

Options for Clean Up of State Waters

A Presentation to the Joint Subcommittee to Study Options to
Provide a Long-Term Funding Source to Clean Up Virginia's
Polluted Waters, Including the Chesapeake Bay and its
Tributaries

September 29, 2005

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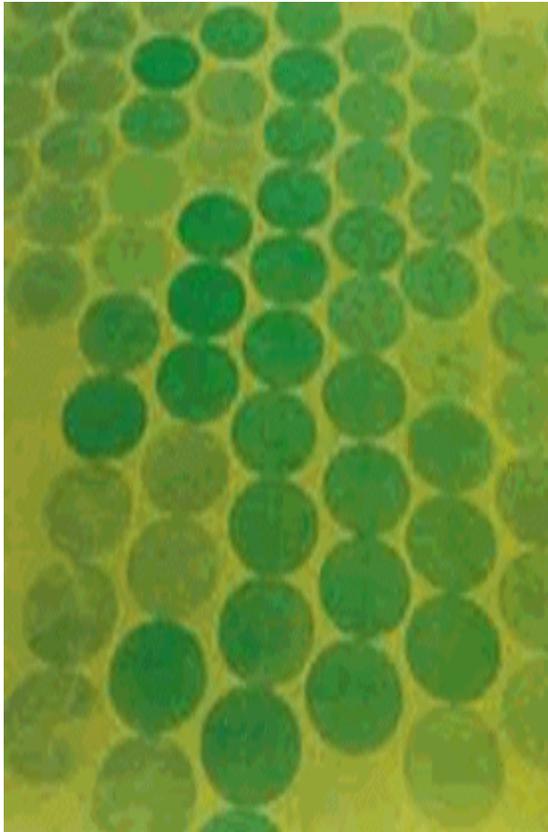
Three Themes --

- **We know more than we realize but perhaps still don't know as much as we need to.**
- **We rely very heavily on mathematical models and perhaps not enough on empirical information.**
- **A free market and the profit motive have produced the least expensive, most effective solutions available.**

Four Examples –

- Point source control through spray irrigation
- Litter Phosphorus control by ProAgri™
- Nitrogen control by urban lawn regulation and nutrient reduction markets
- Sediment, Phosphorus & Nitrogen control by continuous no till agronomy

Point Source Control by Spray Irrigation



- Returns nutrients to crops.
- Costs of nutrient reduction are **one-half** the cost of chemical advanced water treatment.
- Useful in small and some medium sized municipalities in rural settings.

Chicken Litter Phosphorus Control

- Proprietary silica blend (ProAgri™) allows for designer fertilizer for field application of litter.
- 87% Phosphorus reduction with Nitrogen reduced or left available for use.
- 3 % increase in yield (lower bird losses & higher bird weight)
- 50% reduction in litter moisture
- 50% reduction in litter volume
- Reduces ammonia & dust



Lawn Fertilizer – Capturing the Market Externality

- Banning urban lawn fertilizers would produce 24% of the nitrogen reduction goal.
- Lawn fertilizers, unlike every other major source of nutrients, produce no economic crop.
- Option 1 - Ban lawn fertilizers, with an exception for “purchased nitrogen reduction from other sources”.
- Option 2 – Tax lawn fertilizer (\$5/lbs N), with tax to fund urban waste water treatment.



Continuous No Till Agronomy

- **USDA RUSLE II: Representative soils used for crop production without tillage with a corn, small grain and double crop rotation (3 crops over 2 yrs) up to a 9% slope with a 200 ft. length of slope indicate a **sediment discharge of zero.****
- **Increases in yields**
- **Lower fuel and fertilizer costs**
- **Single tractor requirement (reduced from two and a smaller vehicle)**
- **Less time in the field**

Sediment

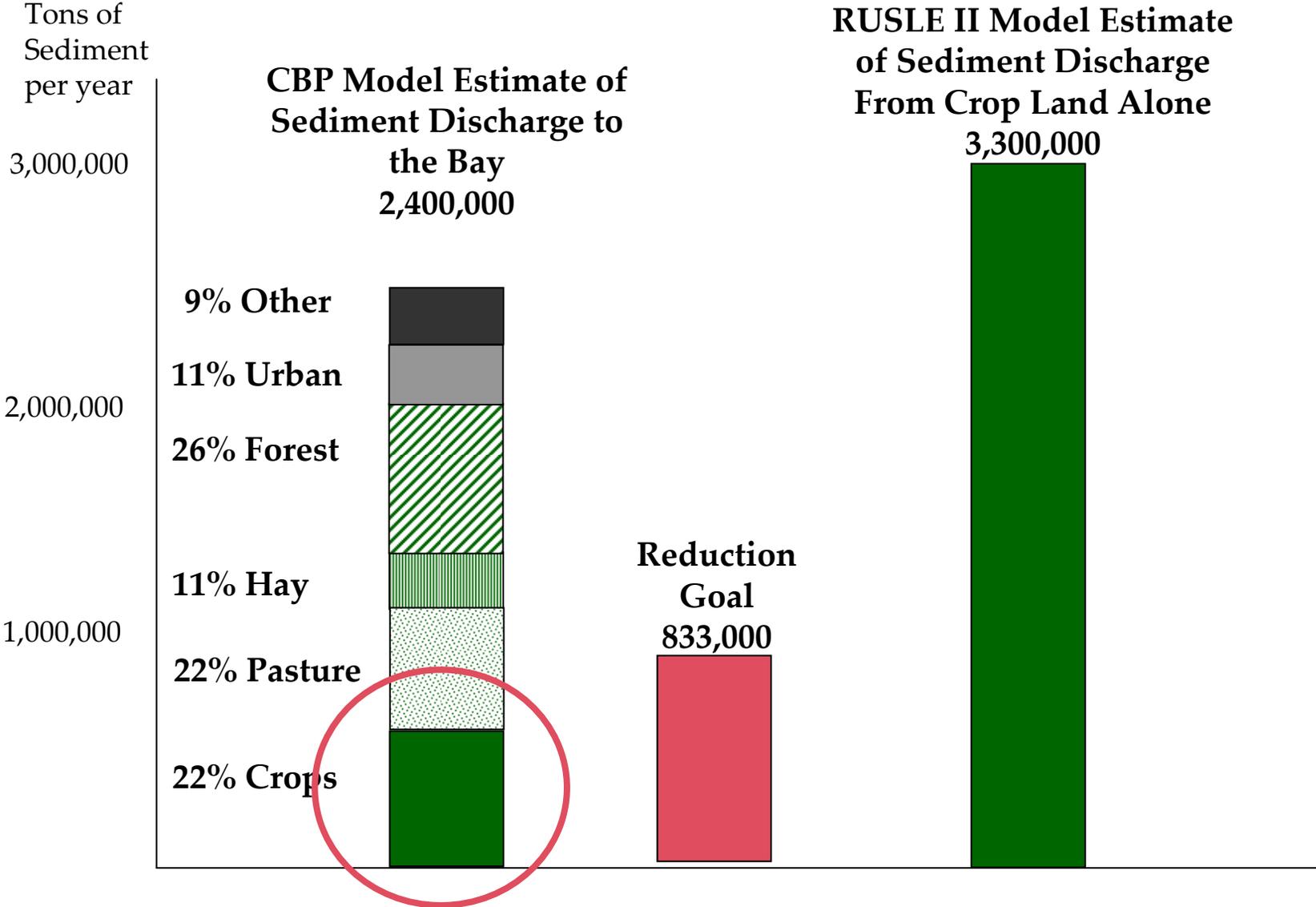


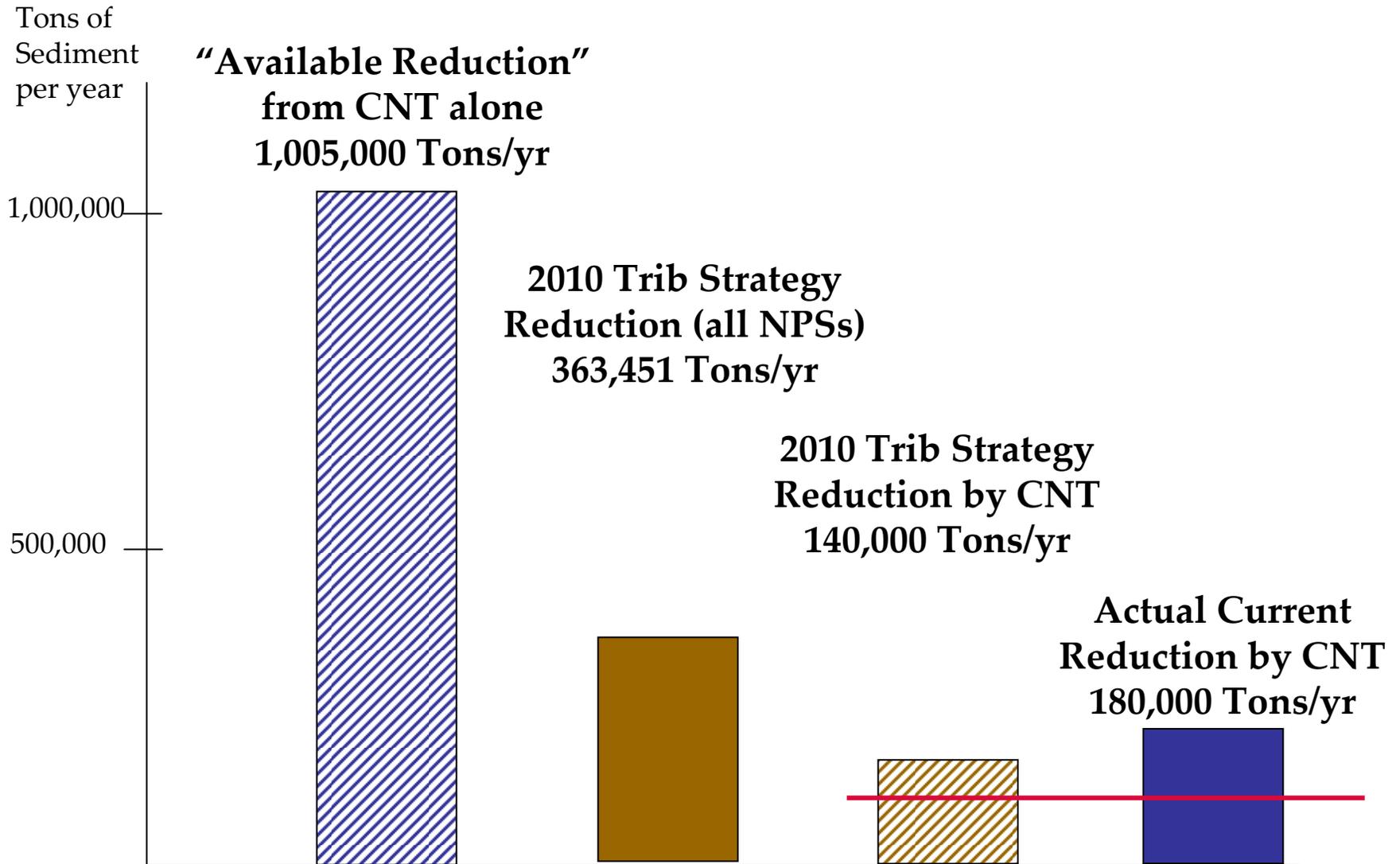
Table D-1. Input Deck, James

Lower James Basin	Land Use	Available	2002 BMP	2010 BMP	Remaining
Forestry BMPs		Units	Progress	Goal	BMP Need
Forest Harvesting Practices	Forest	208,907	0	7,369	7,369
Agricultural BMPs					
Buffers Forested	Hay	2,930	0	220	220
Nutrient Management Plan Implementation	Hay	2,930	69	2,016	1,947
Retirement Highly Erodible Land	Hay	2,930	0	0	0
Soil Conservation Water Quality Plans	Hay	2,930	344	2,016	1,672
Tree Planting	Hay	2,930	0	439	439

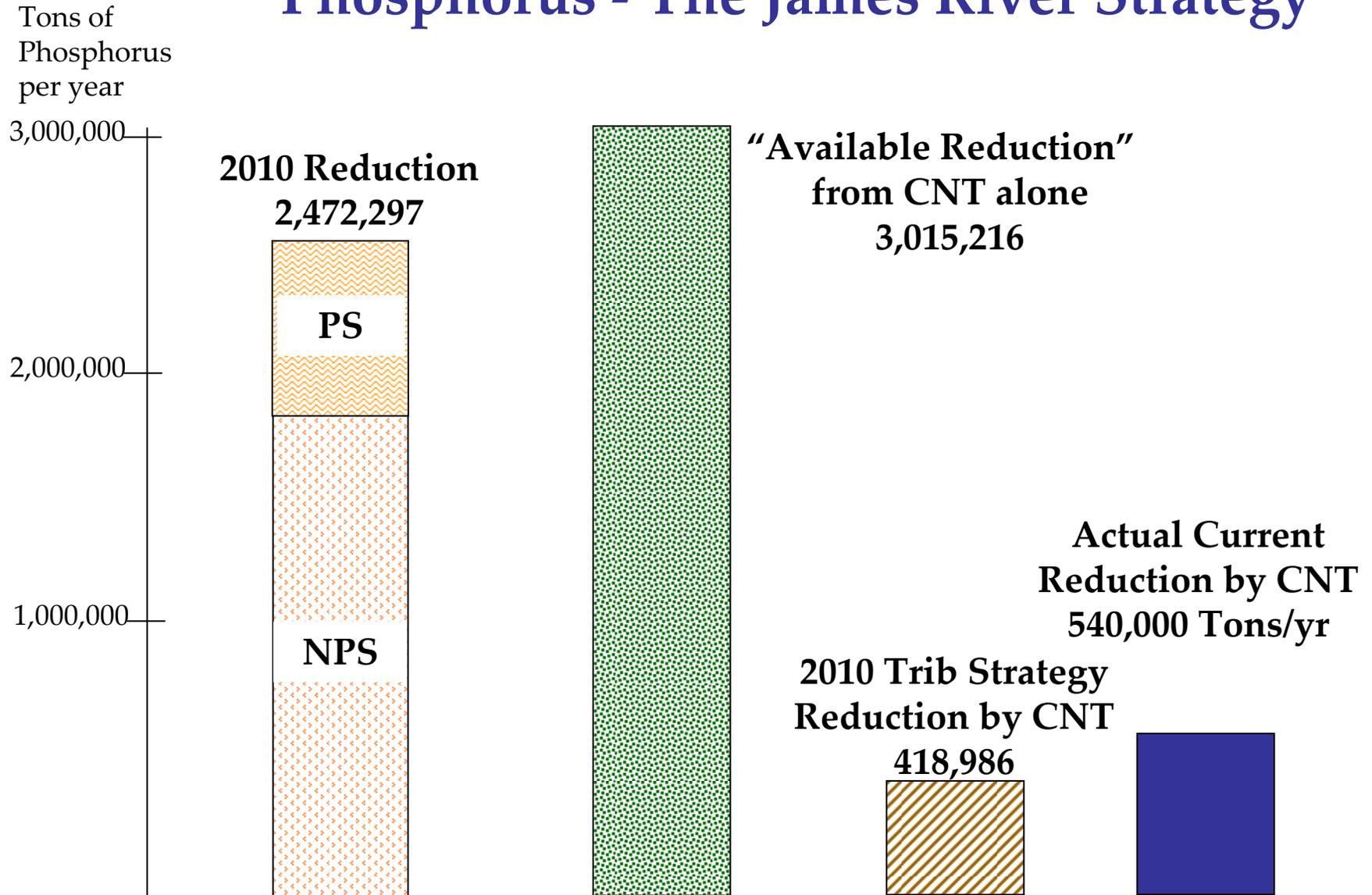
Input Deck, James River

Ag BMP	Available Units Acres	Available Reduction Tons/Yr	2002 BMP Progress	2010 BMP Goal Acres	2010 BMP Red. Goal Tons/Yr
Continuous No Till	167,512	1,005,072	0	23,277	139,622
Buffers Forested	Pasture	4,899	0	481	481
Grazing Land Protection	Pasture	4,899	65	367	302
Soil Conservation Water Quality Plans	Pasture	4,899	1,336	3,488	2,152
Stream Protection with Fencing	Pasture	4,899	0	1,837	1,837
Stream Protection without Fencing	Pasture	4,899	0	1,101	1,101
Stream Stabilization/Restoration (linear feet)	Pasture	na	0	1,500	1,500
Tree Planting	Pasture	4,899	0	734	734
Urban BMPs					
Buffers Forested	Pervious Urban	158,771	0	6,351	6,351
Erosion Sediment Control	Impervious Urban	123,708	0	24,743	24,743
Erosion Sediment Control	Pervious Urban	158,771	0	23,818	23,818
Nutrient Management Plan Implementation	Pervious Urban	158,771	5,317	45,248	39,931
Non Structural Shoreline Erosion Control (linear feet)	Pervious Urban	na	0	56,000	56,000
Stream Restoration (linear feet)	Impervious Urban	na	0	23,500	23,500
Stream Restoration (linear feet)	Pervious Urban	na	0	26,000	26,000
Structural Shoreline Erosion Control (linear feet)	Pervious Urban	na	0	5,600	5,600
Storm Water Management - Filtering Practices	Impervious Urban	123,708	0	17,548	17,548
Storm Water Management - Filtering Practices	Pervious Urban	158,771	0	22,442	22,442
Storm Water Management - Infiltration Practices	Impervious Urban	123,708	0	17,548	17,548
Storm Water Management - Infiltration Practices	Pervious Urban	158,771	0	22,442	22,442
Storm Water Management - Wet Ponds/Wetlands	Pervious Urban	158,771	0	22,442	22,442

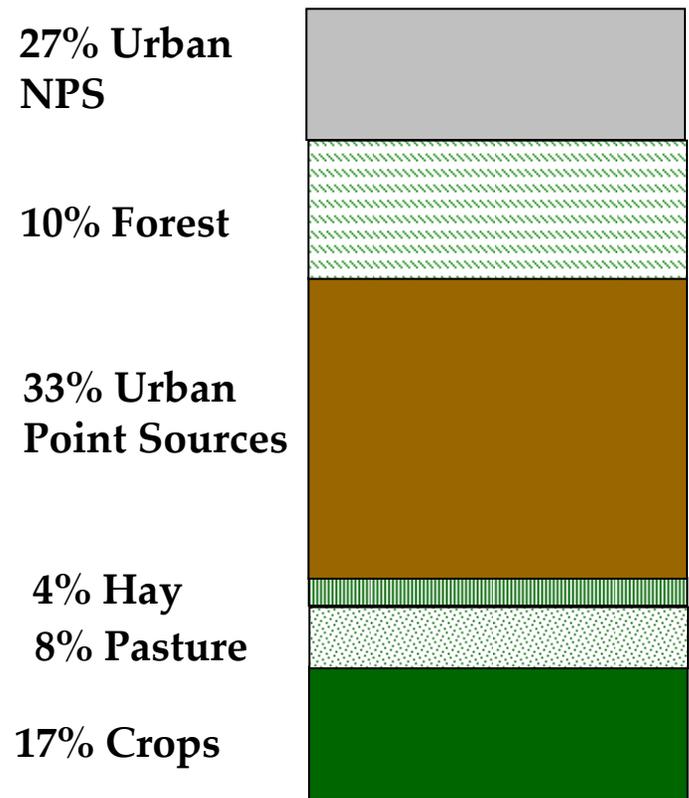
Sediment - The James River Strategy



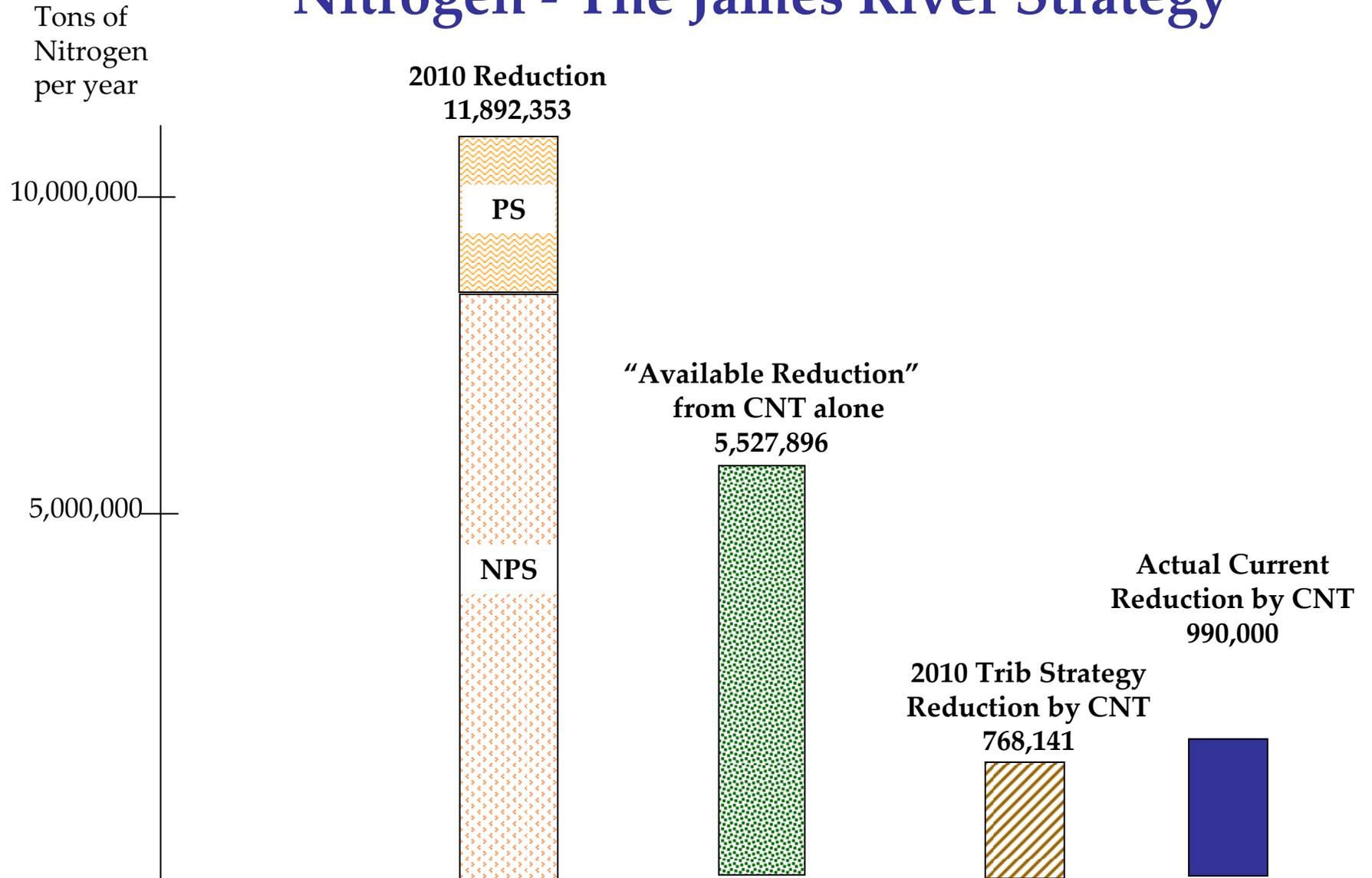
Phosphorus - The James River Strategy



Sources of Nitrogen into the Bay



Nitrogen - The James River Strategy

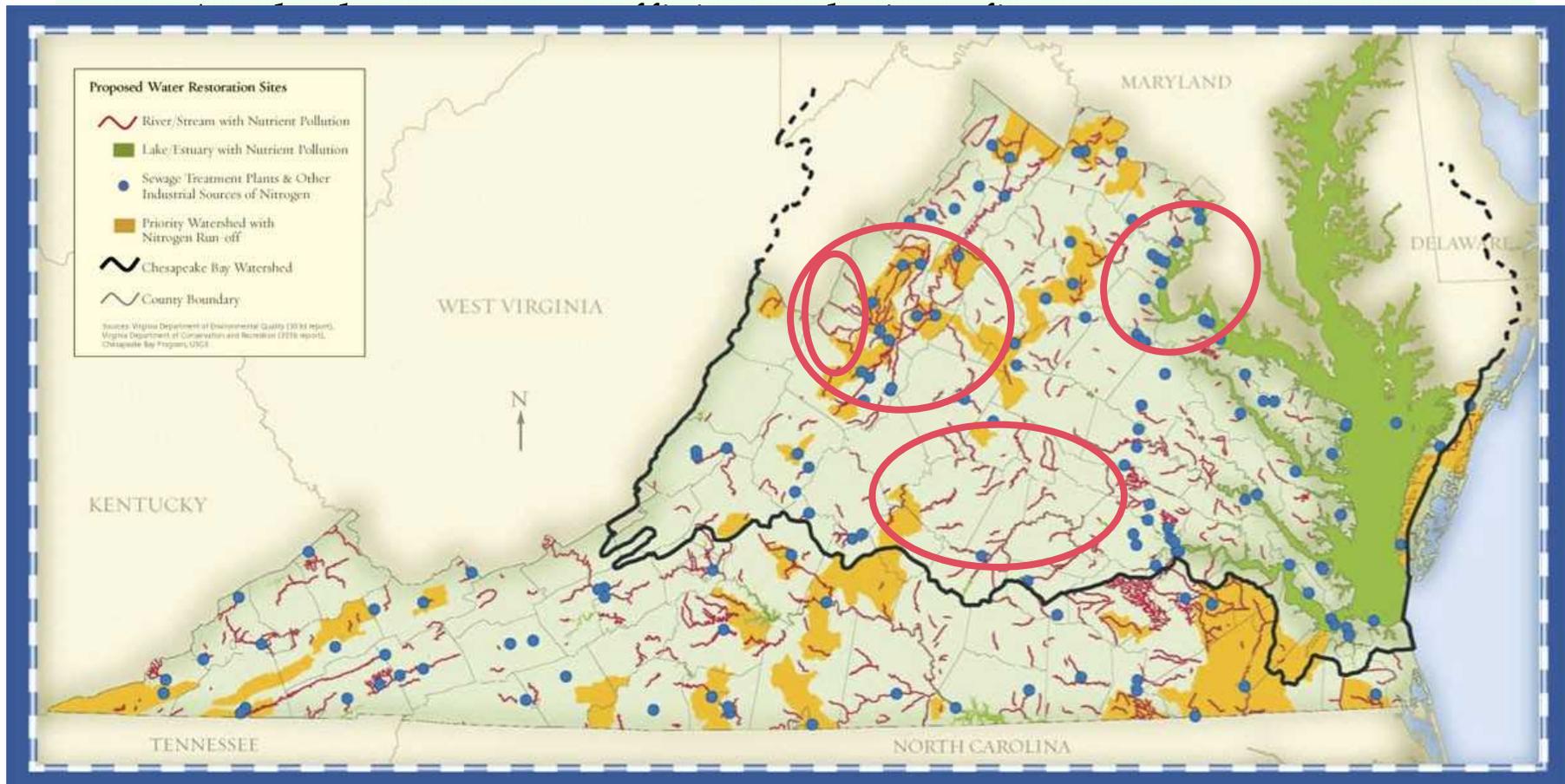


Economic Incentives for Nitrogen Reduction

	Total Cost \$Millions 2003 – 2010	Nitrogen (\$/lb)	Max Achievable Reduction (% of Goal)	Economic Incentives to User
Adv. Waste Water Treat	\$ 1,200	\$ 8.40	34.5 %	Fines & Penalties
Waste Water Land Appl.	145	4.20	5.0 %	Lower cost
Continuous No-Till	55	0.32 to 1.51	60 %	Higher yield Lower cost Less labor
Litter Treatment	N/A	NA	Used as fertilizer	Higher yield Lower costs Less labor
Ban on Lawn Fertilizers	0	0	23.8 %	Fines & Penalties

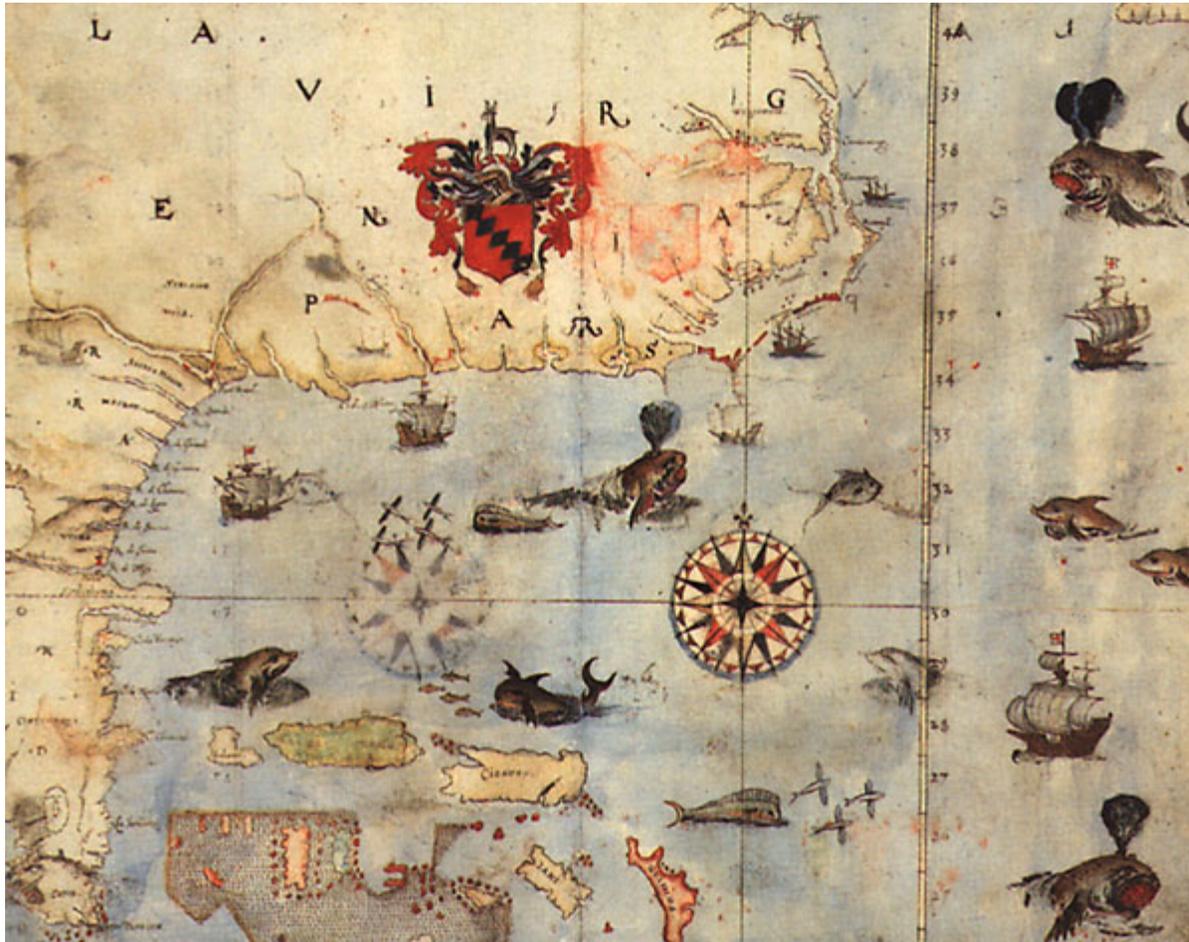
Recommendations

- When without the data needed to make a fully informed decision, take up the problem in discrete steps. In this case –
 - Address the worst impaired waters first;



Recommendations

- **Promote**, rather than inhibit free markets and the incentives and innovations **free markets** produce.
- Make public investment decisions like we would any public investment, within our ability to pay over the long term and in balance with other public needs



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