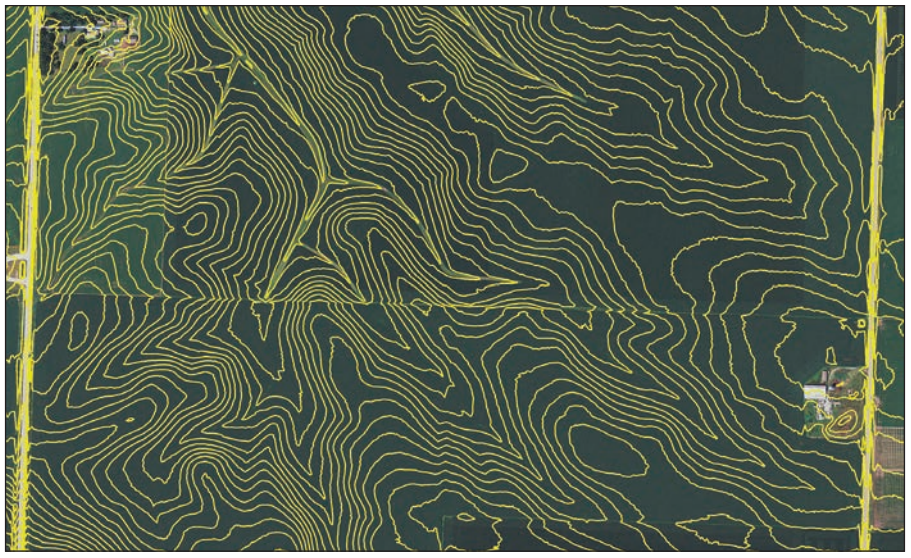
## Natural Resources

# Think 3-D to guide rows

### Key Points

- Soil-loss reductions with contouring vary quite a bit.
- Farming around the hill promotes infiltration of rainfall.
- Technology is increasingly important for the future.

By **LYNN BETTS**



**LAYING CONTOURS:** Where LiDAR, or Light Detection and Ranging, elevation data is available, the software may soon be developed to feed key contour lines into autosteer systems to farm on the contour.

LET'S say you've come to the point that you're using no-till or till-plant systems with technology like autosteering that give you most of the benefits of precision farming. That's great news. If you're farming fairly level land, or sloping land with terraces or other practices that have established row patterns fitting the contour of the land, you're set.

But what if you have the opportunity to rent or buy some rolling land that's farmed up- and downhill that needs to be farmed on the contour?

Contour farming, still one of the most cost-effective soil conservation practices around, brings elevation, the third coordinate of spatial relationships in real-world farming, to the forefront in row pattern consideration.

Soil loss reductions with contouring vary widely, depending on severity of storms, length and steepness of slope, amount of ground cover, and height of soil ridges formed by tillage or planting equipment. Contouring can save significant amounts of soil — especially when heavy residues are left on the field to encourage water infiltration, and when high ridges are formed on a contour with equipment.

Contouring also guards against up- and downhill farming problems of seeds or young plants being washed out of the row during heavy rains, along with the best of your topsoil. Farming around the hill also promotes infiltration of rainfall, as each contour row is a small dam that holds falling rainwater on the hillside. It's a solid practice that's been a staple of conservation on steep slopes for decades.

### Contouring a lost art

Old-time conservationists called contouring an art as much as a science. It seems simple enough to follow the contour of a slope around the hill, more or less on the level. But in practice, goals of contouring also include developing a pattern that promotes long rows, eliminates as many point rows as possible, and maintains grassed waterways with row directions that neither erode soil nor dump sediment into the waterway.

As conservation technicians with contour experience have retired, contour farming has become secondary to conservation tillage, water and sediment control basins, and other practices more accommodating to farm large machinery. Today, it can be difficult to find technicians with strong skills in setting contour lines and laying out complex contour systems.

### Technology available, but …

The know-how, software and hardware exist to lay out and drive contour lines from your own tractor cab — if you live in the right county in the right state. The power behind contours, LiDAR elevation data, is available in some to all counties in states from the Great Plains to the East Coast. LiDAR stands for Light Detection and Ranging.

**TOM BUMAN**

Tom Buman, president of Agren in Carroll, Iowa, has seen the expansion of LiDAR mapping across the country.

For the past several years, his small firm has been developing and licensing time-saving conservation software for USDA, state, and local conservationists in locating and making estimates for practices like ponds, waterways and terraces.

"Very few field offices still stake out contour lines for a farmer to follow in planting," Buman says. "And frankly, it makes much more sense to use elevation data. Where LiDAR is available, a conservationist — public or private — can use LiDAR contour maps to draw contour lines on a map without having to walk and survey a field.

"In the very near future, I think conservationists will be able to provide an electronic file copy of the key contour line to the farmer quickly. Autosteer companies already have the capability to transfer tile lines to autosteer — it won't be long until they figure out how to upload a key contour line file to the steering system, too."

Buman's company develops software that formats LiDAR data and makes its use state-specific for conservation purposes.

### Will conservation tech keep up?

Buman says such technology is quickly becoming ingrained in farming today, and will be increasingly important in the future. "Robots are in development now that will identify and zap weeds, sense ripeness and pick fruit in the next 20 to 40 years," Buman says.

"And some scientists are envisioning intelligent robots that talk to each other to monitor, collect data, and care for plants in ways far beyond what are economically feasible today. They see swarms of small bots that will monitor soil conditions, photograph and analyze plants, and detect insect infestations and diseases before they become widespread," he adds.

Buman believes such technology is inevitable, and will come sooner rather than later. He notes that USDA is part of the National Robotics Initiative, which may put as much as $50 million a year toward development of robots that work beside, or cooperatively with, people.

"The question is, will technology for conservation be part of USDA's support, and will conservation technology keep pace?" he asks.

*Betts writes from Johnston, Iowa.*

## Conservation tools online can save you time

AGREN'S online technology and LiDAR, or Light Detection and Ranging, elevation data make it possible to do more than follow a contour line on the land. Its suite of tools enables conservationists and others to plan a waterway, pond, or wetland and get accurate cost estimates in just a few minutes, without a site visit.

The programs — PondBuilder, BasinBuilder, WetlandBuilder, and WaterwayBuilder — locate a planned practice on the landscape, estimate construction costs, and give landowners a vision of how the practice will fit the land. A fifth program, a new one called SoilLossCalculator, estimates expected soil losses under various cropping and conservation practice combinations. Each of the tools is state-specific, and uses standards and specifications of the USDA Natural Resources Conservation Service.

The tools are only available in the counties and states where LiDAR elevation data are available.

NRCS field technicians say the programs save time and are accurate. In a survey earlier this year of 104 conservationists using the tools, a strong majority said cost estimates take far less time, accuracy is good to excellent, and the tools are easy to use.

Agren's software tools are licensed and available on a subscription basis. For more information, go online to *www.agrentools.com.*