

Case Study #1: Soybeans**Field Profile****Site:** Huron County**Soil:** Perth Clay Loam, Huron Clay Loam, Harriston Silt Loam (Appendix 1)**Acres:** 80**Field Data:** 8 years of yield data were provided by the farmer, and 3 additional layers of UAV, EC, elevation etc. were collected by the PAAO team for the project.**Variable Rate Executed:** Soybeans 2016 – Population trial with Learning Stamp Validation (Appendix 2 Prescription Map)**Management Zones and Treatment(s):** 3 management zones were identified and used. They represented high, mid, and low soybean/edible bean historical yields. The management zones were defined by the Yield Probability Index (YPI) provided in the Research Crop Portal (by Niagara College). The yield data processed was the 2007, 2010, and 2013 soybeans and edible beans maps. The high yielding zones were planted with low soybean seeding rates due to disease pressure, and the low yielding zones were planted with higher seeding rates. There was no variable rate fertilizer prescription planned as part of this project for this field in 2016.**Validation:** The validation was done with learning stamps (approximately 90ft² or 3 planter /combine passes wide). There were 18 total learning stamps, 9 high seeding rate stamps (200,000/acre), and 9 low seeding rate stamps (100,000). For all of the 3 zone types (high, mid, low), 3 high rate stamps and 3 low rate stamps were applied within the field. (See Appendix 3 for detailed statistics tables)

| Field History | |
|---------------|--------------|
| Year | Crop |
| 2007 | Soybeans |
| 2008 | Wheat |
| 2009 | Corn |
| 2010 | Edible Beans |
| 2011 | Wheat |
| 2012 | Corn |
| 2013 | Edible Beans |
| 2014 | Wheat |
| 2015 | Corn |

| Population Zone Rates | |
|-----------------------|-----------|
| Zone | Seed Rate |
| High | 175,000 |
| Mid | 150,000 |
| Low | 125,000 |

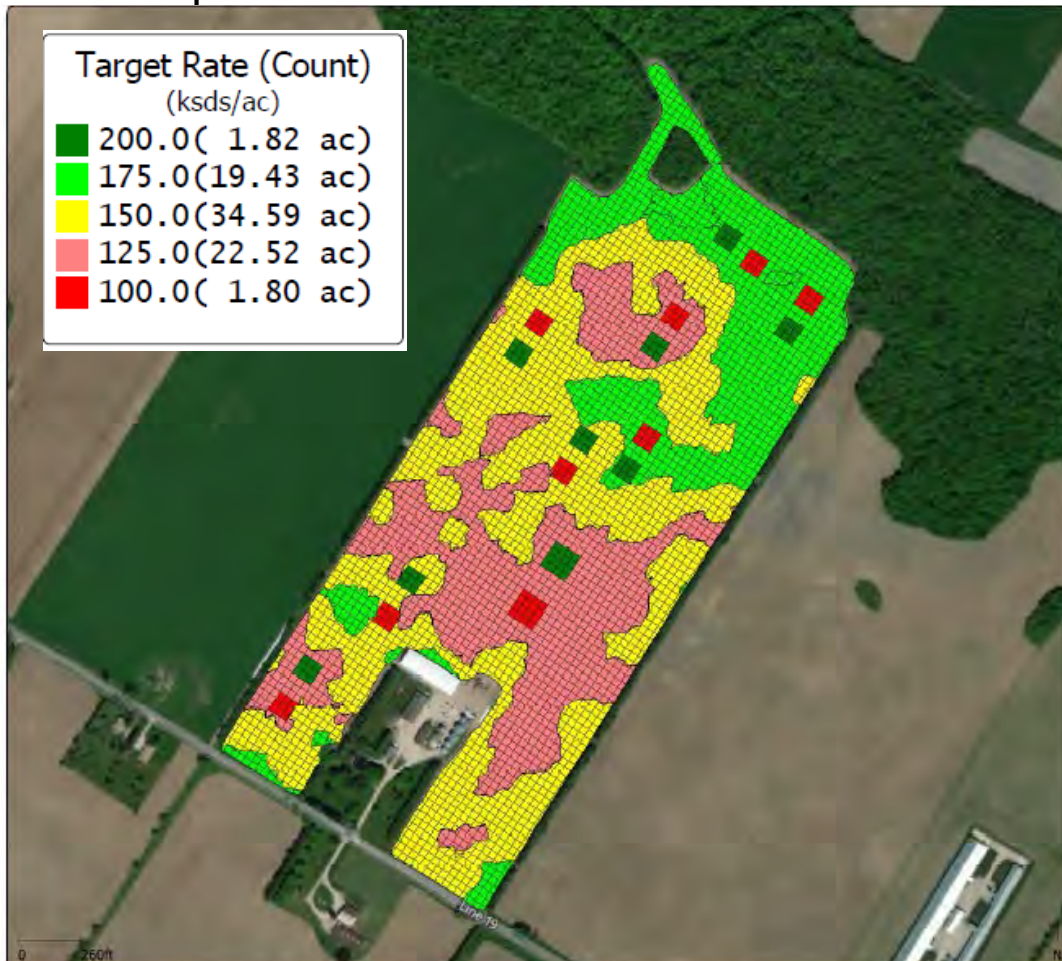
| Population Treatment Checks | |
|-----------------------------|-----------|
| Zone | Seed Rate |
| High | 200,000 |
| Low | 100,000 |

Case Study #1 Results Discussion**Management Zones:** The high zone yielded more than the low (+6.6 bu/ac, \$74.85/ac additional revenue/ac in the high zones over the low zones) and medium (+4.7 bu/ac, \$34.95/ac additional revenue/ac in the high zones over the low zones) zones [F-test significant at p = 0.04].**Validation Review****High Zone:** There was no statistical difference for yield or economics from 100 to 200k seeds/acre. This supports the theory that lower seeding rates is a good strategy.**Medium Zone:** There was no statistical difference for yield or economics from 100 to 200k seeds/acre. The medium rate was fine at 150k sds/ac.**Low Zone:** There was no statistical difference for yield. There was a tendency for lower yields with increasing seeding rates. Economics*: \$97/ac loss from 100 to 200 thousand seeds/ac Rx theory that higher rate in low yielding zone was incorrect.**Conclusions:** Soybeans in the higher yield management zone did yield higher than the medium and low yield management zones. Therefore having 3 years of historical bean data on this field provided the basis to define a high yielding zone. Seeding rate prescriptions for the high and medium seeding zones could be considered correct, primarily because returns were similar for all rates evaluated from 100 to 200 thousand seeds/acre. The higher seeding rate prescription for the low zone was too high. As a consequence, variable rate prescription returns for the field overall will likely be less than if the whole field had been seeded uniformly at seeding rates ranging between 100,000 to 150,000 seeds/ac.

Appendix 1: Soil Map



Appendix 2: Prescription



Appendix 3: Field Statistics

| Overall Zone Yields | | | | Within Zone Seeding Response | | | |
|---------------------|---------------|--------------|-----------------|------------------------------|---------------|--------------|---------------|
| Zone | Target | Yield | Sig. 10% | Zone | Target | Yield | Return |
| High | 125 | 65.2 | a | High | 100 | 64.2 | \$ 809.67 |
| Low | 175 | 58.6 | b | High | 125 | 63.3 | \$ 782.71 |
| Med | 150 | 60.5 | b | High | 200 | 66.2 | \$ 779.19 |
| | | | | Low | 100 | 60.2 | \$ 755.83 |
| | | | | Low | 175 | 58.6 | \$ 690.68 |
| | | | | Low | 200 | 57.0 | \$ 655.55 |
| | | | | Med | 100 | 58.4 | \$ 730.96 |
| | | | | Med | 150 | 62.8 | \$ 762.02 |
| | | | | Med | 200 | 62.6 | \$ 730.94 |