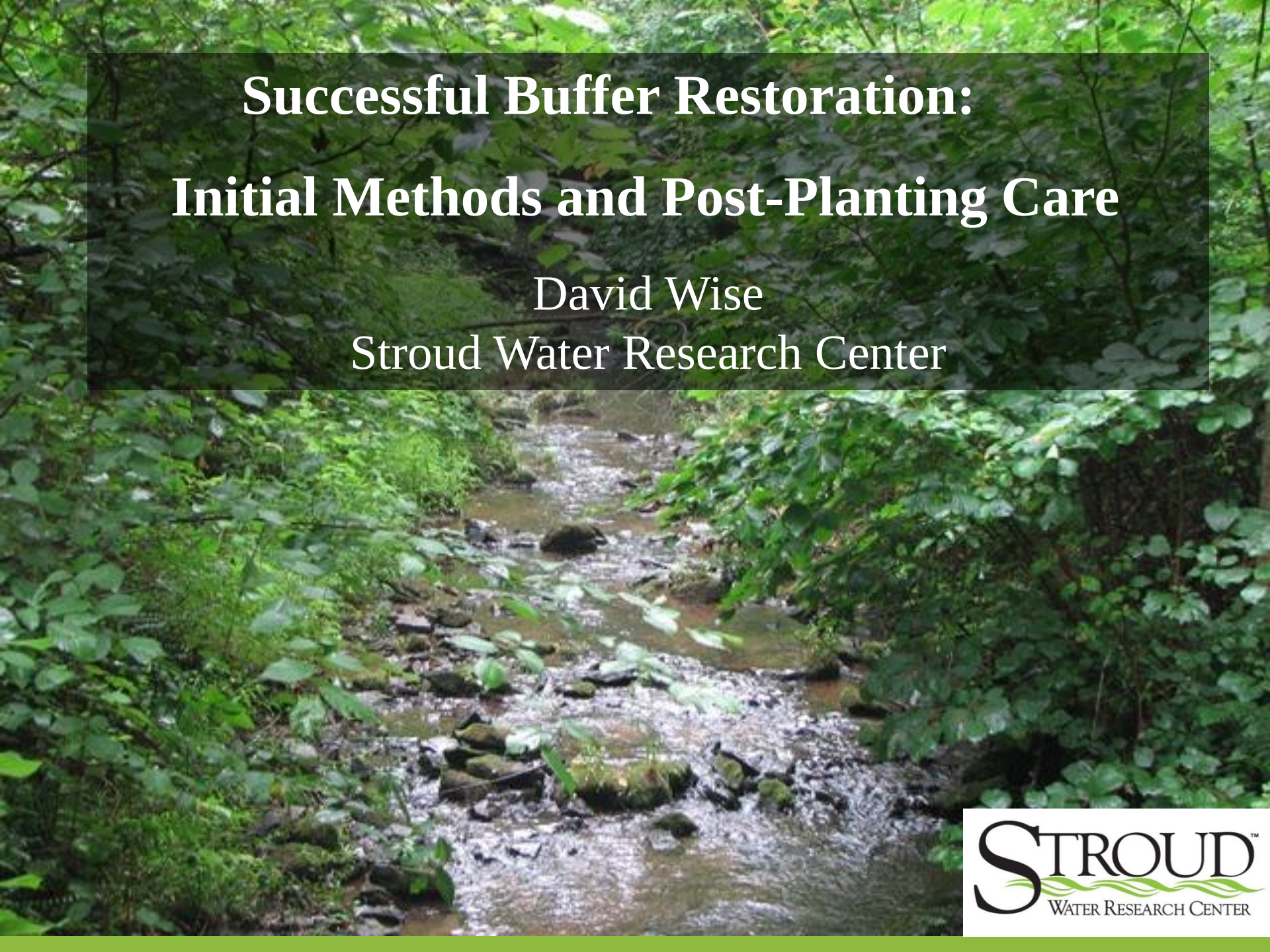

Successful Buffer Restoration:

Initial Methods and Post-Planting Care

David Wise
Stroud Water Research Center

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Thanks to:

- PA CREP partner groups including:
  - Farm Service Agency
  - Natural Resources Conservation Service
  - PA Dept. of Environmental Protection
  - PA Game Commission and others
- Chesapeake Bay Foundation and its PA Office
- Dr. Bern Sweeney and Stroud Water Research Center
- Dr. Judy Okay and Chesapeake Bay Program
- Barry Isaacs and PA NRCS
- Phil Pannill and MD DNR Bureau of Forestry
- Art Gover, Fruittown Land Stewardship Services
- National Fish and Wildlife Foundation for grant support

Outline:

(Install and care methods are linked)

- Background: details and context
- PA CREP and Stroud Center insights
  - herbicide use
  - tree shelters
  - mowing
- Some research in process

Details matter: prior land use, soil moisture

Details matter: what are the threats?

voles~deer~invasives~mowers~bears

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details matter – what kind of grass?

When reasonable people disagree

Figure out:

- the details that matter
- how you can both be right

“shelters kill trees!”

Our context: often wettish pastures…

… rarely well-drained former cropland

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Our context: Busy landowners, not foresters

Our context:

Young tree seedlings planted in shelters

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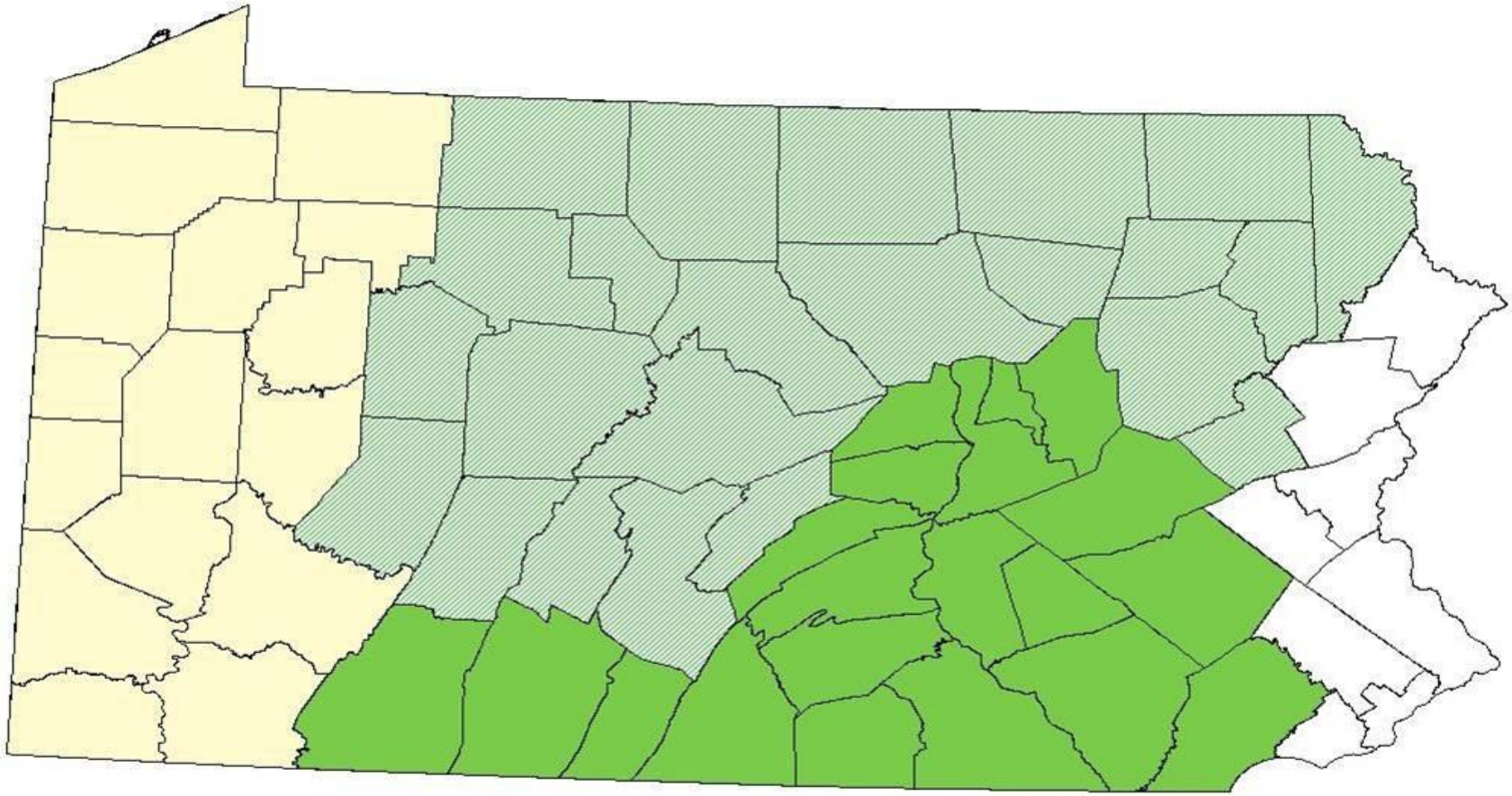
Our context: PA CREP's 25,000 acres



Early PA CREP: hard lesson #1

1x herbicide inadequate against

- Grass competition
- Damage by voles

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Photo: Chesapeake Bay Foundation

The “Brown Death”

Photo: Chesapeake Bay Foundation

An Early Study:

Riparian Forest Restoration: Increasing Success by Reducing Plant Competition and Herbivory

Bernard W. Sweeney
Stephen J. Czapka
Tina Yerkes

Restoration Ecology June 2002

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Year 4

Survivorship (%)
0
10
20
30
40
50
60
70
Control
Mow
Tree Mat
Herbicide

Growth (cm)
0
10
20
30
40
50
60
70
80
Control
Mow
Tree Mat
Herbicide

typical herbicide:

4’diameter spot

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Herbicide use is key!

2x/year for four years, trees in shelters

~16%	~90%	2x+
Survival, NO herbic.	Survival WITH herbic.	Growth w/ herbic.

Sweeney et al 2002 in Restor. Ecol.

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2007 changes to PA CREP

PA CREP partners *requested*:

- Funding for 2x/year herbicide apps for 5 years

USDA in DC *authorized*:

- 3 herbicide apps (50% payment)
- PA DEP agreed to other 50% , if buffer is 50'+

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PA CREP herbicide guidance

If done by a professional:

- glyphosate (ex. Roundup, Rodeo)
- plus a pre-emergence:
  - 2 oz/acre Oust XP or equivalent OR
  - 2 quarts/acre Pendulum AquaCap or equivalent

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four-year old trees:
herbicide strips + mowing = “clean culture”
Photo: Chesapeake Bay Foundation

Lesson Learned #1: Herbicide!

Use glyphosate 2x/year

Treat for 3-4-5 years

Treat 3-4’ spot minimum

Details need more science

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Early PA CREP: hard lesson #2

Tree shelters matter:

- most plantings w/o shelters failed
- 4’ shelters -> deer browse at tops
- many types structurally unsound
- many types damage or kill trees later

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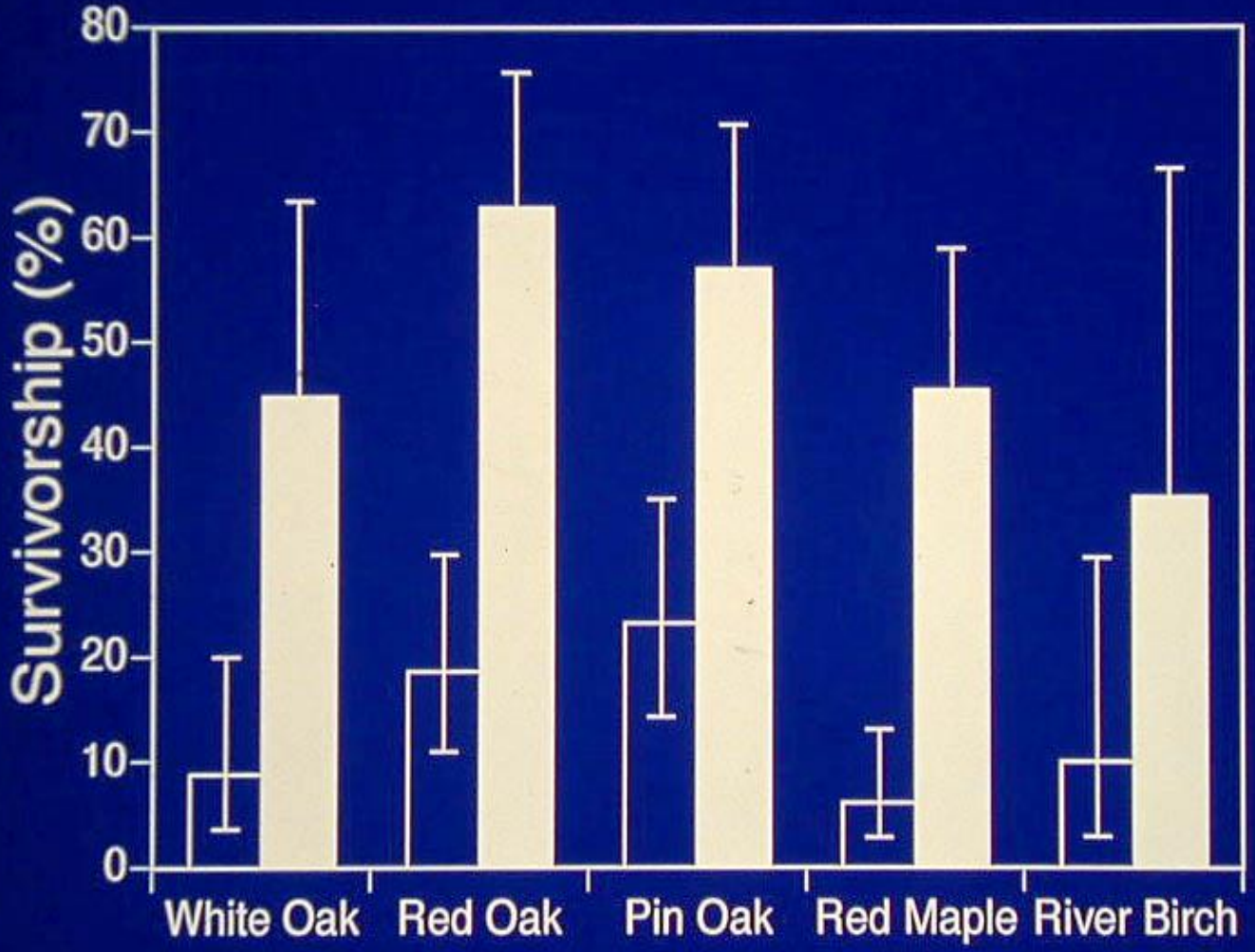
Shelter use

Shelters help with:

- herbicide use
- buck rub and deer browse,
- marking trees for mowing

Year 4



Unsheltered

Sheltered

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Year 4

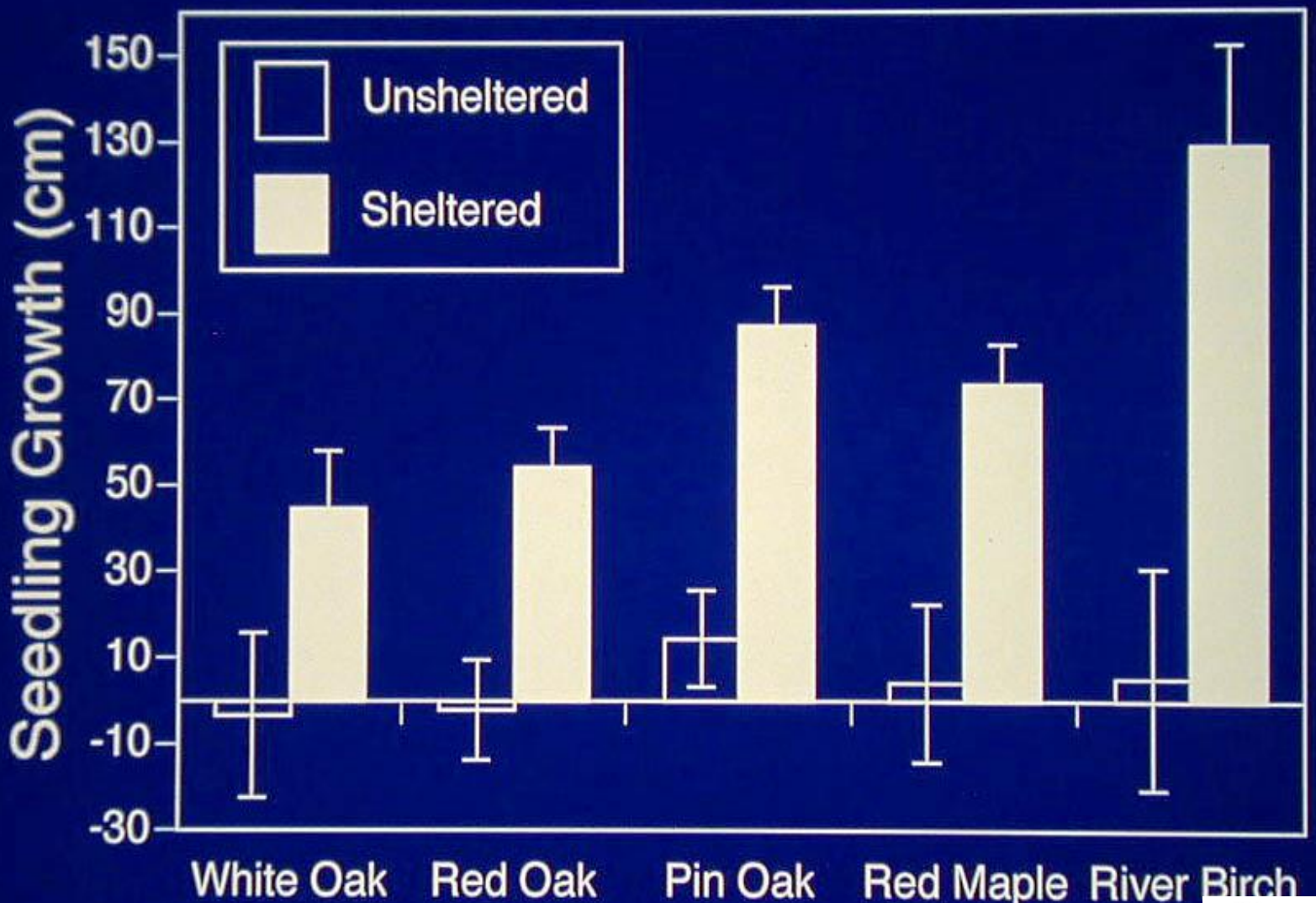

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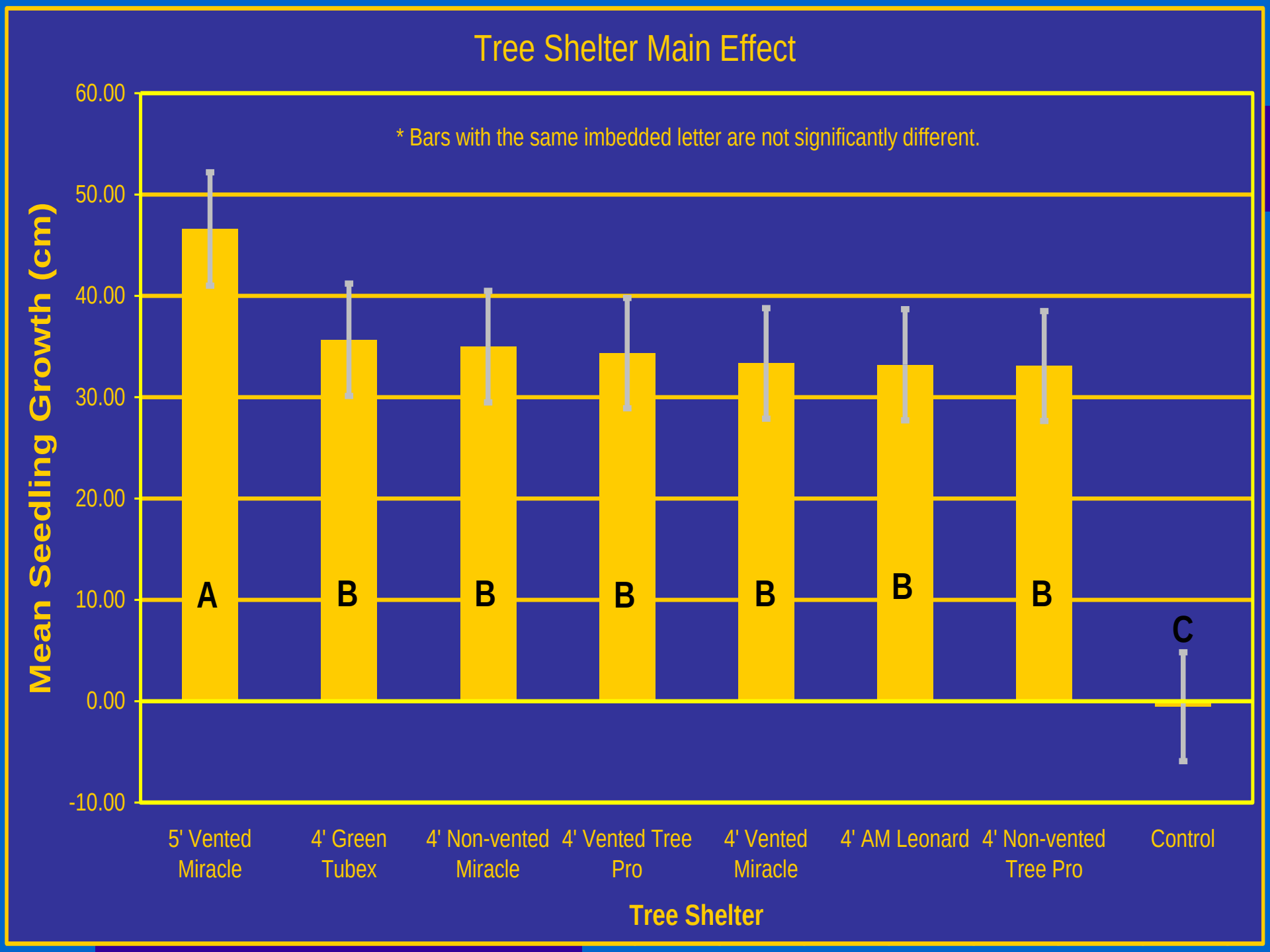
Photo: Jen Johns, Chesapeake Bay Foundation


Tree Shelter Main Effect
* Bars with the same imbedded letter are not significantly different.
Mean Seedling Growth (cm)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
A
B
B
B
B
B
B
C
5' Vented Miracle
4' Green Tubex
4' Non-vented Miracle
4' Vented Tree Pro
4' Vented Miracle
4' AM Leonard
4' Non-vented Tree Pro
Control
Tree Shelter

Lesson Learned #2: Use a Good Shelter

Choose one w/burst feature, flared top
Use 5-footers if deer are around
Get the nets off in time
Get tubes off in time

PA CREP shelter removal guidance:

Remove when tree is 1.5-2” diam. at top of tube

Disease/damage possible if left on longer

But balance vs. risk of buck rub (leave on longer?)

Splitting/leaving in place may address both

Since 2007, PA CREP requires burst out feature

Shelter bursting along perforation

(back up plan)

Hard Lesson #3: Mow?!?!

No clear science

Opinions vary; right answer is contextual

Critical trade-off:

desirable volunteer trees lost to mowing

vs.

# of planted trees lost to invasive plants, voles etc. due to not mowing

PA CREP Mowing guidance

If rodents/invasives are a problem:

- Mow each fall for three years
- Mow at 6-8” or less
- May be waived if good natural regeneration
- More mowing may be done – no cost share

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Stroud's views on mowing

Mowing all sites for 3-4 years is good risk mgmt

- we require it where we provide funds
- 2x/yr for 3-4 years

Our context is southeast/southcentral PA

Northern PA has stronger natural regen

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Hard Lesson #4: Tube Maintenance

It is important

In early years, was too often skipped

Site checks are critical support and accountability

CREP Shelter maintenance recc's

Landowners are responsible to do or hire:

- Fix down tubes/broken stakes
- Redrive stakes/reset shelters (frost heave)
- Remove bird nets at right time
- Remove shelters at right time
- Mark deads for replanting
- Within 3 weeks of any flood, fix shelters

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Clip off damaged leaders

CBF's "Landowner Guide to Buffer Success"

- Given to PA CREP landowners
- Calendar format - relevant for multiple years
- On websites: PA NRCS, CBF, PA CREP (www.creppa.org)
- Electronic or hard copies may be available from Chesapeake Bay Foundation, PA Office

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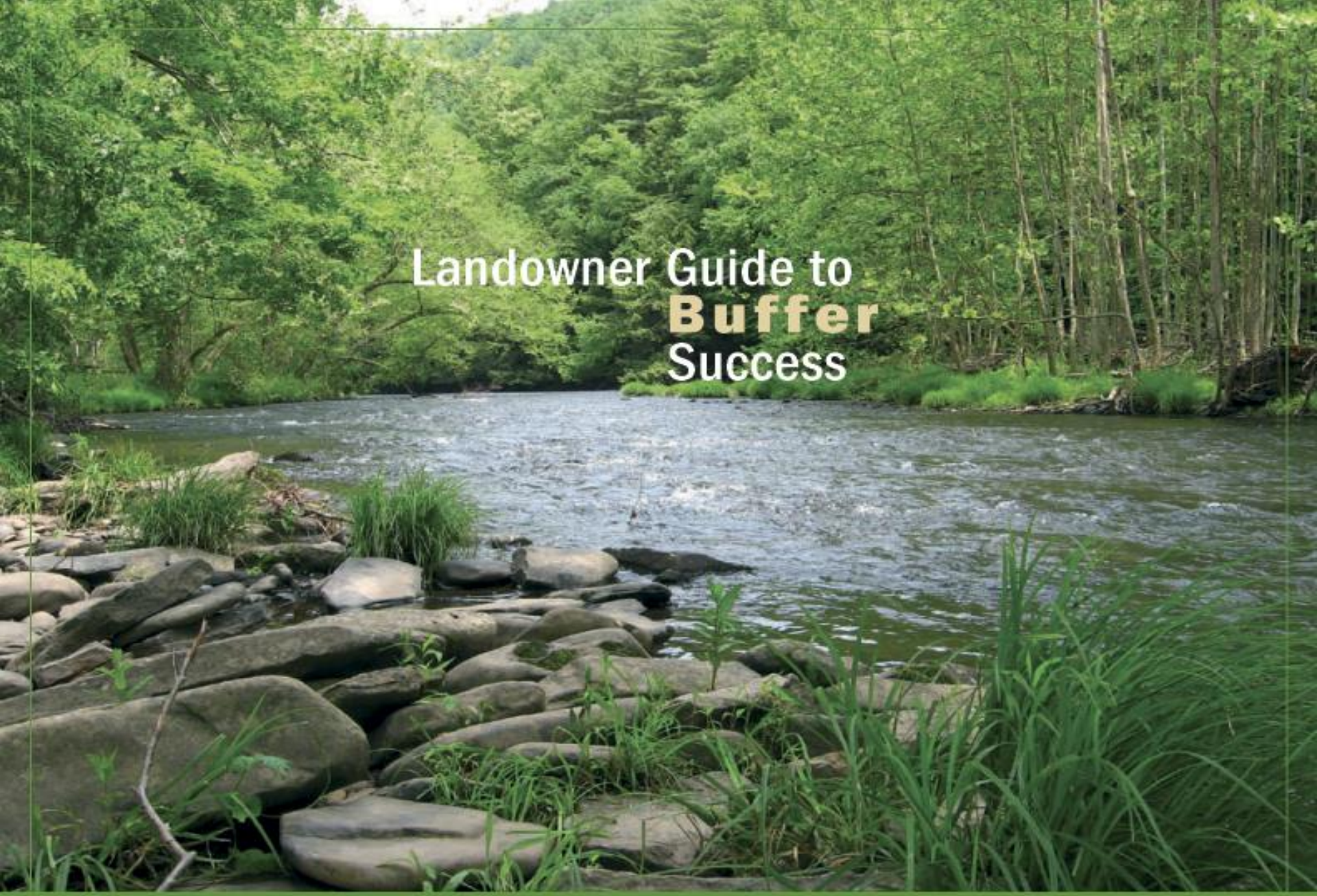

Landowner Guide to **Buffer** Success

A comprehensive seasonal guide for your forested buffer project

Stay tuned for research findings on:

- vole guards v. stone mulch
- herbicide spot size
- pre-emergent herbicide inside tubes
- wire cages v. clear tubes v. green tubes
- 4’ fencing to protect shrub clusters
- “center hole” vs. tasseled bird nets
- direct seeding v. sheltered seedlings

other research underway:

- Hurricane Sandy project
  - Headwaters catchment
  - Majority of landowners doing:
    - level lip spreaders
    - forested buffers 100’ per side
  - A few doing:
    - woody debris placement
    - created wetlands


Vole guard:
goes inside
shelter
THE UNITED STATES OF AMERICA
STROUD
WATER RESEARCH CENTER

Stone mulch (vs. voles), Tube tests

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"Level-lip spreader" located behind Stroud
Water Research Center before construction


Level-lip spreader during construction


Level-lip spreader during construction


Level lip spreader after construction


mid 1990’s - note crooked
tree as reference


~20 years later; buffer done with shelters and herbicide spots

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