

# Precision Agriculture Workshop

## Exercise 5

### *Prescription Maps Development*

Computer Lab (room 114)

Start AGIS software and use imported data layers to calculate **phosphorus** application map (Prate, lbs P<sub>2</sub>O<sub>5</sub>/acre) using the following equations:

1. Replenishment of grain P removal equation *Phosphorous\_1.txt*

$$\text{Prate} = \text{Yield Goal} \cdot 0.33$$

2. UNL P equation (sufficiency concept) *Phosphorous\_2.txt*

$$\text{Prate} = (25 - \text{Bray-P}) \cdot 4 \quad \text{for Bray-P} < 25 \text{ ppm}$$

- *Bray-P = soil test P [ppm] in 0-8" depth*

3. KSU P equation (sufficiency concept with yield goal) *Phosphorous\_3.txt*

$$\text{Prate} = 50 + \text{Yield Goal} \cdot 0.20 - \text{Bray-P} \cdot 2.5 - \text{Yield Goal} \cdot \text{Bray-P} \cdot 0.01$$

*for Bray-P < 20 ppm*

4. KSU P equation with buildup concept - *Phosphorous\_4.txt*

$$\text{Prate} = (20 - \text{Bray-P}) \cdot 18 / \text{Years to Build} + \text{Yield Goal} \cdot 0.33 \quad \text{for Bray-P} < 20 \text{ ppm}$$

Compare Bray-P map used in exercise with the “best” Bray-P map available. Re-run any of the equations with the “best” P map to evaluate the effect of less detailed soil sampling and interpolation of soil test P on the variable rate P application map.

Use UNL Equation to prescribe **nitrogen** application (Nrate, lb N/acre):

1. UNL N Equation:

$$\text{Nrate} = 35 + \text{Yield Goal} \cdot 1.2 - (8 \cdot \text{NO}_3 + 16 \cdot 3) / 24 \cdot 8 - \text{Yield Goal} \cdot \text{SOM} \cdot 0.14 - \text{Other Credits}$$

- *SOM = % soil organic matter in 0-8"*
- *NO<sub>3</sub> = nitrate-N [ppm] in 0-8" depth*

2. Constant yield goal and constant soil nitrate value (NO<sub>3</sub>) of 5 ppm in 0-8" depth

3. Constant yield goal and variable soil nitrate

Compare SOM and nitrate maps used in exercise with the “best” SOM and nitrate maps available and re-run equation.