A photograph of a forest stream flowing over rocks, surrounded by dense green trees. The stream is the central focus, with water splashing over numerous dark, wet rocks. The banks are covered in lush green vegetation and moss. The background is filled with tall trees and a thick canopy of green leaves, with sunlight filtering through in some places. The overall scene is peaceful and natural.

The What, Why and How of Forested Buffers

by David Wise
Chesapeake Bay Foundation

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WHAT are buffers

clean water
factories





It's about the
microbes!

Dairy rumen

Soil health

Stream health



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Goal of buffers:

Enable landowners
to do voluntary,
profitable buffers
which can
include...



fences to exclude livestock,



alternative water sources



...including lines and wells,





stabilized stream crossings,

Randy Thompson - 20150417
CF29
Construction of Crossing Walkway Base
Material
Centre County
Photo by Greg Boyd, DEC

A photograph showing a row of young trees planted in a field. The trees are spaced out and have white protective wraps around their trunks. The ground is covered with green grass and brown mulch. In the background, there is a dense line of trees and a small building with a red roof. A white text box is overlaid at the bottom of the image.

and tree plantings with
proper post-planting care.





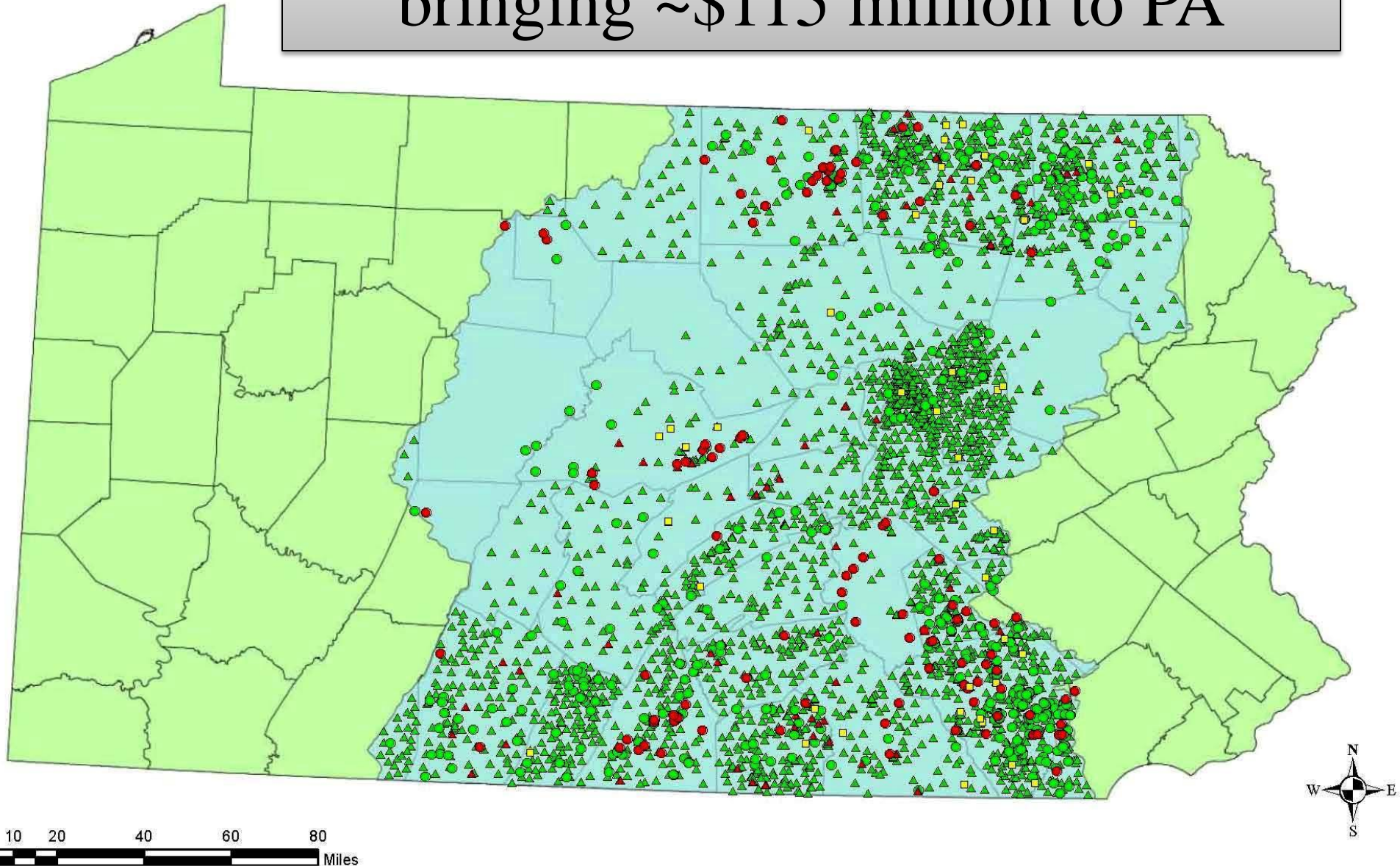
work to date

over 4600
landowners

over 2175 miles
of buffers

roughly \$115
million in costs
(most via CREP)

CREP buffers: 23,000 acres to date
bringing ~\$115 million to PA



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Buffers work...

1. Buffers work for clean water
2. Buffers work for landowners



old news: forested buffers...

- Keep pollutants out of creeks
- Convert runoff into groundwater
- Capture sediment on floodplains
- Moderate flood peaks & drought lows
- Reduce bank erosion

big news: trees boost in-stream water purification

forested streams...

- remove 2 to 8x more nitrogen pollution
- have 2 to 5x more stream life

(Stroud Water Research Center in *Proceedings of the National Academy of Sciences*)

How forests multiply pollution removal

- increase the stream's bottom area 2-3x
- create preferred conditions for stream life
- produce lots of preferred foods

Analogy: bigger cow herd on larger pasture with better feed



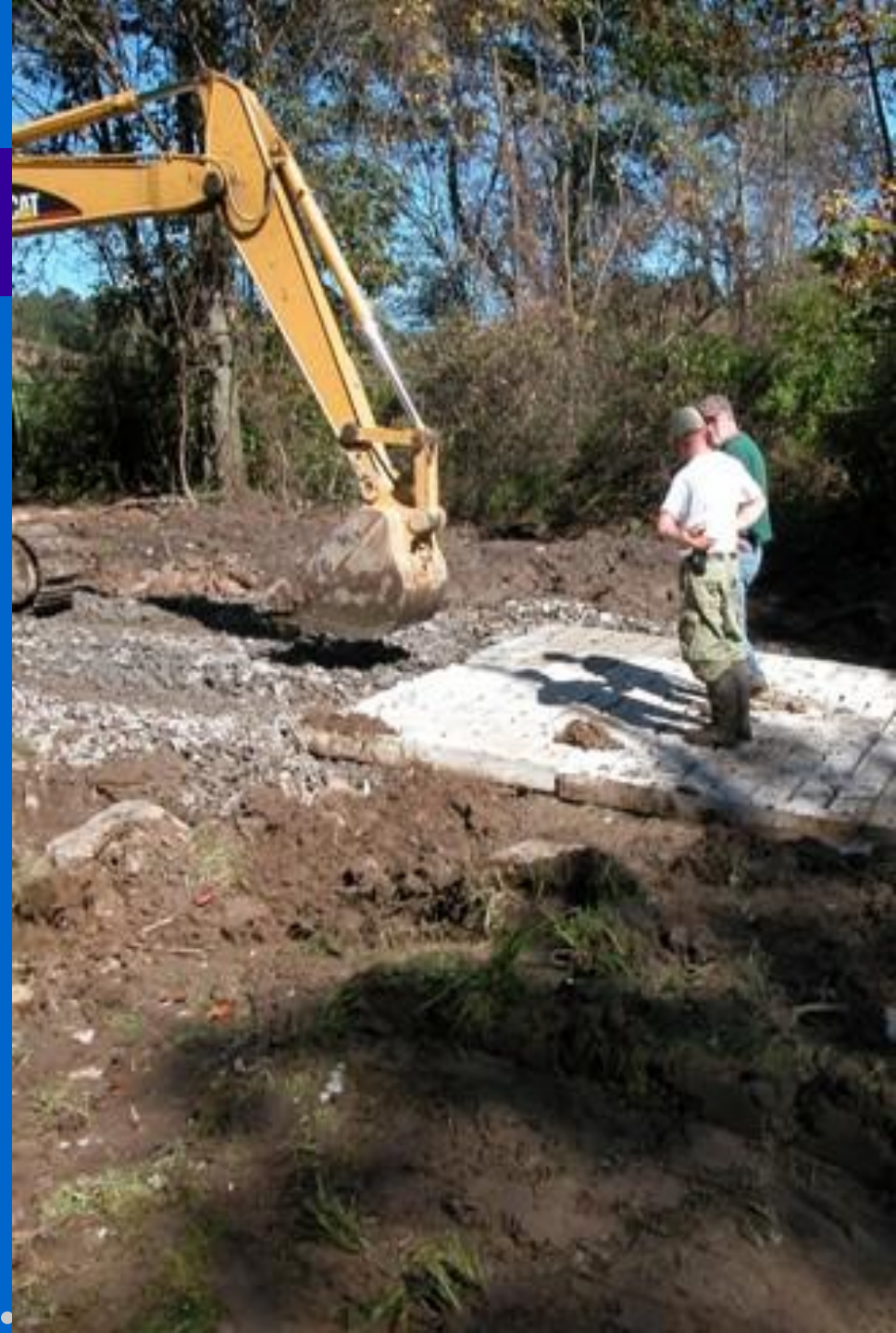
#2. Buffers work for farmers



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• buffers work
financially:

CREP forested buffer
contracts to date:

- provide \$60 million
in project costs
- will pay about \$55
million in rent



• • • buffers work for herd health

- cleaner, drier animals
- stabilized crossings
- safer drinking water



buffers work for rotational grazing

- 
- A man in a blue shirt and khaki pants is herding a group of cattle in a green field. The cattle are of various colors, including black, brown, and white. In the background, there is a white structure and a line of trees.
- builds good stream bank fences
 - provides alternative water & crossings
 - further subdivision fencing is cheap

⋮
HOW we do
buffers





- Main partners: USDA, PA DEP, CBF, PGC
- PA's CREP is nation's largest: 265,000 acres
- Fully used, will be worth ~\$500 million
- A voluntary, profitable conservation option

What is PA CREP?

- Conservation Reserve Enhancement Program
- Partnership of private, state and federal conservation groups
- Focus: water quality, fish and wildlife
- CREP forested buffers are popular

• • • CREP forested buffers

- 35' minimum width
- 100 trees, 25 shrubs per acre
- annual rent from USDA (\$170-350/acre)
- Post-planting care (big change in 2006)
 - contractually required
 - key parts are fully paid



CREP Buffers Work for Landowners

- Pays for installation (typically 100%)
 - Including fences, crossings, alternative water
- Pays for key parts of post-planting care
- Pays yearly rent:
 - Lanc. Co.: \$240-\$350/acre/year
- Option to re-enroll for second contract
- Potential income from tradable credits

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Who is eligible?

- Private, rural landowners
 - No requirement to be a farmer
 - 2/3 of buffer owners aren't farmers

Land Eligible for Forested Buffers

- Within 180' of streams, ponds, etc.
- Less than 30% existing woody canopy
- No need for cropping history

CREP averages \$1700/ac to plant



A four year old buffer
with good maintenance





An early CREP planting with no
herbicide use; the “green death”

Vole damage to roots: the “brown death”



Since 2006: funding for post-planting care



Post-planting care is key



2x/yr herbicide for 4 years:

- 6x better tree survival
- 2x better growth

Sweeney et al 2002 in Restor. Ecol.

CREP pays 100% for key
parts of care after planting

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Success Stories

Millport
Conservancy
progress in
12 years



CBF/Stroud monitoring

Valley Creek:

- 4/5 of farms buffered
- 3x increase in pollution sensitive bugs
- may come off “impaired waters” list





Over 7,000 acres of wetlands aided



Don't underestimate forested buffers –
remember the in-stream services
remove 2-8x more N than healthy grass



An aerial photograph of a rural landscape. In the upper center, a farm with several buildings and silos is visible, surrounded by a small cluster of trees. A straight road or path runs horizontally across the middle of the image. Below the road, the landscape is characterized by large, wavy, terraced fields in shades of green and brown, suggesting a mix of crops or vegetation. The overall scene depicts a typical agricultural setting.

Don't overestimate forested buffers



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