Natural Resources

Think 3-D to guide row patterns on slopes

By **LYNN BETTS**

At a glance

- Contouring is not dead, but few know how to lay out systems.
- Autosteer helps, but mostly on flat land or where terraces are installed.
- Steering systems for cost-effective contouring consider elevation, tool.

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 that fit 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 down hill that needs to be farmed on the contour?

TOM BUMAN

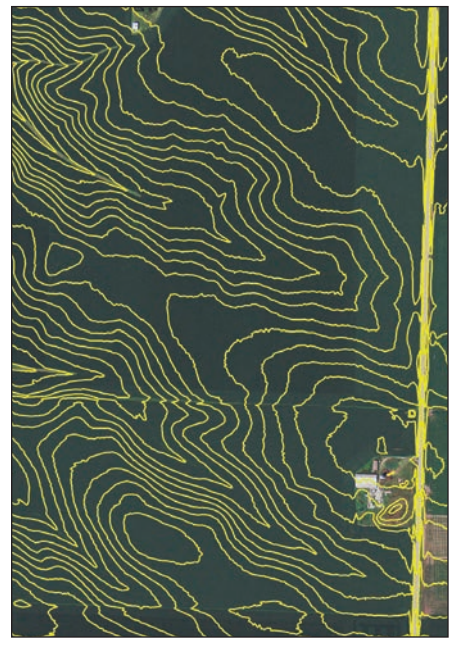
Contour farming, still one of the most cost-effective soil conservation practices around, brings elevation, the third coordinate of spatial relationships in real-world farming, to the forefront in row pattern consideration.

Soil loss reductions with contouring vary widely, depending on severity of storms, length and steepness of slope, the amount of ground cover, and the 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.

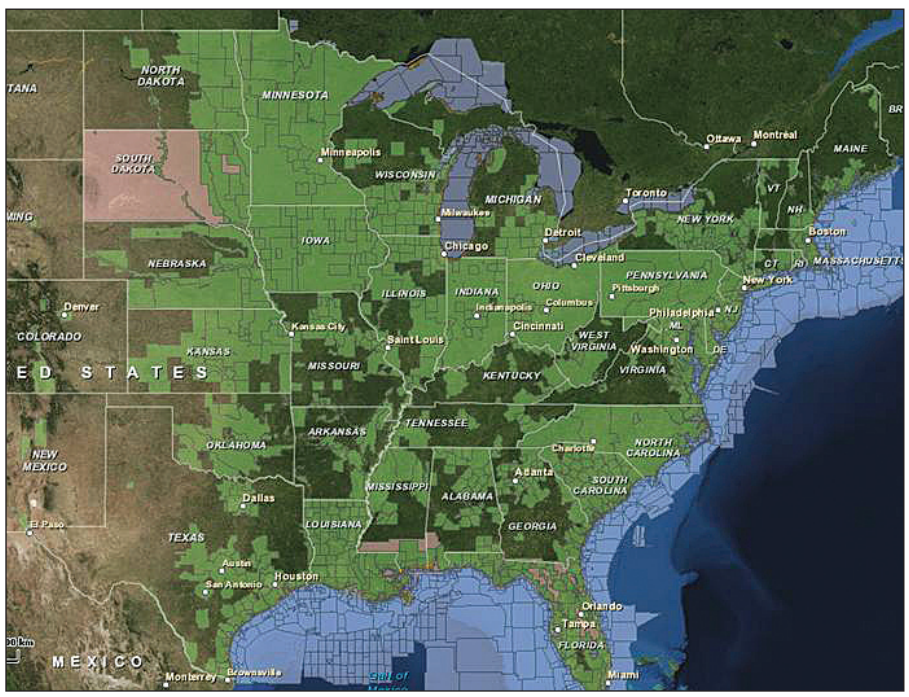
Contouring also guards against up and down hill farming problems of seeds or young plants being washed out of the row during heavy rains, along with the best of your topsoil. Farming around the hill also promotes infiltration of rainfall, as each contour row is a small dam that holds falling rainwater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

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.



LAYING CONTOURS: Where LiDAR elevation data is available, key contour lines can be fed into autosteer systems to farm on the contour.



LIDAR IN THE EAST: LiDAR elevation data is available in most counties in the eastern U.S. (light green on map).

Technology available, but …

The know-how, software and hardware can be made available 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.

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. He or she can then provide an electronic file copy to the farmer quickly. That file can be uploaded to the steering system so the farmer can follow contour lines without any delays."

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 that 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."

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.