

# Thinking About Landscape Position and Variable Rate Irrigation



Pivot ~ 500 acres centered 4.8 miles SSW of Wray, Colorado.

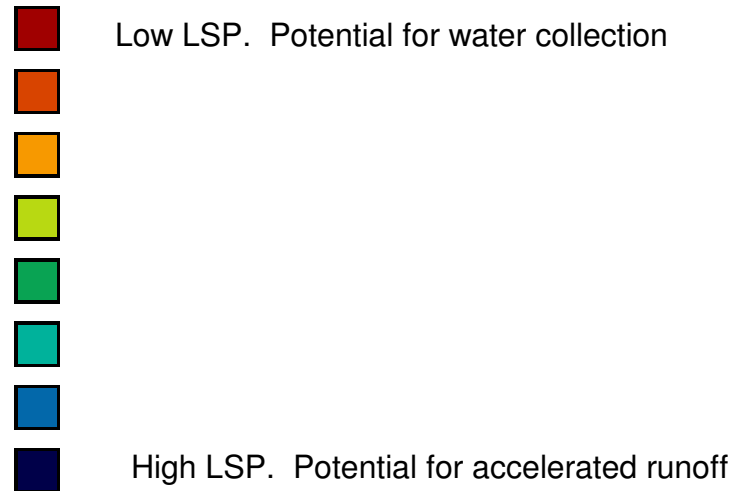
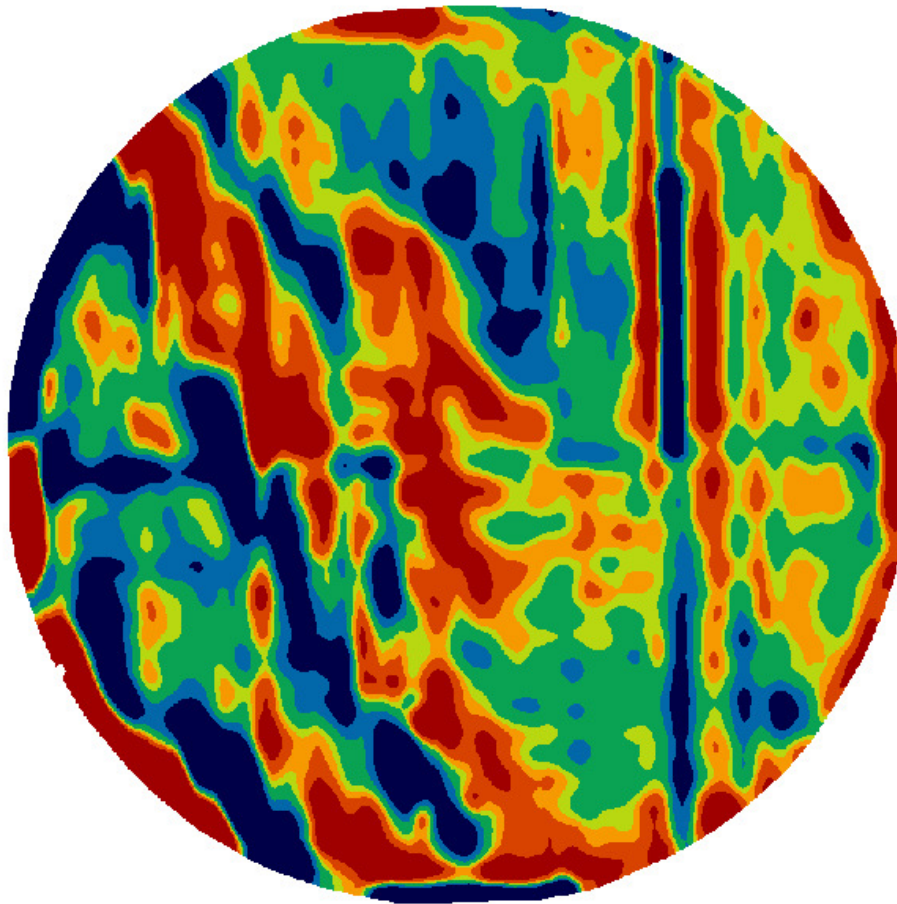
2008 Corn harvest yielding an average of ~216 bu/ac with a range of 140 bu/ac to 260 bu/ac.

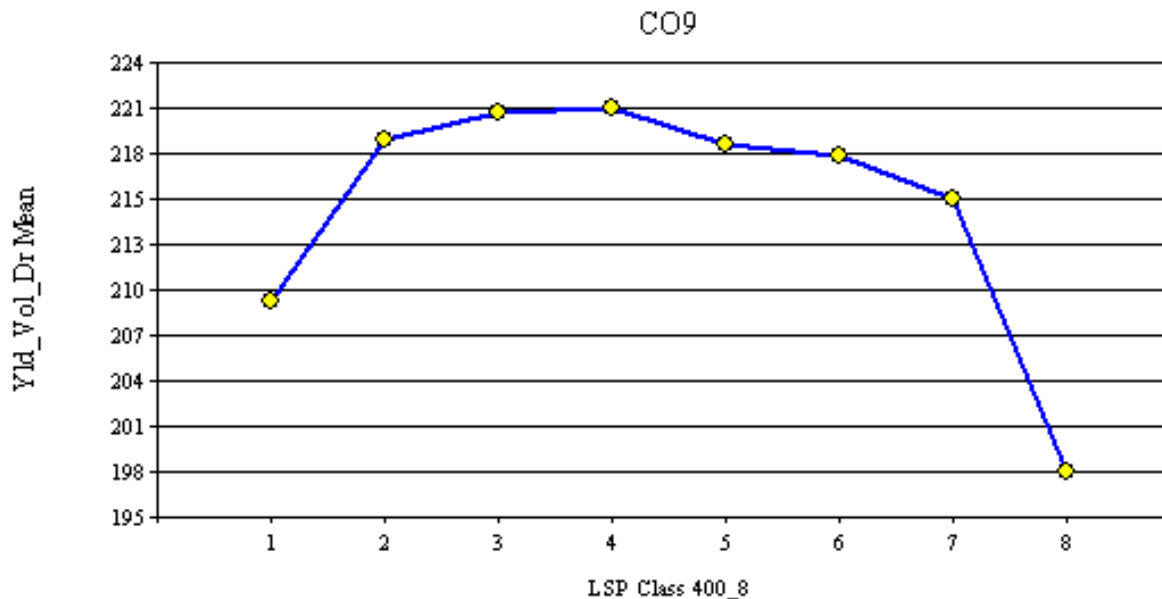


## Landscape Position Classes (LSP)

This is a terrain derivative generated through a proprietary process developed by Delta Data Systems in collaboration with the agro-technology unit of an Ag industrial company.

These are LSP derivations from (said to be) RTK elevation collections by CaseIH harvester system.





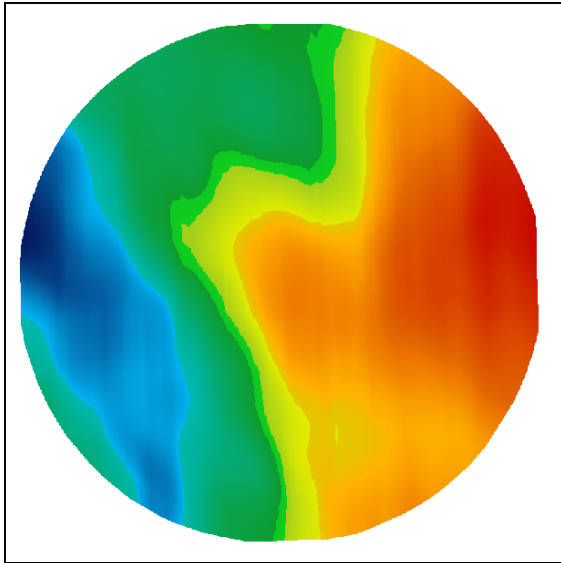
“LSP Effect”. Yields varied as a ‘regular’ function of LSP with lower outcomes at the extremes. There appears to be an LSP-induced shortfall of 20 bu/ac on 60 acres of highest LSP and a shortfall of 10 bu/ac on 60 acres of the lowest LSP. The general LSP effect, spread over the pivot, is approximately 6 bu/ac (what we calculate as the Precision Ag Quotient).

LSP is either a driver or a marker of some other process. In either case, there is an observable effect of variability involving ~ \$10,000 in gross revenue.

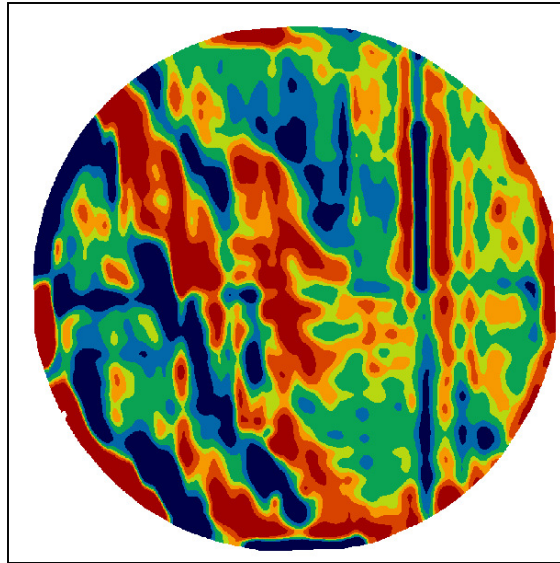
Whether yields can be increased or costs reduced by appreciating a ‘pattern of variability’ remains the central PAg question. We believe that if seed/fert/cpp inputs are managed and environmental conditions are within range, water is left as the primary yield influence. An LSP structure is influencing or marking water distribution/holding.

This is not counter-intuitive. You could suggest that there are different wilting points associated with changes in LSP. A constant watering rate may not be addressing this. You could also suggest that the lowest LSP collects water to a point that nutrient uptake is impaired. Finally, at the highest LSP you could suggest that accelerated run-off is starving the plants of water. Is there value in varying water rate? How would you go about designing a variable irrigation plan?

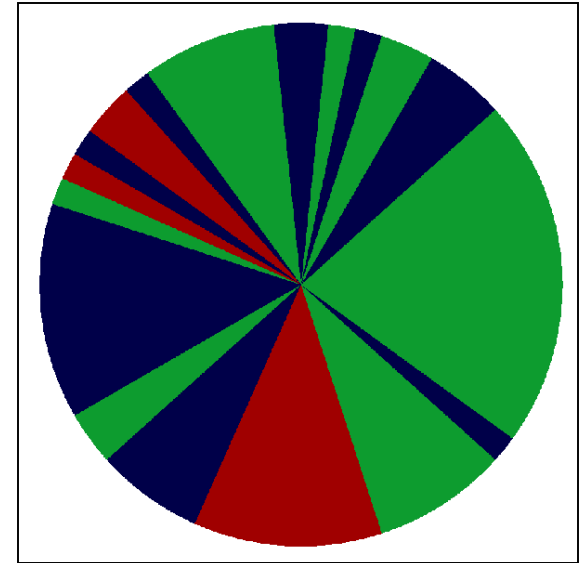




1



2



3

## An Approach

From an RTK-based DEM (1), LSP is derived (2). The highest frequency LSP zone is calculated for each region subtended by some degrees of arc (here 6 degrees). As an example, say that the higher LSP regions need 1 ac-in (dark blue), the middle regions need 0.75 ac-in (green) and the lowest regions, 0.50 ac-in (red).

A constant rate of 1 ac-in on 472 acres is 472 ac-inches for an irrigation. The proposed 'LSP-driven' plan will deliver 376 acre inches. The water savings of 20% coupled with potential for positive yield effect would seem to be the basis of a 'value story'.

