

EROSION CONTROL BASICS

Erosion Control Short Course

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San Luis Obispo City/County Library

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EROSION CONTROL BASICS

- ✘ Process by which soil and rock are removed from the Earth's surface by natural processes such as wind or water flow, and then transported and deposited in other locations.
- ✘ Human activities have dramatically increased (by 10-40 times) the rate at which erosion is occurring globally.

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Overview of Major Factors Affecting Erosion

- ✘ Erosion is directly related to the forces applied to the soil by erosive agents in relation to the soil's resisting forces regardless of the land use.
- ✘ Erosion occurs where mineral soil is exposed to the direct forces of water (either runoff or rain drop impact) that is greater than the infiltration rate of water into the soil.

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Factors Affecting Erosion

- × Climate
- × Soil
- × Topography
- × Land use

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Climate

× Rainfall Erosivity

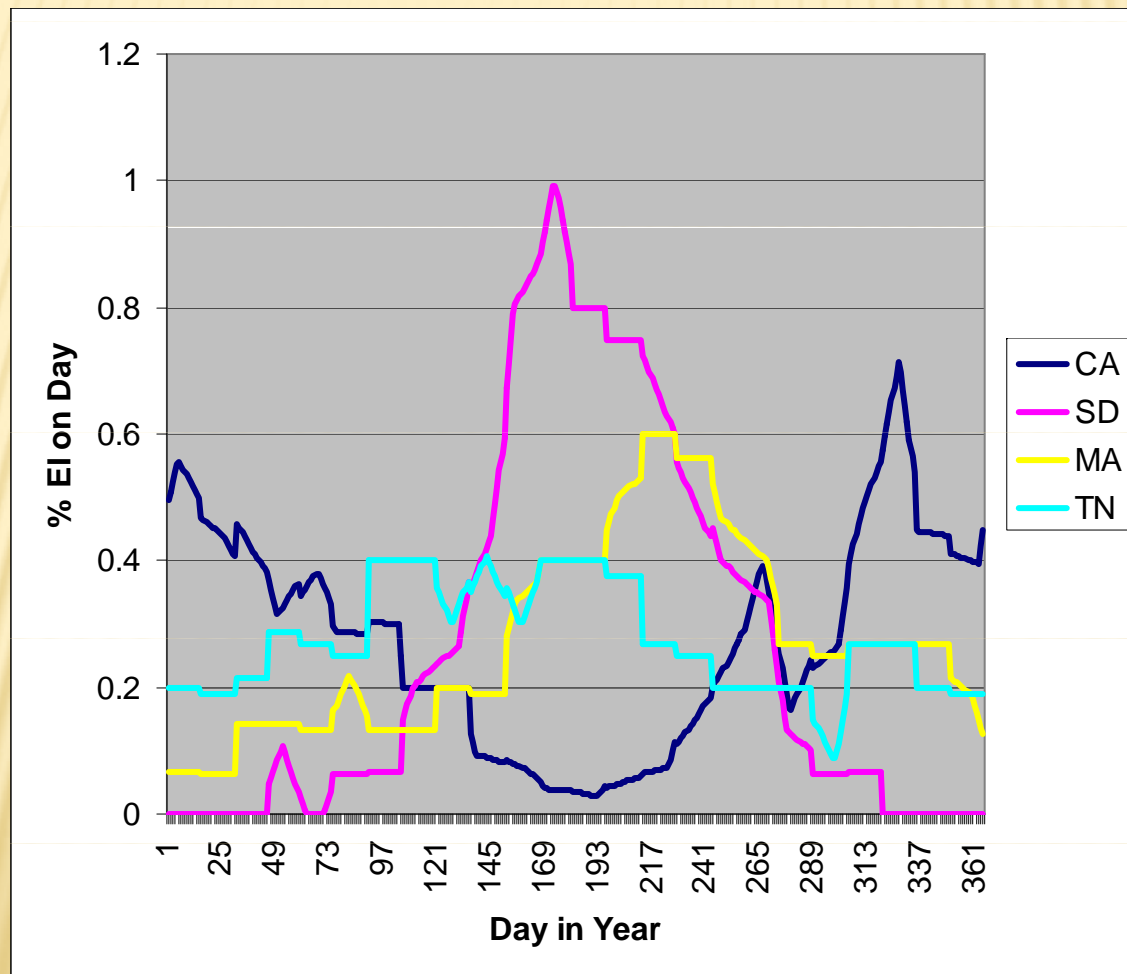
- + Related to rainfall amount and intensity

× Temperature

- + Temperature and precipitation together determine the longevity of biological materials like vegetative cover, crop residue, and applied mulch used to control erosion.

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Erosivity varies throughout the year.



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Soils

✘ Soil Erodibility

- + Estimate of the ability of soils to resist erosion
 - + Based on the **physical characteristics** of each soil. Generally, soils with faster **infiltration rates**, higher levels of **organic matter**, and improved **soil structure** have a greater resistance to erosion. Sand, sandy loam and loam textured soils tend to be less erodible than silt, very fine sand, and certain clay textured soils due to allowing water to permeate the soil instead of running off.
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- ✘ Preventing water accumulation and runoff are keys to preventing erosion.

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The soil in this photo is quite well protected on its horizontal surface; however, its vertical surface is very susceptible to erosion.

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SOIL DATA MART

<u>Survey Area</u>	<u>Symbol Survey Area Name</u>	<u>Available Data</u>
CA664	San Luis Obispo County, California, Coastal Part	Tabular and Spatial
CA665	San Luis Obispo County, California, Paso Robles Area	Tabular and Spatial
CA667	San Luis Obispo County, California, Carrizo Plain Area	Tabular and Spatial
CA772	Los Padres National Forest Area, California	Tabular and Spatial

<http://soildatamart.nrcs.usda.gov/>

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<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

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Topography

Slope length, steepness, and hillslope shape are the topographic characteristics that most affect erosion. Naturally, the **steeper** the slope, the greater the potential amount of erosion by water. Soil erosion by water also increases as the **slope length** increases due to the greater accumulation of runoff.

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Hillslope Shapes



Uniform

A straight black line sloping downwards from left to right, representing a uniform hillslope.



Convex

A black line sloping downwards from left to right, curving upwards (concave up), representing a convex hillslope.



Concave

A black line sloping downwards from left to right, curving downwards (concave down), representing a concave hillslope.



Complex-
Convex:concave

A black line sloping downwards from left to right, starting with a convex curve and transitioning into a concave curve, representing a complex hillslope shape.



Complex-
Concave:convex

A black line sloping downwards from left to right, starting with a concave curve and transitioning into a convex curve, representing a complex hillslope shape.

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Land Use:

- ✘ Most important factor affecting erosion because **type of land use** and **land use condition** are features that can be most easily changed to reduce excessive erosion.
- ✘ The combination of **cover-management (cultural) practices** and **support practices** are important in controlling erosion.

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Land Use - Cover-management practices

- ✘ Basic Factors affecting permeability
 - + Plant yield (amount of vegetative material on the soil surface)
 - + Vegetative canopy (height above ground and % of soil surface covered)
 - + Rooting patterns (fibrous roots vs. tap roots)
 - + Surface roughness (especially the direction of surface roughness)
 - + Mechanical soil disturbance
 - + Amount of biomass in the upper layer of soil

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Land Use – Support practices

- × Reduce erosion primarily by reducing the erosivity of surface runoff and by causing deposition.

- × Practices include:
 - + Ridging along the contour
 - + Vegetative strips and barriers (e.g., vegetative buffer strips, strip cropping, fabric fence, gravel bags)
 - + Runoff interceptors (e.g., terraces, diversions)
 - + Small impoundments (e.g., sediment basins, impoundment terraces)

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1980



1995



2002

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