High winds lasting for several days combined with longer term environmental conditions have created the "perfect storm" for soil erosion to develop in western Nebraska. The erosion is visible in moving and windswept soil and should be controlled before more topsoil–and crops–are lost.

The 2009 crop year was cooler and wetter than normal, resulting in:

• a delayed start and prolonged planting season,

• a longer growing season (almost a month behind by September) due to the slower accumulation of growing degree days,

• delayed start of harvests, and

• a prolonged harvest season.

All these factors delayed or prevented farmers from performing final operations to reduce or eliminate wind erosion through the winter.

This includes roughing or ridging the ground or planting a winter annual crop like wheat with a goal of getting enough ground cover to prevent wind erosion.

The two-day windy blizzard at Christmas added to the concern. One day of wind is unusual, but two days and nights is even less common–and the winter season had just begun.

Unfortunately, the storms returned and worsened the weekend of Jan. 24-25 with gusts at

Sidney measured over 60 mph.

## Emergency Control Options

Wheat is in a passive or dormant state, and cannot recover to produce ground cover until it warms up.

Although soil erosion is best handled with a long-range plan that includes maintaining vegetative ground cover, reducing field widths, and planting wind breaks, when soil starts moving unexpectedly, or conditions suggest this may occur, emergency control strategies are needed.

The following emergency control methods are available to reduce damage from wind-induced soil erosion that already has started or is anticipated:

- tillage to produce ridges and clods;
- addition of crop residue;
- application of livestock manure;
- irrigation to increase soil moisture;
- temporary, artificial wind barriers;
- and soil additives or spray-on adhesives.

The choice of method, or combination of methods, depends on severity of erosion, soil type, soil moisture, type of crop, stage of crop growth, and equipment or materials available.

**Emergency Tillage**

Tillage is commonly used for emergency wind erosion control, but it should be viewed as a last resort. It can be effective if done properly.

The purpose of emergency tillage is to provide a rough, ridged, cloddy surface more resistant to wind erosion. Surface roughness reduces wind velocity at the soil surface and helps trap windblown soil particles.

Emergency tillage is only a temporary measure because clods readily disintegrate.

When using emergency tillage in growing wheat, use an implement with narrow chisel or shovel point shanks placed 4-5 feet apart and drive perpendicular to the direction of the prevalent winds.

Where possible, use emergency tillage before soil blowing starts. Soil erodes more rapidly from abrasion by windblown soil particles than from wind that contains no soil particles.

If erosion is anticipated because high winds are forecast, start emergency tillage on areas of the field most vulnerable to erosion before the wind reaches a critical speed.

If soil blowing already has started, begin emergency tillage on the upwind edge of the eroding area. Tillage in a direction perpendicular to the expected wind direction is most effective.

An implement used for emergency wind erosion control should gently lift the soil, creating as many and as large of clods as possible.

Disks and harrow-type implements with several ranks of closely spaced tines generally will not be effective, and should not be used.

**Adjust Equipment Settings**

**to Soil Type**

In fine- or medium-textured soils, most types of chisel, lister, or broad shovel points create a ridge and bring clods to the surface.

The shank and/or point should produce a gentle lifting action to bring clods to the surface and to avoid breaking them.

An angled, wide point that lifts the soil usually creates larger clods and a larger ridge than a point that has a straight, narrow, vertical shape.

Narrow points, 2 to 4 inches wide, require a shank spacing of about 24 inches for best results. Wider shovels or lister bottoms that create a larger ridge can be spaced 36 to 48 inches apart. Tillage depth to produce maximum roughness generally varies between 4 and 12 inches, depending on soil conditions.

Moist or heavy soils often provide good ridges and clods with tillage depths of 4 to 8 inches. Dry or sandy soils generally require deeper tillage.

Field speed for emergency tillage depends on the implement, soil conditions, and depth of tillage. In general, slow speeds produce more clods while faster speeds provide more ridging effect.

Speeds of 3 to 4 mph usually result in the most effective surface.

For best results, vary both implement depth and field speed to determine the combination producing maximum overall roughness.

With sandy soils, it's often difficult to obtain effective clods and roughness, and the roughness is often short-lived. Wide shovels or lister bottoms spaced 40 to 50 inches apart usually provide the best combination of clods and ridges in sandy soil.

If more than one emergency tillage operation is anticipated, use a shallow depth (4 to 6 inches) the first time.

Follow with a deeper tillage the second time, with new furrows spaced between the original furrows. Vary the face angle of the tillage tool, depth of operation, and field speed to obtain the best combination.

In sandy soils it usually is best to anticipate emergency tillage will be required, and time the operation to obtain the best roughness.

Some operators obtain best results soon after a rainfall when the soil is moist and the implement shanks follow tractor tire tracks. Clods readily form in sandy soil when the soil surface is moist and has been lightly compacted.

Other operators prefer a soil ripper to bring up large, dry clods when subsurface soil is dry. Still

others attempt to time the operation when the top two inches of soil is frozen, to bring up frozen clods.

One danger is that the soil may freeze too fast or too deep before the operation is completed.

**In Planted Wheat**

Emergency tillage can be used in a field planted to winter wheat. If wind erosion occurs, it is better to control the damage early using emergency tillage, rather than risk losing the entire crop.

Use narrow chisel points spaced 4 to 6 feet apart, 4 to 6 inches deep. Tillage direction should be perpendicular or at an angle to the wheat row to minimize plant injury.

Before beginning emergency tillage operations, producers should check with their crop insurance agent.

**Effects of Emergency Tillage**

Data from a five-year study at two sites in Kansas suggests this type of emergency tillage has minimal effect on potential yield, but can reduce the damage to growing wheat and can reduce soil loss in moderate erosion situations.

This study found emergency tillage caused the most damage to wheat yields when the wheat had just emerged.

The least yield reduction was found when the tillage was done in fields with wheat plants already tillered. Emergency tillage is not effective if clods cannot be brought to the surface, and

is not possible after the soil has frozen more than 2 inches deep.