

THE RED RIVER VALLEY FLOOD-1997**Robert Vavrek****USGA Agronomist- North Central Region**

The Red River of the North begins at the confluence of the Bois De Sioux River and the Otter Tail River in the southeast corner of North Dakota and flows north into Canada where it ends at Lake Winnipeg located in central Manitoba. The topography of Red River Valley is often described as "a scratch in a pie pan", because the vast amount of farmland that borders the river is relatively flat and because there is very little elevation change along the course of the river. Consequently, extensive flooding occurs across a considerable area once the level of the river exceeds flood stage.

The Red River Valley was inundated by a five-inch rainfall during late October of 1996 and then buried under a record 119 inches of snow over the winter. The rain and snow set the stage for the historic flooding that occurred during the following spring after another heavy rainfall swamped the area in early April. For example, the Red River crested at 39' 5" at Fargo North Dakota on April 17th, which was 22' 5" above the flood stage. An entire golf course bordering the river in Grand Forks, ND was submerged at one point during the most severe flooding and extensive areas of many other golf courses in North Dakota and Minnesota were under water anywhere from several days to over a month. The flood washed out bunkers, swept away many recently planted trees, and deposited debris and silt across numerous courses as floodwaters slowly receded.

Bunker perimeters were restored and the contaminated sand was removed and replaced. Silt was washed from elevated greens with pumps and hoses just as soon as it was possible to reach the putting surfaces, even though many of the surrounding fairways and roughs were still submerged. Maintenance crews waded through the icy water or used small boats to ferry squeegees, pumps and hoses to silt covered greens. The bentgrass on greens weathered the prolonged periods of flooding quite well as long as the silt was washed from the putting surface just as soon as floodwaters receded. Turf on greens was usually killed where silt deposits dried on the putting surface. A thin layer of silt could still be seen in the upper root zone of flooded greens in spite of repeated washing operations. The long-term effects of silt contamination on sand based greens remains to be seen. In general, though, the effect of the severe flooding on greens was minimal due, in no small part, to the efforts of the maintenance crews during the clean-up operations.

On the other hand, a considerable amount of damage to fairways and roughs occurred at most courses affected by the flood. There was simply nowhere to wash or relocate a thick deposit of silt from a low-lying fairway as the flood subsided, even if the crew could find the time and equipment to attempt the task. Consequently, fairway cleanup was a tedious time consuming job that took weeks or months to accomplish before a playable surface could be restored. Silt deposits were slick and somewhat dangerous to work on when wet, especially steep slopes and hillsides. Most of the turf under silt had died but weeds deposited by the flood and *Poa annua* from seed already present in the soil would rapidly fill into an area if the silt was broken up and the area kept relatively moist.

Most superintendents attempted to remove silt from fairways before attempting any overseeding operations. A chisel plow and disc was used at one course to mix the silt with the underlying soil. The wet silt was pushed and windrowed into the rough with small tracked Bobcat-type front-end loaders at another course. Box blades were used to scrape dry silt from fairways and roughs at several courses. Another method was to use a fairway aerifier or a pull behind spiker to pulverize the dry silt and then use a sweeper to move the silt into the rough.

At least one superintendent simply cut seed into the thick silt deposits, which seemed to support turf growth very well, but it was almost impossible to travel across the fairway after a rainfall or irrigation cycle until a dense stand of turf developed. Regardless of the method used to reestablish turf in fairways, superintendents battled a wide variety of unusual crop-type weeds in fairways and roughs that were likely washed onto the course from the adjacent farmland.

Most superintendents at courses bordering the Red River are no strangers to flood clean up operations. However, the no one could predict the extent or the duration of the flooding that occurred in 1997. The sight that put the scope of the flood into the proper perspective for me was the damage caused by beavers to full

grown poplar trees growing just adjacent to a fairway at Oxbow Country Club, a course located just south of Fargo ND. Beaver injury to the trunk of a tree is not unusual, unless the damage is located about 25 to 30 feet up into the crown of the tree. The period of severe flooding was so extensive that beavers had time to swim into the fairway and feed near the top of a full grown tree for several days before the flood began to subside. The fact that the maintenance crew at most courses affected by flooding were in a playable condition before the end of summer is certainly a testimony to their perseverance and dedication.