Environmental Geomorphology

Geology 33
Professor Bennington

Geomorphology

- The study of the present surface of the Earth
- How it developed and the processes that shaped it
- Arguably the oldest branch of geology

All landscapes are primarily Quaternary in age...
...but affected by the geology left by older events.

Geologic Time Scale
Nature, to be commanded, must be obeyed.
- Sir Francis Bacon

- Landscapes are dynamic, not static.
- In most cases, the processes that produce landscapes are in a dynamic equilibrium.
- Engineering landscapes to suit people can result in catastrophe if the geological forces at work in the landscape are not understood and taken into account.

“Environmental” Geomorphology

Failure to understand and to respect the functioning of natural geological systems usually results in eventual property destruction and loss of life. Examples include:

- Flood control structures along rivers that allow wetlands to be reclaimed and settled, but that eventually create larger, more devastating floods.
- Developments built on steep hillsides in southern California without regard for dynamics of wildfires, rainy season, and slope stability.

Red River flooded the Fargo area Wednesday March 25, 2009

La Canada Flintridge, California, Feb. 2010
• River systems exploited and engineered with poor regard for the surrounding geology and affect of flood control on downstream wetlands and floodplains.

• Dams built with poor regard for the cost effectiveness of the water supplied by reservoirs and the ecological impact of dams on riparian ecosystems.

• Construction of nuclear reactors on both active and inactive fault lines.
• Settlement of areas with a known history of prior geological disturbance, such as landslides, volcanism, and flooding.

Landslide hummocks near Mt. Shasta volcano, California

• Construction of shoreline erosion control features that disrupt the natural movement of sand along the shoreline.

Westhampton Beach, Long Island after 1993 nor’easters