Live Stakes:

A Simple, Natural Solution to Stabilizing Streambanks

PRESENTED BY:

BRITTNEY HARTZELL, WATERSHED SPECIALIST

COLUMBIA COUNTY CONSERVATION DISTRICT

4/9/2021

webinar begins at noon

Welcome! If you are reading this, then you are successfully seeing the webinar video! Webinar audio should be automatic through your computer. If your computer audio does not work, you can listen on your phone by opening the audio options (arrow in bottom left by the microphone), click “switch to phone audio”, and following the directions on the popup screen.

While you wait, please take a moment to locate your “chat box”, introduce yourself, and answer the question of the day:
What is your favorite spring/summer outdoor activity?

PA DEP 2020 Environmental Education Grant

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Financial and other support for developing this workshop has been provided by the Department of Environmental Protection's 2020 Environmental Education Grants Program.

Columbia County Conservation District

COLUMBIA COUNTY
CONSERVATION DISTRICT

The mission of the Columbia County Conservation District is to lead the citizens of Columbia County in sustainable use of our shared agricultural and natural resources through partnerships, education, and technical assistance, in order to assure the best quality for life for future generations.

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www.columbiaccd.org

Agenda

Today's Webinar: 4/9 noon-1pm

What is "live staking"

Species to know

How to harvest

How to install/plant

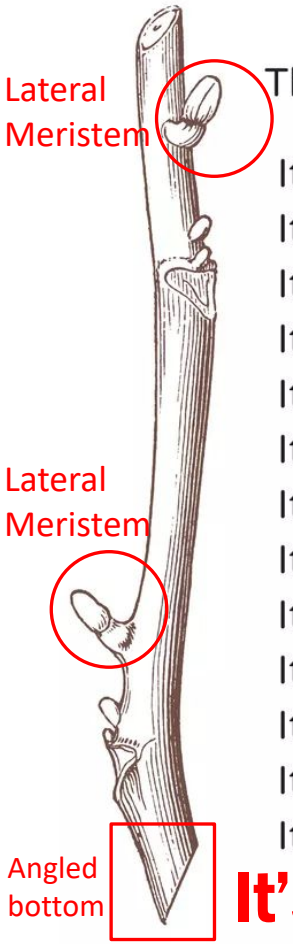
Q&A

Tomorrow's Workshop: 4/10 10am-noon*ish*

In-field species ID

Collect live stakes (and plant at home!)

7 spots available! Sign up at www.columbiaccd.org/workshops



This is not a stick...

It's a wand
It's a guitar
It's a shovel
It's a horse
It's a baton
It's a telescope
It's a sword
It's a microphone
It's a ski pole
It's a spoon
It's a fishing pole
It's a treasure finder
It's a paddle.

It's a live stake!

and anything else a child can imagine!

What is “live staking”?

Easy, cost-effective method for revegetating bare banks and preventing streambank erosion

Live stakes = Cuttings from dormant woody vegetation planted into wet soils of streambanks

Over time, plants will grow into fully rooted trees/shrubs

Roots hold soil in place, prevents erosion

What's causing my stream to erode?

Lack of permanent streamside vegetation

Lack of access to floodplain

Stormwater runoff

Stream disturbances

Mowing up to bank edge

Conversion of land to grasses and impervious surfaces

Livestock access to stream

Historic land use / fine legacy soils

Why use live stakes?

Easy peasy

Cheap / FREE

Quickly re-vegetate streambanks

Reduce erosion and land loss

Improve water quality, filter pollutants

Reduce stormwater runoff into streams

Provide shade to coldwater streams

Wildlife will thank you

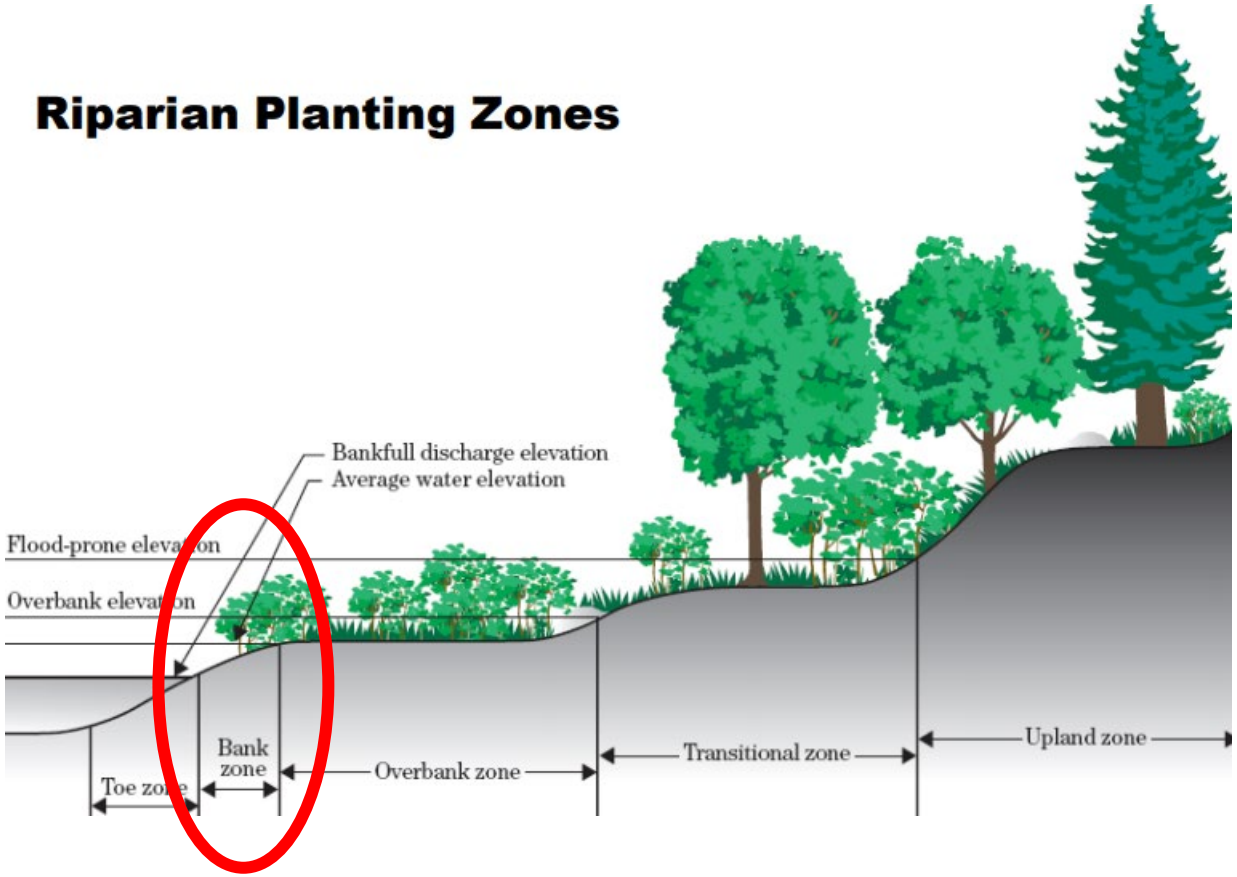
Flood resilient species

Where to plant them?

Minimally or non-vegetated stream banks

Plant in wet / saturated zone

BONUS POINTS if you continue plantings for a complete riparian buffer!



How live staking works (basic)

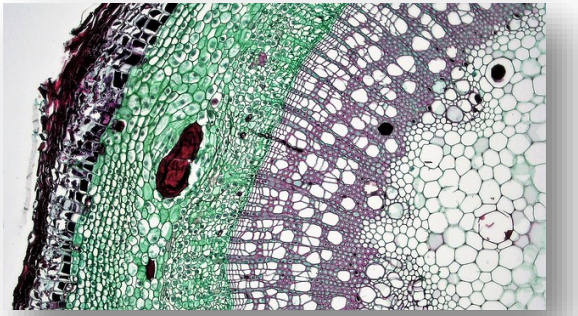
1. Cut some twigs

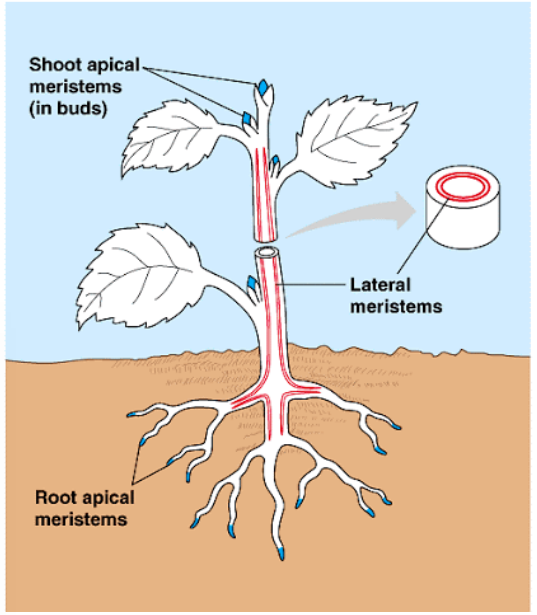
2. Stick them in the ground

3. Watch them grow

How live staking works (science!)

Apical Meristem (Terminal Bud) produces auxins





Auxins = a group of plant hormones that coordinate growth and behavioral processes. “Tells” the plant to remain in a dormant state

When live stake is cut, the auxins are also cut off, signaling new growth to the stake’s lateral meristems

Lateral Meristem (Lateral Buds) = have the flexibility to form roots when in contact with wet soils *(will also form leaves and branches if above-ground)*

Plant continues to grow and establish as usual

Plant Species with Rooting Ability from Live Hardwood Materials for use in Soil Bioengineering Techniques (NRCS, 2007)

(Excellent/Very Good)

- Balsam Poplar
- Eastern Cottonwood
- Peachleaf Willow
- Dwarf Willow
- Pussy Willow
- Sandbar Willow
- Purple osier Willow
- Silky Willow
- Common Elderberry

(Good/Fair)

- Silky Dogwood
- Common buttonbush
- Red osier Dogwood
- Common ninebark
- White willow
- Bebb willow
- Prairie willow
- Shining willow
- Black Willow
- Plainleaf willow

Other Potential Species

- American sycamore
- Streamco willow
- Arrowwood
- Spicebush
- River birch
- Box elder

http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/mipmctn7266.pdf

Spot them in the wild*

On your property??

Riparian areas along a stream

Wetlands https://www.fws.gov/wetlands/data/Mapper.html

Young, regenerating forests (shrub phase)

Roadsides

Public parks, trails

**Be sure to get permission to cut if plants are not on your property*

Plant Identification Resources

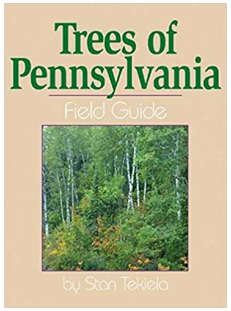
iNaturalist (app): https://www.inaturalist.org/

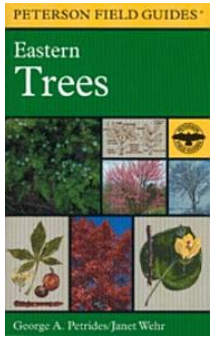
Go Botany (online): https://gobotany.nativeplanttrust.org/

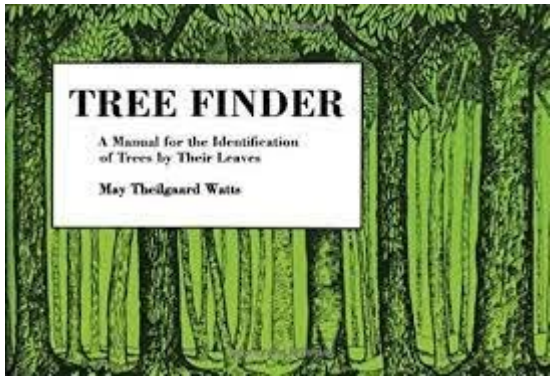
USDA Plants Database (online): https://plants.sc.egov.usda.gov/java/

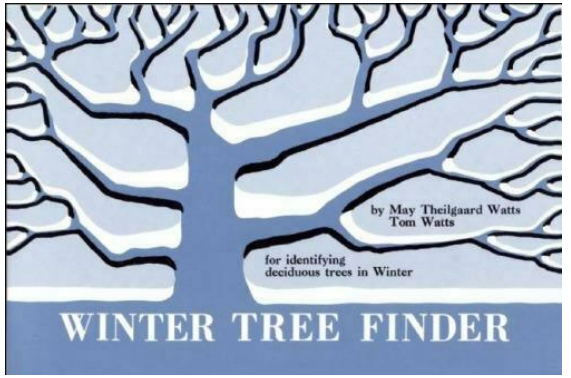
Tree Finder (book): https://www.amazon.com/Tree-Finder-Manual-Identification-Eastern/dp/0912550015

Winter Tree Finder (book): https://www.amazon.com/Winter-Tree-Finder-Identifying-Deciduous/dp/0912550031









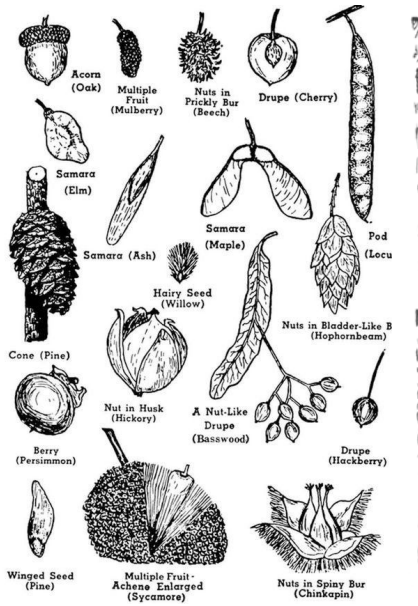
Seasonal ID Tips

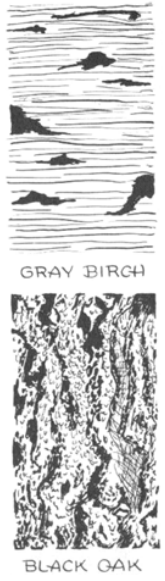
Summer/Fall ID

- Easiest time of year to identify plants
- Look @ bark, stems, buds + flowers, leaves, fruit/nuts
- Mark trees/shrubs for dormant season harvest

Winter/early Spring ID

- Easiest time of year to spot woody plants
- Look @ bark, stems, **buds**
  - Buds = unique to each species





Check for pests/diseases before you cut!

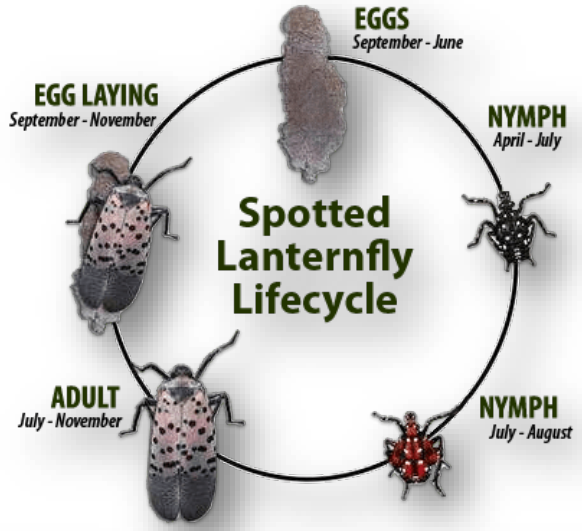
Spotted Lanternfly

1Anthracnose- fungal leaf disease

2Scale- armored insect

3Sycamore Lace bugs

4Elderberry Borers



SLF egg cases

Source: https://extension.psu.edu/pests-and-diseases-of-common-live-staking-species

Species to know: TREES

Willows

★Black Willow [1]

Silky Willow [2]

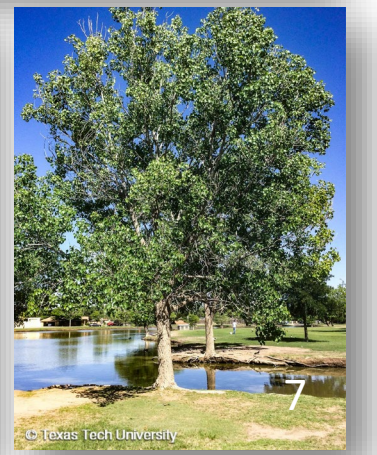
Box Elder [3]

★River Birch [4]

Tulip Poplar [5]

★American Sycamore [6]

Eastern Cottonwood [7]



Species to know: TREES

Willows
- Black Willow
- Silky Willow

Box Elder

River Birch

Tulip Poplar

American Sycamore

Eastern Cottonwood

Distinguishing Features:
- Fast growth, large tree when mature
- Found along riverbanks, floodplains, wetlands
- Bark = gray and rigid
- Long, slender leaves
- 1 scale on winter bud

Species to know: TREES

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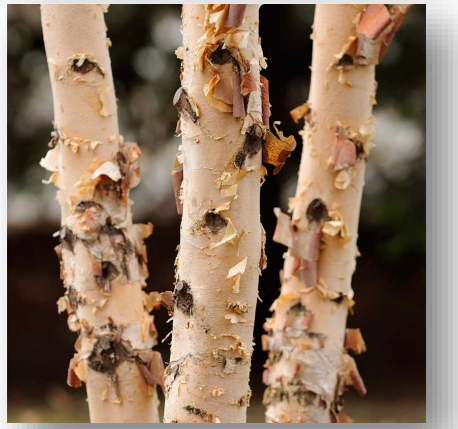


Distinguishing Features:
- Fast growth, medium-large tree
- Found along riverbanks
- Bark = cinnamon-colored, curls and peeling
- Brown/Green catkins in summer
- 3+ overlapping scales on winter bud

Species to know: TREES

Willows
- Black Willow
- Silky Willow

Box Elder

River Birch

Tulip Poplar

American Sycamore

Eastern Cottonwood

Distinguishing Features:
- Fast growth, very large tree
- Found along floodplains
- Bark = gray/tan and peeling, white at top of tree
- Buds surrounded by leaf scars, 1 scale
- Distinct ping-pong sized seed balls

Species to know: SHRUBS

Shrub Dogwoods
- Gray Dogwood 1
- ★ Silky Dogwood 2
- ★ Red-osier Dogwood 3

Buttonbush 4

Winterberry 5

★ Spicebush 6

Arrowwood 7

Common Ninebark 8

★ Common Elderberry 9

Highbush Blueberry 10

Alders
- Speckled Alder 11
- Smooth Alder 12

Species to know: SHRUBS

- Shrub Dogwoods
  - Gray Dogwood
  - Silky Dogwood
  - Red-osier Dogwood
- Buttonbush
- Winterberry
- Spicebush
- Arrowwood
- Common Ninebark
- Common Elderberry
- Highbush Blueberry
- Alders
  - Speckled Alder
  - Smooth Alder

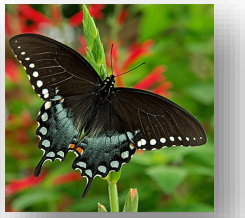
Red-osier Silky Silky Red-osier

Distinguishing Features:

- Fast growth, rounded shrub habit
- Found in fields, along rivers, and wetlands
- Readily suckers to form dense thickets
- White flowers
- Bark = thin and smooth, red stems

Silky	**Red-Osier**
2 scales on bud	No scales on bud
Blue round fruits	White round fruits
Red pith	White pith

Species to know: SHRUBS



Shrub Dogwoods
- Gray Dogwood
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Buttonbush

Winterberry

Spicebush

Arrowwood

Common Ninebark

Common Elderberry

Highbush Blueberry

Alders
- Speckled Alder
- Smooth Alder

Distinguishing Features:
- Slower growth, medium-large shrub, shade tolerant
- Found in wetlands and moist places
- Bark = thin and smooth with bumps, brown
- Green-yellow flowers in Spring, red spicy berries in Summer
- Bright yellow, orange leaves in Fall
- 3+ overlapping scales on Winter bud
- Aromatic when leaves are crushed
- Host plant to Spicebush Swallowtail Butterfly

Species to know: SHRUBS

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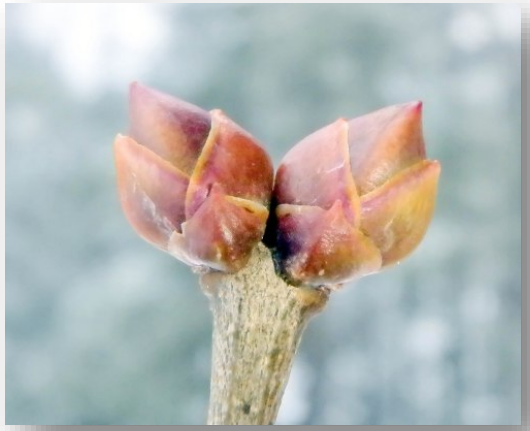
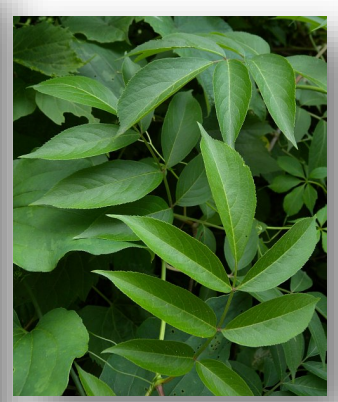




Distinguishing Features:
- Moderate growth, medium rounded shrub
- Found along forest edges, fields, along rivers, wetlands
- Bark = green-brown smooth bark, bumps on young plants
- 3+ scales on winter bud
- White, lacy flower clusters in summer
- Develops clusters of blue-black edible fruits late summer

When to Harvest Live Stakes

Collect in **late fall – early spring** (November - April)

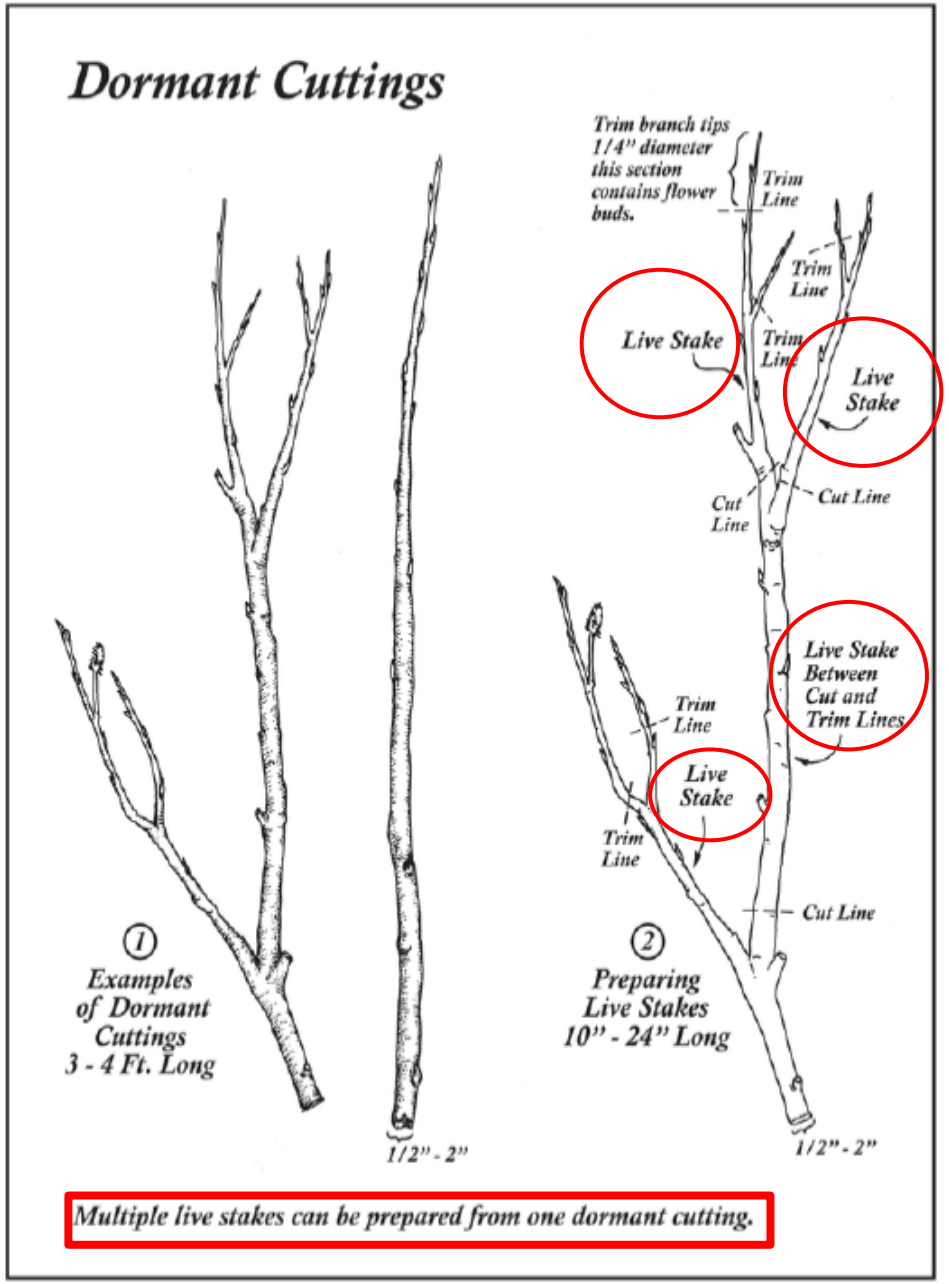
While plants are **dormant** (prior to bud break)

Harvesting Live Stakes

You will need: lopper, pruner, bucket(s), gloves

Harvesting instructions:

1. Located and identify the species you are cutting
2. Cut pinky-thumb sized diameter branch as close to main them stem as possible
3. Starting at bottom of the branch, cut stake approx. every 18-24“
   - You can get multiple stakes from a single branch cutting
4. Cut the top of each stake flat; Cut an angle at the bottom of each stake (where the roots will grow)
5. Remove all side branches from live stake
6. Put live stake(s) into a bucket with the angled bottom of the stake down
   - If not planting immediately, add water to bucket and store in a cool, dark location
   - Ideally, plant within 24 hours or up to 3 weeks from harvest date



Harvesting Live Stakes

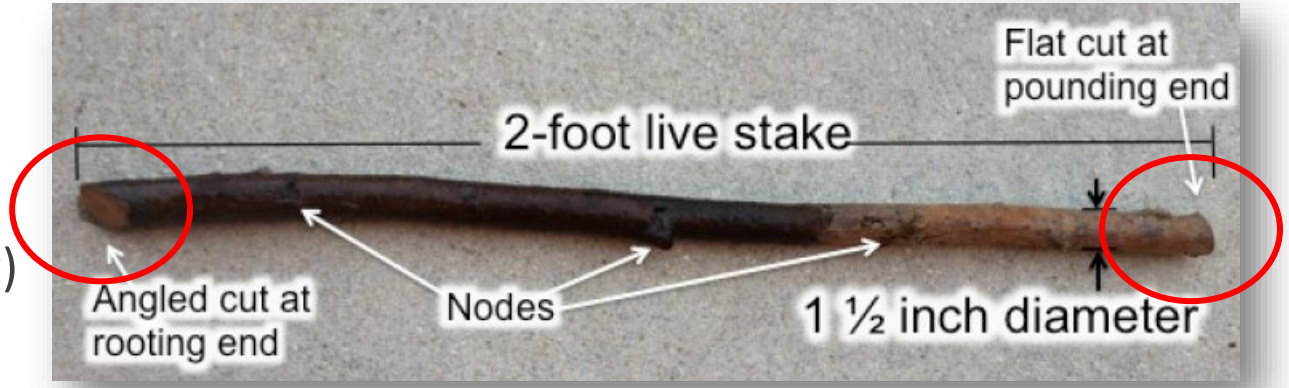
A few important notes:

ID your plant species
- Not all tree/shrub species can be live staked
- Avoid invasive, non-native species

Use different buckets for different live stake species (and label them!)

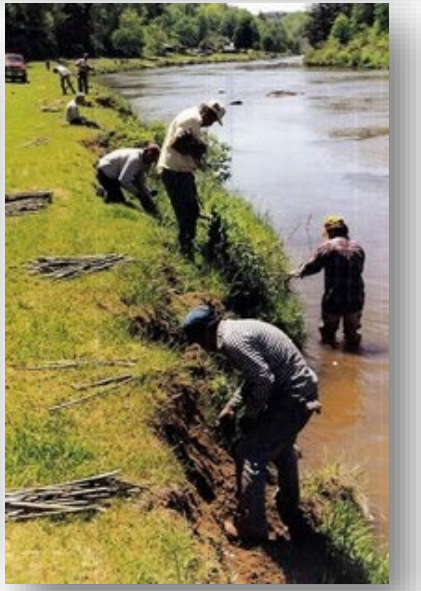
Be careful not to over-harvest
- Don't remove more than 30% of plant
- Allow for regrowth, continued ecological value

Make sure bottom of stake is angled (top is flat)
- Indicates which end gets planted
- Helps drive stake into the ground



Planting Live Stakes

1. Space stakes 3’ apart on the stream bank in a zig-zag pattern
2. If soils are compacted or rocky, dig pilot holes by driving rebar into the soil with a rubber mallet or hammer
3. Plant the stakes by hand or using a rubber mallet
4. Drive stakes into the soil at a **90° angle** (perpendicular with the bank) and as deep into the soil as possible
5. Leave at least 1-2 nodes remaining above the surface
6. Clip the end of the stake with hand shears if splintering or other damage occurred during installation



Maintenance of Live Stakes

In the spring, note which stakes are sprouting and which were unsuccessful

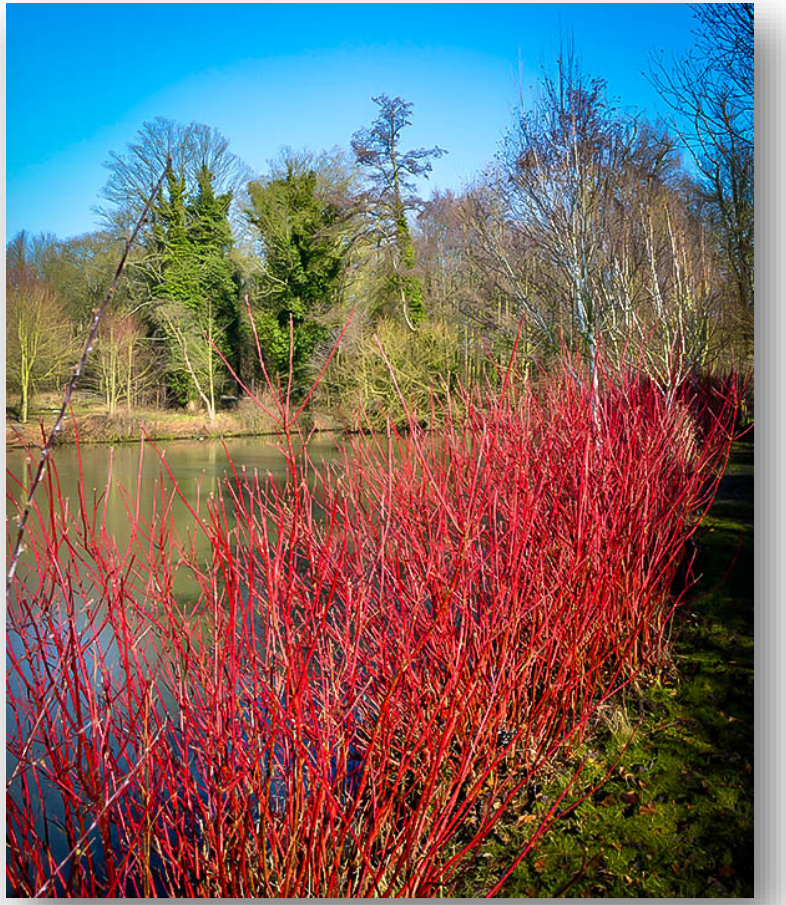
- It helps to tag and label each stake to remember where and what was planted

Replace stakes as necessary

May need to occasionally trim/prune, replace stakes, check for disease/pests

Always look for and remove invasive species!

After establishment (2-5 years)



Other effective stream erosion “BMPs”

“No Mow” Zones – zero cost ☺

Forested Riparian Buffers - $

Livestock Exclusion Fencing & Crossings - $

Grading Banks - $$ *requires permit*

Stabilization Structures - $$$ *requires permit*

Additional Resources

Video Demos:

Forests for the Bay: https://youtu.be/aH9OV58iezM

PA DCNR: https://youtu.be/VHXQW5lKQD8

Readings:

Chesapeake Conservancy's Live Stake Species ID Guide: https://chesapeakeconservancy.org/wp-content/uploads/2020/06/Live_stake_identification_guide.pdf

Pests and Diseases of Common Live Staking Species: https://extension.psu.edu/pests-and-diseases-of-common-live-staking-species

Riparian Buffers: PA's Best Solution for Protecting Its Waters:https://extension.psu.edu/riparian-buffers-pennsylvanias-best-solution-for-protecting-its-waters

Small-scale Solutions to Eroding Streambanks: https://www.ncforestservice.gov/publications/BYSRGuide2015.pdf

PA DEP Guidelines for Maintaining Streams in your Community: https://www.dep.pa.gov/Citizens/My-Water/PrivateWells/Pages/Stream-Maintenance.aspx

Additional Resources

Check out CCCD's other lunch 'n learn webinars!

No Mow Zones and Riparian Buffers: https://www.youtube.com/watch?v=yVEXlOUaNYo

How streams work (includes information on stabilization structures): https://youtu.be/J1SAmYUqbcc

Importance of trees/Keystone 10 Million Tree Partnership initiative: https://youtu.be/d1DC48DnLN8

CCCD Better Backyards Certificate Program: https://youtu.be/ah_nOXVHICE

Invasive Species: https://youtu.be/T0f7RwpuraM

PA Native Plants: https://youtu.be/67jhxImZnVo

Natural Areas of Columbia County: https://youtu.be/KQwhewOAlLA

Contact Info

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COLUMBIA COUNTY
CONSERVATION DISTRICT

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Facebook.com/columbiaccd

570-317-9456

Tomorrow's Collection Workshop

April 10th 10am-noon

In-field species ID

Demonstration

Collect live stakes for planting at home!

7 spots left

Sign up at: **www.columbiaccd.org/workshops**

Exact location will be emailed to you

The workshop will take place outdoors. Please dress appropriately for the weather.

Collection equipment and work gloves will be provided on-site.

Questions?