

BACKGROUND SEDIMENT YIELDS

Background sediment yields for smaller basins (100 to 1,000 km²) (fig. 6a) are similar to those for larger basins (1,000 to 10,000 km²) (fig. 6b). Values range from less than 25 (Mg/km²) in the eastern part of the study area to more than 300 (Mg/km²) in the west. This large variation suggests that factors controlling sediment yield vary significantly within the study area.

An examination of background sediment yield is more likely to show the importance of climate and natural basin characteristics in determining sediment yield than is a similar examination of all values of yield. If the effects of impoundments are removed, the lower limit of possible sediment yield from a basin is determined by climate and natural basin characteristics. The background yield in any part of the study area does not necessarily equal the yields that would occur if the basins in the area were undisturbed by human activities; the basins used to define background yield in any portion of the study area may be highly disturbed by human activities. Nevertheless, some relations were observed between background yield and selected basin characteristics, as discussed below.

Comparison of background sediment yields with yields from benchmark stations (table 1) indicate that background yields from smaller basins approximate yields from undisturbed basins at selected locations (fig. 6a). The benchmark basins in the study area are part of the U.S. Geological Survey hydrologic benchmark network of basins undisturbed by human activities (Cobb and Biesecker, 1971). Streamflow leaving these basins is sampled to determine the characteristics of water leaving undisturbed basins throughout the United States. The yields from these benchmark basins are compared only to the yields from the smaller basins in the study area because most of the benchmark basins in the study area have areas of from 100 to 1,000 km².

TABLE 1.—Mean annual sediment yields at stations on benchmark basins in the study area

[Yields are in megagrams per square kilometer per year; drainage area is in square kilometers; except as noted, yields were calculated by author with the flow-duration curve method of Miller (1951)]

Mean annual sediment yield	Station number	Station name	Drainage area
22	01545600	Young Womens Creek near Renova, PA	120
49	02450250	Sispey Fork near Grayson, AL	238
26	03237280	Upper Twin Creek at McGaw, OH	32
60	03276700	South Hogan Creek near Dillsboro, IN	99
15	03460000	Catalochee Creek near Catalochee, NC	127
21	03497300	Little River above Townsend, TN	274
61	03604000	Buffalo River near Flatwoods, TN	1,158

¹From C.E. Simmons, U.S. Geological Survey, North Carolina District, personal commun., 1986.

Relations Between Background Sediment Yield and Selected Basin Characteristics

Background sediment yields of 25 (Mg/km²) or less in the eastern part of the study area appear to show that some basins in this area are relatively undisturbed by human activities. Background yields of this magnitude approximate yields from undisturbed, forested basins in the eastern United States (Pattin, 1976). The smaller basins (100 to 1,000 km²) with yields of 25 (Mg/km²) or less have an average forest cover of 74 percent; the corresponding value for the larger basins (1,000 to 10,000 km²) is 70 percent. Considering only the smaller basins in the eastern part of the study area, the area of background yields of 25 (Mg/km²) or less coincides with the area containing stations on basins with at least 75 percent forest cover (fig. 7a). A similar comparison for the larger basins shows less agreement (fig. 7b).

In northern Illinois and Indiana and southeastern Wisconsin, background sediment yields of 25 (Mg/km²) or less appear to reflect deposition in natural lakes. Considering larger basins, the area of background yields of 25 (Mg/km²) or less coincides with the part of the Interior Plains containing a large concentration of natural lakes (fig. 7c). A similar comparison for the smaller basins shows less agreement (fig. 7a).

The largest background sediment yields occur in western Illinois and adjacent parts of Iowa and Missouri and appear to be due to the presence of thick deposits of loess, a highly erodible material deposited by the wind. The areas of background yields greater than 200 (Mg/km²) or less coincide with the area containing loess deposits at least 2.4 meters thick (fig. 8).

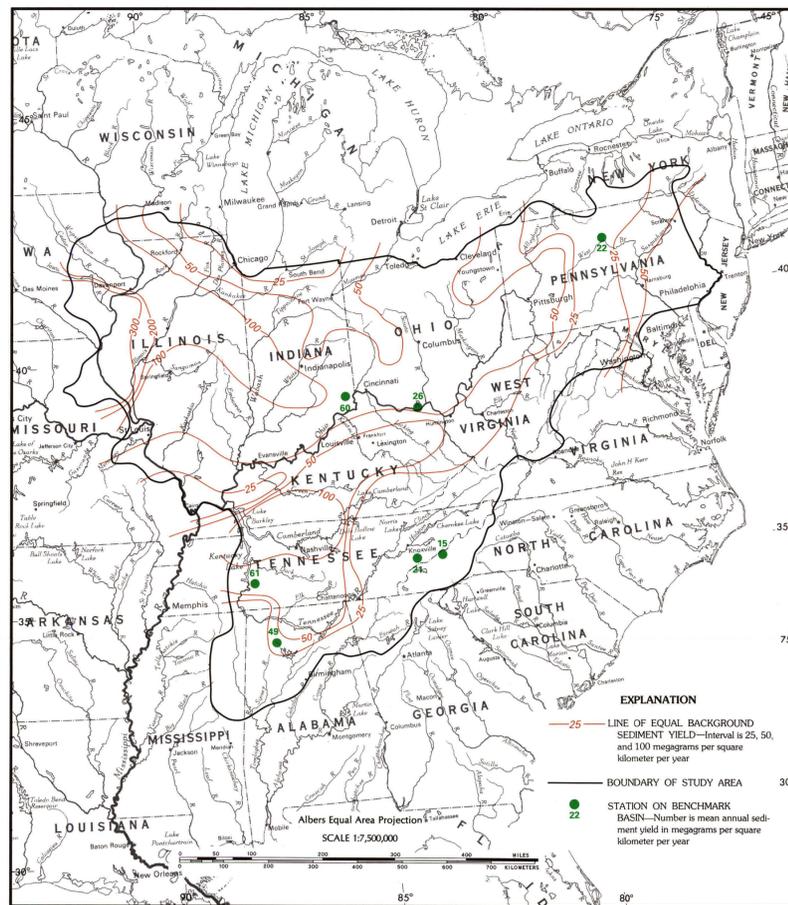


FIGURE 6a.—Background sediment yield at stations on basins with areas of from 100 to 1,000 square kilometers; mean annual sediment yields at stations on benchmark basins. Benchmark basins are listed in table 1.

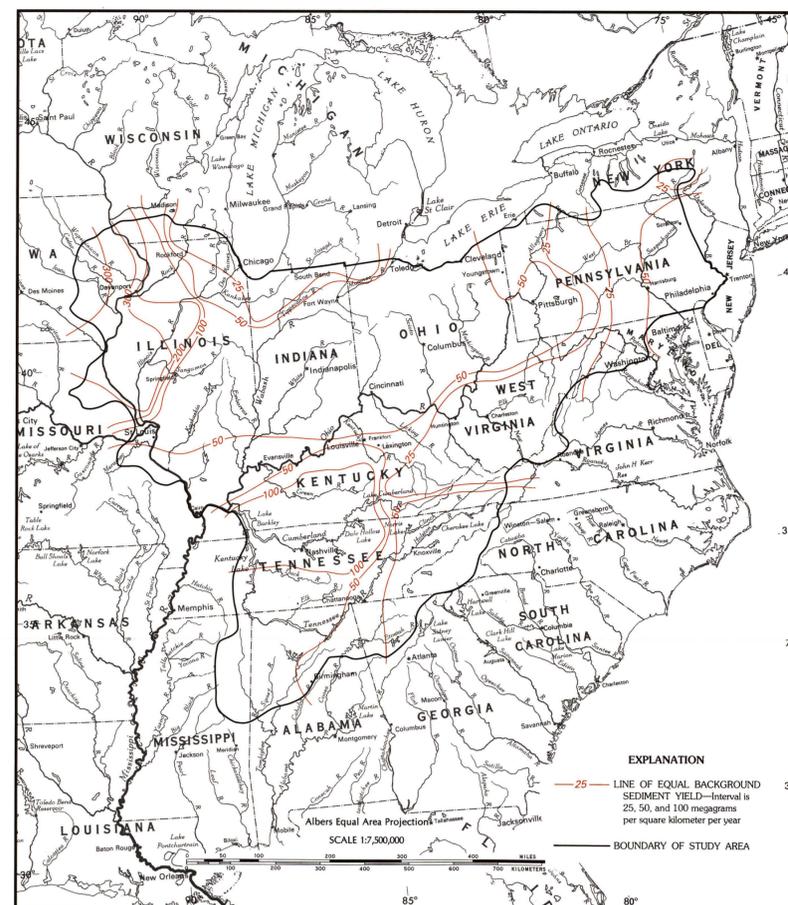


FIGURE 6b.—Background sediment yield at stations on basins with areas of from 1,000 to 10,000 square kilometers.

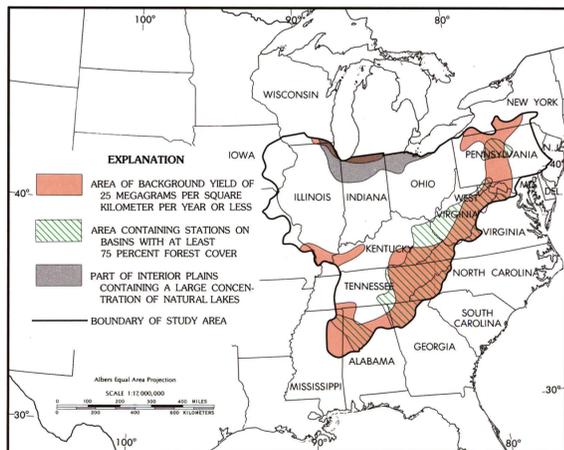


FIGURE 7a.—Areas of background sediment yield of 25 megagrams per square kilometer per year or less, the part of the Interior Plains containing a large concentration of natural lakes, and areas containing stations on basins with at least 75 percent forest cover. Data are for stations on basins with areas of from 100 to 1,000 square kilometers.

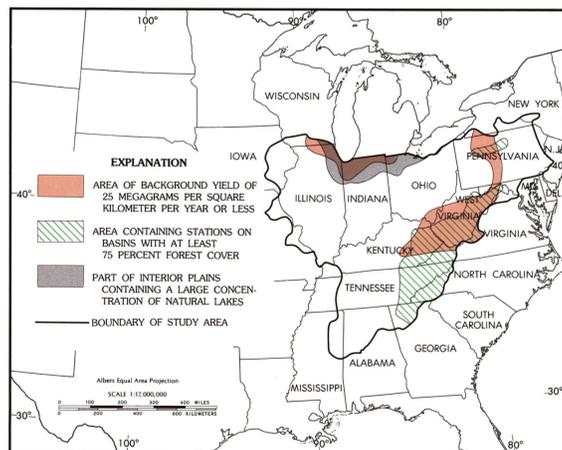


FIGURE 7b.—Areas of background sediment yield of 25 megagrams per square kilometer per year or less, the part of the Interior Plains containing a large concentration of natural lakes, and areas containing stations on basins with at least 75 percent forest cover. Data are for stations on basins with areas of from 1,000 to 10,000 square kilometers.

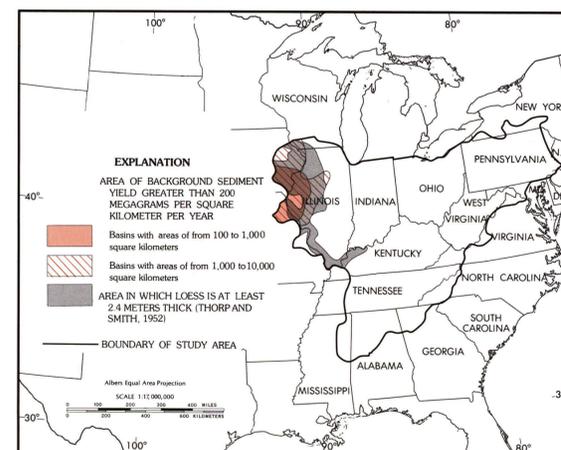


FIGURE 8.—Areas of background sediment yield greater than 200 megagrams per square kilometer per year, and the area in which loess is at least 2.4 meters thick.

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