Session 3

Assessing Erosion Hazard

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Erosion Hazard

- With some jobs the risk of erosion is low but in other cases it can be high
- So how can we assess **erosion hazard**?
- The susceptibility, or risk of land to erosion, depends on a combination of factors and varies from site to site

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Assessing Erosion Hazard

What factors do you think affect erosion hazard?

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Slope?

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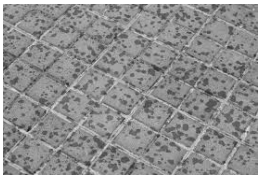
Rainfall intensity?



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Surface protection?

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Degree of cover?

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Erosion Factors

These factors are significant:

- **Rainfall** erosivity / intensity
- **Soil** type and erodibility
- **Slope** length/steepness
- **Conservation practice**
- **Cover** type

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R.U.S.L.E

- These factors form the basis for the **R**evised **U**niversal **S**oil **L**oss **E**quation
  - Empirical equation used to estimate erosion hazard for a location
  - Only applies to non-channelised erosion
  - Ignores soil dispersibility

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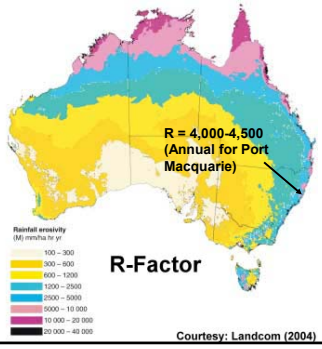
Rainfall Erosivity (R-factor)



- A measure of the ability of rainfall to cause erosion
- Related to the energy and intensity of rainfall
- Varies throughout Australia and throughout the year
- Range in NSW 250-10,000

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Rainfall Erosivity (R)

- Predominant rainfall droplet size (energy)
- Based on average annual rainfall data
- Ignores prevailing soil moisture

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Soil Type and Erodibility (K)

- A measure of the susceptibility of soil particles to erosion
- Affected by soil texture, structure, organic matter, profile permeability and other parameters
- Generally, fine sands and silts are most erodible, but dispersible clays can be highly erodible

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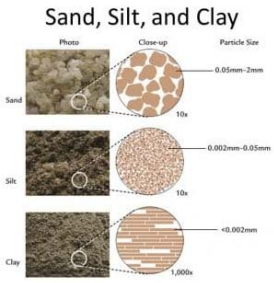
Soil Texture

- Sand grains
  - Visible to the eye
  - Roll between fingers
- Silt grains
  - Not visible to the eye
  - Roll between the fingers
- Clay grains
  - Not visible to the eye
  - Smooth to the touch



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Slope Length / Steepness (LS)

- A measure of the combined effect of slope length and gradient on soil loss
- Increases as slopes get steeper and longer
- Gradient has greater influence

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Slope Length

- Long slope shortened by use of berms and cross-drainage


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Slope Steepness

- Slope gradient more significant than length


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Conservation Practice (P)

- Relates to surface condition rather than cover
- Reduced by practices that reduce both the velocity of runoff and the tendency of runoff to flow directly downhill, e.g.
  - Track walking up/down slope rather than across slope
  - Straw crimping
  - Loose soil surface

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Track Walking

- Creates furrows which reduces downslope movement of soil



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Cover Type (C)

- A measure of the amount and effectiveness of ground cover
- Reduce the erosion hazard by maintaining good ground cover (lower C-factor) – a key erosion control practice!
- Proper rehabilitation should ensure C-factors drop to below 0.15 (50% cover) within 20 days of completing work

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Cover Type (C) for Grass

Grass Cover	C-Factor
No cover, soil smooth and compacted	1.0 **(High)**
20%	0.45 **(Med)**
50%	0.15 **(Low)**
70%	0.05
100%	< 0.01

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No Cover

- No cover, C-factor 1.0


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100% Cover

- Well covered site, C-factor 0.01

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Discussion

Which of the previous erosion factors can be readily manipulated to reduce the erosion hazard on your construction site, and how?

- Rainfall, soil type – NO
- Slope length, cover type – Possible
- Conservation practice – DEFINITELY!

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Discussion

When should you aim to work on sensitive sites or sites with high erosion hazard that may be difficult to manage?

- Timing (rain / wind probability?)
- Available resources?
- Previous disturbance?

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