LETTERS TO THE EDITOR

Sediment and Soil Conservation

It was gratifying to read John Stall's paper, "Effects of Sediment on Water Quality" (1972). The Journal of Environmental Quality is to be congratulated on their ability to attract this and other papers concerning sediment in natural waters. Because so many people are involved in one way or another in contributing to an excessive amount of sediment in streams and other water bodies, the subject is too often swept under the rug.

In the past few decades there has been a pronounced effort to control erosion of rural areas in the USA. For various reasons, the program has been only partly implemented and maintained. Erosion remains the dominant conservation problem in 161 million acres of cropland. Stall states, relative to Table 1, "soil erosion is still the dominant conservation problem on 35% of the private cropland", which, it should be emphasized, is based on an assumed set of values for "tolerable" yield. It might also be assumed from Table 1 that most of the reason for the need to shift an additional 3% out of cropland into pastures and forestland is primarily the result of excessive erosion on this cropland.

It seems logical to assume that the "tolerable" sediment yield was probably set from the viewpoint of maintaining agricultural production for a given number of decades or centuries. The concept recognizes that nature has always provided sediment to streams. The difficulty is to know what the natural sediment yield was before man interfered with the system, if indeed, our goal is to try to approach the natural yield. One gets the impression that some conservationists would like to stop all sediment input to streams, the results of which might be much more serious than we have generally experienced in the past with an "excessive" sediment load. In addition to the serious degradation problems as indicated by Stall on page 357, an underloaded stream may cause bank erosion problems, and a drastic change in the biological equilibrium. As pointed out by Guy and Ferguson (1970), the concern about sediment today focuses more on the impact on streams than on the impact of the loss of a soil resource.

Stall mentions on page 359 that conservation programs can substantially reduce the sediment yield to small man-made reservoirs. The combined impact of the many environmental factors can cause a wide range of conservation results. Records of suspended-sediment measurements (Reed, 1971) from May 1954 to September 1967 from the 12.2-square mile conservation-treated Corey Creek basin in north-central Pennsylvania show sediment yield to be 47% less than the nearby and similar 10.2-square mile untreated Elk Run basin during the growing season (May to October), if two major storm events are excluded. However, this difference in yield is representative of only 6% of the total sediment yield from the basins. The other 94% of the yield occurred during the dormant season (November to April) and the two major warm-season events when there was no significant difference in yield between the treated and untreated basins. This suggests that substantial improvements are needed in our conservation programs to better control erosion during the dormant season and the large-storm events if progress is to be made in reducing "excessive" sediment movement in streams. This low degree of effectiveness in reducing stream sediment loads further degrades prospects of applying soil-conserving methods which do not offer a profit to the farmer-landowner. Prospects for controlling the movement of sediment in urban construction areas are also dim because of the large number of small but intense impacts which are considered extremely temporary in nature (Guy and Jones, 1972).

However, there is evidence to show that something has caused a decline in sediment movement in many of our rivers draining from rural areas in the past few decades. An example of this is the Juniata River at Newport, Pennsylvania (Williams and Reed, 1972) where the sediment-discharge rate was about 20% less for 1957-62 and about 30% less for 1962-67 than for 1951-56. It is not known how much of this reduction can be attributed to gradual increased use of soil conservation techniques and how much to improvement in land use; that is, the conversion of cropland to pasture and pasture to forest.

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LITERATURE CITED