

PWP June 2007

The Best Reasons The Best Buffers The Best Places

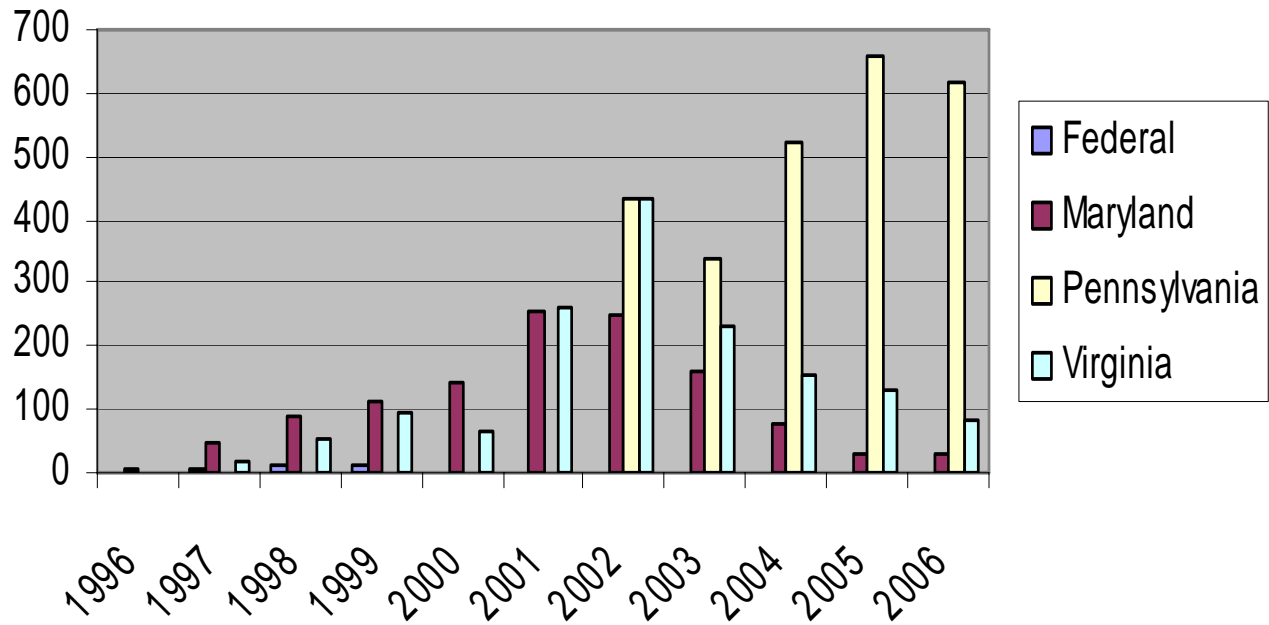


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We are not just planting trees and going for numbers, we are Looking for quality sites and links to improvements in Bay health. We are progressing to conservation/protection and sustainable riparian projects.

Chesapeake Bay Riparian Miles By State 2006



WHAT CHARACTERIZES GOOD BUFFER FUNCTION?

- 🌲 Species composition - diversity, selection, distribution
- 🌲 Site characteristics - soil, slope, aspect, moisture
- 🌲 Adjacent land use - urban/rural/ag/recreational (nutrient loading capacity)
- 🌲 Wildlife component - population sizes, species diversity, nuisance species
- 🌲 Adjacent watercourse - stream/river/shoreline/ flood regime,

Species Composition



Diversity - variation in seed types, mast types, foliage, bark and structural physiology



Selection - Root depth, nutrient needs, fall color, flowers and size



Distribution - clumped, random, even (rows)



Winterberry Holly

Site Characteristics

- Soil -Hydric characteristics, high infiltration rate, thick organic layer, good mineral content
- Slope - < 10 % preferably 3-5% (5 feet of buffer for every 1% > in slope (Klapproth and Johnson)
- Aspect - Species are sensitive to sun and prevailing wind exposure
- Moisture - Hydrologic fluctuation, water table depth, groundwater depth



Connection with the water and root access to nutrient source is important for denitrification efficiency



Before
Don't plant here



After
Good slope and floodplain reconnection

Piedmont streams



High energy streams with meandering patterns, fed through surface flow and ground water recharge seepage

Coastal Creek - sluggish
tidal influenced flow.



Associated wetland and tree buffer combination intercept sheet flow and groundwater seepage at toe of slope. Surface flow slowed by upslope woodland.

Blue Ridge Stream



High gradient streams, sloping banks with groundwater seepage and surface flow dynamics, buffer at waters edge and upslope captures both sources.

Adjacent land use



Urban - Loading from storm sewers, waste water, lawn fertilizers imperviousness accelerates delivery, overwhelms buffer



Rural & Agriculture- Loading from animal waste, field fertilizers, erosion process, livestock loafing



Recreational ~- Parks, golf courses, playing fields - Loading from field maintenance, nuisance wildlife densities

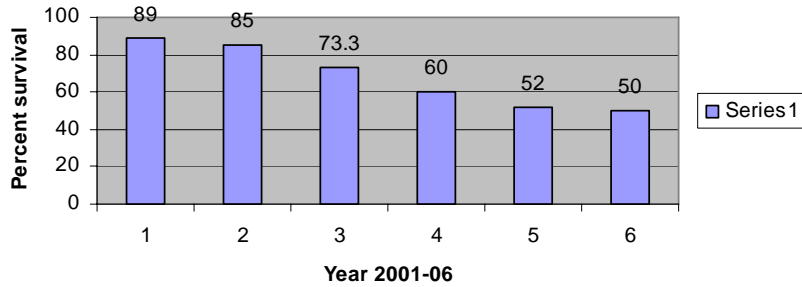
Wildlife Component

Bird species richness correlates positively with vegetation richness of riparian forest buffers.

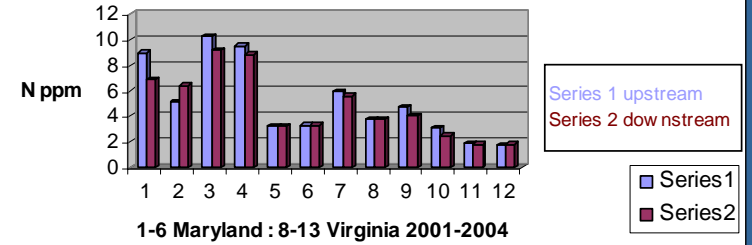


PWP Monitoring Data

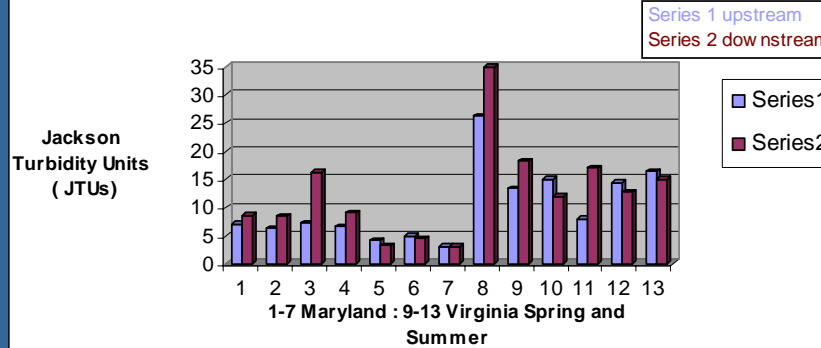
PWP Tree Survival Data 2001-2006



Nitrate Levels for PWP Monitoring Sites 2001-2006

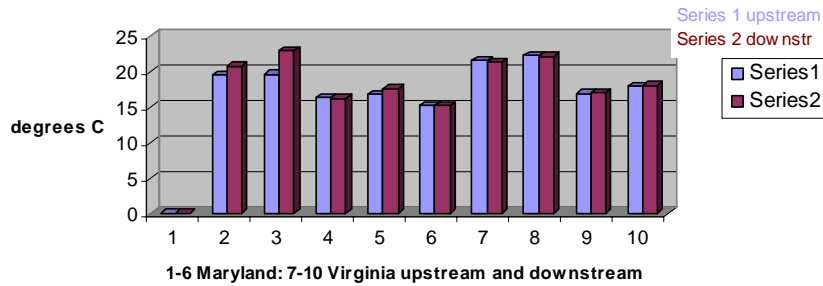


PWP Maryland and Virginia Turbidity Levels 2001-2006



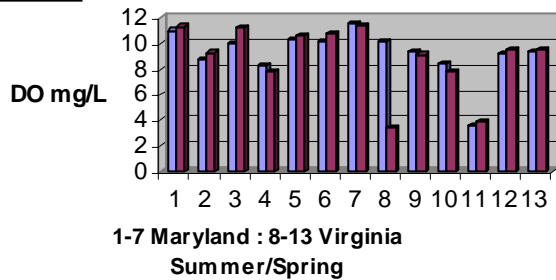
Close relationship between temperature and dissolved oxygen (DO) as temperatures rise DO decreases * note green and red highlights for each

PWP Maryland & Virginia Temperature Data 2001-2006



Dissolved Oxygen Levels at PWP Monitoring Sites 2001-2006

Series 1 upstream
Series 2 down nstr



Year	Temp	u	d
2001		19.6	20.9
2002		19.7	23.06
2003		16.4	16.3
2004		16.9	17.7
2006		15.3	15.24
VA			
2001		21.6	21.43
2002		22.4	22.22
2003		17	17.1
2004		18	18.1

State	Season	Temp	DO
Maryland DO	Spring	11.03	11.35
	2001 Summer	8.76	9.31
	Spring	10.07	11.27
2002	Summer	8.24	7.78
2003	Spring	10.3	10.6
2004	Spring	10.2	10.8
2006		11.59	11.43
Virginia	Spring	10.22	3.46
2001	Summer	9.41	9.15
	Spring	8.42	7.82
2002	Summer	3.52	3.82
2003	Spring	9.2	9.5
2004	Spring	9.4	9.6

Ecosystem Service Category	Provisioning = Products obtained	Regulating = Ecosystem process regulation	Cultural = non-material benefits	Supporting = Services necessary for the production of other services
	Organic litter	Water cycling	Aesthetic scenes	Nutrient cycling
	Wildlife food	Air gas exchange	Recreation	Soil retention and formation
	Plant Seed bank	Climate moderation	Solitude	Flood control
	Game production (fish, avian, and mammals)	Carbon cycling	Artistic opportunities	Refugia
	Medicinal products	Trophic dynamic	Educational forums	Plant and animal genetic
				Pollution control

If you had to put a price on it, what would You say it is worth?

We're losing it.....

Change in Riparian Forest Cover by Study Area

....Wilder and Jorgenson 2006

	•Percent Δ
•Dauphin	• -1.7%
•Prince George's	• -1.1
•Spotsylvania	• -2.7
•Henrico	• -5.2
•James City	• -1.8
•Total	• -2.7

-Henrico County, VA study area had the greatest % decline. Most of the decline was in mixed forest.

-Prince George's, MD study area had the lowest decline of 1.1%.

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