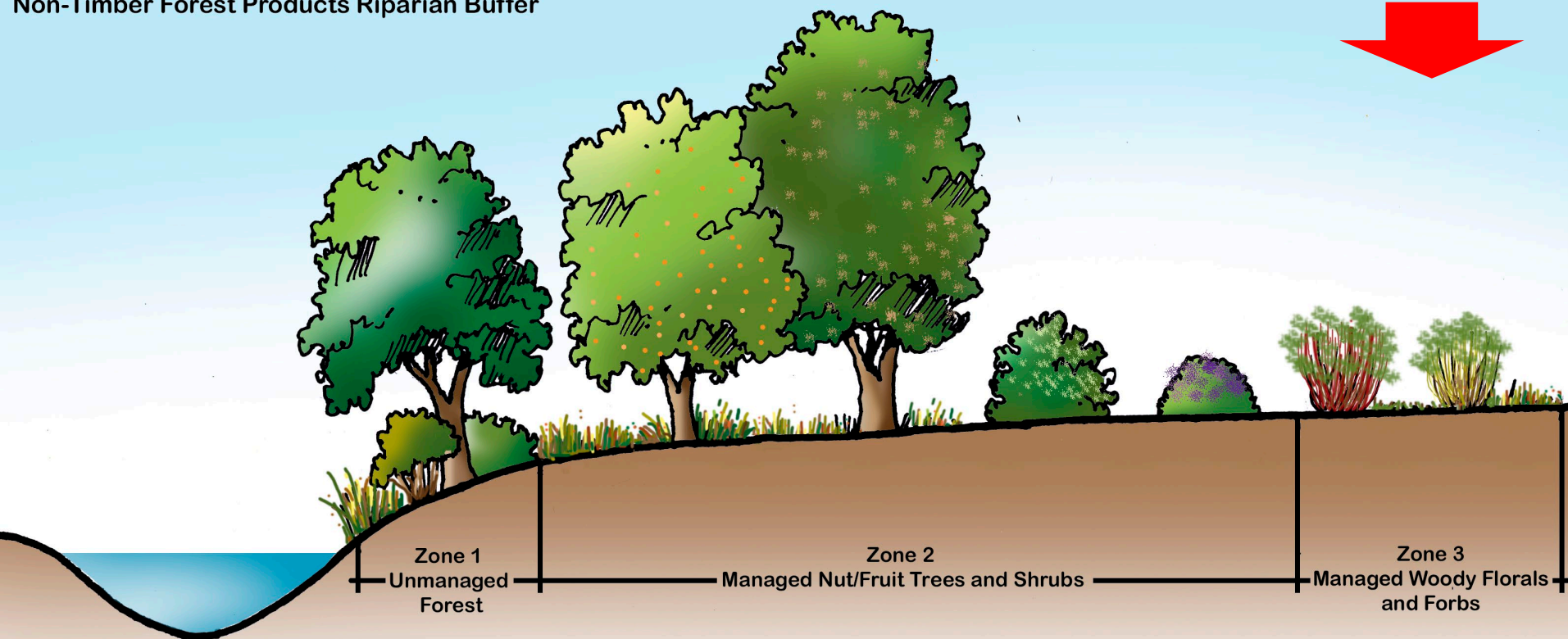
### Zone 2: Managed Nut/Fruit Trees & Shrubs

- Herbicide use allowed at site prep and twice annually
- Containerized stock preferable
- Width varies on hydrology, soil type, and site conditions

## Example of Multifunctional Buffer Plants: Zone 2

- Serviceberry
- Black Walnut
- Raspberry
- Elderberry
- Chokeberry
- Highbush Blueberry
- American Hazelnut
- Crabapple
- Pawpaw
- Persimmon



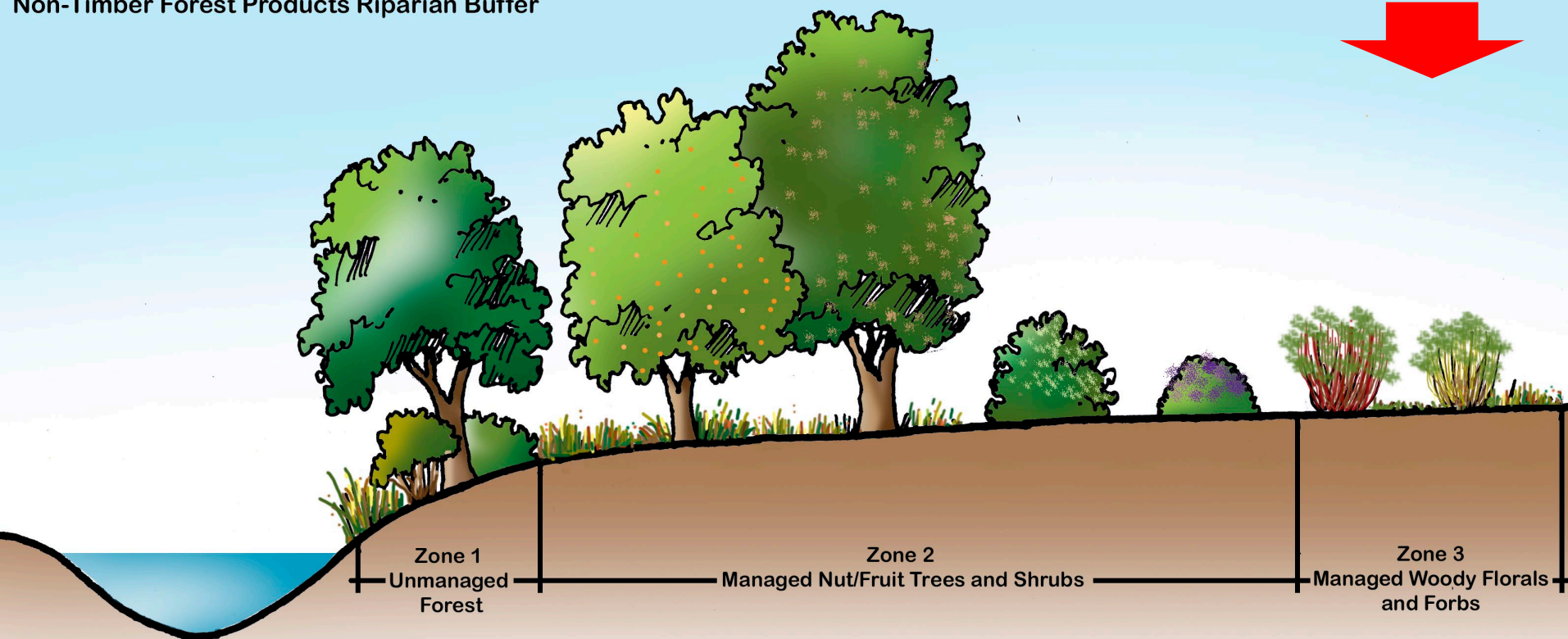


USDA National Agroforestry Center 2015

# Multifunctional Riparian Buffer Design

## Zone 3: Managed Woody Florals & Forbs

- From edge of Zone 2 to 50 – 100 ft+
- Woody florals, forbs (including biomass crops)
- Mechanical harvesting allowed



USDA National Agroforestry Center 2015

## Establishment and Maintenance

### Managed Woody Florals & Forbs

- Herbicide use allowed at site prep and twice annually
- Mechanized planting and harvesting allowed
- Live-stakes, bare root, direct seed, and containerized stock

## Example of Multifunctional Buffer Plants: Zone 3

- Dogwood
- Pussy willow
- Quince
- Witch hazel
- Curly willow
- Hydrangea
- Chestnut
- Perennial wildflowers
- Warm & cool season grasses



# Additional Resources

- DCNR Concept for Multifunctional Riparian Forest Buffers  
[https://www.grants.dcnr.state.pa.us/Documents/Summary\\_Multifunctional%20Stream%20Buffer%20Program.pdf](https://www.grants.dcnr.state.pa.us/Documents/Summary_Multifunctional%20Stream%20Buffer%20Program.pdf)
- DCNR, Edible and Floral Riparian Plants  
<https://pecpa.org/wp-content/uploads/DCNR-Riparian-Plants-Book.pdf>
- USDA – National Agroforestry Center, “Riparian Forest Buffers: An Agroforestry Practice”  
<https://www.fs.usda.gov/nac/assets/documents/agroforestrynotes/an49rfb01.pdf>
- USDA – National Agroforestry Center, “Why add edible and floral plants to riparian forest buffers?”  
<https://www.fs.usda.gov/nac/assets/documents/workingtrees/infosheets/WTInfoSheet-MultiFunctionalBuffer.pdf>
- Virginia Cooperative Extension “How to Plan for and Plant Streamside Conservation Buffers with Native Fruit and Nut Trees and Woody Floral Shrubs” <https://www.pubs.ext.vt.edu/ANR/ANR-69/ANR-69.html>

## Water



### Drinking and Residential Water

Make clean water a priority. Test and treat drinking water, build and manage a well, and improve water quality for you and your family. Conserve water and lower your bill.



### Pond Management

Increase your pond expertise. Uncover educational content to help you build and manage a pond. Explore aquatic plants, invasive species, pond construction, and pond ecology.



### Stormwater Management

Protect your home, business, property, and septic system from flooding and storm damage. Improve stormwater quality. Build cisterns, rain gardens, and more.



### Wastewater Management

Discover educational content to help you build, maintain, and troubleshoot a private or industrial septic system.



### Water for Agriculture

Use quality water for your crops and livestock. Discover nutrient management techniques, test and improve water quality, conserve water, and more.

# Penn State Extension's Master Watershed Steward Program (MWS)

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# Image Credits

1. [Non-Timber Forest Products Riparian Buffer](#) by National Agroforestry Center on flickr.com licensed under CC BY-2.0
2. Kristen Kyler, Penn State
7. [Quercus bicolor – Swamp White Oak](#) by Virens (Latin for greening) on flickr.com licensed under CC BY 2.0
10. [Elderberry](#) by karen\_hine on flickr.com licensed under Public Domain
13. [Pussy willows](#) by liz west on flickr.com licensed under CC BY 2.0





An aerial photograph of a rural landscape. In the foreground, there's a dense forest of green trees. To the left, a winding road or path leads through a green field. In the middle ground, a small farm with several white buildings, including a barn, is visible. The background shows more green fields and a distant treeline under a clear sky.

# Products and Markets of Working Buffers

**Robbie Coville, PADCNR Bureau of Forestry**

*Intro to Buffers You Can Eat! webinar*

April 9, 2024

# Spectrum of goals and markets



Home use

Small scale

Value-added, retail

*Purpose*

*Scale*

*Sales*

Commercial use

Larger scale

Wholesale

# Forest Farming



# Alley Cropping



# Silvopasture



# Short Rotation Coppice



# *Like* Forest Farming / Gardening



- Food—fruits, nuts, mushrooms, syrups, seasonings
- Medicinal—mushrooms, roots, teas, tinctures
- Decoration— woody florals, dried berries
- Crafts—wreaths, baskets, rods for artisans
- Other specialty goods

# Pawpaw

- Naturally more shade tolerant
- Best production in full sun
- Moist, rich soils
- Plant in spring
- Fruit production 5-7 yrs.
- Cultivars



# Ramps

- Mixed hardwoods
- North- and east-facing slopes
- Indicators—trout lily, mayapple, trillium, nettle
- Harvest --- April
- Planting bulbs --- Mid-March to early April
- Seeds --- August - September



# Nuts—Foraged



**BLACK WALNUTS**

**HICKORIES, ACORNS**

# Nuts—Cultivated

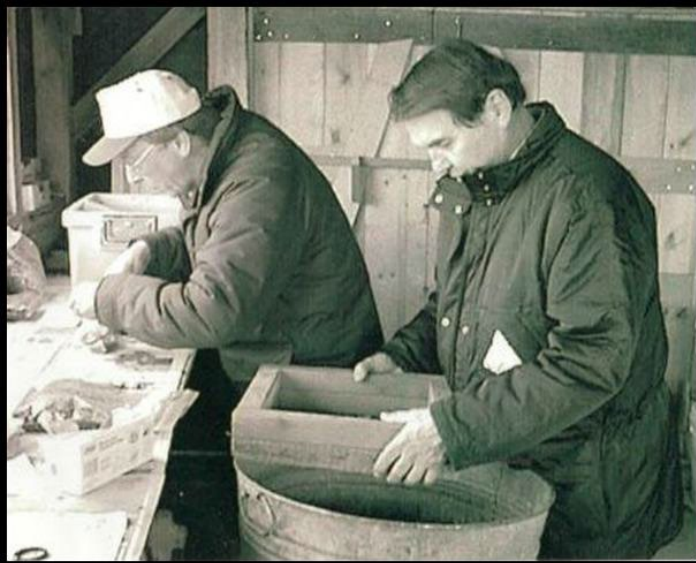


## HAZELNUT

- Windbreak, edge, intermittent stream
- Can spread through suckers
- Netting or other protection
- Can produce 10-15 lbs.



# Nuts—Cultivated



## CHESTNUT

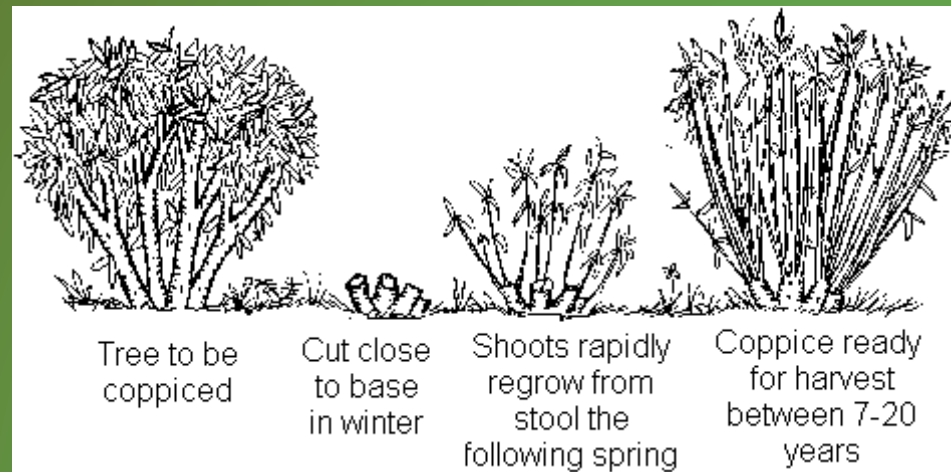
- Upland alleys and fields
- Fresh nuts
- Dried/frozen nuts
- Gluten-free flour
- Co-op opportunities ?

# Fruits & Berries

- Species:
  - **Elderberry**
  - American persimmon
  - Chokecherry (Aronia)
  - Serviceberry (Saskatoon)
  - Blueberries (acidic soils)
  - Spicebush berries
  - Crabapples
- Windbreak/edge plantings or moremanageable orchards
- Medicinal or culinary uses



# Short Rotation Woody Crops (Woody Biomass, Coppices & Pollards)



- Moist & marginal areas
- Zone 3 management
- Low-tech or high-tech fuel sources, crafts

- Shrub willows
- Poplars
- Black locust
- Osage orange
- Silver maple
- Hazels/birches, oaks, lindens and more!



# A Few More Examples...

- Maple syrup (silver maple and red maple tolerate wetter sites and grow quickly)
- Winterberry holly
- Dogwoods
- Pussy willow
- Hydrangea
- Curly willow
- Witch hazel



# Sample Income Potential *Elderberry & Woody Florals*

## *Elderberry*

- **Flowers:** \$4-5/oz retail
- **Berries:** \$3/lb retail
- **Juice:** \$15-20/ 11oz jar
- **Syrup:** \$10-20/ 4oz jar retail
- **Wine:** \$10-13/bottle retail
- **Cough drops:** \$2.50/ 12 retail
- **Concentrate:** \$20-25/375ml
- **Cuttings:** \$1-2.50 each
- **Plants:** \$5-15 each



Photos:  
Fairfax County Public Schools  
[continuumhealing.com](http://continuumhealing.com)  
[Goodmorninggloucester.com](http://Goodmorninggloucester.com)  
[gardensofgrowth.com](http://gardensofgrowth.com)



## *Woody Florals & Rods*

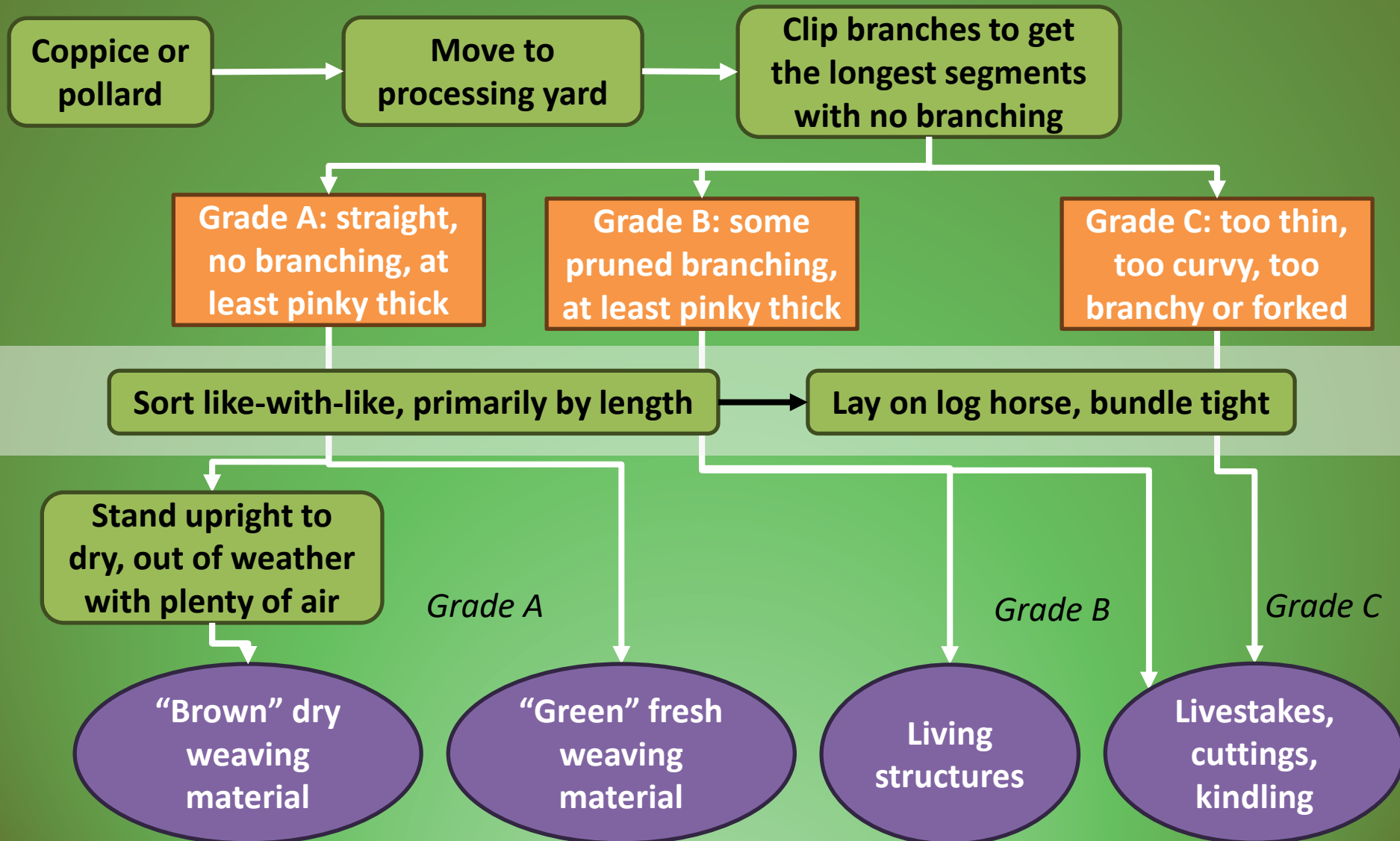
*(e.g. dogwood, shrub willow)*

- **Cuttings:** \$0.37-0.45/ stem  
*(some species up to \$6/stem)*
- **Rods for weaving:** \$12-15/lb  
*dry rods (increase w/ rod length)*
- **Wreaths:** \$45+ each retail

Source: *Farming the Woods* by Ken Mudge and Steve Gabriel  
USDA National Agroforestry Center  
University of Kentucky

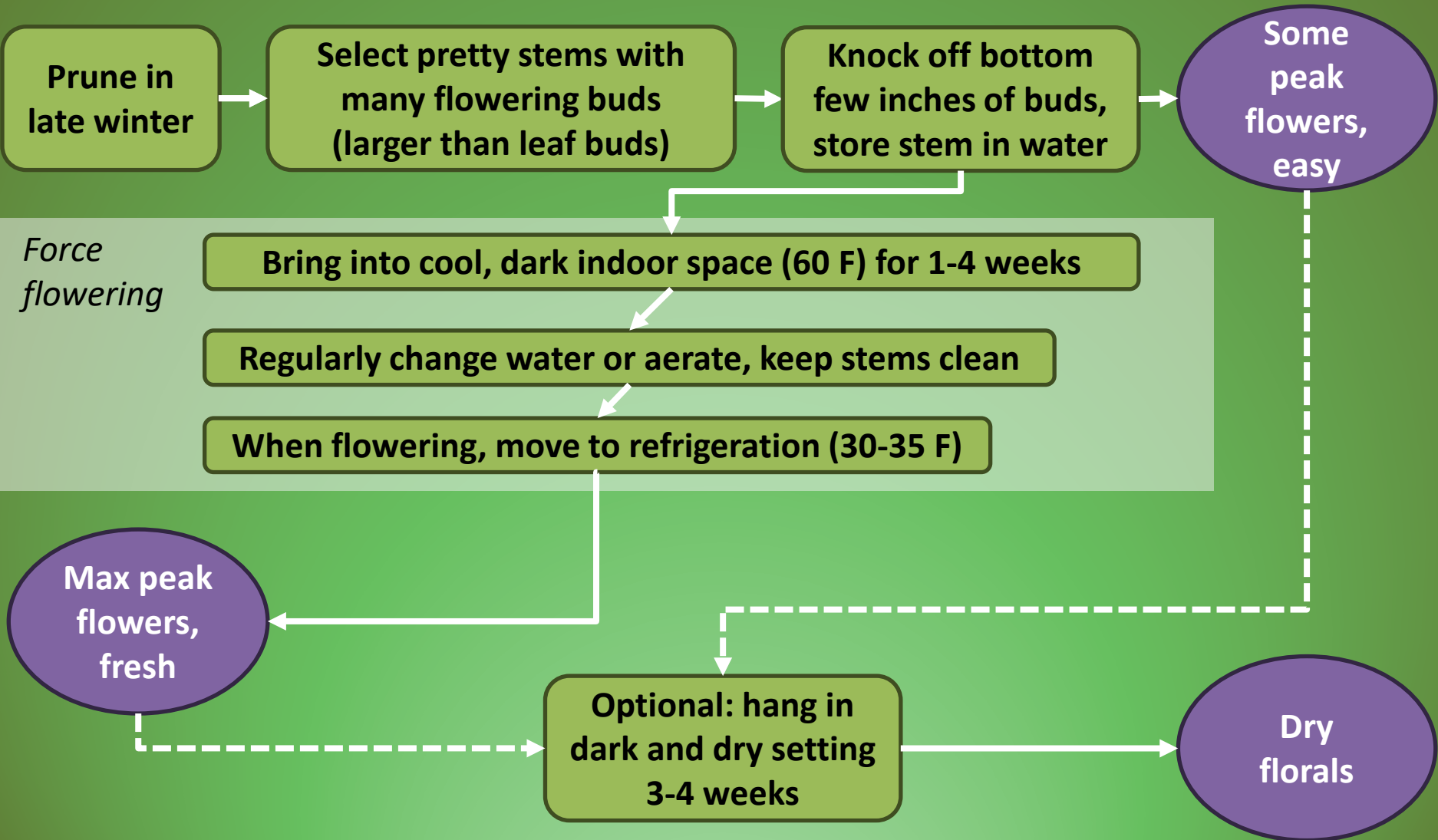
# Sample Workflow from Buffer to Market

## *Willow Rods for Weaving Crafts*



# Sample Workflow from Buffer to Market

## *Woody Cut Florals*



# Sample Workflow from Buffer to Market *Points of Sale*

Grade-A  
willow rods

Florals

Cuttings

Livestakes

Nut butters

Tinctures

Nuts In-Shell

Syrups

Jams

- Existing direct-to-consumer: farm stand, CSA
- Retail partnerships: local florists, grocers, herbalists
- Online retail: Etsy (takes a cut), online marketplaces, your own searchable website
- Produce auction for overflow if possible (e.g. for florals)

Ideally, ask potential buyers what they need ahead of time. Plan & plant accordingly, adjust for your own efficiencies.

If you already have a buffer, explore what works for buyers and your logistics, then propagate & scale up those plants.



# Multi-Functional Buffer Concept: Publications

Penn State **Extension**

## AGRICULTURAL ALTERNATIVES

### Highbush Blueberry Production







Blueberries can be a suitable crop for small-scale and part-time farm operations. However, blueberry production is a for everyone due to the specialized cultivation requirements of the plants and the relatively short shelf life of the fruit. The initial investment is high, primarily because of the cost of preparing the land, establishing plants, and installing an irrigation system. However, equipment needs for small plantings are minimal once the plants are established and healthy, well-tended plants can be expected to bear fruit for fifty years or more. Demand for blueberries has been strong in recent years, and fresh-market prices have been relatively high because per capita consumption of blueberries in the United States has been increasing.

To meet this growing consumer demand, commercial blueberry acreage and production has doubled in the past fifteen years. Major increases have occurred in the Pacific Northwest, California, and in the southeastern United States. Half of world's commercial production is from the United States, with considerable production also occurring in Canada and Poland.

Four types of blueberries are grown North America: northern highbush (used in commercial plantings in cooler climates), lowbush (wild fruit harvested commercially in New England), and southern highbush and rabbiteye (used in commercial plantings in the southern United States). This publication focuses on northern highbush blueberry production.

*This publication was developed by the Small-scale and Part-time Farming Project at Penn State with support from the U.S. Department of Agriculture-Extension Service.*

**Edibles and florals harvested from multifunctional riparian forest buffers\***

Pawpaw	Persimmon	Elderberry
 <p><b>Market Opportunities</b> With a tropical flavor, custard texture and high nutrient content, America's forgotten fruit can be eaten fresh or made into desserts.</p> <p><b>Average Prices</b> Fresh fruit: \$2/lb wholesale \$3+/lb retail Frozen pulp: \$6/lb retail Jam: \$8/oz jar retail</p>	 <p><b>Market Opportunities</b> The "Fruit of the Gods," sweet persimmon can be sold fresh or made into pudding, jam, dried fruit and even beer.</p> <p><b>Average Prices</b> Fresh fruit: \$2.76/lb retail Frozen pulp: \$8+/lb retail Dried fruit: \$11+/lb retail</p>	 <p><b>Market Opportunities</b> Coined "Nature's Medicine Chest" for its immune boosting properties, elderberries can be made into syrup, cough drops, juice, wine, jam and food coloring.</p> <p><b>Average Prices</b> Juice: \$15-\$17/11oz jar Syrup: \$18/4oz jar retail Wine: \$10-\$13/bottle retail Cough drops: \$2.50/16 retail</p>
Hazelnut	Woody Florals	Black Walnut
 <p><b>Market Opportunities</b> A great source of fiber and "good" fats, hazelnuts can be sold in shell or shelled and made into flours, candies, butters and oils.</p> <p><b>Average Prices</b> In shell: \$3/lb wholesale \$6/8oz retail Oil: \$8/8oz jar retail</p>	 <p><b>Market Opportunities</b> Woody florals, such as pussy willow and red and yellow twig dogwood, can be coppiced every 2-3 years and sold to the floral industry or used in crafts.</p> <p><b>Average Prices</b> Cuttings: \$0.37-0.46/stem retail Wreaths: \$45-60 retail</p>	 <p><b>Market Opportunities</b> The multi-use tree produces valuable timber and heart-healthy nuts sold in shell or shelled.</p> <p><b>Average Prices</b> In shell: \$9.25/lb retail Shelled: \$12/lb retail</p>

\*Prices can vary considerably by season and local markets.

## How to Plan for and Plant

Streamside Conservation Buffers  
with Native Fruit and Nut Trees  
and Woody Floral Shrubs



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APPALACHIAN  
sustainable  
DEVELOPMENT



Cooperating Agencies: USDA National Agroforestry Center, 4805-1278 St. 4011, Box 4801-1278, 1940 N. 9th St., Ames, IA 50010; and the National Agroforestry Center, 1000 North 17th Street, Raleigh, NC 27617. USDA is an equal opportunity provider and employer.

# Thank You!

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PA Agroforestry Peer Network survey:  
[www.bit.ly/PAAPNsurvey](http://www.bit.ly/PAAPNsurvey)

Summary of funding for agroforestry in PA:  
[www.bit.ly/PAagroforestryassistance](http://www.bit.ly/PAagroforestryassistance)

