

Name: _____

Erosion in the Critical Zone

1. In small groups (2-3) examine the two maps showing erosion in the United States: A) showing natural/geologic erosion (non-human) and B) showing erosion from human activity

- Identify units of erosion in Fig. A and convert the average erosion rate into mm/yr
- In Fig. A, determine which regions in the US have the highest continental erosion rates and predict why these locations might have the highest rates
- In Fig. B, determine which regions in the US have the greatest erosion rates from human activity
- Look at the rates in Fig. B and compare to the natural rates of erosion in Fig. A
- What do you think is the source of human erosion in Fig. B?

Be prepared to report out your small group findings/discussion.

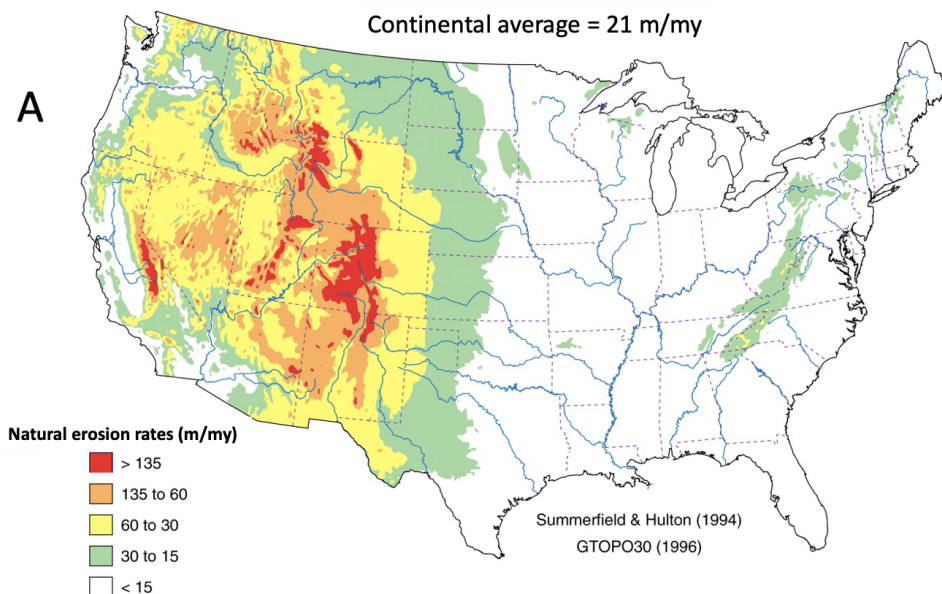
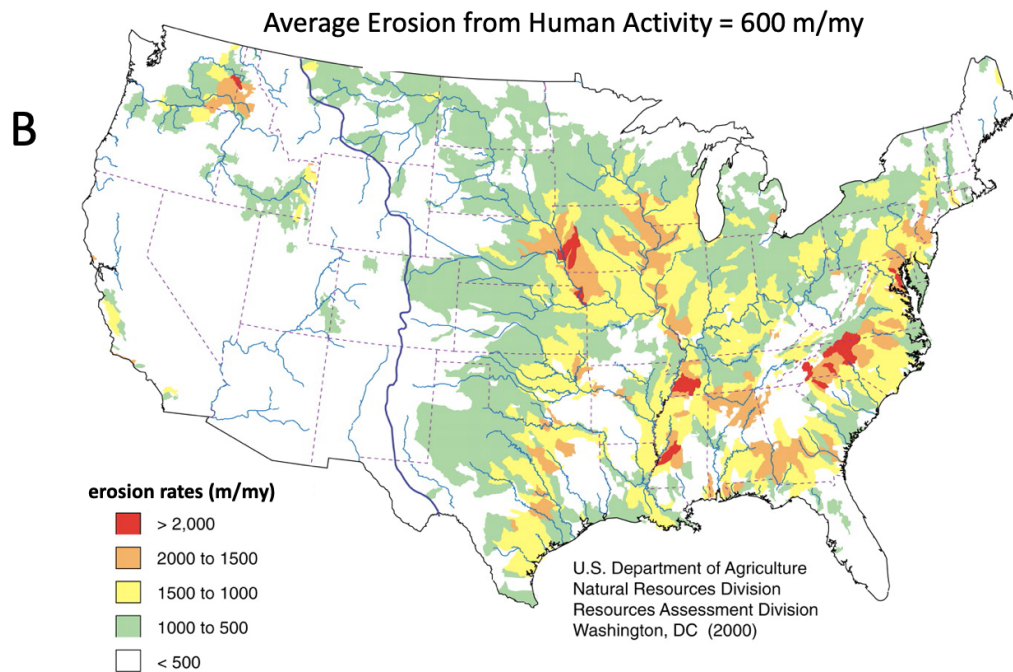


Figure 6. Estimates of average natural erosion (denudation) rates inferred from GTOPO30 area-elevation data and global fluvial erosion-elevations relations from [Summerfield and Hulton \(1994\)](#). Mean rate of denudation for the entire area of the contiguous United States is ~21 m/m.y. (Wilkinson and McElroy, 2007, *GSA Bulletin* January/February, 2007 vol. 119 no. 1-2 140-156)



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2. Visualize how much soil thickness will change in your lifetime. Recall average natural rates of cropland erosion is 600 m/my or 6 mm/decade.

3. Average rate of cropland erosion = 6 mm/decade.
Average rate of soil formation = 0.36 mm/decade.
An average soil thickness = ~15 cm (150 mm).

At these rates, how much soil would be lost in the remainder of your lifetime (~60 years)?

At current rates, how long would it take to completely remove 15 cm of soil?

4. In Figure A, exploring natural erosion rates, areas in white and green have erosion rates that are less than soil production rates (30 m/my). In figure B, exploring cropland erosion rates, all regions that are colored in have erosion rates that exceed soil production rates. **Based on the two figures, 1) how much area could potentially generate new soil? (Estimate to the nearest 10%.) 2) Is the soil at your location threatened under present erosion rates?**