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Page 81. Soil organic matter (SOM) mineralization as a net source of N to leaching. An important point is that if soil organic matter in fact is declining, that not only is there an additional source of N to account for, but also there is a decline in the soil's capacity to assimilate and retain N. This effect of SOM declines would lead producers to further increases in N fertilization rates above those currently applied, just to maintain crop yields. There is ample evidence that current agricultural systems have led to long-term SOM declines. Tillage practices in tile drained areas of the UMRB are often aimed at warming the soil in the spring. The report points out this increases N mineralization, but warmer more aerated soil may also lead to declines in SOM stocks, further exacerbating nutrient losses leading to Gulf hypoxia. Schipper et al. have shown that if C:N ratios in soil approach 10:1, that their capacity to assimilate additional N is becoming filled. We are seeing C:N ratios near 10:1 commonly in Iowa, often associated with better drained soils in complex landscapes that include tile drained soils; these better-drained soils are also those most susceptible to leaching in spring (perhaps counter-intuitive, but true). Crop management strategies that increase soil organic matter contents will fix atmospheric CO_2, and improve the soil's capacity to retain nutrients. Several of the alternative cropping scenarios advocated in the report should benefit soil quality and reduce nutrient losses.

Declining SOM and soil quality could also partly explain why riverine N fluxes are not declining with reduced N fertilizer use.

Schipper, L.A., H.J. Percival, and G.P Sparling. 2004. An approach for estimating when soils will reach maximum nitrogen storage. Soil Use and Management. 20:281-286.

Page 125. Funding for adaptive management programs at the small watershed scale should be included as a specific recommendation, for both scientific and social reasons that are involved with the concept of adaptive management.

Page 169. The section on use of cover crops and annual rotations is good, but the recommendation needs to be more specific about how we should go about encouraging these practices, and identifying settings where they are most viable.

It should be emphasized that these alternative practices can also increase SOM, improving soil productivity and its capacity to retain nutrients.

Page 176. Under the second bullet, the meaning of "critical loss areas" may need to be better defined.

Page 189. The discussion on N rate effects on SOM change is interesting but is a red herring: would the committee endorse managing SOM using fertilizer rates under current cropping systems anyway? Declines in SOM (from times of pre-mechanized agriculture) have resulted from annual-crop agriculture and have reduced the soil's capacity to retain nutrients. Alternative practices that may increase SOM have the potential improve the soil's productivity and resilience to environmental degradation, on and off site. The report does a good job of discussing these but should make a stronger point about the soil benefits from such practices.

Page 196. Generally, interactions between soil quality (SOM) and susceptibility to leaching should be better quantified.