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**This is PA based testimony!**

**Issue: Should restoring streamside forests be considered an important part of the infrastructure to reduce the costs of drinking water for downstream users?**



**YES!**

# Why?

**Because the cost of filtering & treating drinking water goes up...  
in response to increases in the amount of unwanted “stuff” in the water**

**Riparian forests “keep the stuff out” and keep the stuff from “moving downstream (to the water intake of towns and cities)”**



**“Stuff” includes**

**Dissolved organic chemicals**

**Suspended sediments**

**Nutrients (e.g., nitrogen)**

**Microscopic bacteria/animals**

**Pharmaceuticals**

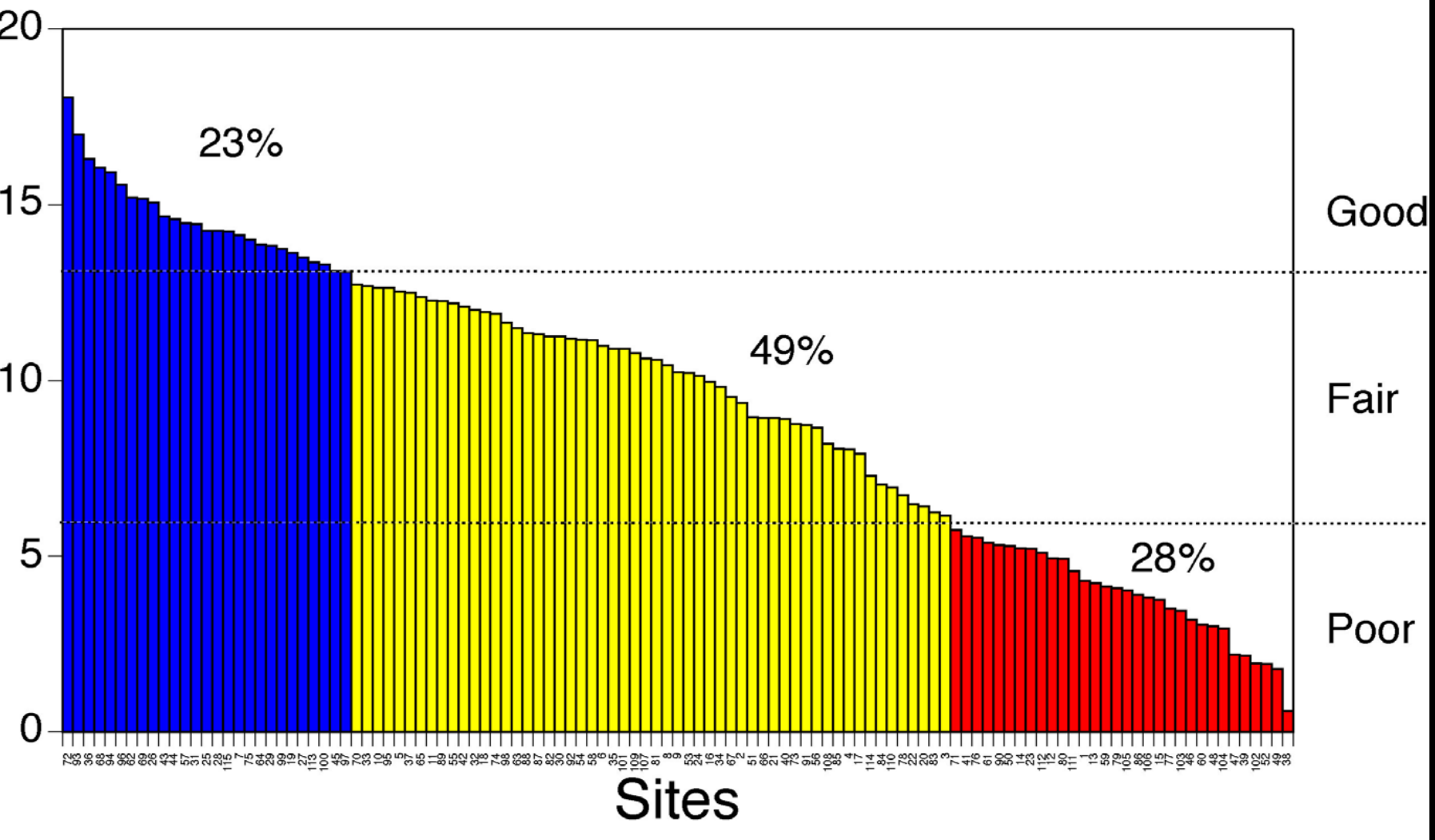
**Etc.**

**Case Study:**  
**Philadelphia Drinking Water**  
**Schuylkill River watershed**  
(Stroud Water Research Center data)



# Schuylkill River, PA





Water Quality Score --- 125 tributaries of the Schuylkill River

**What single factor best explains the variation in water quality score across all 125 study sites?**

# **% Forest Cover in the Watershed**

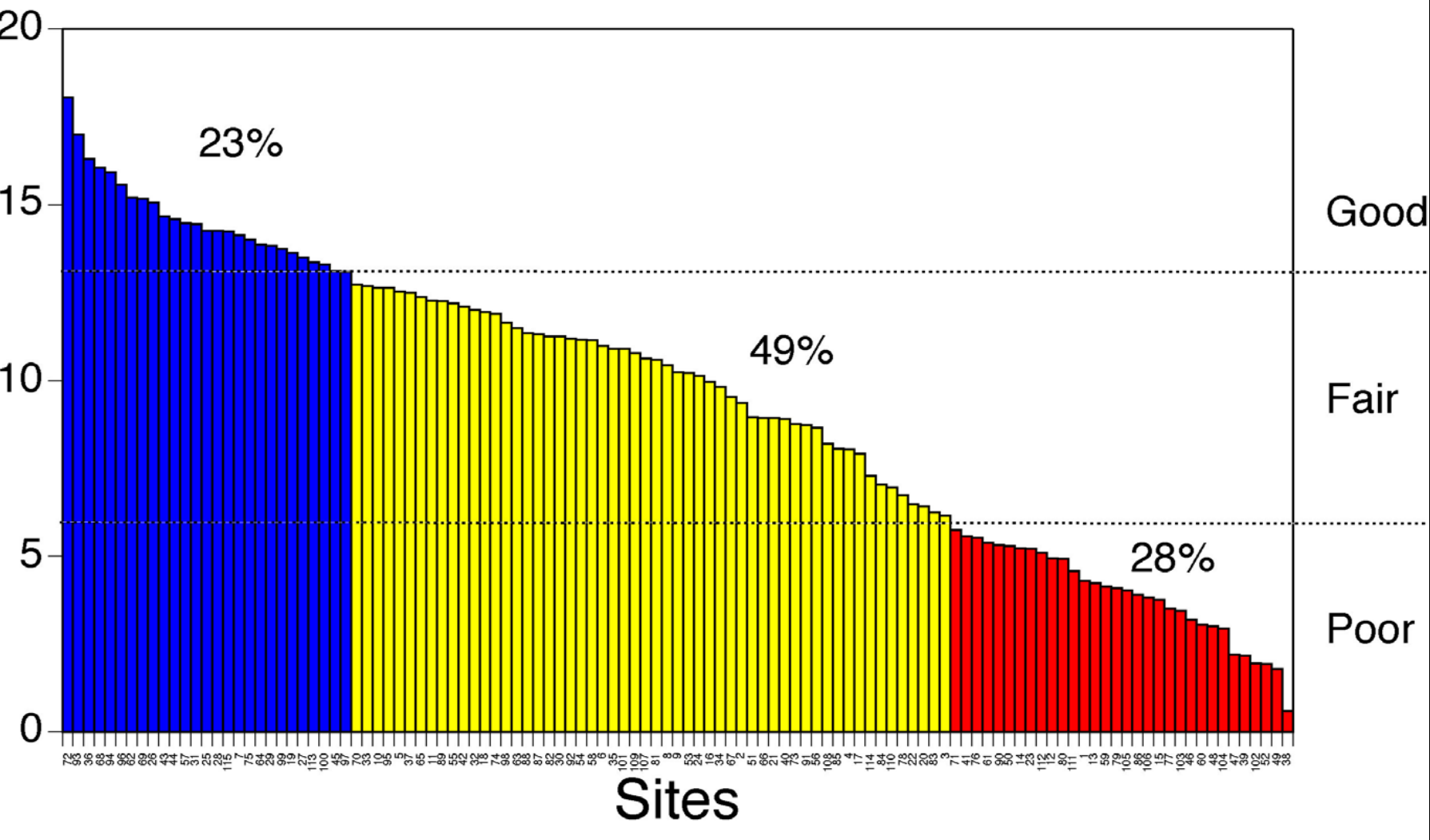
# **% Forest                      Costs per Million Gal**

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<b>60%</b>	<b>\$ 37</b>
<b>50%</b>	<b>\$ 46</b>
<b>40%</b>	<b>\$ 58</b>
<b>30%</b>	<b>\$ 73</b>
<b>20%</b>	<b>\$ 93</b>
<b>10%</b>	<b>\$115</b>

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American Water Works Association (1994)



**High % Forest Cover ----->Low % Forest Cover**



**The more  
forest in the  
watershed....  
the more  
small streams  
that are  
completely  
forested**



**Small streams  
(and their dry  
feeders) are  
abundant and  
everywhere....  
They are a major  
point of entry for  
contaminants**

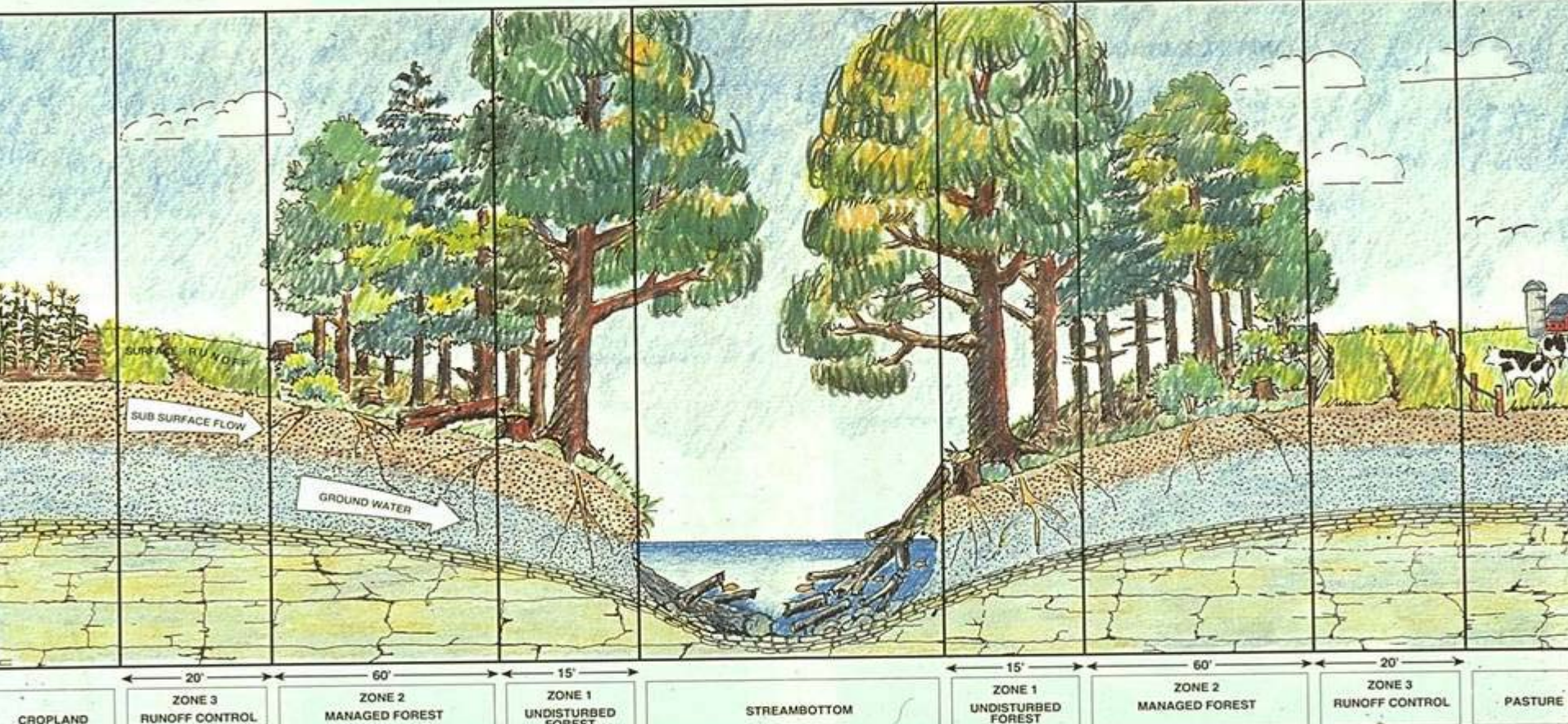


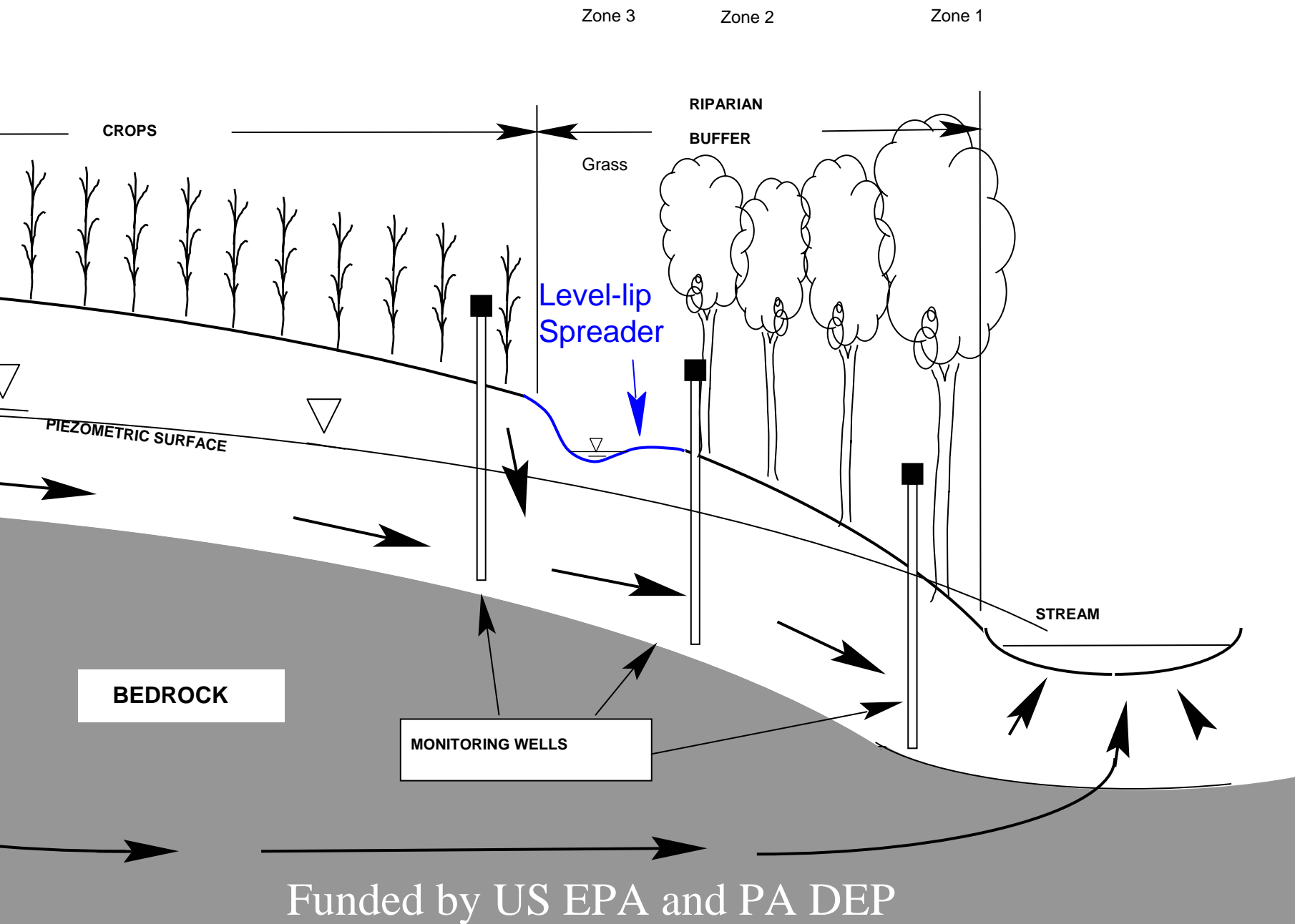
**Forests along small streams help  
keep the “stuff” out ...plus  
increase the capacity of the stream to  
“self-purify”  
(process, degrade, sequester  
contaminants)**

**Two case studies in PA**

# Case Study (keeping the stuff out): National Monitoring Proj.: Testing the 95ft wide riparian forest buffer protocol (Welch 1991) (1991-2008, Stroud Preserve, Chester County, Pennsylvania)

THE STREAMSIDE FOREST BUFFER





# Average Results (1998-2006)

**Nitrogen: 26% removal**

**Suspended sediments: 43%  
removal**

**good news/bad news story**

# Case Study (self purification): The ability of small streams to process organic matter and remove nutrients with / without a streamside forest (Sweeney et al. 2004)









**Forested reaches are significantly wider than adjacent deforested reaches (up to 3x wider)**



**Forested streams have more bottom area per unit length....and its ecosystem (water filtration/treatment plant) is on the bottom**



**Forested**



**Deforested (grass)**

## Results (15 streams)

**Sign. more nitrogen uptake (up to 10x)  
& organic matter processing (up to 5x)  
in forested streams**

**Other studies confirm that small healthy forested streams can, for example, eliminate 27 - 75% of nitrogen inputs through an in-stream process called denitrification**

**Seitzinger et al. (2002)**

**Wollheim et al. (2006)**

**Mulholland et al. (2008)**

**Streamside Forest: Can reduce costs of treating drinking water due to non-point source pollution.....**

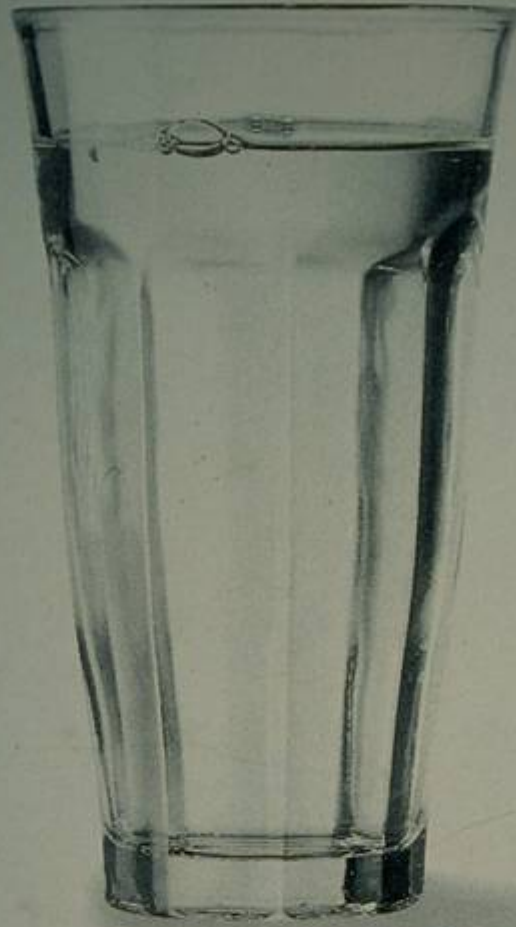


**.....as well as point source pollution!**



**Take home message: Streamside forests reduce the costs of treating and filtering drinking water by *keeping pollutants out & keeping them from moving downstream***





Trees  
clean our  
water.



**Every tree  
counts in a  
watershed  
...especially  
next to a  
stream!**

**The wider  
the forest,  
the better!**





This person gets it!

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The logo for the Stroud Water Research Center features the word "STROUD" in a large, dark blue, serif font. Below the word "STROUD" is a decorative blue wavy line representing water. Underneath the wavy line, the words "WATER RESEARCH CENTER" are written in a smaller, dark blue, serif font.

STROUD  
WATER RESEARCH CENTER

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