

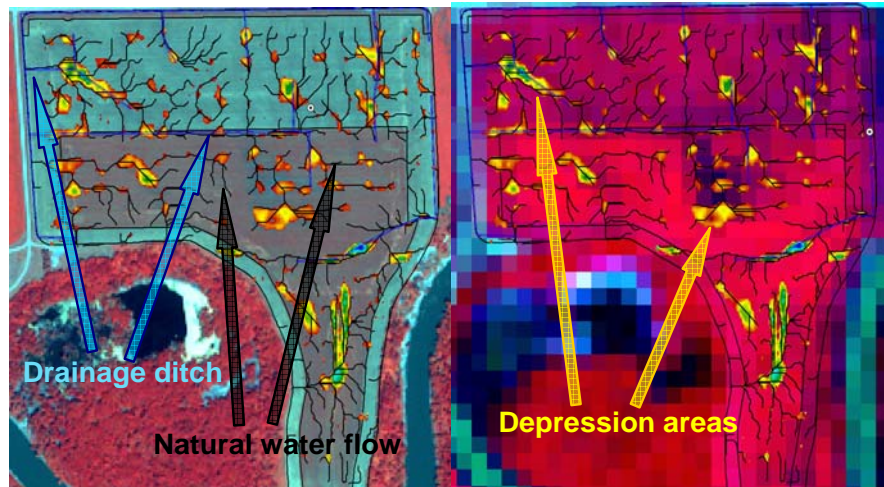
Using Remote Sensing for Drainage Improvement

Background:

Drown out events highlight the importance of good drainage systems. After torrential rains, wet areas sometimes appear where they have never been observed before. Even if flooding can't be entirely avoided, water damage can be reduced with an efficient drainage system.

Use of Data:

An eastern MN farmer layered imagery, a drainage ditch map, a natural water drainage map, and a depression map (derived from field topography) to try to detect potential flooding zones in his field. With this information the farmer decided whether or not further improvement of the field drainage system was required. The 2002 summer satellite images (IKONOS and Landsat) clearly show flooded areas (light blue on IKONOS, dark blue on Landsat). After layering the different maps and satellite



IKONOS August 02, 2002

Landsat July 13, 2002

Drainage ditch map and map of water natural flow are overlaid to the images highlighting the area of potential drainage improvement.

images he observed that the inundated areas and some of the depression zones were in similar locations. He precisely located the flooded areas and then decided to proceed with drainage improvements before the start of the next growing season. Even when zones are heavily flooded, drainage improvement is a value added to farm management. Improving soil conditions favors better crop development during average years and prevents various scale devastation during extreme rainfall events. A second Crookston, MN farmer used the imagery to ditch a new field he has never farmed before. He studied the image and found the low areas of the field. Then, with his laptop hooked up to his GPS, he precisely located the inundated areas. He finally was able to improve the drainage system. The farmer was glad to get imagery during the actual flooding events to direct him through the process. After harvest, when the field was tilled, it would have been almost impossible to find those low areas. After receiving his August 2, 2002 IKONOS image, a third eastern MN farmer noticed poorly drained areas in his fields. He also remarked that potholes were easier to identify because they clearly appeared on the image. Using the IKONOS image he measured the drown-out acreage, georeferenced them, and then ground-truthed these areas. He intends to use the information to improve the field's drainage system.

Economic and Environmental Benefits:

Because of the extreme rainfall events of the 2002 growing season, the summer imagery should serve as reference documentation for many years to come for drainage system improvement. The farmers will also use the imagery to decide which land to rent or not to rent. A quick look at the 2002 imagery draws a very powerful map of the lands with deficient drainage systems and that are "at risk" for flooding events. The use of satellite images for drainage system improvement is one more tool producers can use to increase their farm profitability.

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