



## IOWA CHAPTER

# Water Quality Plans for Iowa Farms

Many millions of state and federal dollars have been invested to improve Iowa's water quality over the past couple of decades. However, in spite of those extensive investments, there is little evidence that Iowa's water quality has improved, and there are even indications that our water quality has gotten worse.

A new approach is needed to ensure that progress is being made to reach Iowa's water quality goals that are delineated in the Iowa Nutrient Reduction Strategy (INRS). Lessons for how to ensure progress in water quality improvement can be learned from progress made in the past with soil conservation.

### **Universal Soil Loss Equation Used on Iowa Farms Today**

The Dust Bowl of the last century spurred research into farming practices to conserve soil on farms in Iowa and across the country. That research was put into a soil erosion model called the Universal Soil Loss Equation (USLE). Using the USLE, farmers could input their individual farming and conservation practices into a mathematical model, and the model would predict how much erosion would be expected on specific fields when those practices were used. The set of farming and conservation practices constituted a farm's Soil Conservation Plan, and a requirement of a Soil Conservation Plan was that it reduce soil erosion on farm fields to a tolerance level, called "T." T was the estimated "tolerance level of erosion that would allow the soil to maintain its current productivity. If the farming and conservation practices chosen by a farmer did not reduce erosion to T, the farmer was required to choose additional or alternative practices in order to bring the predicted erosion down to T in order to qualify for government programs.

Conservation practices such as cover crops and prairie strips play a significant role in restoring soil health. It is the soil health that increases the soil's capacity to absorb more rainfall, preventing more runoff, and therefore, water pollution. Bringing our soil back to life is the goal of reducing tillage, including cover crops and increasing biodiversity. These practices increase the sustainable productivity of soils as well as protect water quality.

## **A Model for Nutrient Reduction Similar to the Universal Soil Loss Equation**

There are parallels between Iowa's water quality crisis today and the Dust Bowl of last century. Today we have a lot of research data on the water quality effects of farming and conservation practices, as described in the Science Assessment of the INRS.

- Like with the USLE, current water quality research data could be compiled into a "Universal Water Quality Equation" (UWQE) model, which could be used to predict the nitrogen and phosphorus (the two major nutrient pollutants) loss from farm fields to lakes, streams and rivers.
- Similar to the USLE, "T" (tolerance) values could be established for both nitrogen and phosphorus in the UWQE model. Those T values would be based on the goals of the INRS for agriculture—a 41% reduction in nitrogen loading and a 29% reduction in phosphorus loading—normalized to a farm field level.
- Using the UWQE to create a Water Quality Plan, farmers could learn what predicted levels of nitrogen and phosphorus loss would be expected under the practices they are currently using, and what additional practices could be used on their farms to reduce nitrogen and phosphorus loss to the T values. Like with Soil Conservation Plans, Water Quality Plans would allow farmers the flexibility to choose practices that fit their farming operations, as long as they met the T values for both nitrogen and phosphorus.

## **Conclusion**

In conclusion, water quality plans will help Iowa make real progress on reducing the nitrogen and phosphorus in Iowa's rivers, streams, and lakes.

The mechanism for creating water quality plans provides a tool for landowners to measure their own progress in reducing nutrients leaving their farmland.

What's more, the plans acknowledge that every farm is different and one size does not fit all. Farmers would be able to implement those techniques that apply specifically and fit best to their own farms.

If every farm in Iowa adopted and implemented a water quality plan that met the T values for nitrogen and phosphorus, the aggregate effect would be that we would meet Iowa's statewide water quality goals for agriculture expressed in the INRS, a 41% load reduction for nitrate-N and a 29% load reduction for phosphorus.