EROSION CONTROL BASICS

Erosion Control Short Course
Monday, April 23, 2012
San Luis Obispo City/County Library

Ron Harben, Project Director
California Association of Resource Conservation Districts
and
USDA NRCS Conservationist - Retired
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.
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.
EROSION CONTROL BASICS

Factors Affecting Erosion

- Climate
- Soil
- Topography
- Land use
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.
Erosivity varies throughout the year.
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.

- Preventing water accumulation and runoff are keys to preventing erosion.
The soil in this photo is quite well protected on its horizontal surface; however, its vertical surface is very susceptible to erosion.
## EROSION CONTROL BASICS

### SOIL DATA MART

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

http://soildatamart.nrcs.usda.gov/
EROSION CONTROL BASICS

http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm
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.
Hillslope Shapes

- Convex
- Concave
- Complex: Convex:concave
- Complex: Concave:convex
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.
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 roughnessness (especially the direction of surface roughness)
  - Mechanical soil disturbance
  - Amount of biomass in the upper layer of soil
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)
EROSION CONTROL BASICS
EROSION CONTROL BASICS
EROSION CONTROL BASICS
EROSION CONTROL BASICS
EROSION CONTROL BASICS
The End