

Impacts of Riparian Ecosystems on Water Quality in the Western Upper Suwannee River Watershed

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USDA-Agricultural Research Service

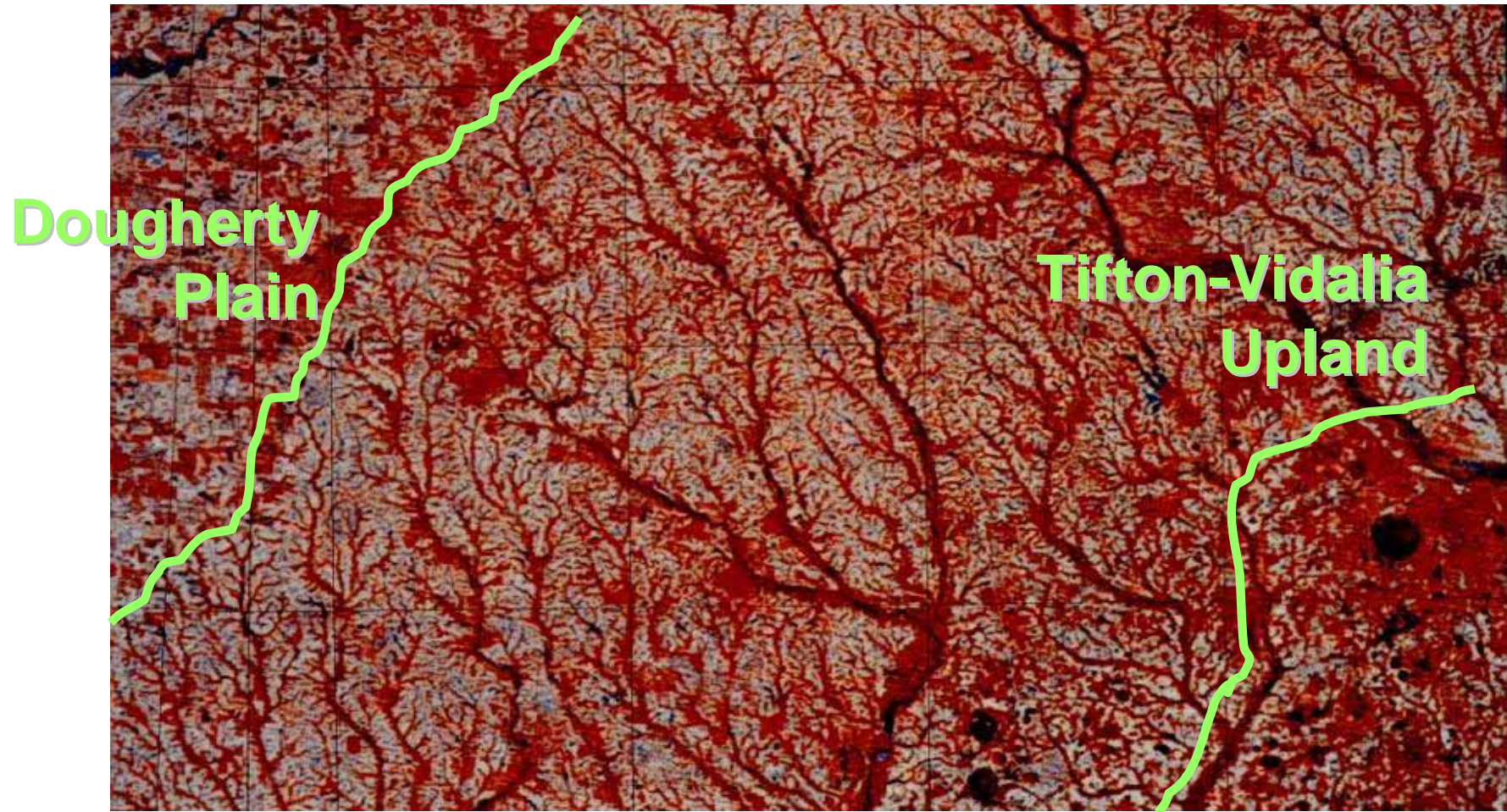
University of Georgia

Outline

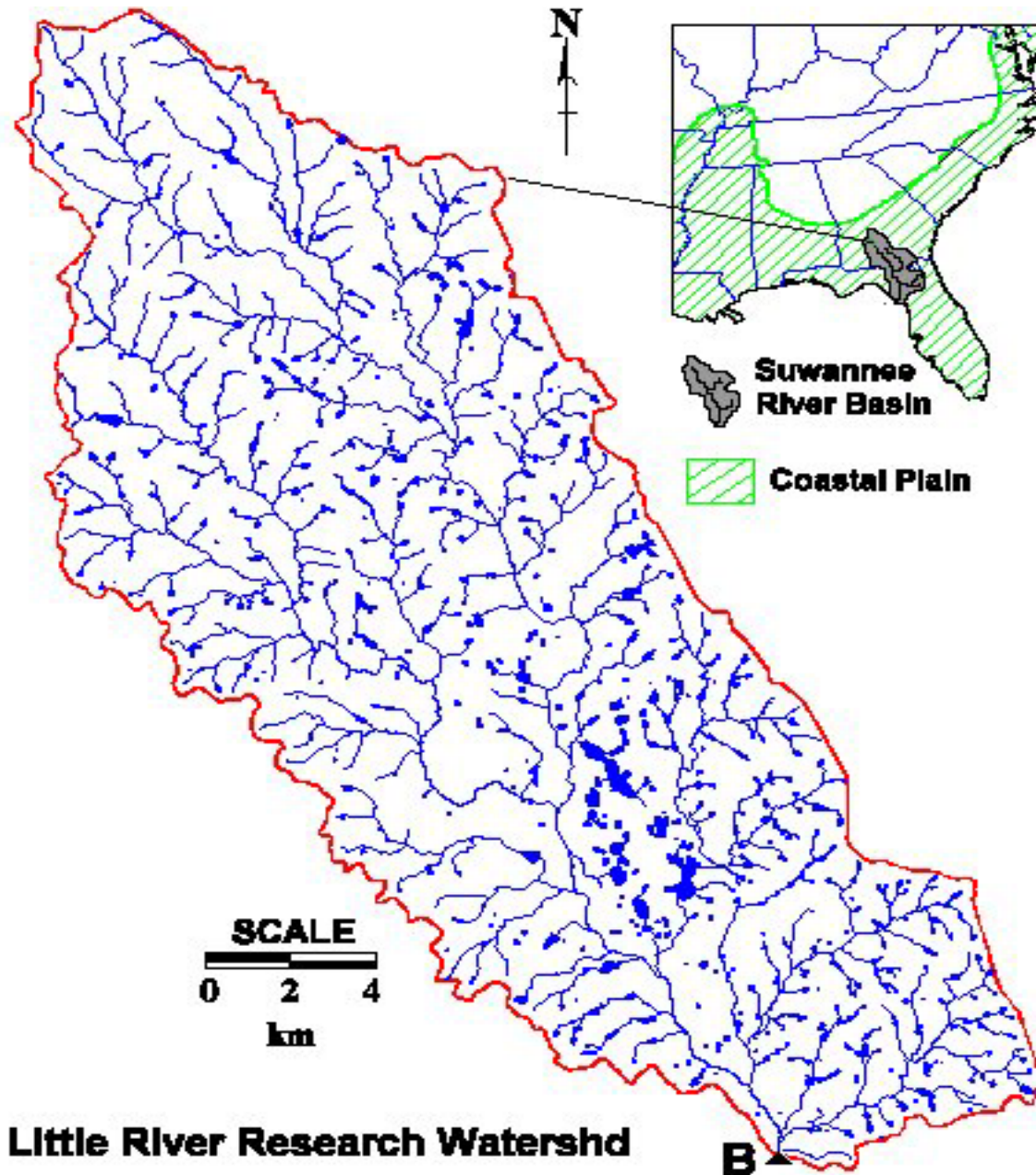


- **Nutrient Budgets**
- **Managed Forest Buffers**
- **Effect of Extreme Case**

Georgia Coastal Plain

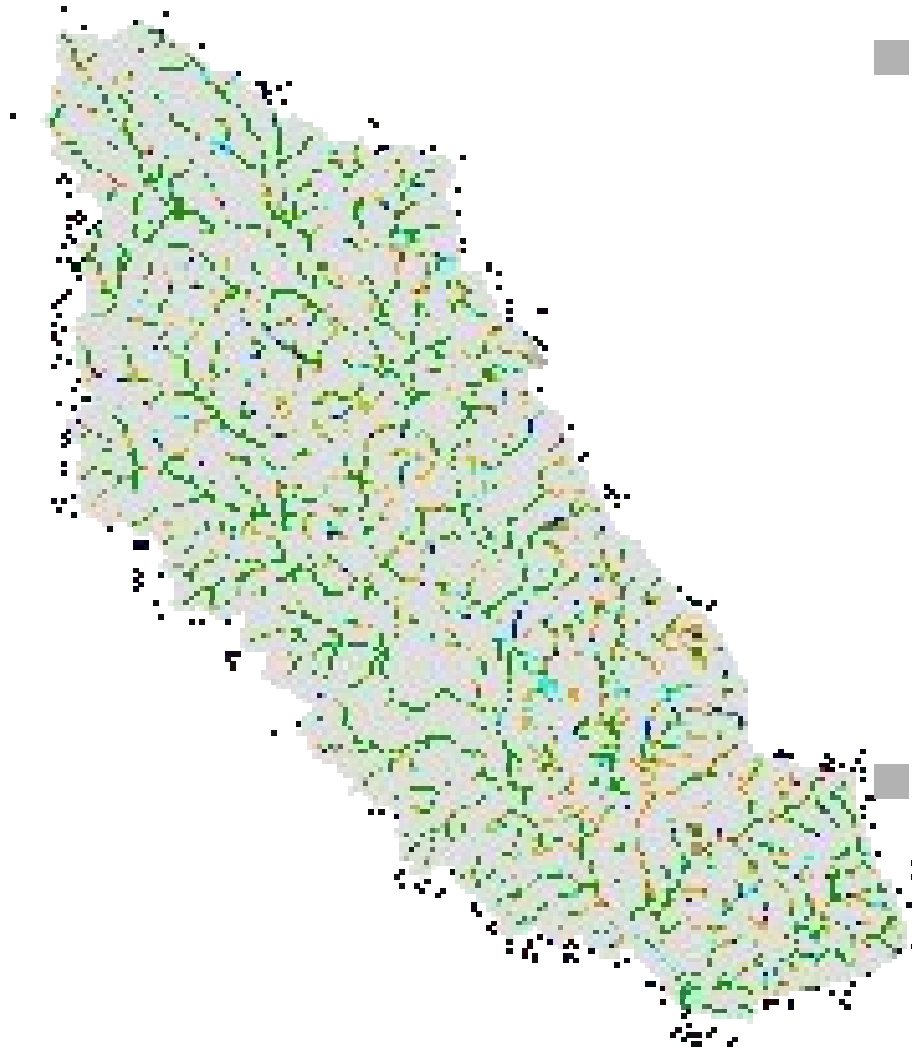


Little River Research Watershed



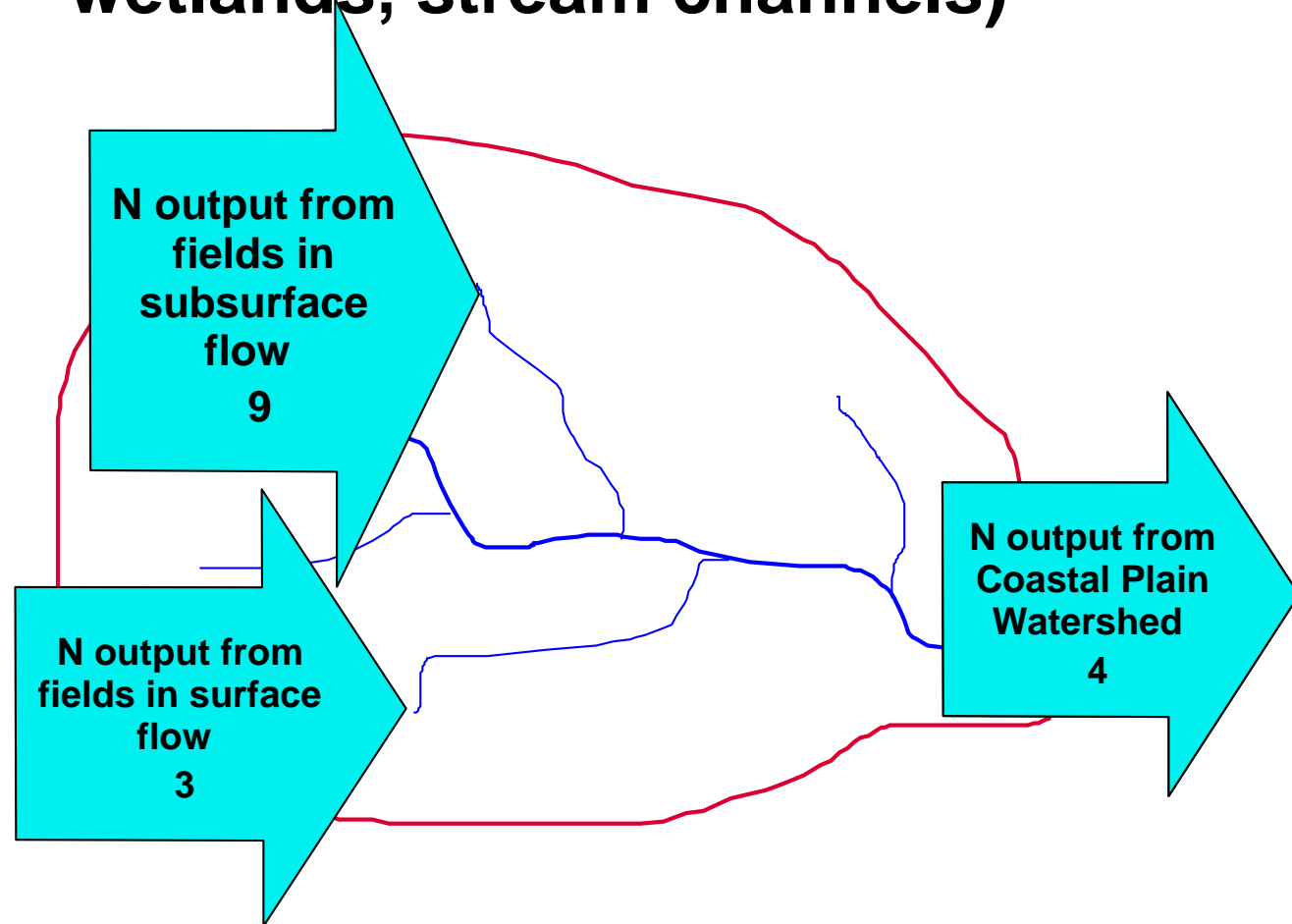
- Little River Research Watershed is 334 sq. km (129 sq mile) drainage in headwaters of Suwannee River Basin in Tift, Turner, Worth County, GA

Riparian Condition

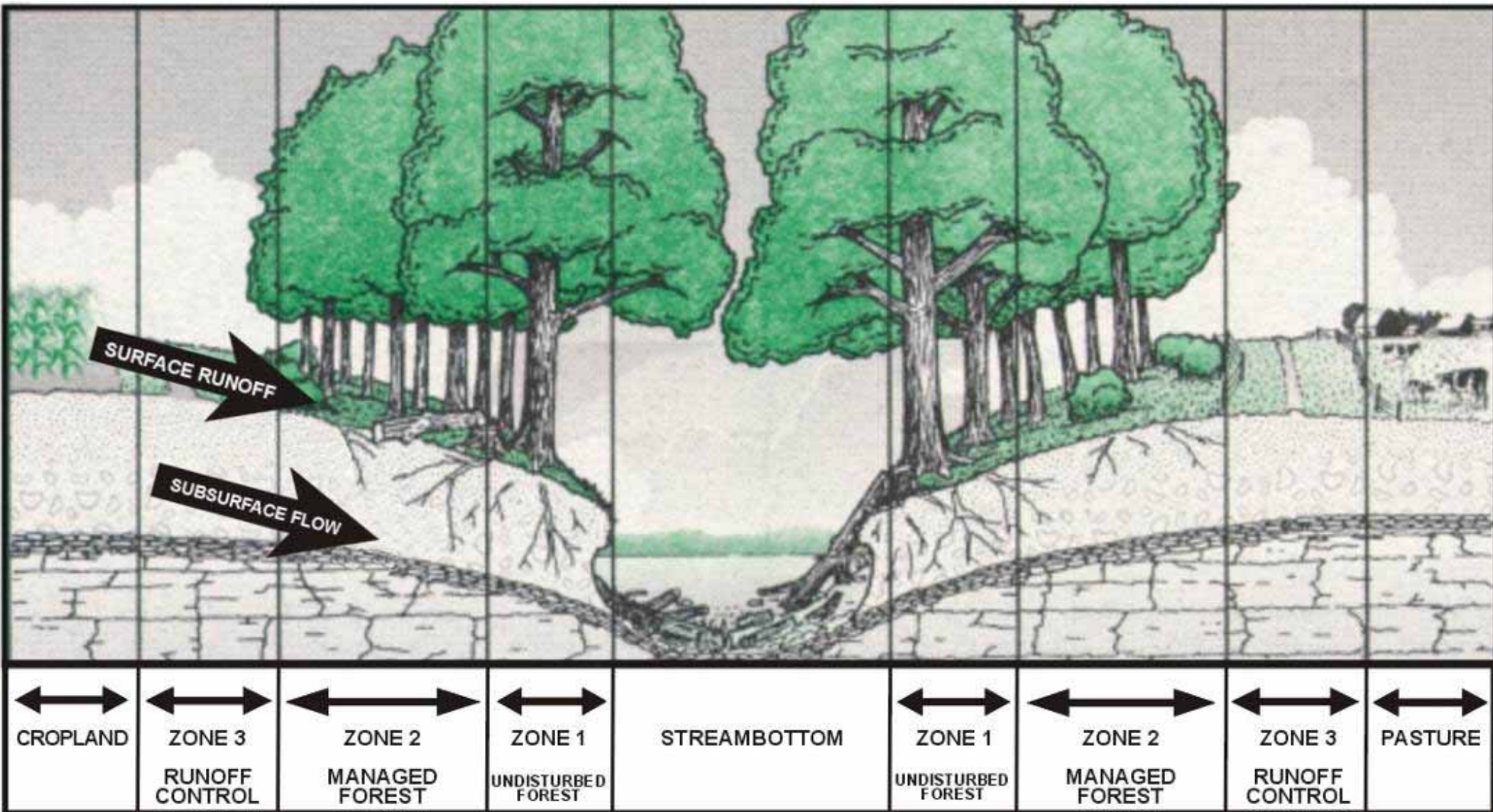


- **Estimated the extent of forest in a 60 m diameter riparian zone**
 - **60% of riparian zone in forest**
 - **40% in other uses, mostly agriculture**
- **Most of non-forested riparian zone down slope from agriculture**

**Field and Watershed Scale N outputs
(kg/ha/yr) - N is lost in large amounts in
riparian forests and other sinks (ponds,
wetlands, stream channels)**



Three Zone Buffer System



Restored Riparian Buffer Receives Water from a Liquid Manure Site



Little River, GA, Riparian Wetland Restoration – Planting trees



Little River, GA, Riparian Wetland Restoration – Seven Years Later



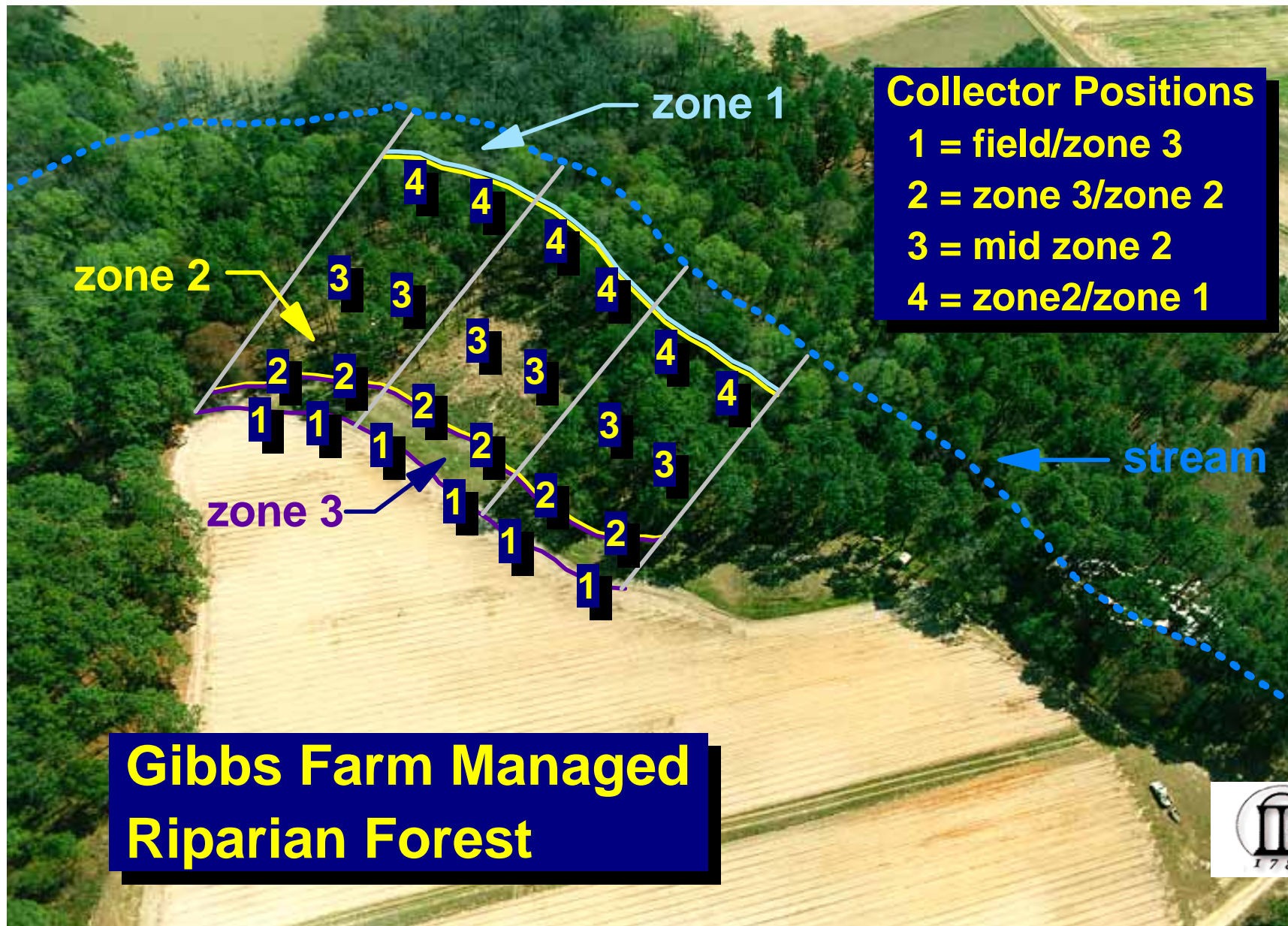
Nutrient Budgets for the Restored Buffer

	Total N (kg N/ha/yr)	Total P (kg P/ha/yr)
Runoff Input	105	18
Ground Water Input	21	2
Precipitation	13	0.4
Runoff Output	51	5
Ground Water Output	7	1
Per cent Retention	59%	66%

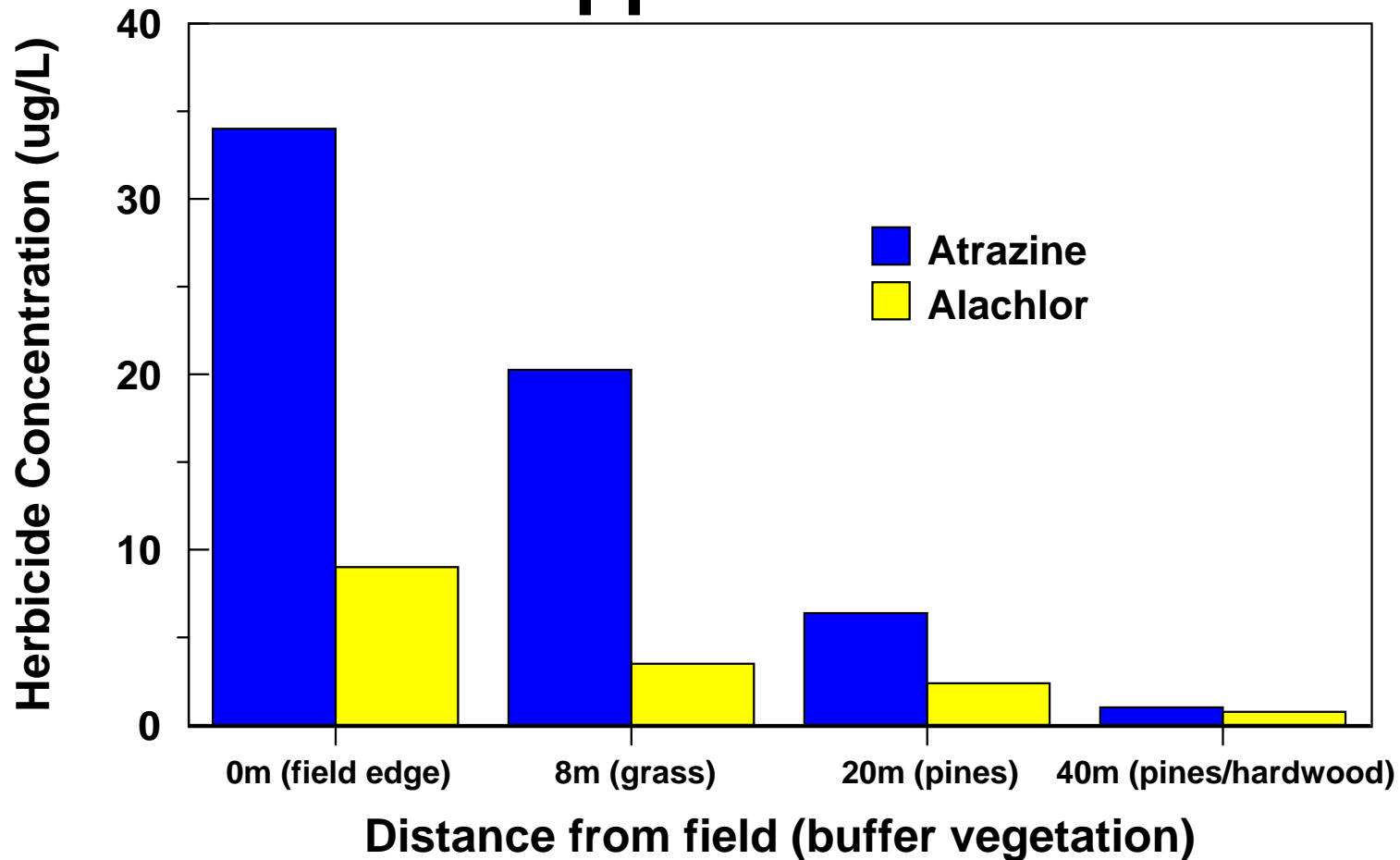
Typical Landscape



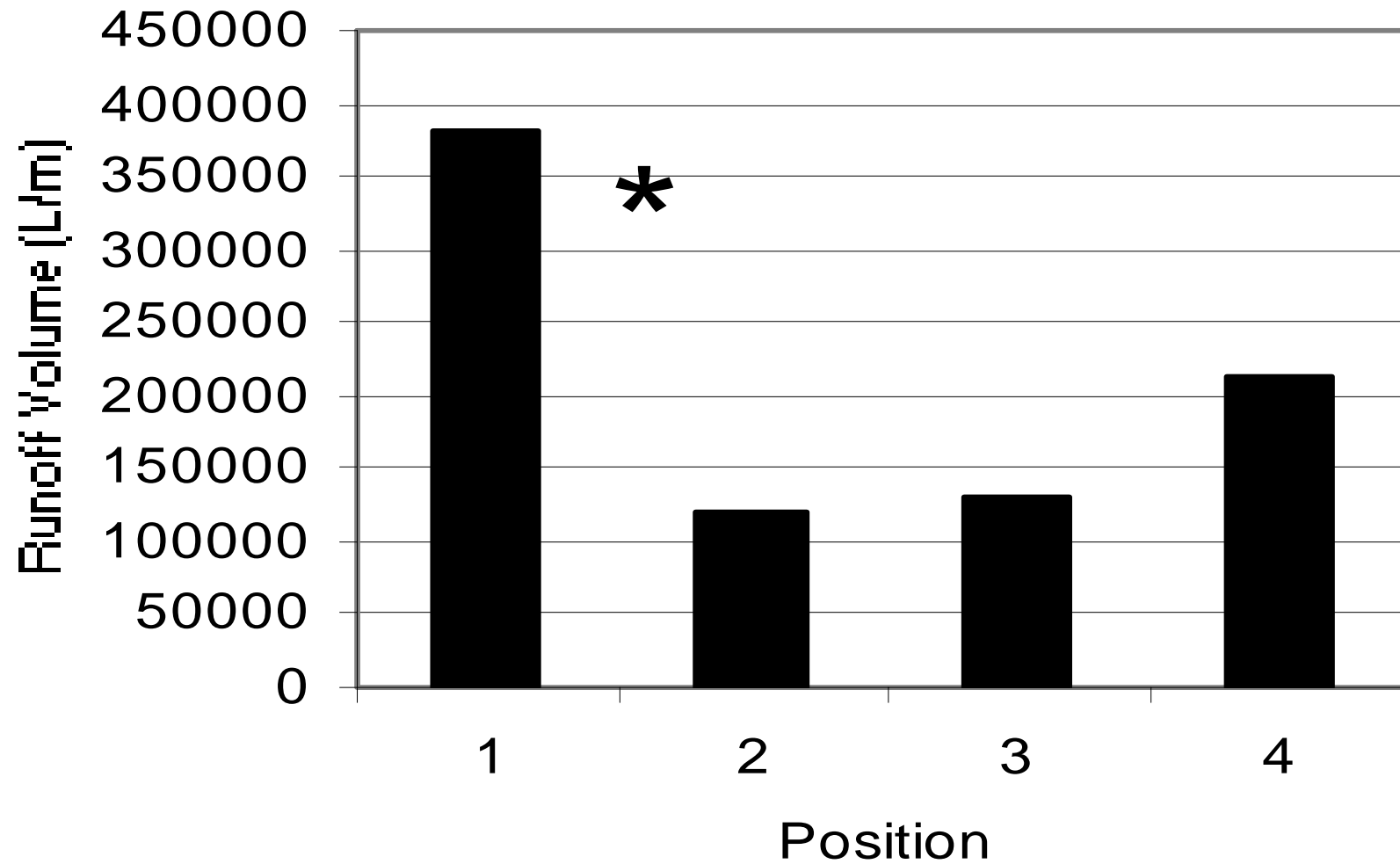
- **Agricultural land in well-drained upland**
- **Forest and ponds in channel systems**



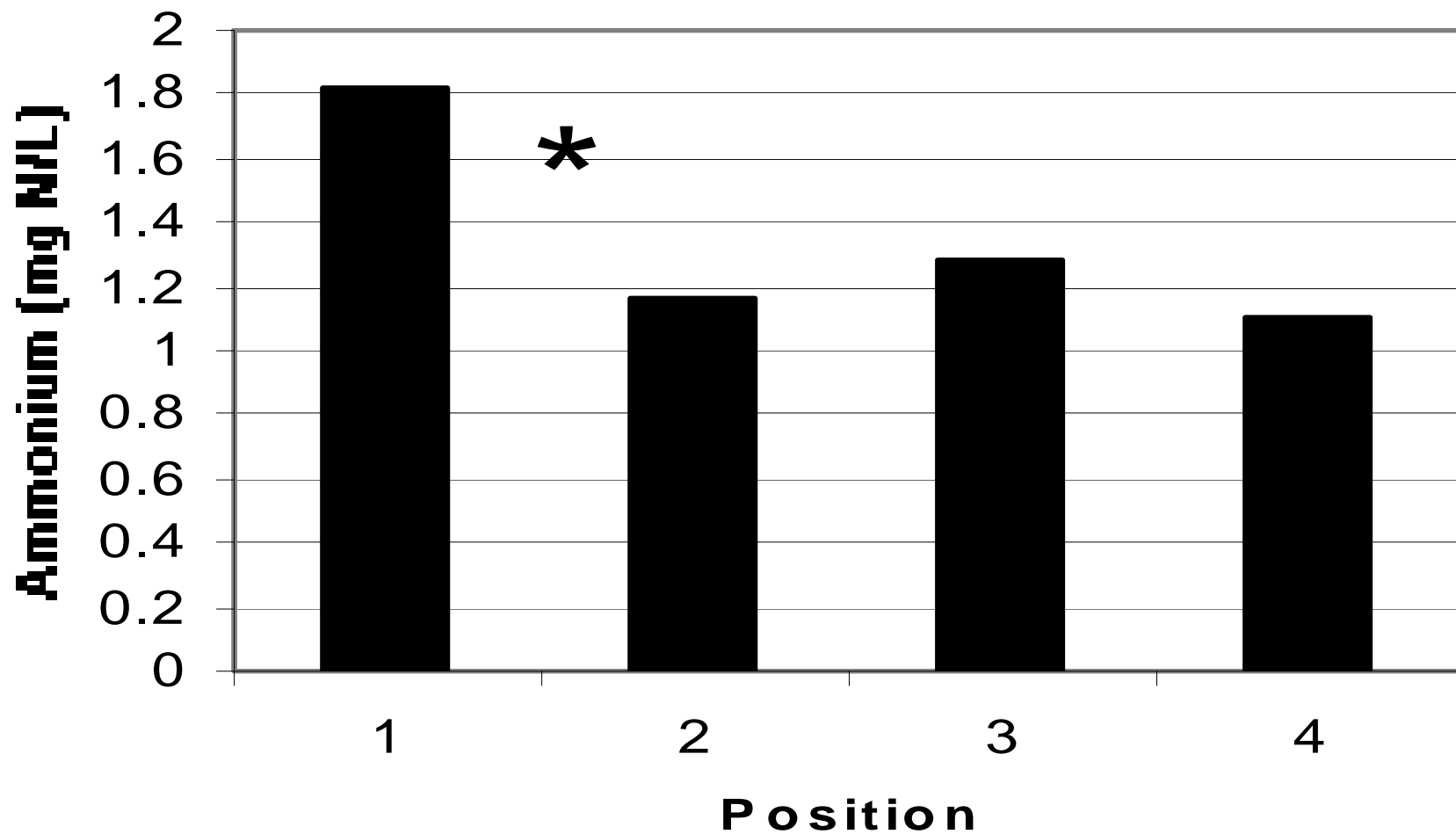
Average herbicide concentrations in surface runoff within 3 months after application



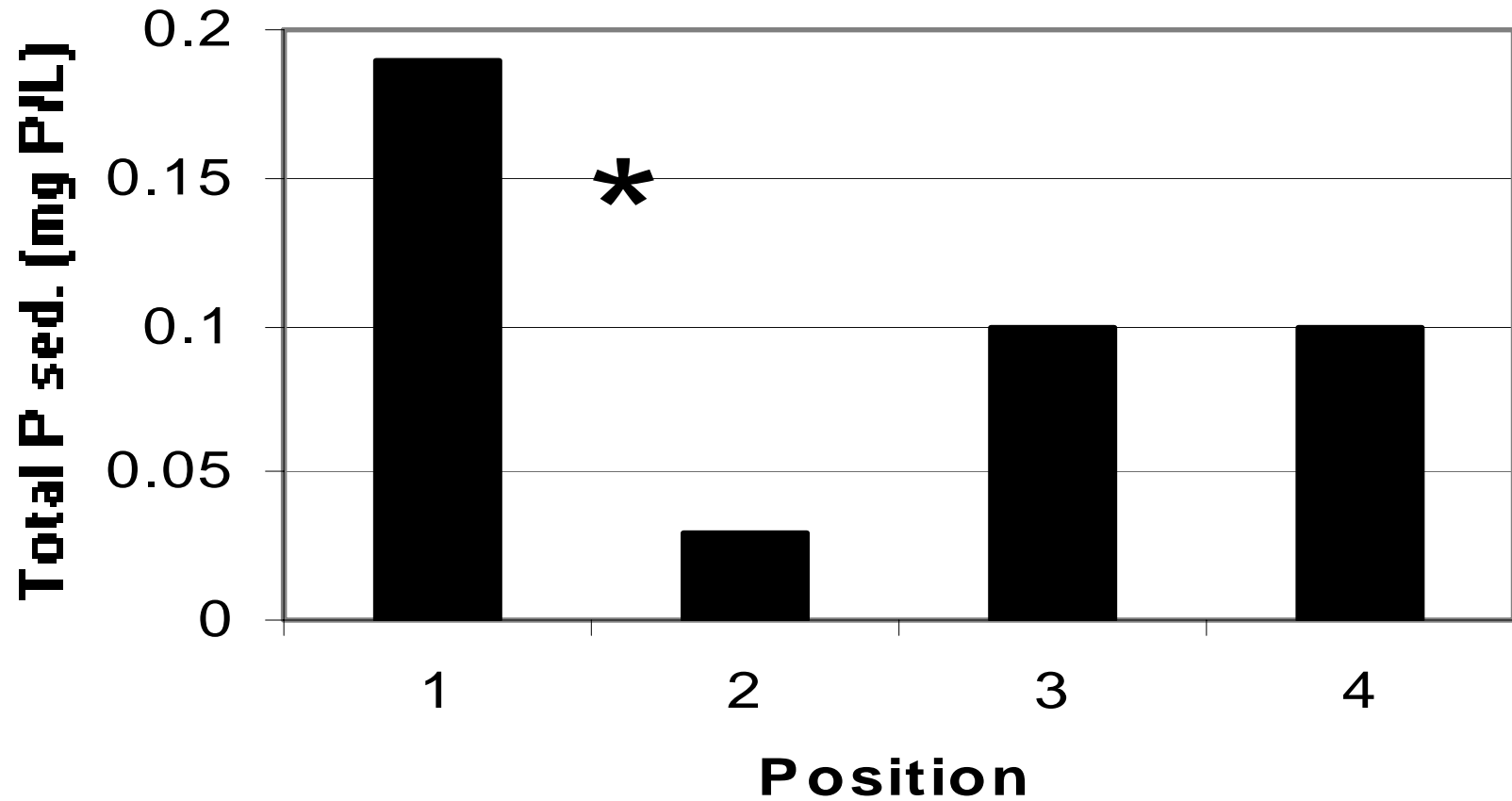
a) Runoff Volume



b) Ammonium Concentration



h) Sediment Total P Concentration



Typical Landscape



- **Generally intensifying landscape but remaining agricultural**
- **Many areas vegetables production is replacing tobacco and traditional row crops.**

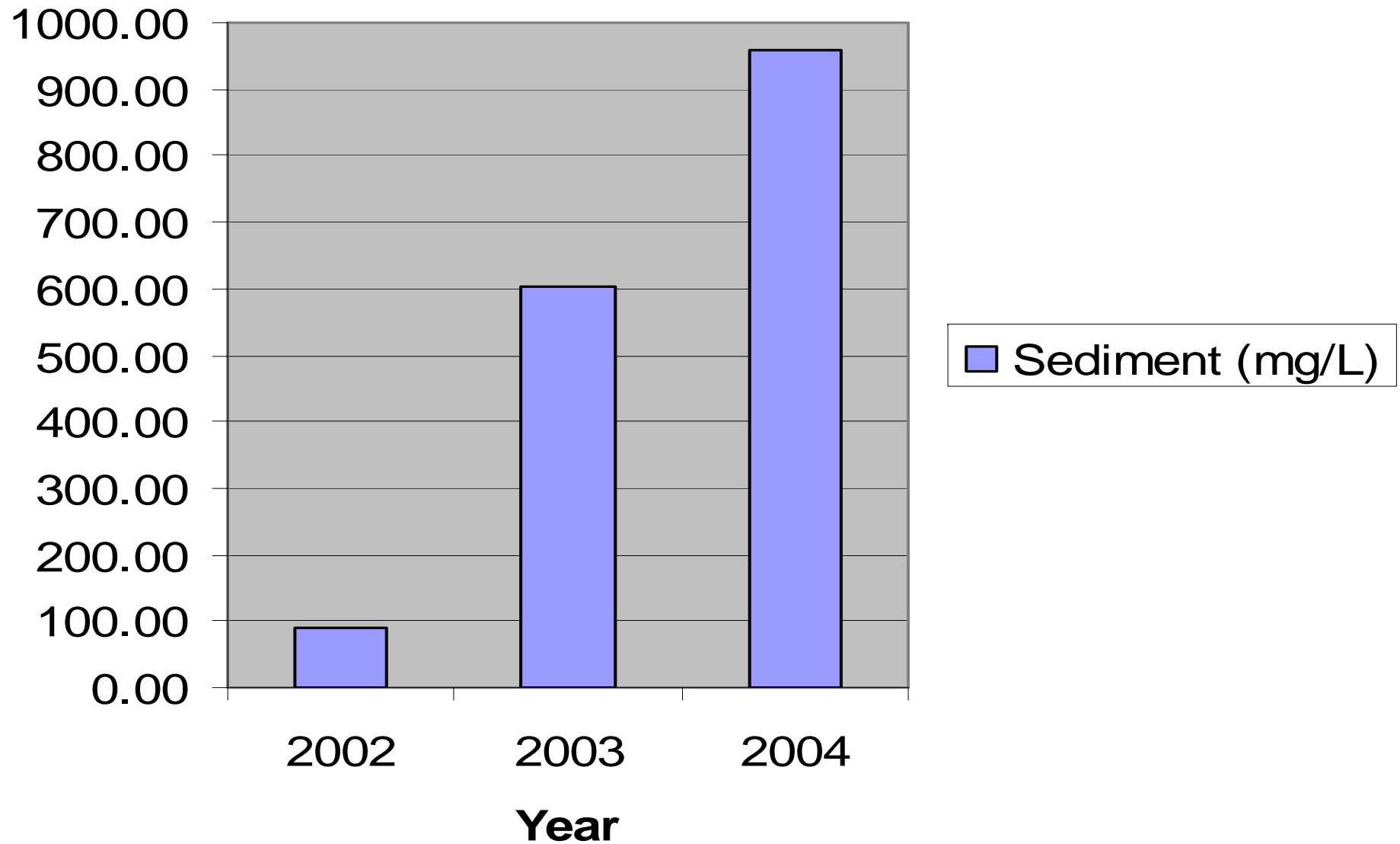
Extreme Riparian Buffer Functions







Sediment (mg/L)



Extreme Riparian Buffer Functions

- Gross Erosion- > 500 Mg/ha
- Sediment transport after 150 m of riparian forest < 20 Mg/ha



Research Needs

- Ecological relationships of riparian buffers
- Functions in other parts of Basin
- Interactions with discharge water that infiltrates in sinks

