



Soil Erosion Processes

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Water Quality Problems: EPA Ranking

Sediment: widespread problems in surface water.
Ruins habitat, clogs waterways, fills lakes and reservoirs.

Nutrients: cause algal blooms and ultimately oxygen depletion. Yuck.

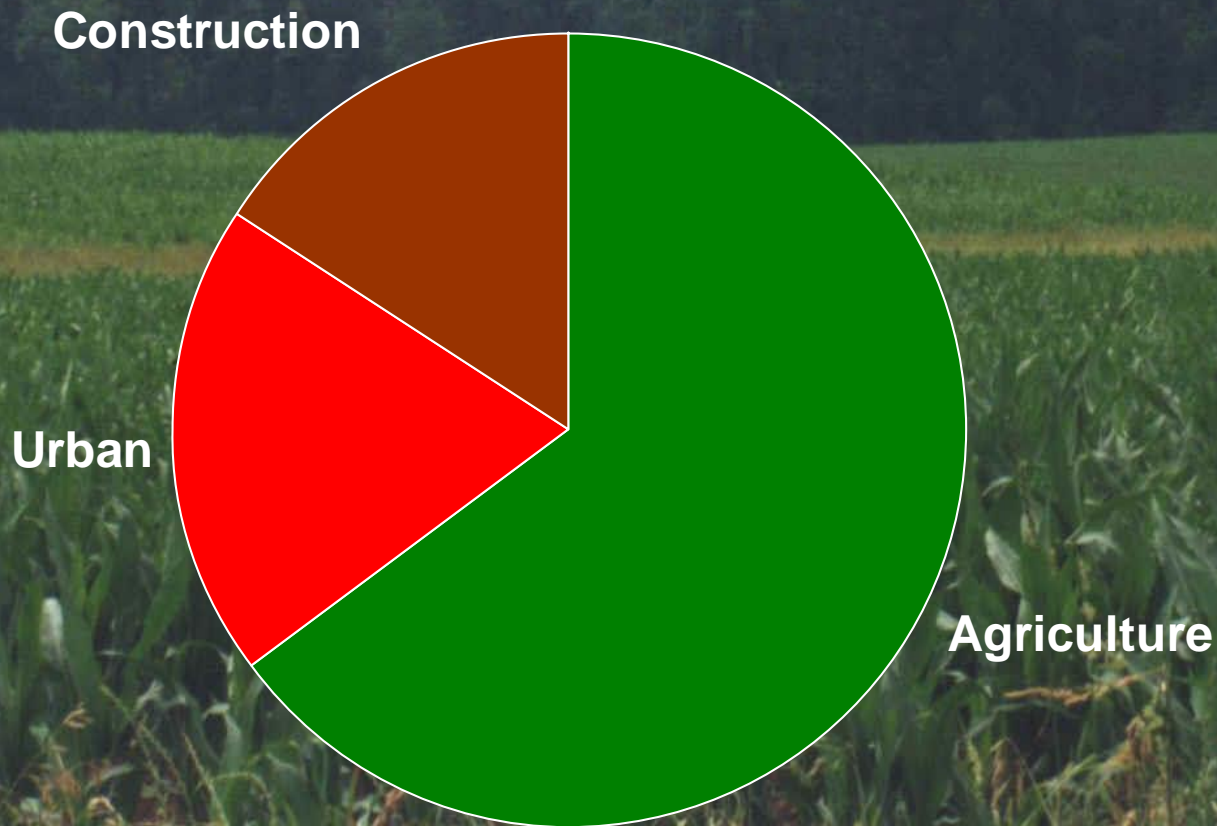
Pathogens: local problems especially on coast.
Many sources and no way to tell them apart!

Organic Stuff: degrades and robs oxygen.

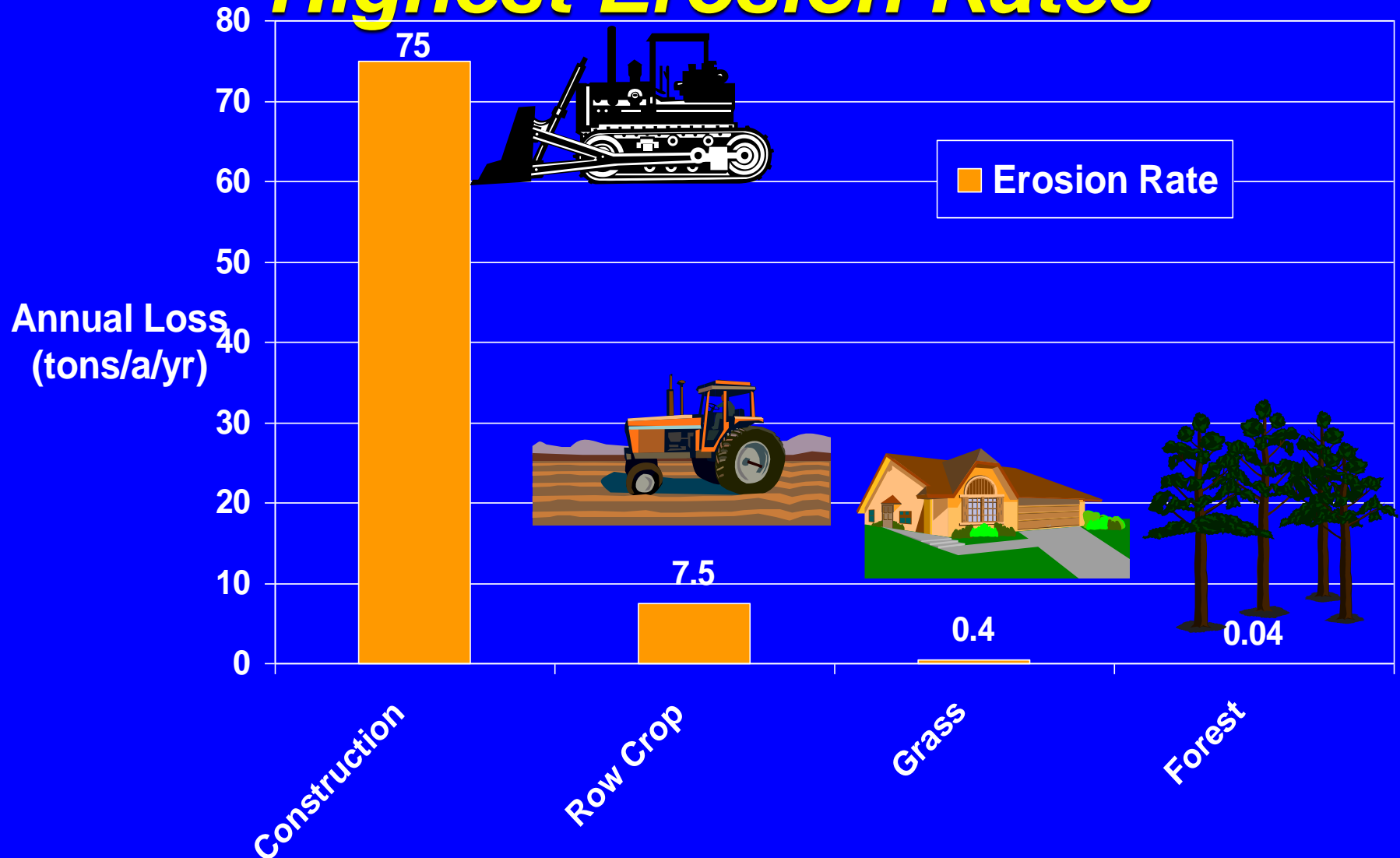
Heavy Metals: biological impacts

Pesticides: mostly a private well problem.

Non-Point Pollutant Sources: North Carolina Rivers



But...Construction Sites Have Highest Erosion Rates



Erosion: Two Phases

- **Detachment:** individual particles are loosened from the soil mass.
 - Rainsplash > running water > wind
- **Transport:** water or wind carries the detached particles downslope or downwind.
 - Flow in rills is the most important.

Factors in Soil Losses

- ***Rainfall***: intensity, duration, and energy.
- ***Soil erodibility***: texture, structure, organic matter content.
- ***Topography***: slope length, steepness.
- ***Surface Condition***: vegetation, mulch, bare, etc.
- ***Erosion Control Practices***: contours, terraces, silt fences, basins, etc.

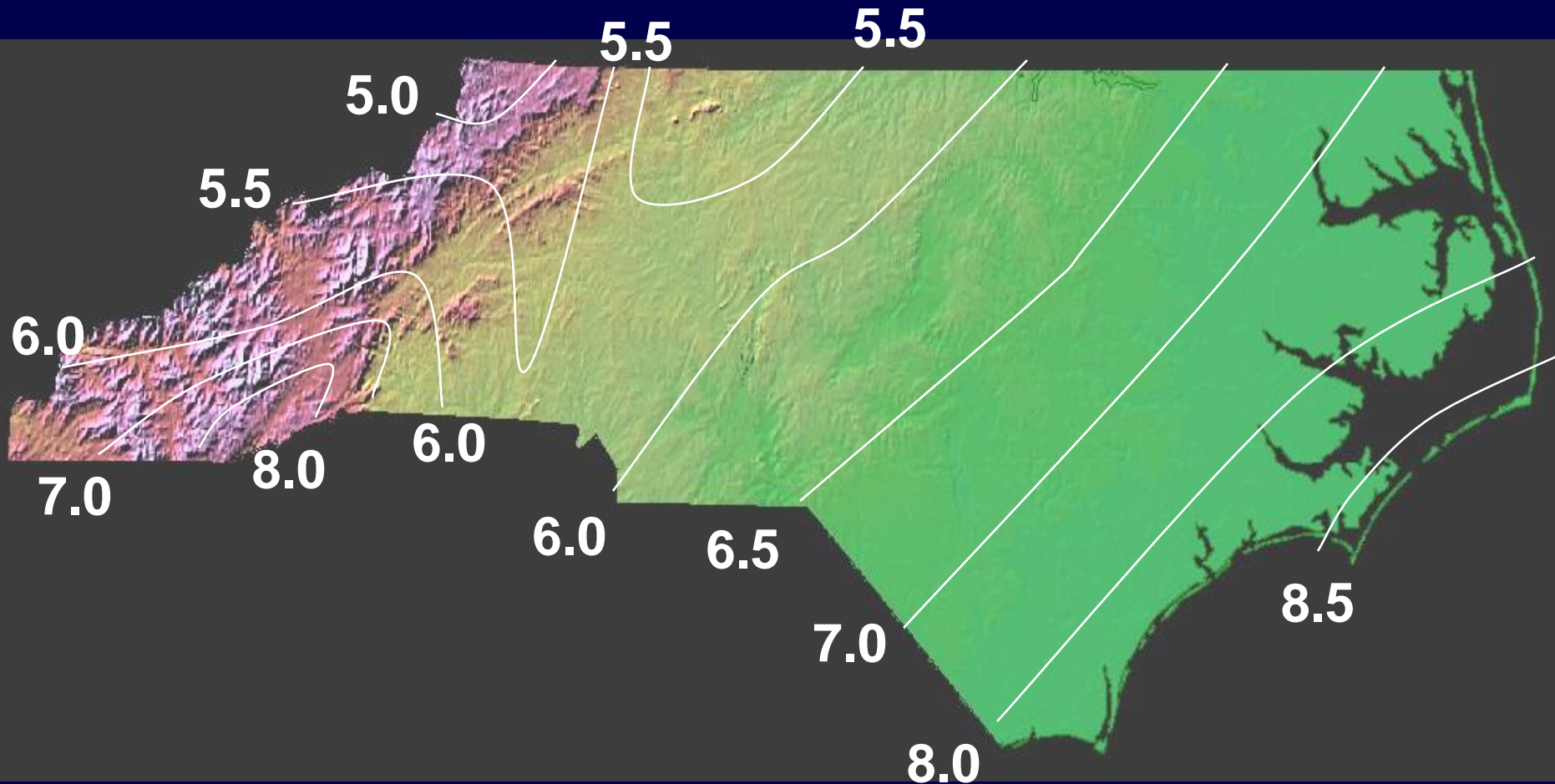
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Rainfall Factor

- **Intensity**: the volume of water per unit of time e.g. inches/hour.
 - Records: 1.23" in 1 minute (MD, 1956), 19" in two hours (WV, 1889), 45" in 3 days (FL, 1950).
- **Duration**: how long the storm lasts.
 - Norfolk has an average of 603 hours of precipitation/year, or 6.9% of the time. Of that, 12 hours exceed 0.5 in per hour.
- **Energy**: droplet size and velocity.
 - Heavy rain (0.6"/hr) has 30 times more energy than light rain (0.04"/hr).

24-Hour Rainfall Amounts for a 25-Year Recurrence



Rainfall Erosivity: Duration + Intensity

