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- Key Concept: Buffers should *slow* water movement
- Slow water velocity will enhance sediment filtration, increase infiltration of surface water into the soil and groundwater, and expose contaminants to extended periods of removal mechanisms.
- Fast Water Movement: Concentrated Overland Flow
- Water can cross 50 foot buffer in less than 1 minute**.** Buffers can't treat concentrated flow (e.g. gutters, pipes, and channels).
- Slow Water Movement: Ground water flow and sheet flow
- Dense Cover of Vegetation Promotes Water Quality within a Buffer
- Research shows the value of vegetation for groundwater nitrate removal in buffers
- Several studies suggest forests promote deeper roots and nitrate removal in subsoil:
- Factors that reduce natural buffer effectiveness include increased slopes, high sediment loading, dense soils, and altered hydrology.
- Groundwater Hydrology (Groundwater Flow Path) is Important to Nitrate Removal
- Upland Development Can Overwhelm a Natural Buffer: Consider *LID*. Vegetated buffers fail if upland generates concentrated flows. Minor ground reshaping often needed to promote buffer functions.
- Low Impact Development in Uplands Can Protect Buffers and Coastal Features
- Minimizing Upgradient Impacts on Buffers: Designed Bioretention Basins and Rain Gardens
- Center For Watershed Protection: Vision of Buffers Includes Designed, Reshaped Landscape
- Recommendations:
- Buffers must be viewed as one component of coastal protection
- Where upland development is intense, land reshaping, rain gardens and bioretention basins should be considered as buffer options
- Buffers with a mix of mowed and forest vegetation can provide water quality protection
- Optimal buffer width for water quality protection will vary with upland practices and site features
- Coastal Buffer Design Principles
- Incorporate native, coastal, non-invasive plants
- Buffer width and vegetation must reflect safety – storm surge protection and urban crime.
- Buffers must reflect aesthetic and cultural values.
- Urban and rural locations warrant different buffer designs