

from a field using different data layers to guide the sampling. Notice the variability in the aerial image (center, right) of a field where nitrogen was uniformly applied.

You don't need GPS, a yield monitor or an airplane to do this. All of these services can be contracted. When done on a watershed scale, it increases the value as well as the efficiency to collect the data. The image on page 6 shows all the fields sampled in the West Buttrick Creek Watershed program.

In Iowa Soybean Association agronomy and watershed programs, the specific details of nitrogen management for each field is important and recorded. However, the data is not shared in a way that it can be linked back to any of the individual growers, except in the grower's personal reports. Different examples of how the survey data can be collected and combined, and the value derived from this can be seen at www.isafarmnet.com.

Surveying Real World Conditions

If the majority of growers in a watershed participate, then the majority of the systems and practices within the watershed will be assessed. Below is a table with data collected from the Buttrick Creek watershed in 2003. Notice the difference between the two management practices.

Number of Samples	Tillage Timing	Stalk Nitrate (ppm)	Percentage of Samples by Category		
			Low/Marginal	Optimal	Above
26	No-till	770	65	15	19
54	Fall	1493	46	24	30
153	Spring	2494	31	18	50

There was substantial nitrogen stress in the no-till fields shown in the chart above. Data presented below helps explain how broadcast liquid nitrogen used on the no-till fields was at least part of the problem.

Number of Samples	Fertilizer Timing	Stalk Nitrate (ppm)	Percentage of Samples by Category		
			Low/Marginal	Optimal	Above
75	Spring Liquid	870	63	20	17
81	Fall NH3	3257	16	21	63

Year-to-Year Variability

Weather can have a big impact on how much nitrogen is lost. The graph (lower right) details the differences in stalk nitrate concentration within the watershed. Differences are connected to rainfall patterns.

Note: More than 50% of the stalk samples collected in 2004 showed nitrogen stress significant enough to reduce grain yield. Spring and early summer rainfall was heavier than normal in 2004, which may account for much of this difference.



For accurate nitrate analysis, cut an 8 in. section from the stalk, beginning 6 in. above the ground. Note: the stalk sample cutter shown here was developed by ISA technicians and perfected and manufactured by a group of Jefferson-Scranton High School FFA members.

