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# Wind Erosion in Iowa

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**Abstract**
Wind erosion occurs in Iowa even during winter. Its effect is especially noticeable when the snow is covered with black sediments from the erosive force of wind, even at subzero temperatures (Photo 1 and 2). Water erosion is also a major concern. Erosion caused by water far exceeds the amount of sediment loss by wind because of the high volume of precipitation, and its powerful erosive effects on removing sediments and associated organic matter and nutrients to water ways. However, wind erosion contributes to the significant loss of top soil, especially the loss of organic matter at the soil surface.

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# Wind Erosion in Iowa

**By Mahdi Al-Kaisi, Professor, Agronomy Department**

Wind erosion occurs in Iowa even during winter. Its effect is especially noticeable when the snow is covered with black sediments from the erosive force of wind, even at subzero temperatures (Photo 1 and 2). Water erosion is also a major concern. Erosion caused by water far exceeds the amount of sediment loss by wind because of the high volume of precipitation, and its powerful erosive effects on removing sediments and associated organic matter and nutrients to water ways. However, wind erosion contributes to the significant loss of top soil, especially the loss of organic matter at the soil surface.

**Photo 1. Wind erosion sediments; sediment-covered snow by a tilled field. Photo by Richard Schultz.**

**Photo 2. No-till field with less wind erosion sediments. Photo by Richard Schultz.**

When one drives around the state, particularly at this time of the year, and as many have noticed, there is the sheer volume of sediments accumulated in ditches or near farm fences with the snow looking black. This phenomenon is observed in many parts of the state and it is worse where fields are tilled or have no residue or cover crop to prevent the wind from dislodging soil particles. The misconception is that the soil is frozen; therefore, wind erosion is not a concern in detaching soil particles. Wind can have significant effect on soil erosion during winter and what we see in the ditches and close to fields is only a small portion of the total soil loss during the wind erosion process.

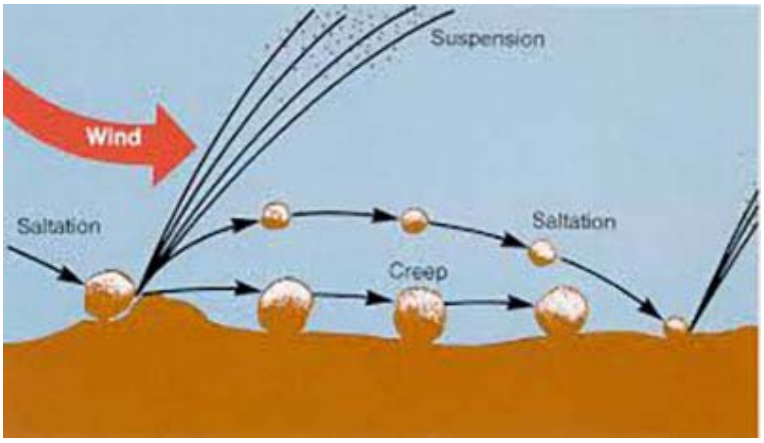


**Figure 3. Wind erosion process. By Wind Erosion Prediction System.**

During wind erosion, three distinct processes (Fig. 3) occur to displace soil particles. These include the initial process (saltation), when wind's force detaches and removes soil particles which subsequently return to the soil surface dislodging other soil particles. Thus, creating what is called the "creeping effect", which is another process in wind erosion. During the creeping process, sand particles move slowly along the soil surface striking other soil particles. Then these dislodged particles are transported (suspension phase) airborne, for an extended period of time. Those sediments and airborne particles are deposited at different distances from the point of origination or source. The heaviest particles are deposited closer to the source and that is what we see as "sediment-covered snow" by the roadside, ditches, and near fences. However, significant amounts of eroded materials with lighter density are transported greater distances and may end up in water bodies and other places across the landscape and cities.

Regardless of the type of soil erosion, the loss of top soil can have a profound effect on soil productivity, in addition to impacting water quality and air quality. The loss of organic matter, sediments, and attached nutrients is highly driven by the intensity of tillage and lack of residue or cover crop on the soil surface as it is shown in Photo 1 and 2. Generally, fields with good intact residue cover, with no-tillage, and cover crops reduce wind erosion significantly. Crop residue and cover crops create conditions at the near surface to increase soil roughness to deflect the wind profile above the soil surface. This results in less erosive effects of wind to remove soil particles. Also, residue and cover crops slow down water movement on the soil surface, and provide better soil structure for increased soil porosity and water movement into and through the soil profile.

The combined effects of residue and cover crops lead to less eroded sediments to reduce wind erosion. Therefore, residue and cover crops have the dual effect of stabilizing the soil structure and reducing the effect of wind and water erosion.

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