**Evaluation of Measurement Methods as Surrogates for Tile-Flow Nitrate-N Concentrations**

**Issue:** Nitrogen management practice effects on nitrate loss to surface waters are best determined through measurement of nitrate-N concentrations in tile water flow at specially developed water quality sites. These sites, however, are expensive to develop and maintain. Plus, the number of treatments that can be compared is limited due to physical constraints on the number of plots. With a need to determine N reduction practice effects with multiyear rotations, such as corn following soybean, the number of drainage plots available for different practice evaluation becomes even more limited.

**Objective:** Surrogate methods need to be developed that allow evaluation of N management practices that reasonably estimate nitrate-N concentrations comparable to measurement in tile flow drainage. Such surrogate methods would allow many more practices to be evaluated, and support agronomic research evaluating effects on crop production and N use efficiency. If successful, surrogates could be utilized on land that is not suitable for tile drainage, but where ground water recharge supplies water, plus potential nitrate-N, to surface water systems.

**Approach:** This project will include two surrogate methods, measuring soil nitrate-N and soil solution nitrate-N concentrations. Sampling will be done by probing the soil profile and with suction lysimeters. To make the comparison with tile-flow nitrate-N concentrations, two existing tile drainage sites will be used, with contrasting N management practices. The project sites will be at the Iowa State University Northwest Research Farm, Sutherland, and the Ag Drainage Water Quality Site, Gilmore City. At Sutherland, N treatments studied will be fall-applied anhydrous ammonia with N-serve and spring-applied anhydrous ammonia. At Gilmore City, treatments will be spring-applied N with and without a rye cover crop. Both sites will be in corn following soybean, and measurements will be taken in both crop phases.

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