Grid or Zone sampling “Unfertilized” Soybean Fields in the Spring/Summer is Increasing (topsoil only)

Advantages of Spring/Summer Sampling P, K, pH, %OM, Zn

- Sample quality is better (firm soil = consistent depth)
- K test data is equal or better than fall data (moist soil K data may be little better)
- Labor is available for getting soil samples collected
- Soil Test data available before soybean harvest
- VR maps for P & K can be discussed by grower and agronomist with plenty of time to make best decisions

Questions: Can you Soil Test "Fertilized" Soybean Fields?

How long do you have to wait after fertilizer has been applied?

“Researchers Said”

- Moderate rates (50 lb/a P_2O_5, 50 lb/a K_20)
  - You can soil test right away with low rates
  - Must wait 3-4 weeks before soil testing
  - Must wait until after harvest to soil test
  - Don’t really know how long to wait
  - Depends

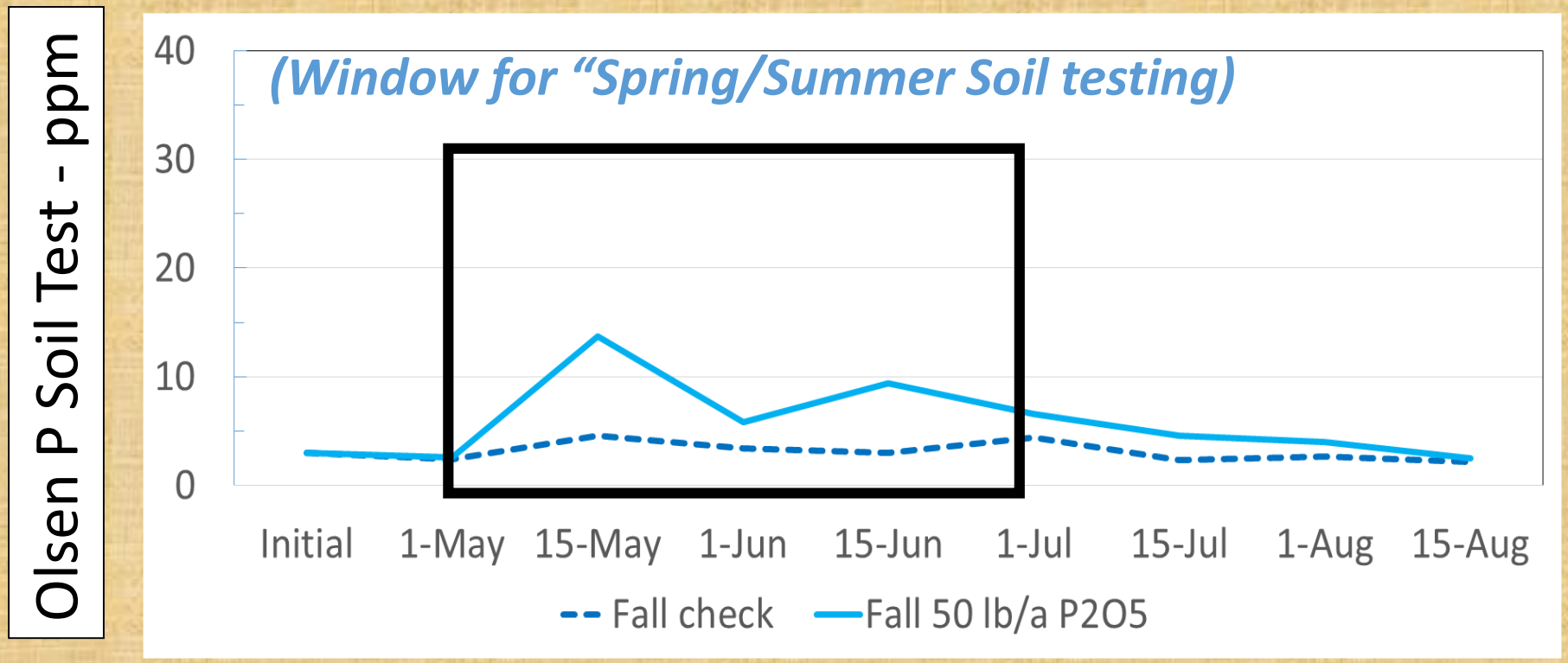
Sampling "Fertilized" Soybean Fields? Demonstration Project

- Objective: Determine if a moderate amount of P & K fertilizer will affect soil test levels if you sample a short time later?
- Moderate rate = 50 lb P_2O_5 and 50 lb/a K_2O
- P & K Applications made in fall and in spring on adjacent locations
- P and K fertilizer incorporated (tiller or farmer practice)
- Higher rates of 100 and 200 lb/a of P_2O_5 and K_2O too

P & K applied and tilled into topsoil
Fall and Spring application
(Other locations left to grower practices)

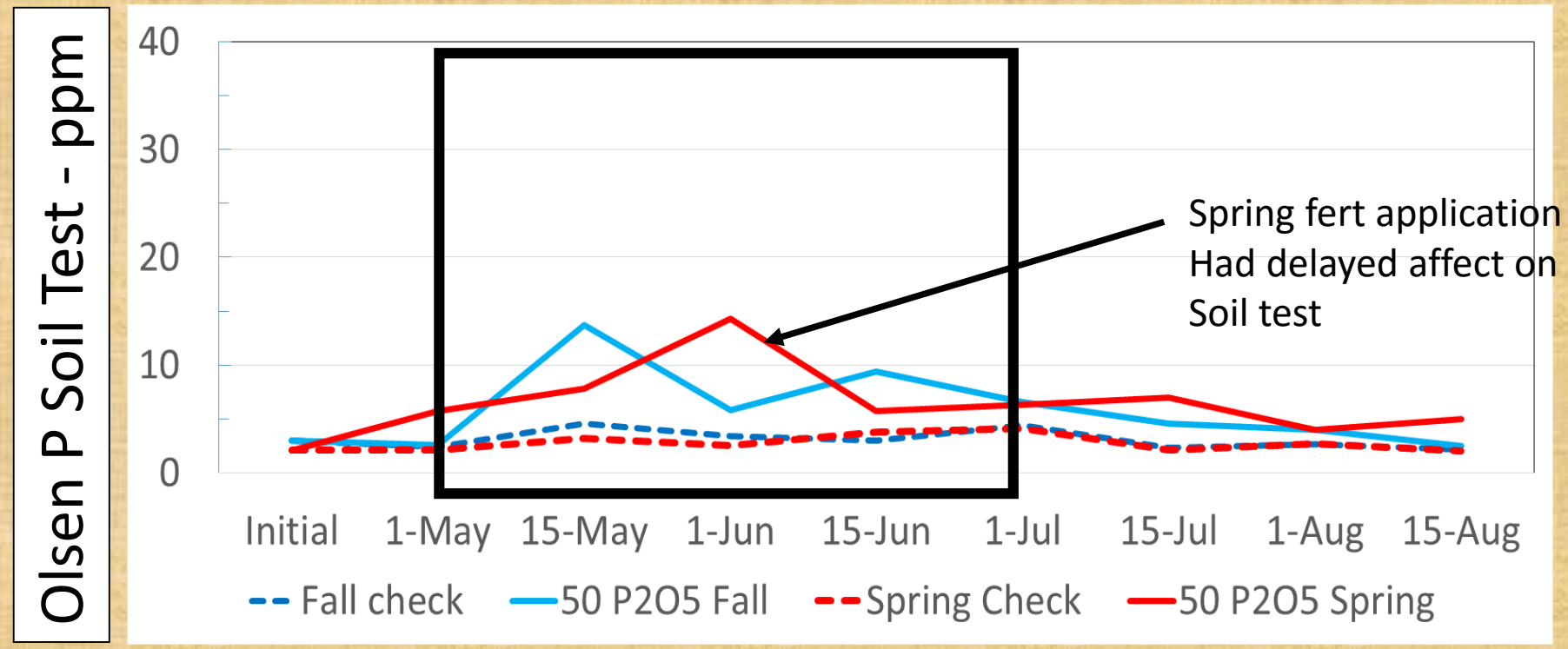
Phosphorus

Sampling Fertilized Soybean Fields
(Northwood ND)
Fall Application 50 lb/a P_2O_5



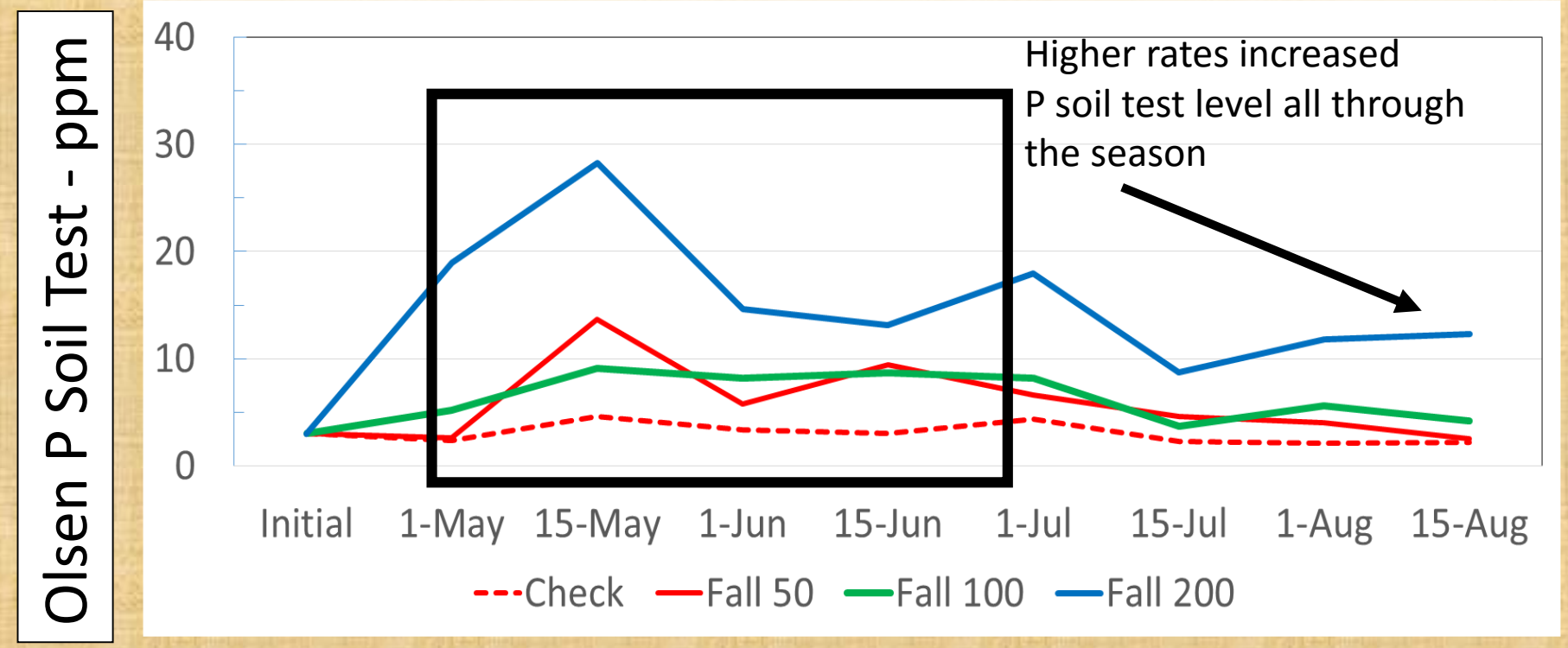
Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields
(Northwood ND)
Fall and Spring Application 50 lb/a P_2O_5



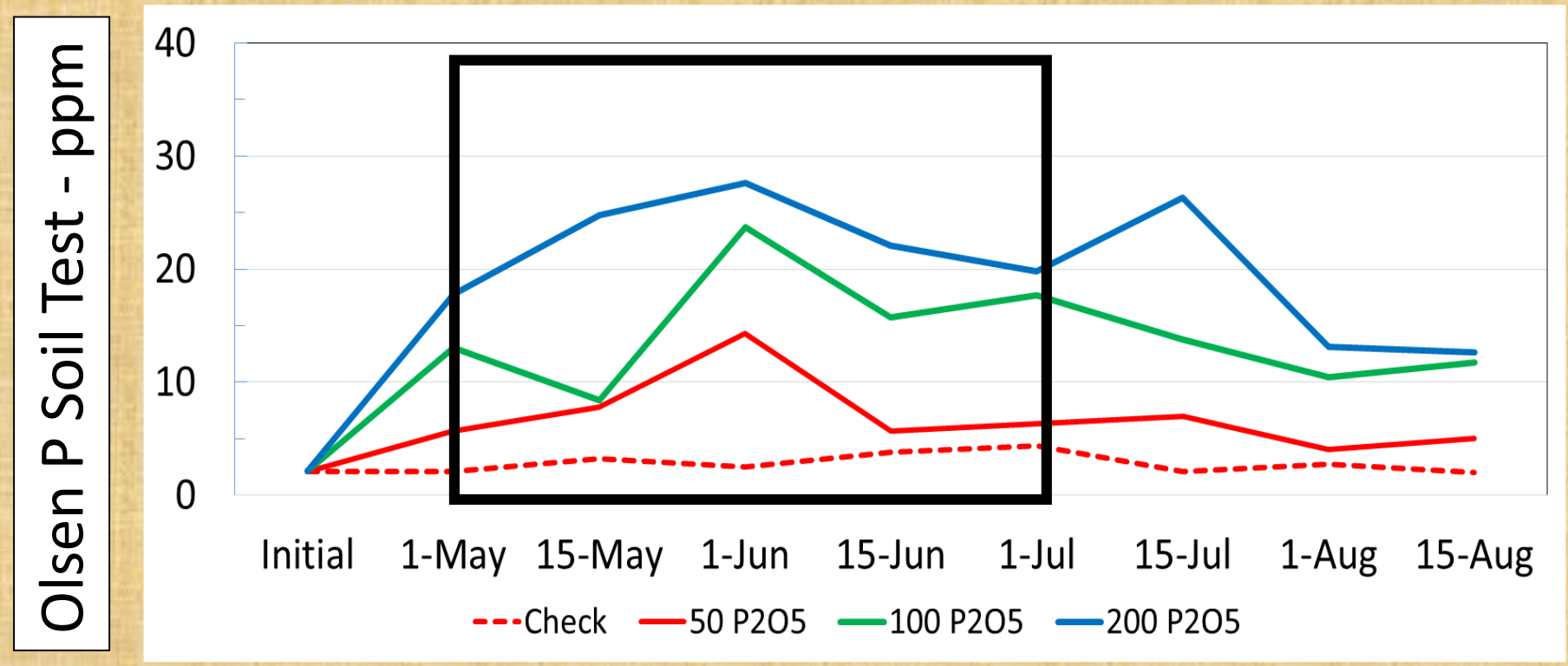
Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields
(Northwood ND) Fall – 50, 100, 200 lb/a P_2O_5



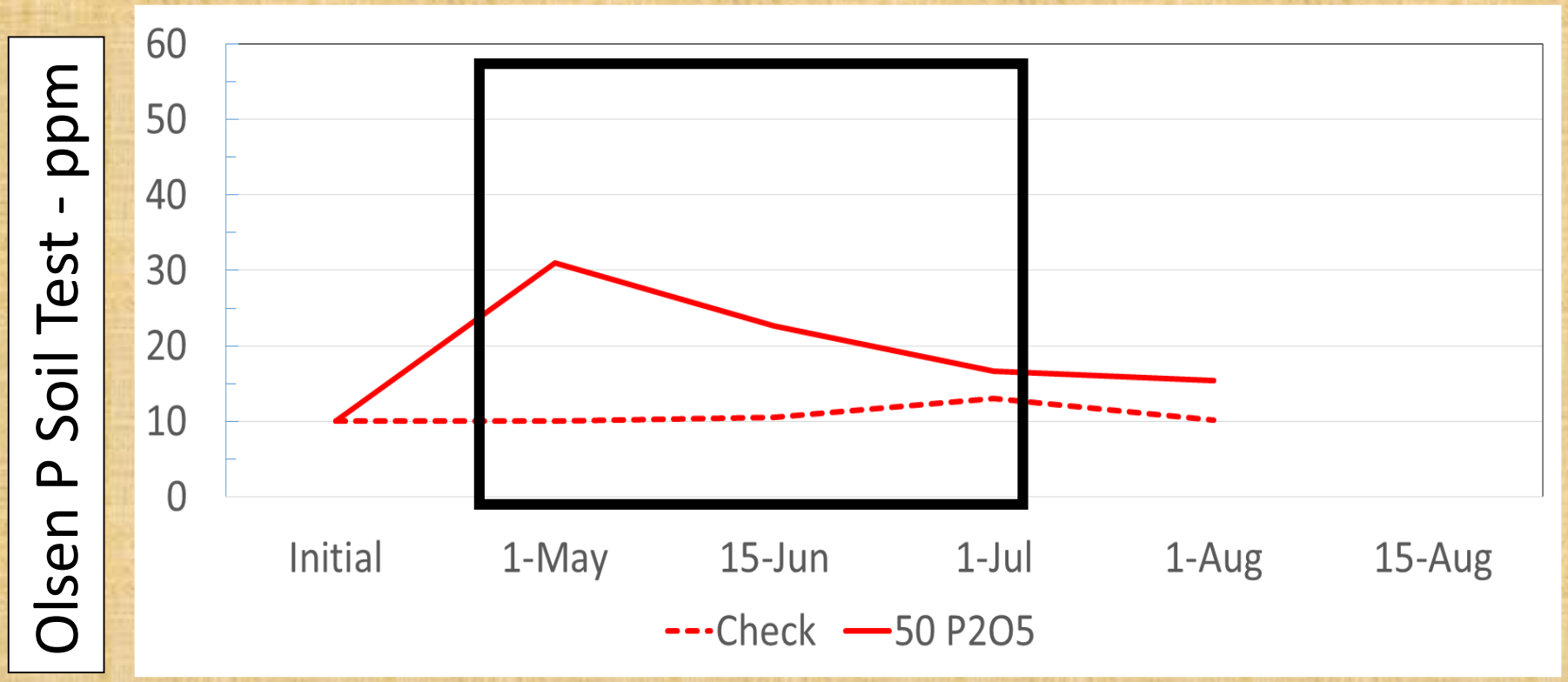
Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields
(Northwood ND)
Spring - 50, 100, 200 lb/a P_2O_5



Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields
Hillsboro ND - Fall 50 lb/a
Broadcast and incorporated Application

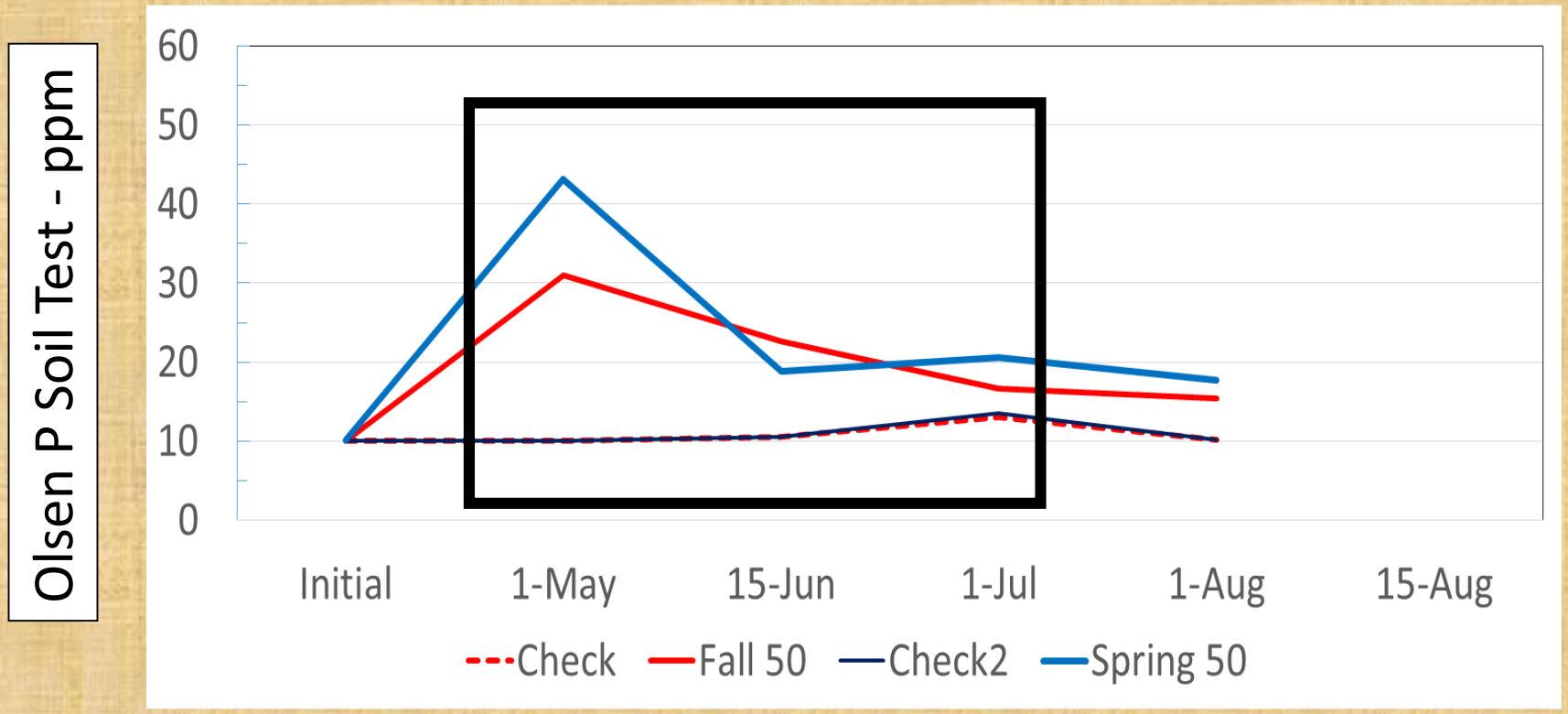


Hillsboro ND, pH -7.7 Clay texture (59%)

Sampling Fertilized Soybean Fields

Hillsboro, ND

Fall or Spring 50 lb/a P_2O_5

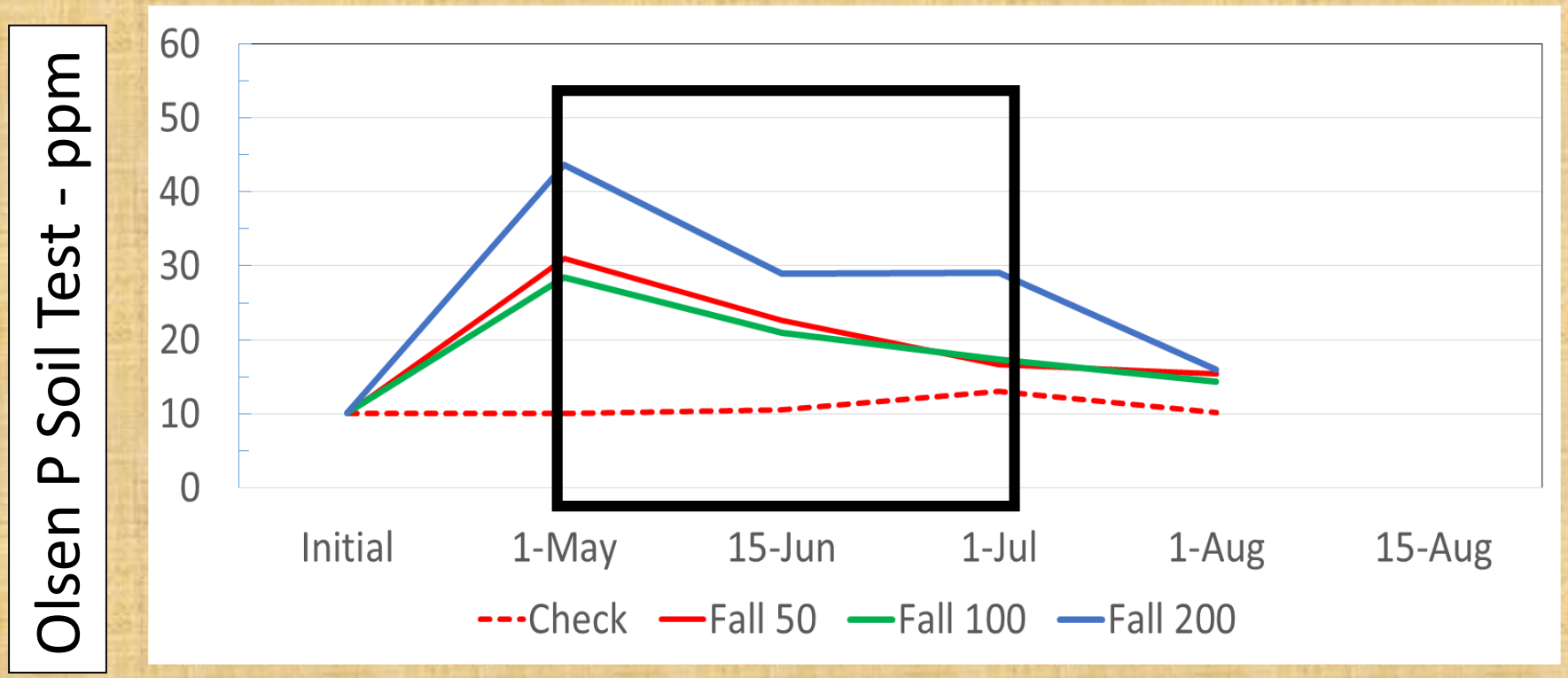


Hillsboro ND, pH = 7.7 Clay texture (59%)

Sampling Fertilized Soybean Fields

Hillsboro, ND

Fall – 50, 100, 200 lb/a P_2O_5

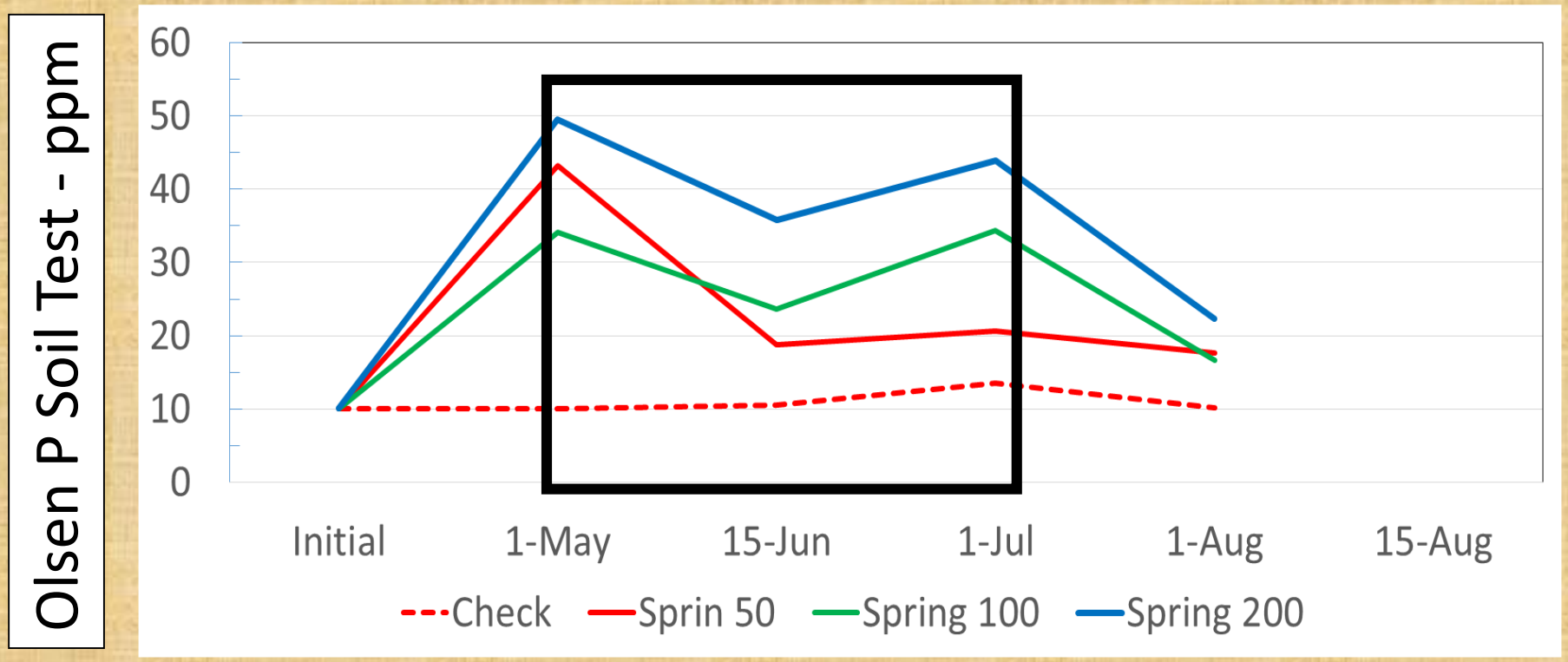


Hillsboro ND, pH – 7.7 Clay texture (59%)

Sampling Fertilized Soybean Fields

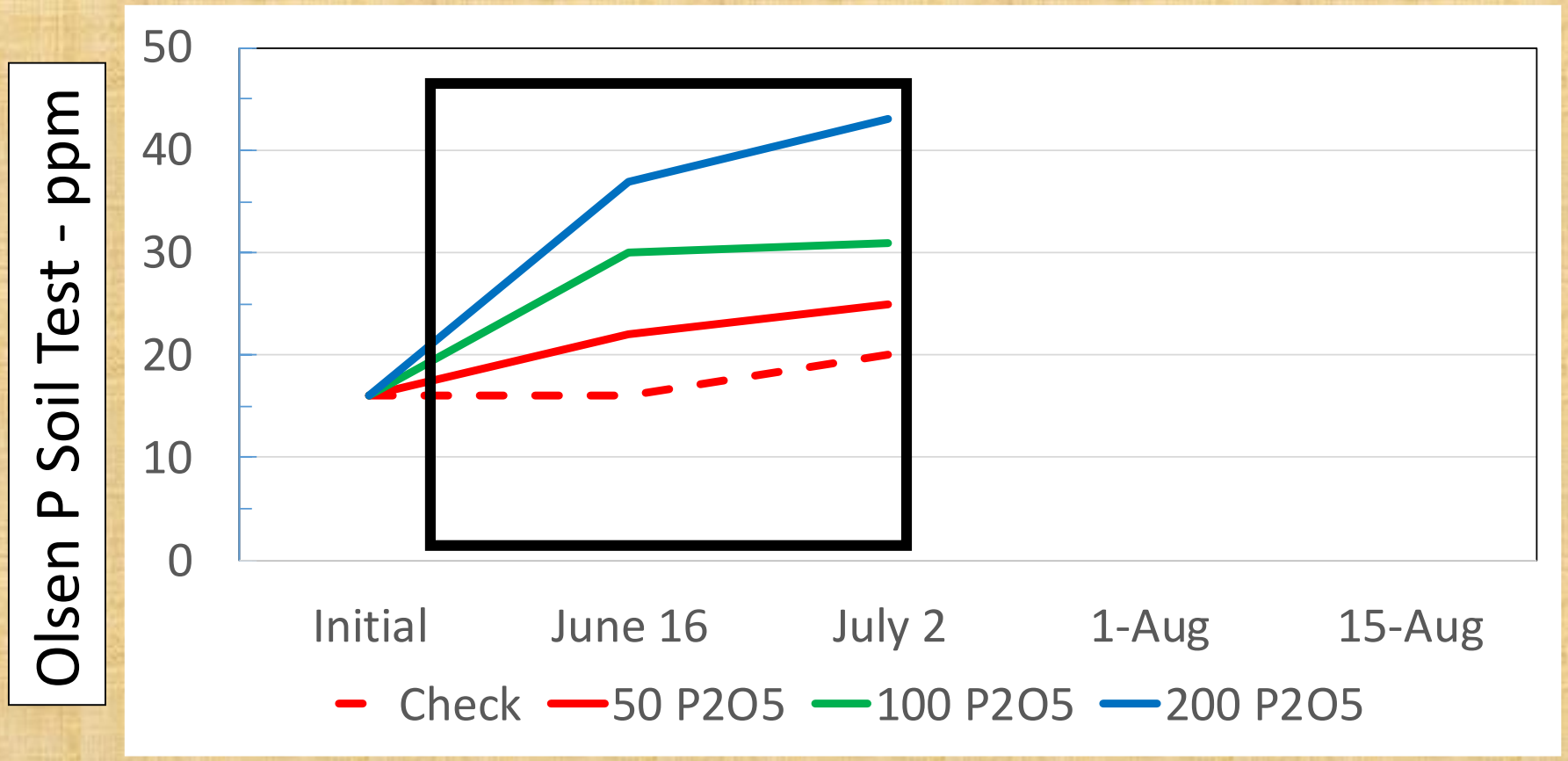
Hillsboro, ND

Spring 50, 100, 200 lb/a P_2O_5



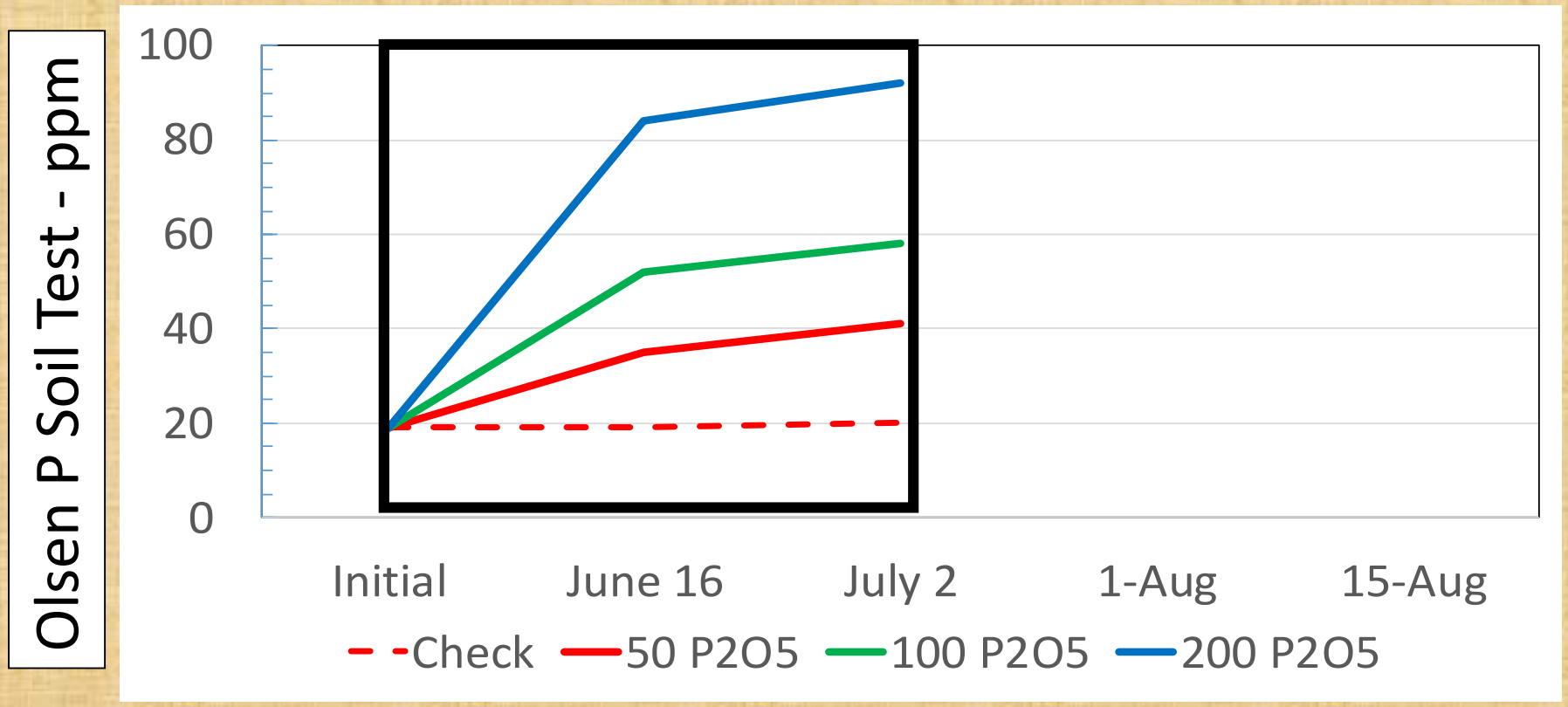
Hillsboro ND, pH 7.7 Clay texture (59%)

Sampling Fertilized Soybean Fields
Benson, MN Site 1 - Spring
Broadcast and incorporated Application



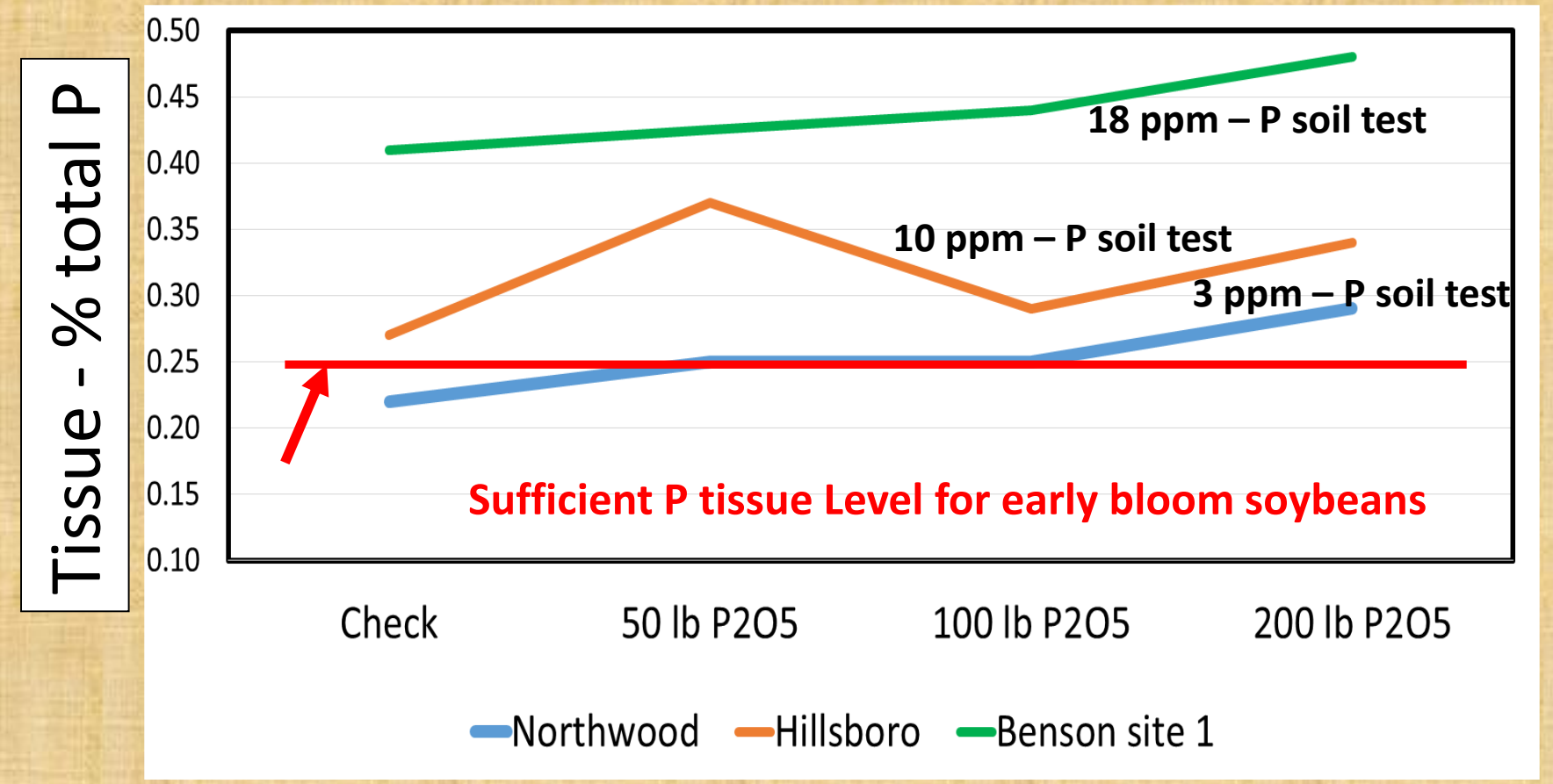
Site 1, Benson, MN, pH = 6.1, silty clay loam

Sampling Fertilized Soybean Fields
Benson, MN Site 2 - Spring
Broadcast and incorporated Application



Site 2, Benson, MN, pH = 7.6, silty clay loam

Soybean "P" tissue levels? Early Bloom



Conclusions

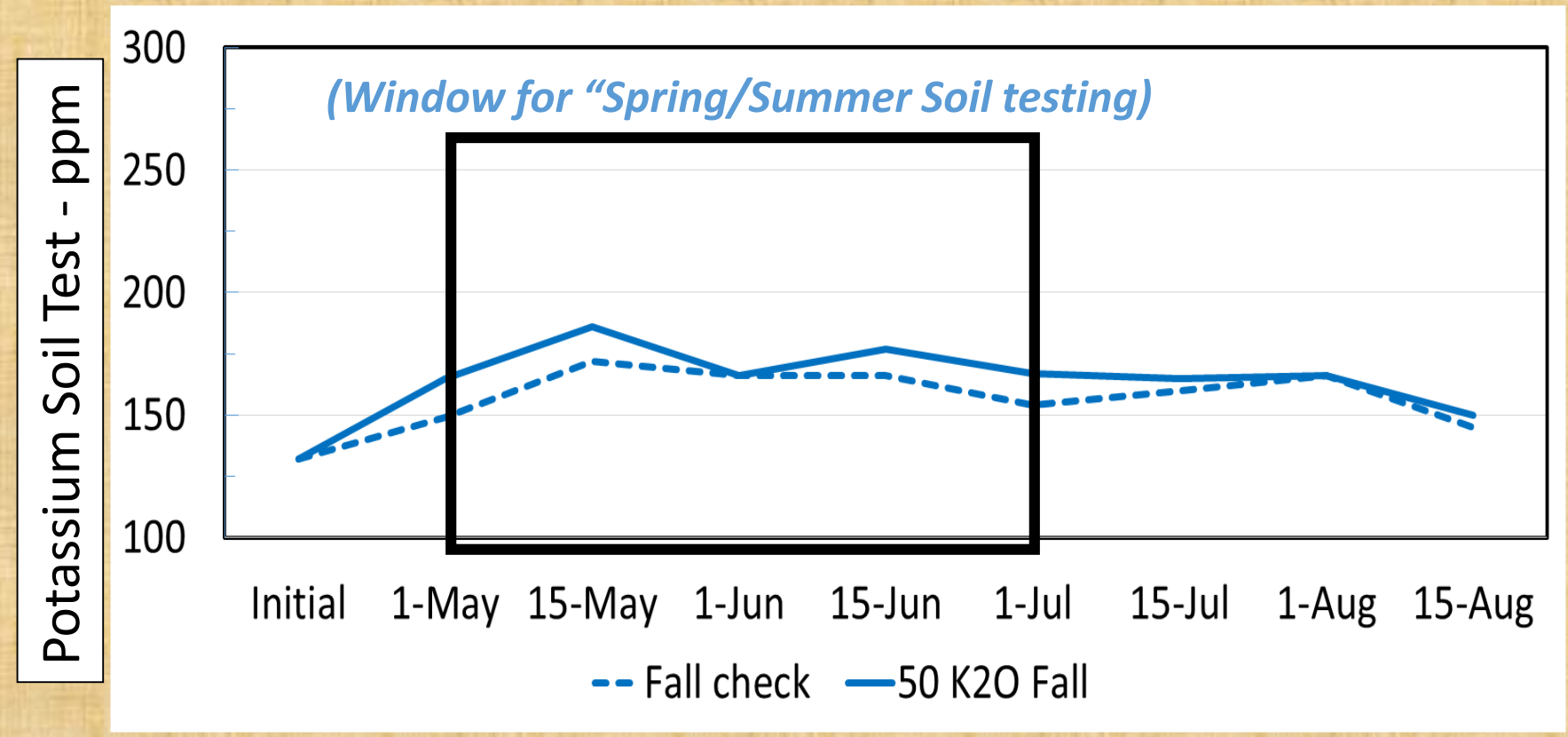
- 50 lb/a P_2O_5 did effect soil test levels whether the fertilizer was applied fall or the spring
- Spring applied Fertilizer had more affect on soil test level.
- 50 lb/a P205 rate did increase P soil test slightly at end of the season in Northwood
- Higher rates of P fertilizer increased soil test levels all season long

Conclusions

- Soil testing should wait until after harvest when P fertilizer is applied the fall before or in the spring before planting.
- To do spring/summer sampling you will need to plan to sample fields which were not fertilized with P the fall before or in the spring

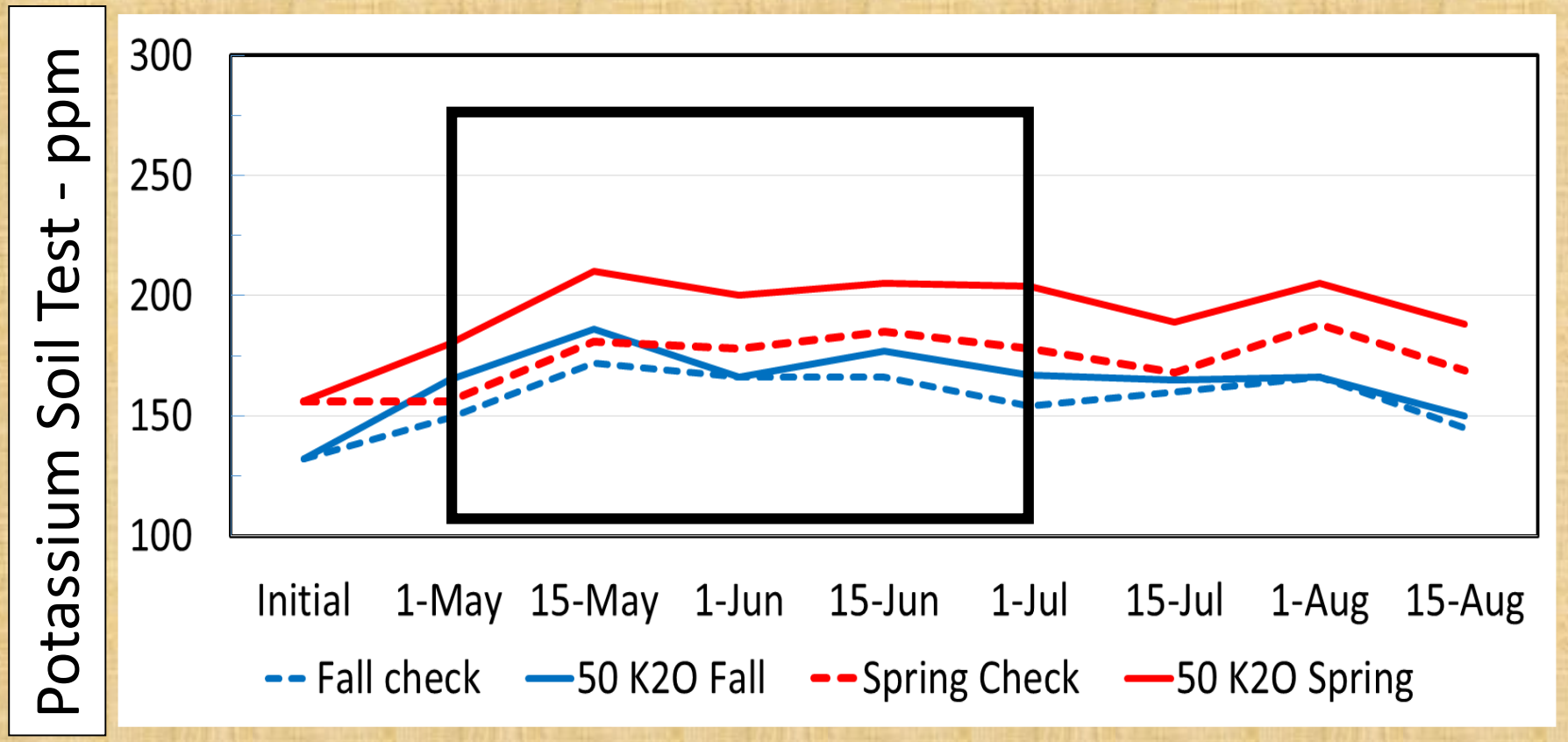
Potassium

Sampling Fertilized Soybean Fields
Northwood, ND Fall and Spring Application
K fertilizer (50 lb/a K_2O)



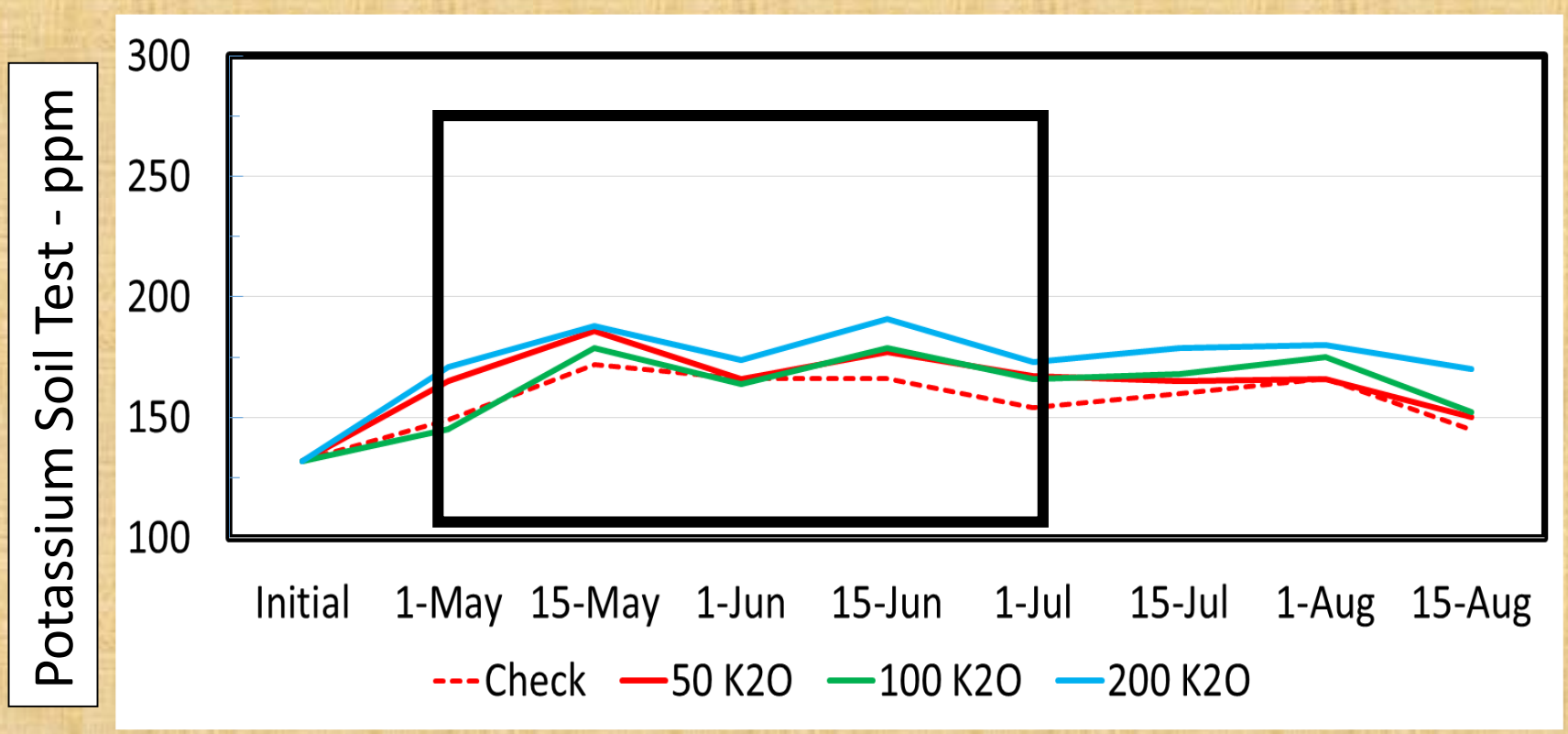
Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields
Northwood, ND Fall and Spring Application
K fertilizer (50 lb/a K_2O)



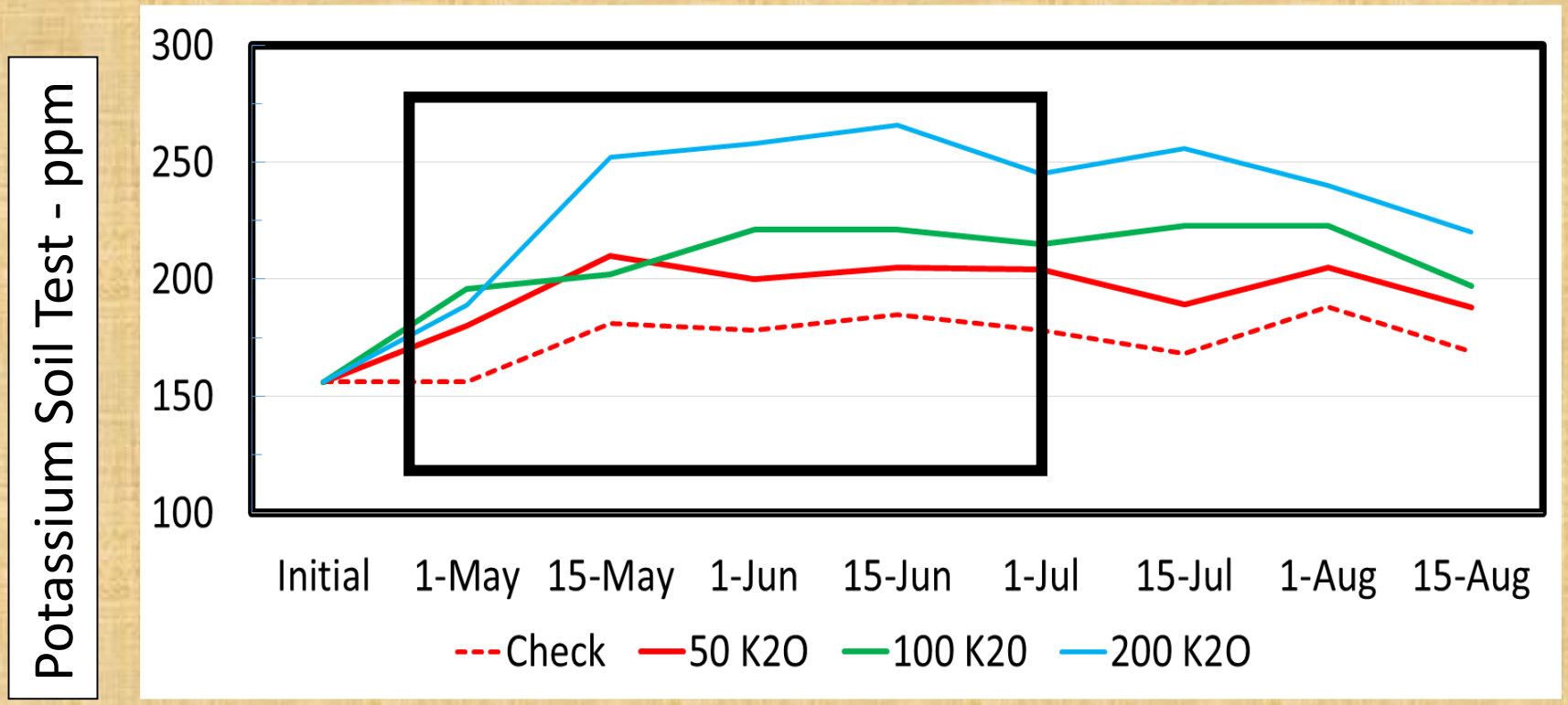
Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields
Northwood ND
Fall Broadcast Application



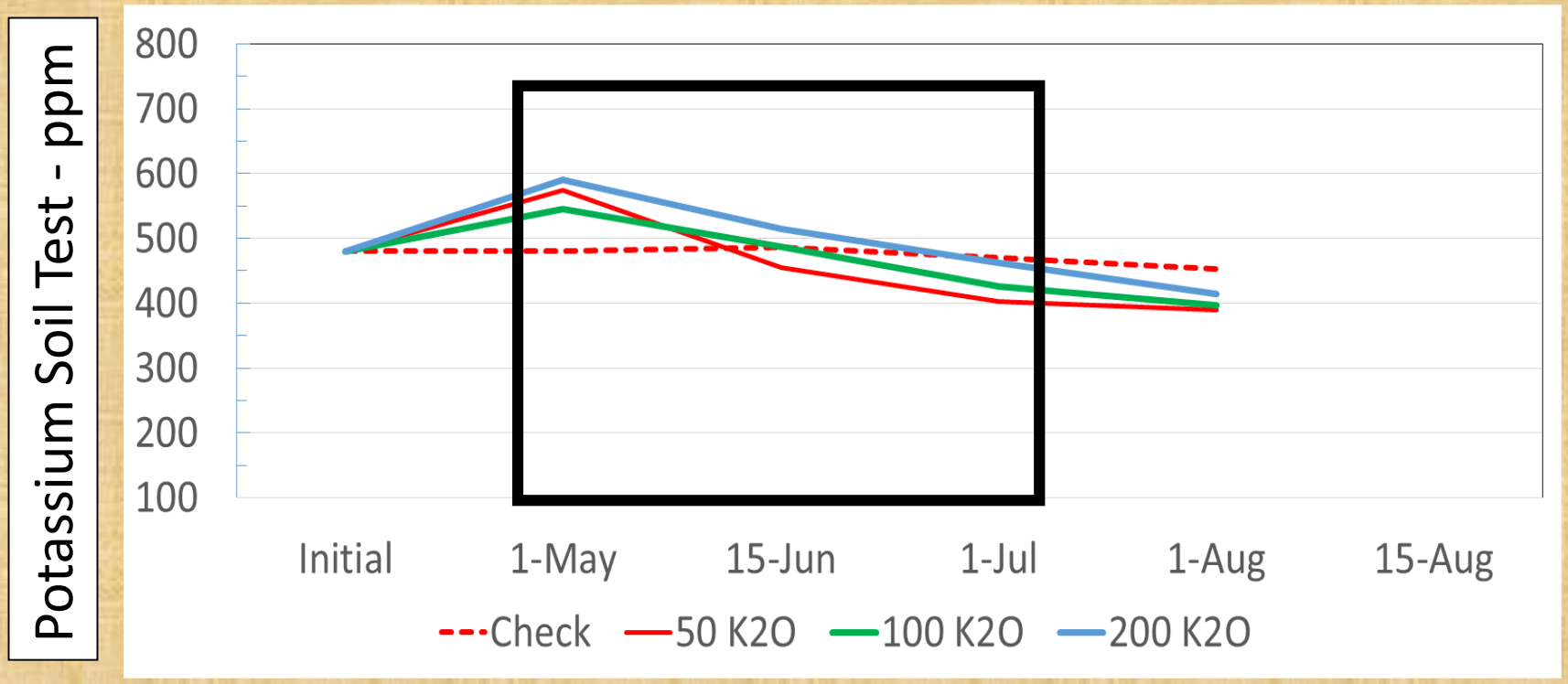
Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields (Northwood, ND) Spring Broadcast Application



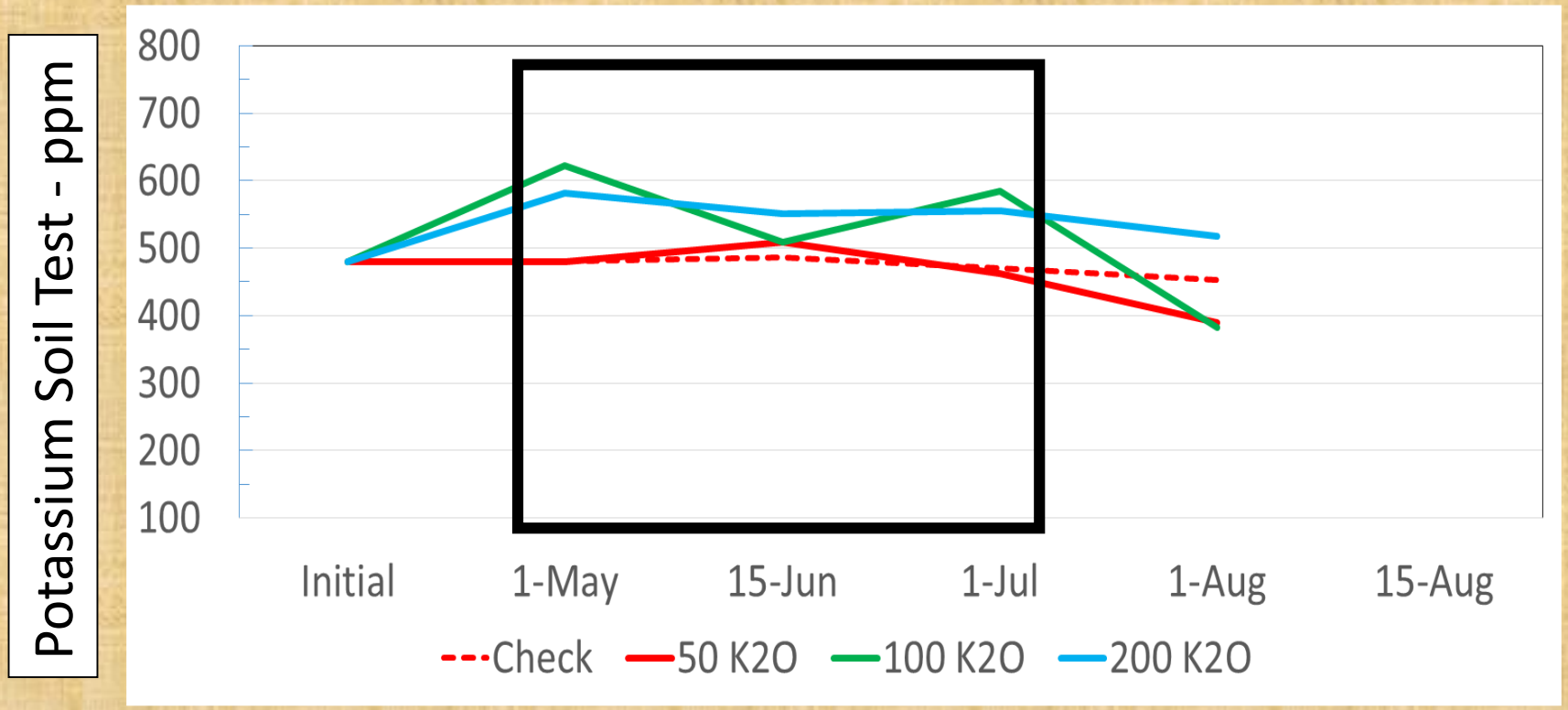
Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Sampling Fertilized Soybean Fields
Hillsboro, ND
Fall Broadcast Application



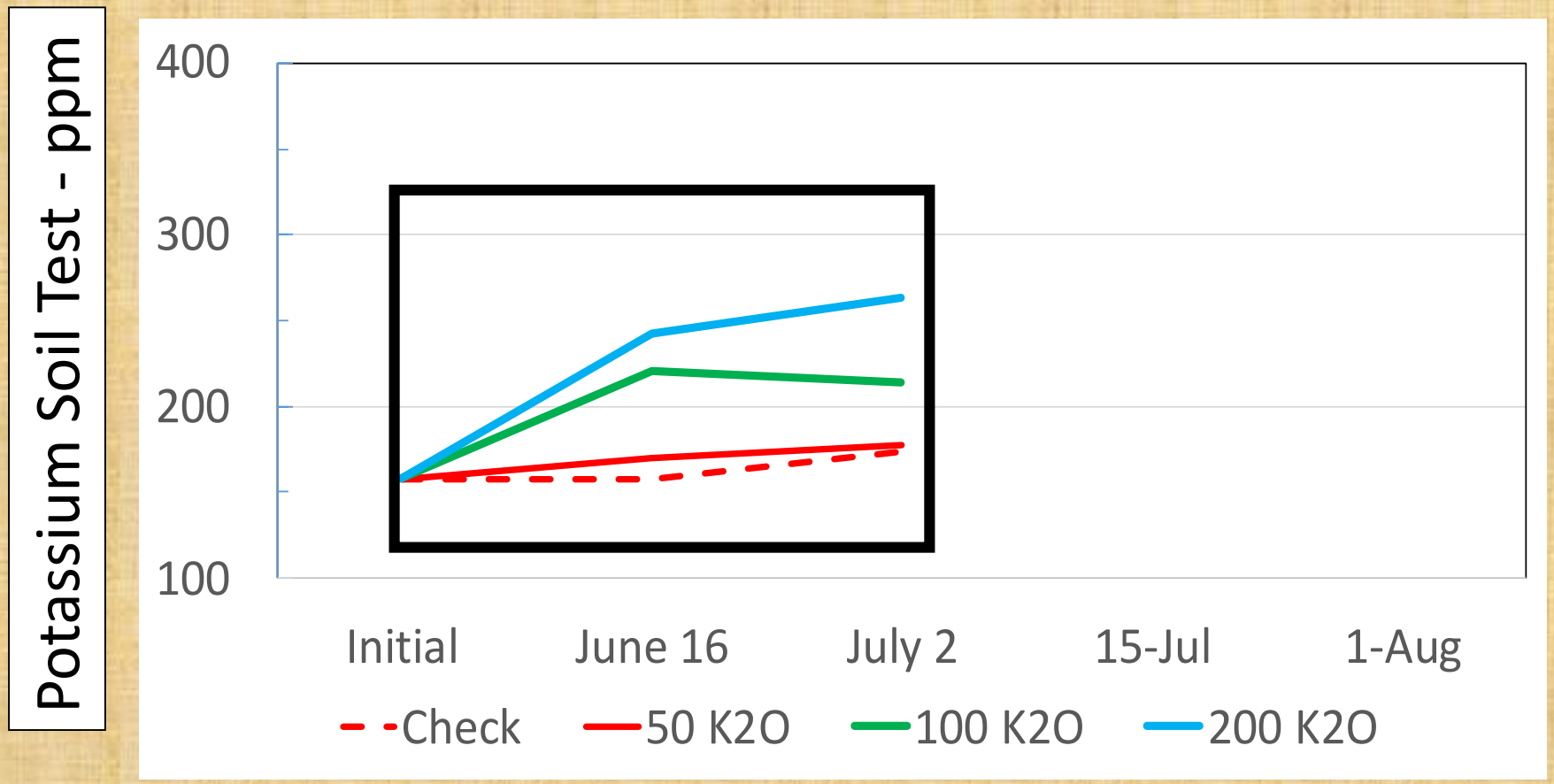
Hillsboro ND, pH = 7.7 Clay texture (59%)

Sampling Fertilized Soybean Fields
Hillsboro, ND
Spring Broadcast Application



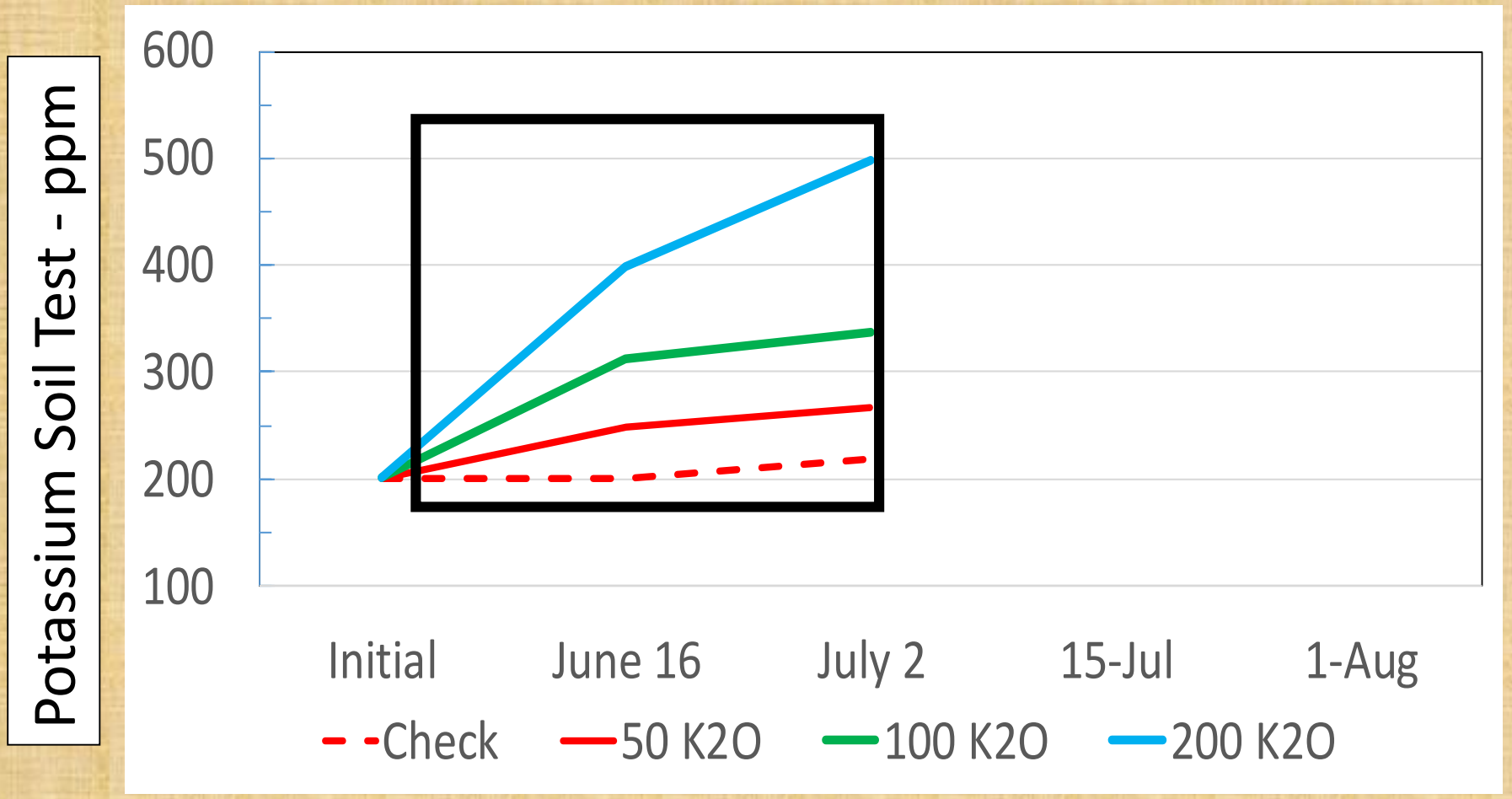
Hillsboro ND, pH 7.7 Clay texture (59%)

Sampling Fertilized Soybean Fields
Benson, MN
Site 1 - Spring Broadcast Application



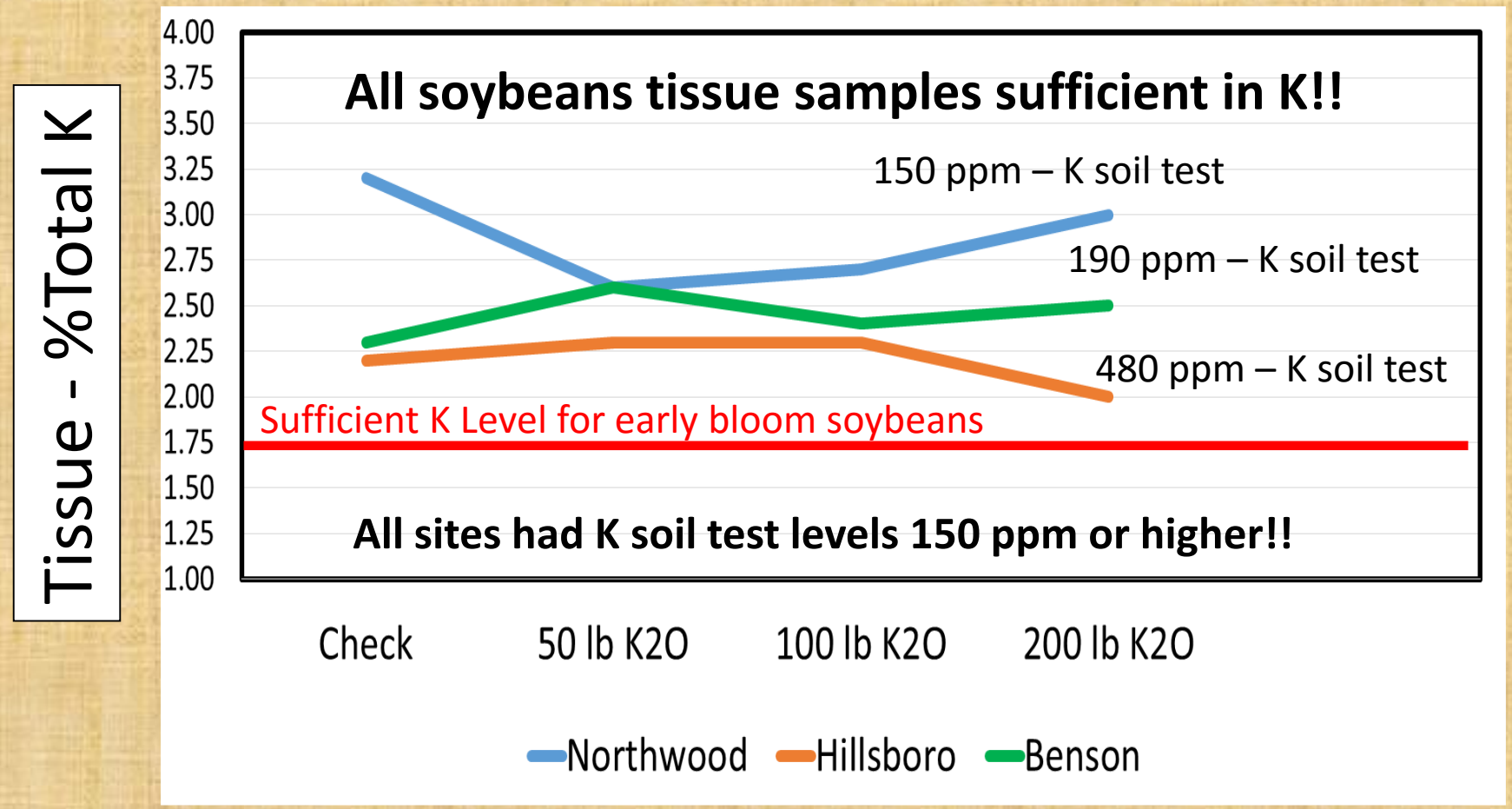
Site 1, Benson, MN, pH = 6.1, silty clay loam

Sampling Fertilized Soybean Fields
Benson Site 2
Spring Broadcast Application



Site 2, Benson, MN, pH = 7.6, silty clay loam

Soybean K tissue levels? Early Bloom



Conclusion

- 50 lb/a K_2O did effect soil test levels whether the fertilizer was applied in the fall or the spring
- Spring applied Fertilizer effected soil test level a little more
- Higher rates of K fertilizer increased soil test levels all season long

Conclusions

- Soil testing should wait until after harvest when K fertilizer is applied the fall before or in the spring before planting.
- To do spring/summer sampling you will need to plan to soil test fields which were not fertilized with P & K the fall before or in the spring.


Questions?
51°F
MOULTRIECAM
05 AUG 2015 06:

Meetings promoting “Base Saturation” and Cation Ratios (lots of questions)

- Base saturation is a calculation showing % of each cation
  - Calcium (Ca++)
  - Magnesium (Mg++)
  - Sodium (Na+)
  - Potassium (K+)
- Research from 40’s & 50’s implied “Optimum” range for each cation
- Research from 60’s, 70’s, 80’s, 90’s 2000’s proved % of each cation is not important and does not limit crop yield
- What is important is “ppm” of each cation!

Simple Project To Show "Flaw" in "Base Saturation" Concept?

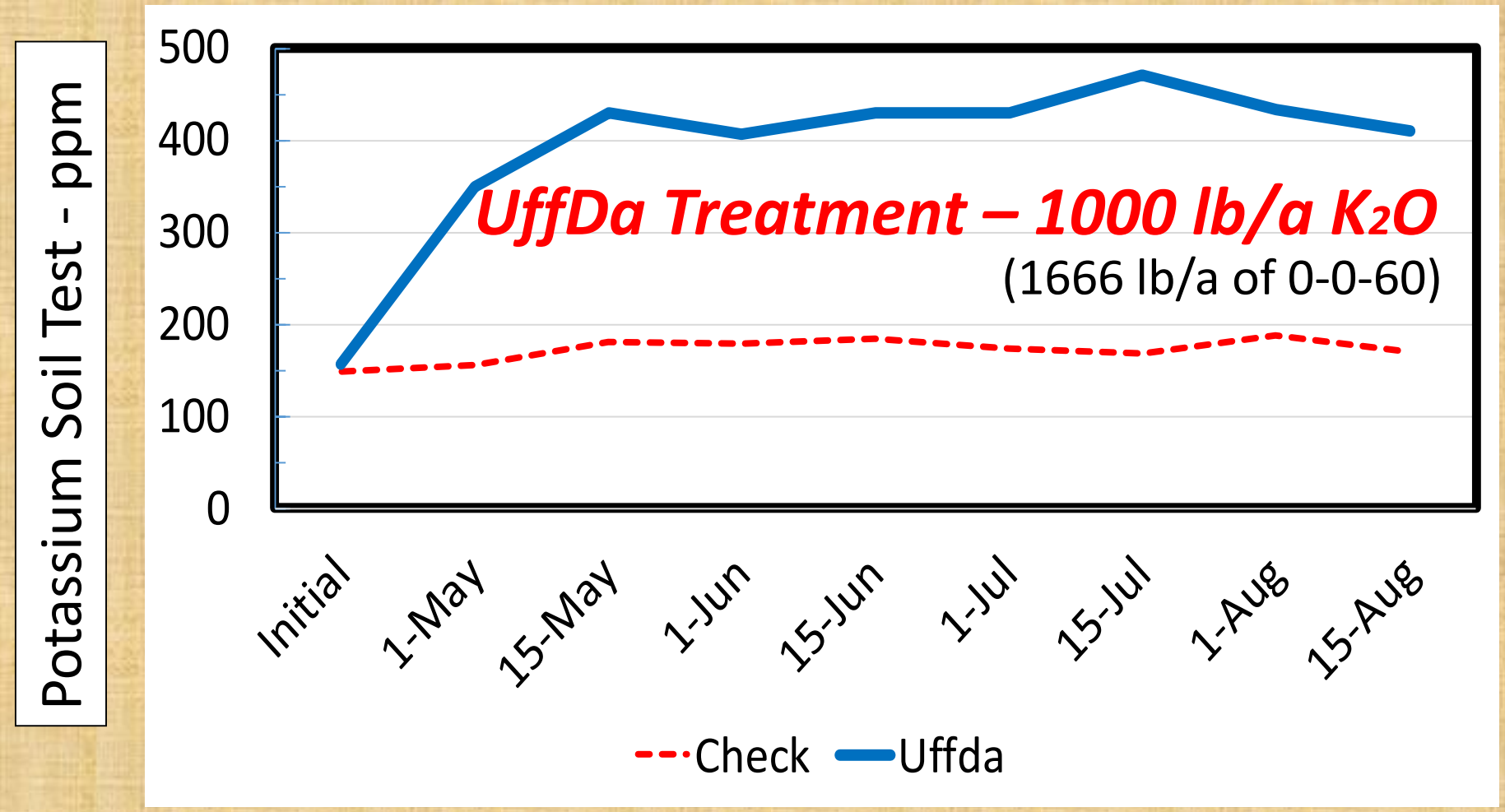
"Project was Dreamed Up!
Apply1000 lb/a K_2O
(1666 lb/a KCl 0-0-60)
Uff-Da Project!

Reason: See if you can increase the %K to the magical 4-8% range

“Uff Da” Project

- My Grandpa was a farmer who came over on the boat from Norway
- “Uff Da” Comes from immigrants from Scandinavia during the early part of the 20th century. If you are over worked you say "Uff Da", if you are surprised you say "Uff Da", If you are Upset you say "Uff Da“
- He would have said “Uff Da” that’s a lot of Potash

"UffDa" Project – Northwood, ND Site
Effect of 1000 lb/a K_2O on K Soil Test ppm

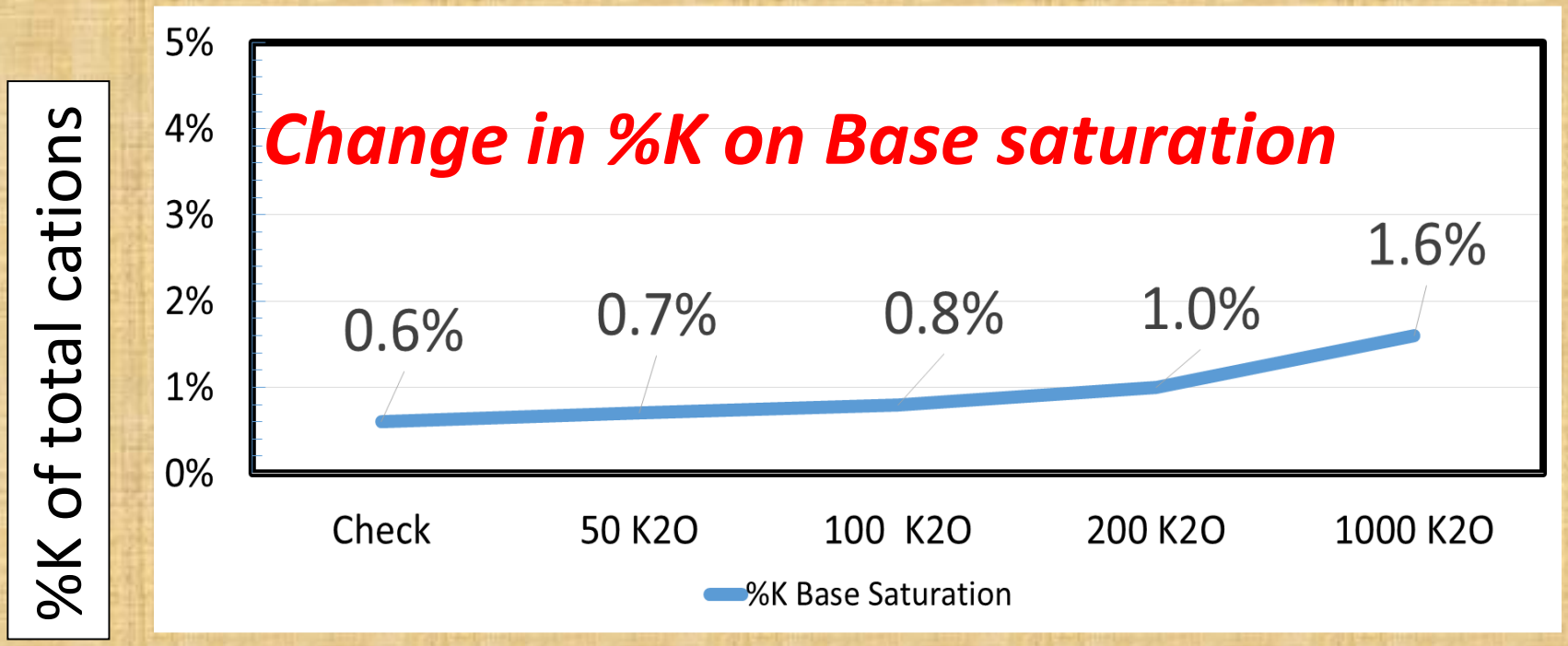


Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

“UffDa” Project – Part 1

- Did the K soil test pick up the large amount of K fertilizer applied? (YES!)
- The K soil test increased 150-350 ppm on 3 sites
- Would K fertilizer still be recommended based on the soil K ppm test after this large application? (NO!)

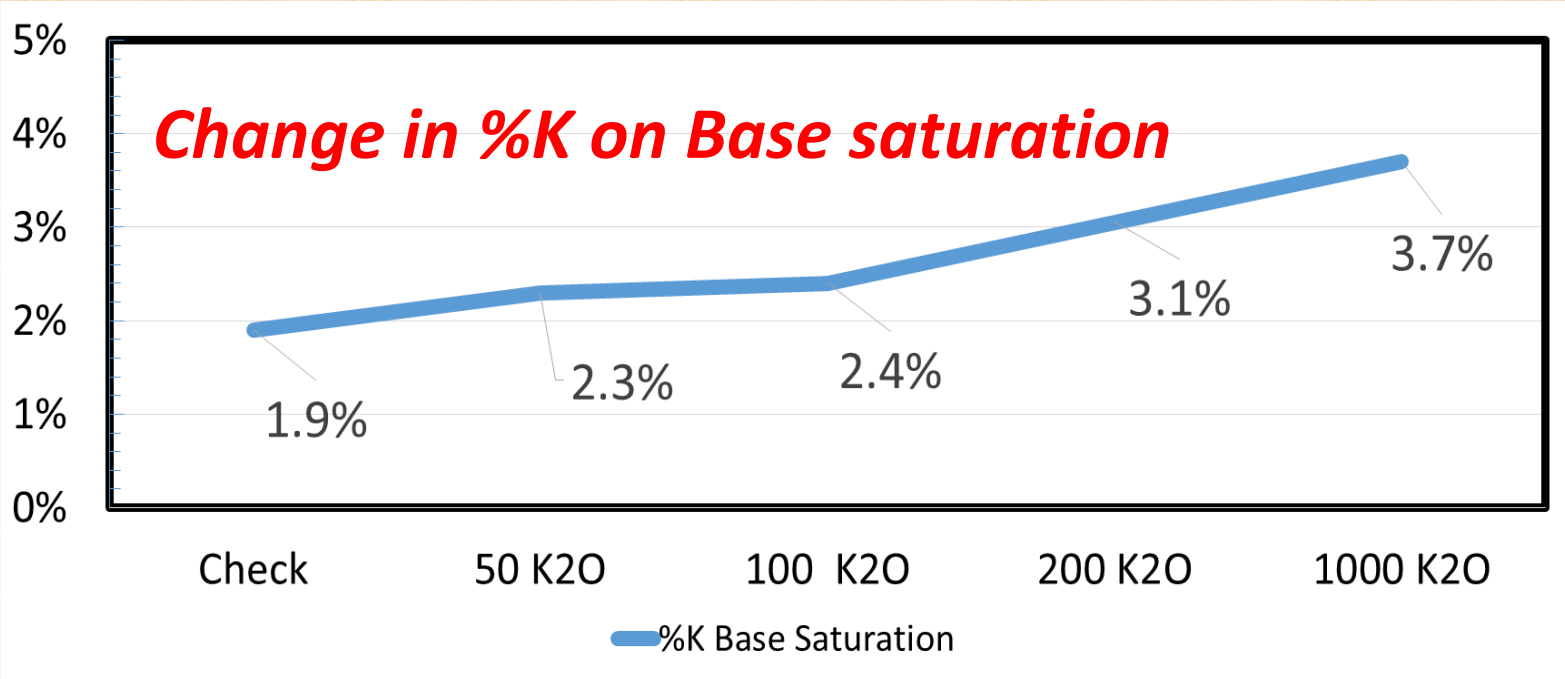
Did 1000 lb/a K_2O Change %K on Soil test?
Northwood, ND Site



Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Did 1000 lb/a K_2O Change %K on Soil Test? Benson, MN Site

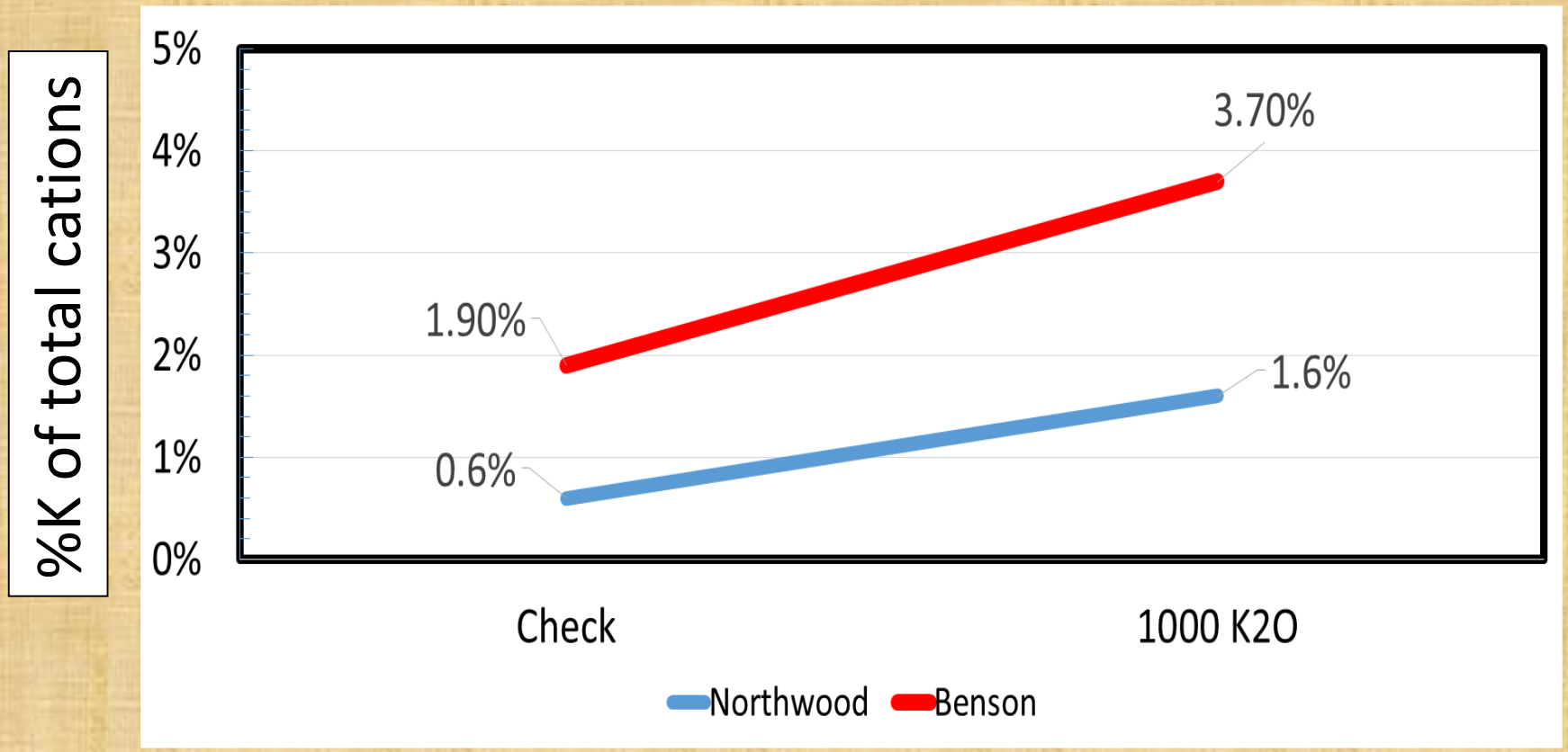
%K of total cations



pH 6.6 salt .17, carbonates 0%

1000 lb/a K_2O changes %K by only 1.0-2.0%

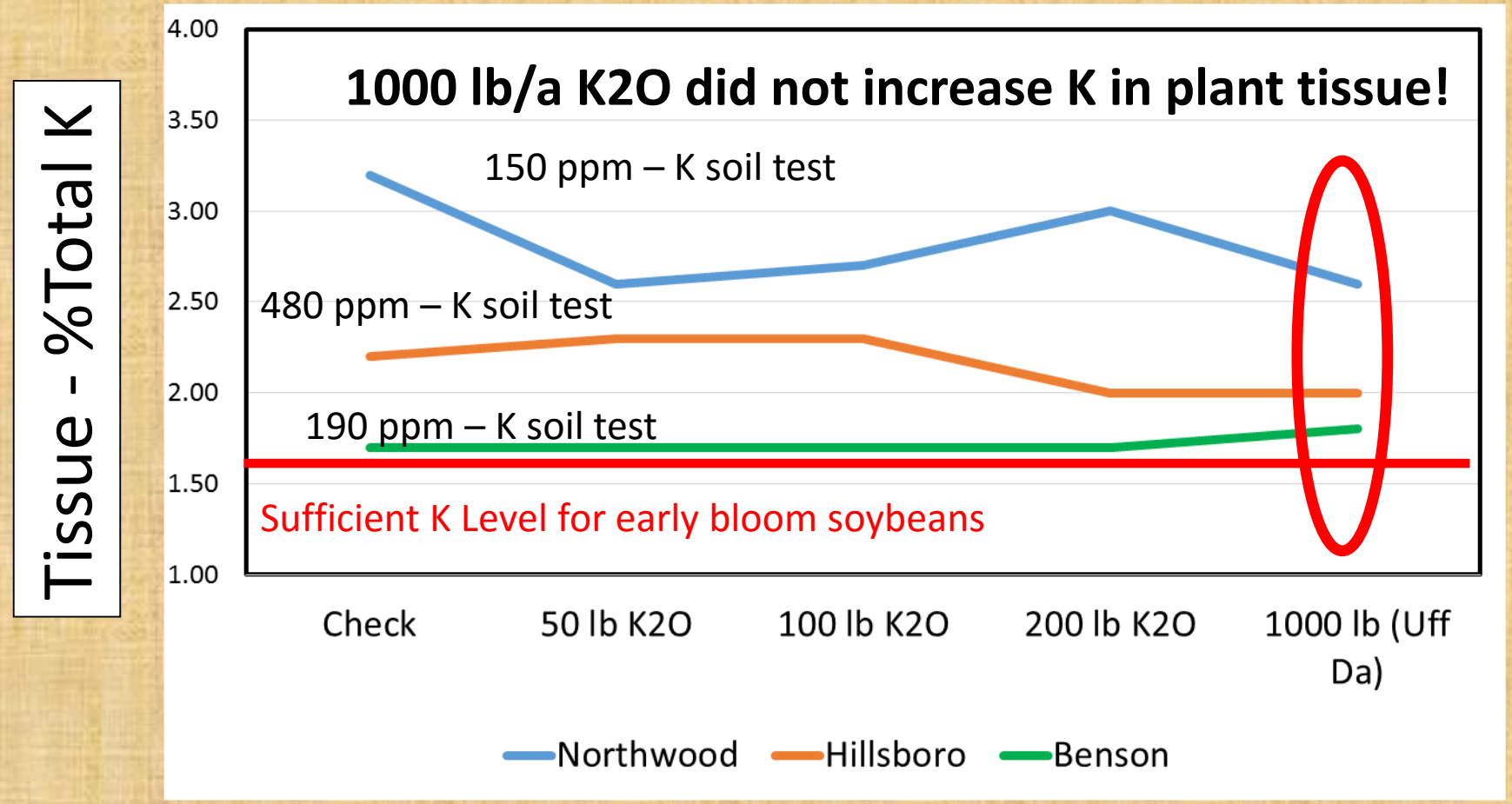
"Base Saturation" concept says 4-8% K is Magical???



“UffDa” Project – Part 2

- Did 1000 lb/a K_2O increase the %K on base saturation?
- Yes, but only increased 1 to 2% (with 1000 lb/a K_20!)
- “Base Saturation” concept would still recommend more K fertilizer because %K below 4-8% magical range
- Apparently 1000 lb/a K_20 (1666 lb KCL) is not enough!

Soybean K tissue levels? Early Bloom



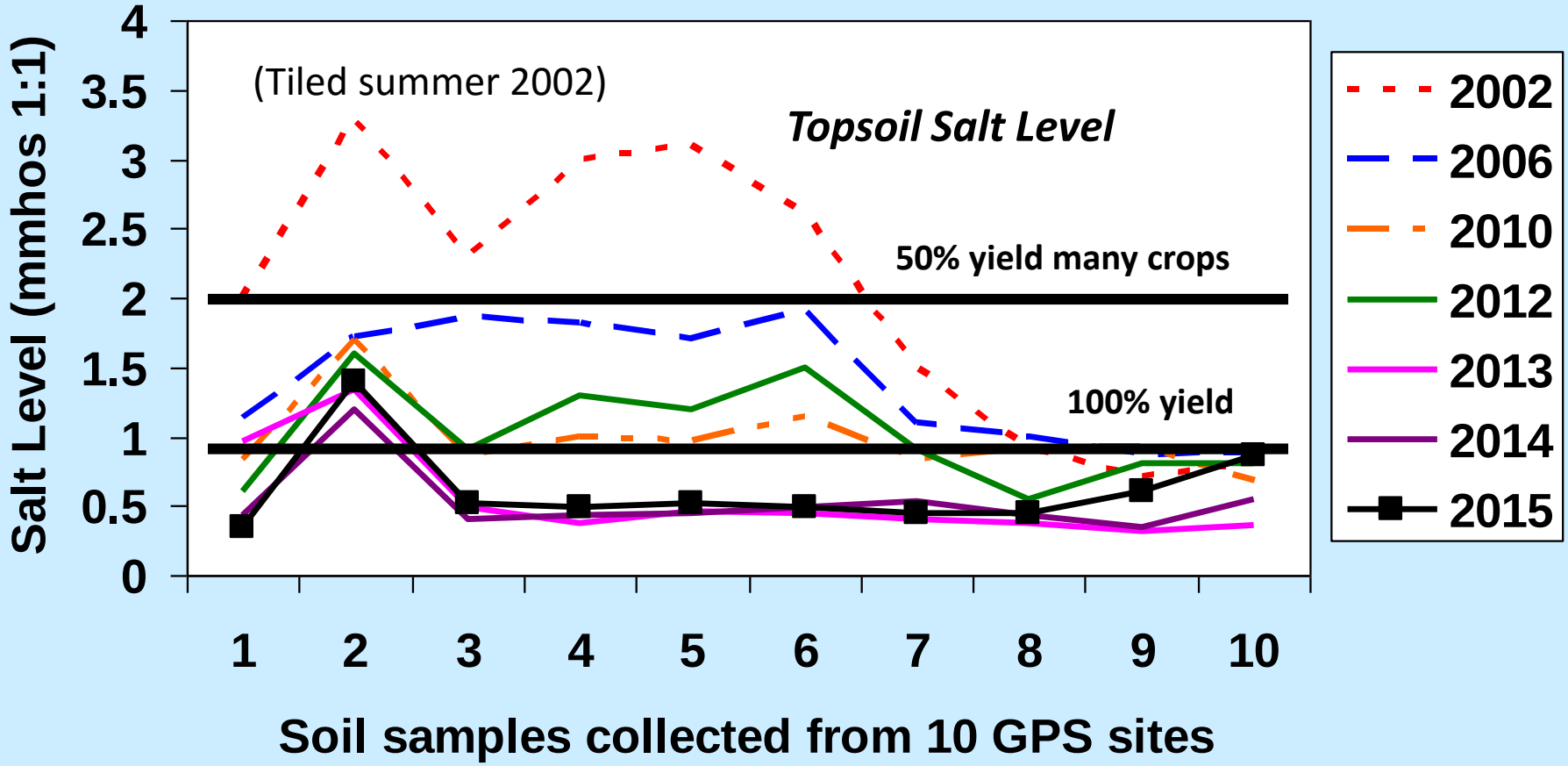
Lots of “Good” Reasons to Apply K Fertilizer

- K soil test is below 160 ppm (zone or grid test)
- K soil test is below 200 ppm (composite sample-variable field)
- K tissue levels have history of being below sufficiency range
- Reduced tillage (ridge till)
- Compaction issues
- Replicated strip trials show significant yield increases!!!
- Chloride is low (small grains may require chloride from KCl)
- %Base Saturation/Cation Balancing is “NOT” a reason to apply more K fertilizer! (Time to get out of the 50’s)

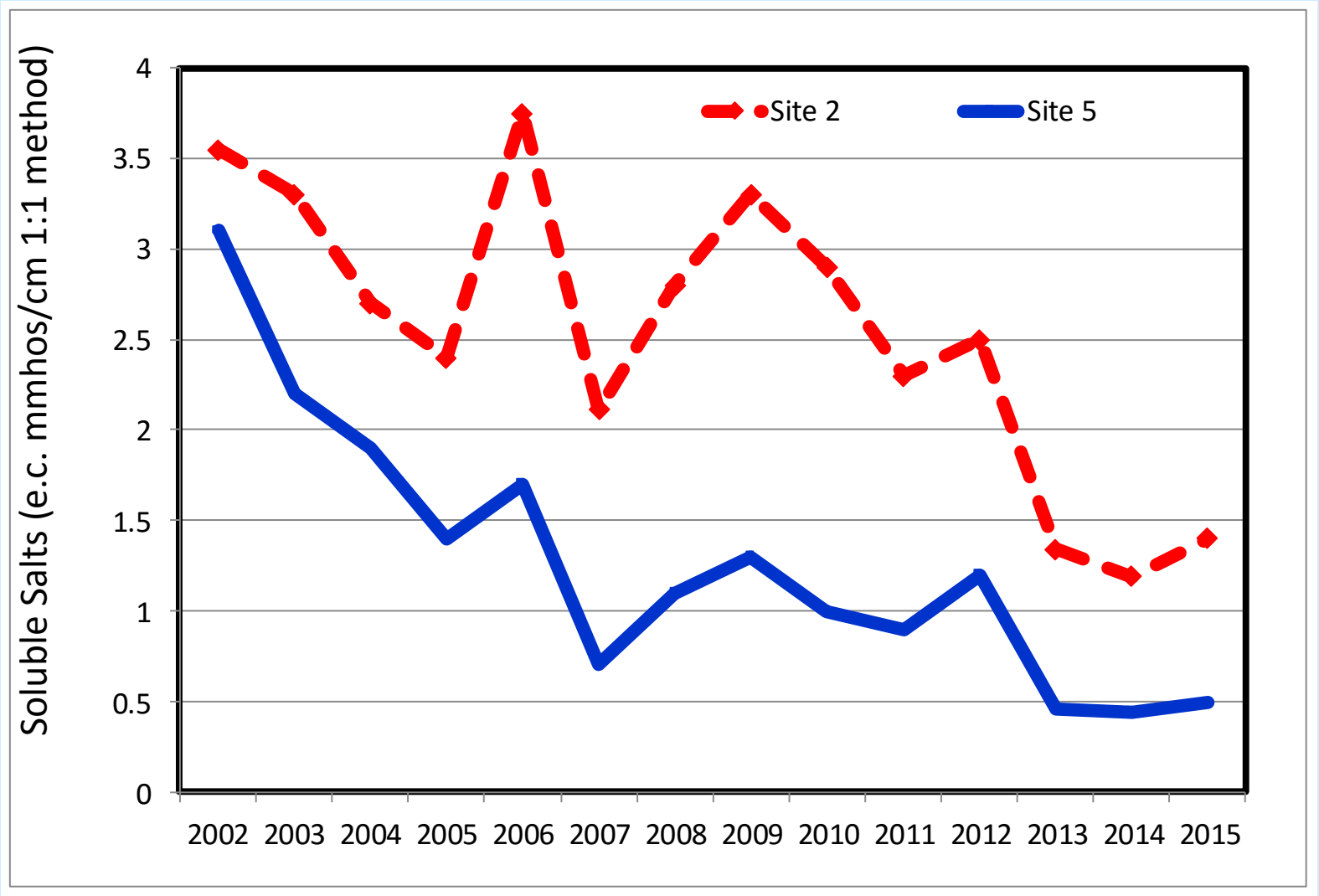
Questions?

Tile Drainage - Soluble Salts Demonstration Project (Northwood)

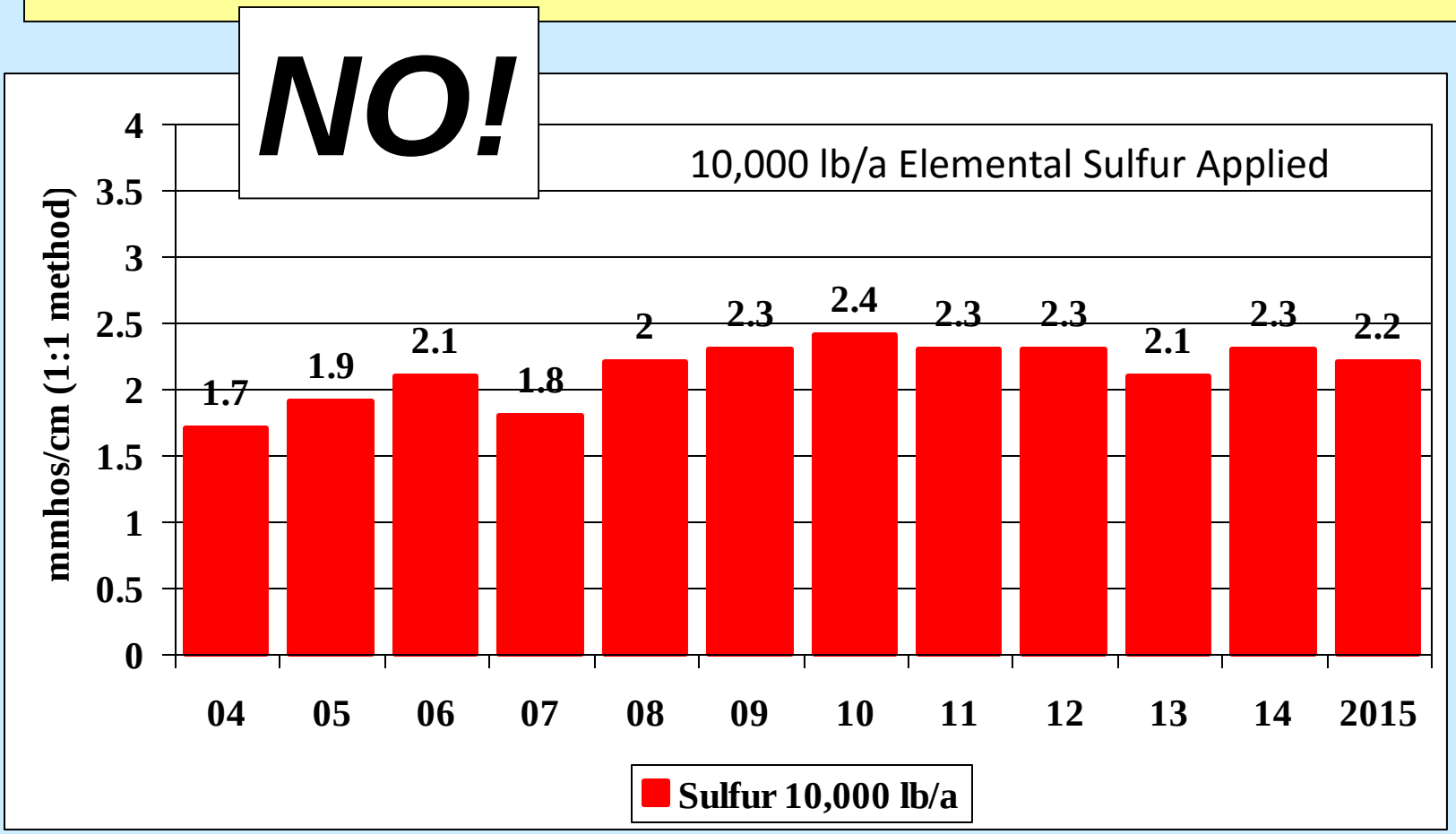
Topsoil (0-6”) Salinity (02, 06, 10, 12,13,14,15)



Salinity Trend of Two Sites
Tile Drained Feld (2002 – 2015)



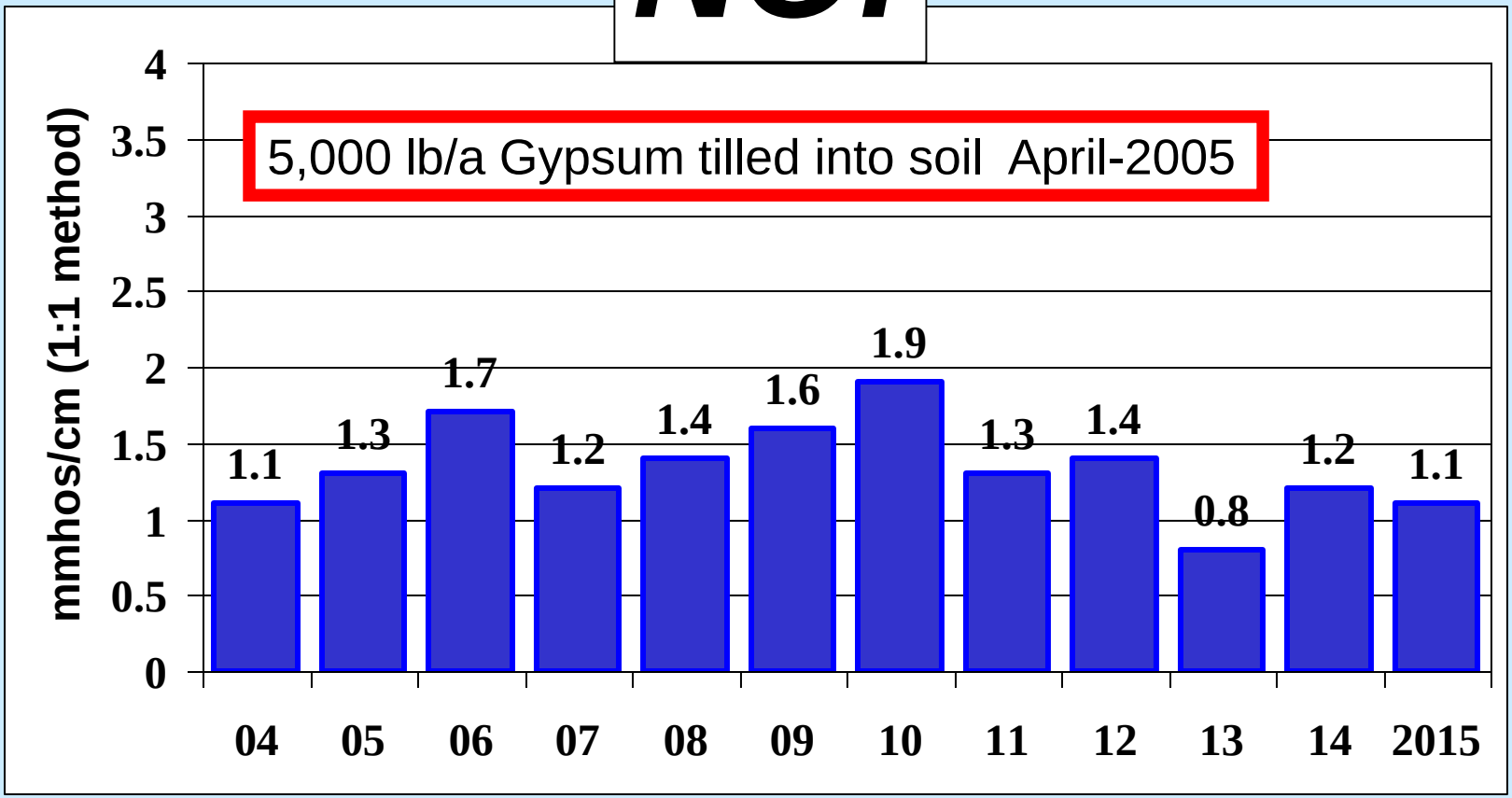
Does Elemental Sulfur Reduce Soluble Salts?



Topsoil (0-6”) sample tested each fall

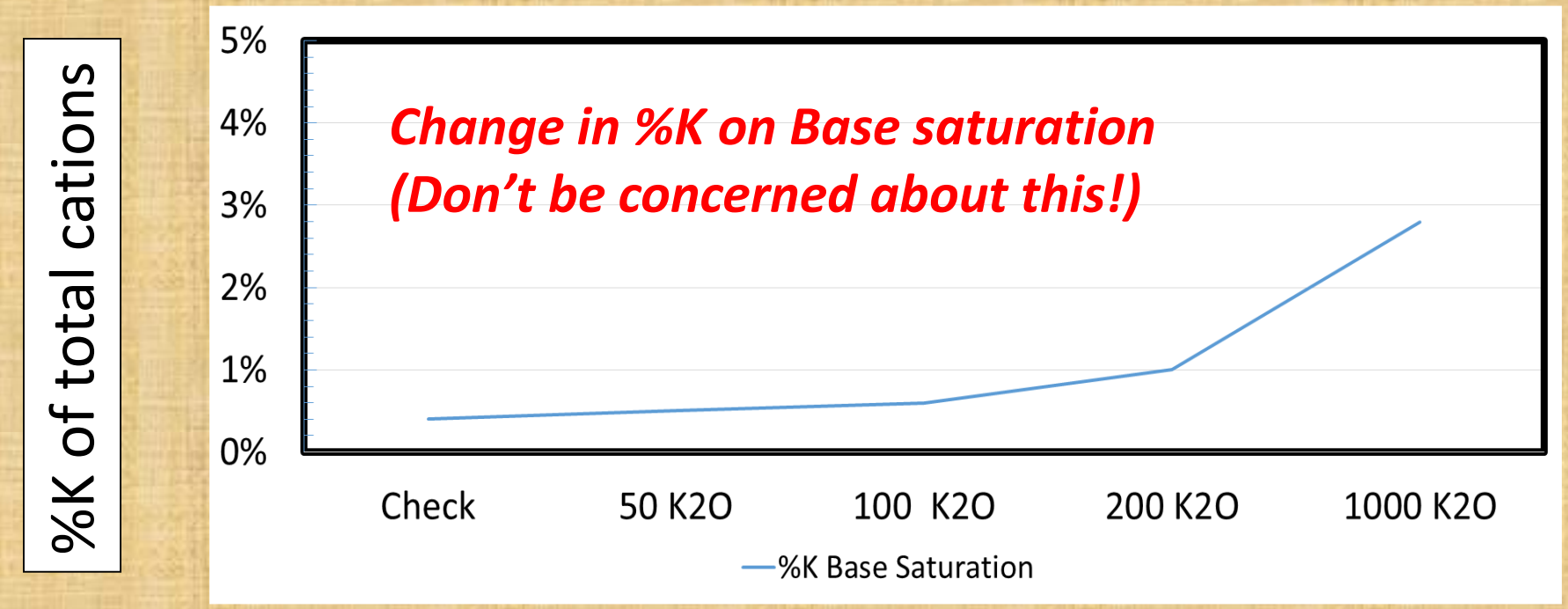
Does Gypsum Reduce Soluble Salts?

NO!



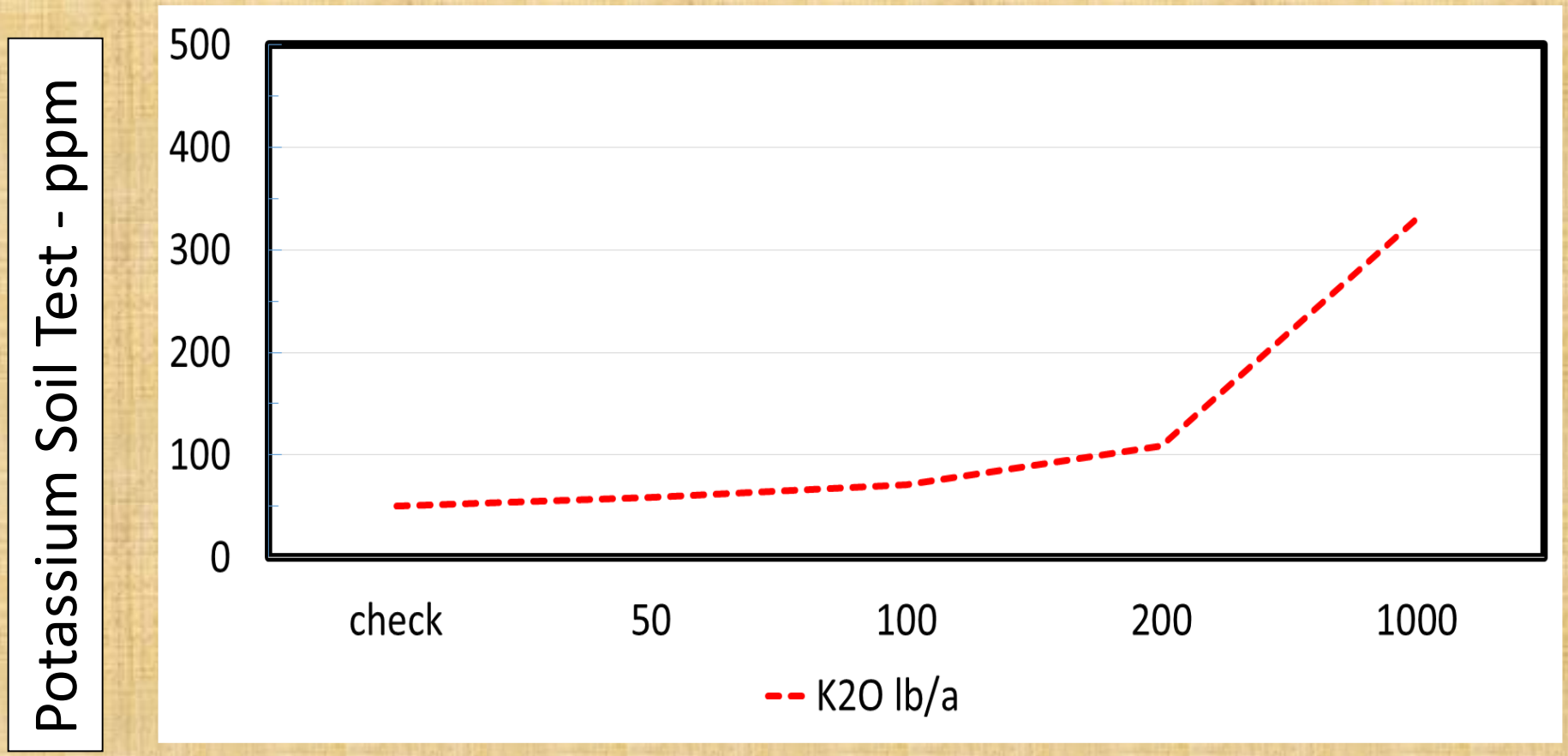
Topsoil (0-6”) sample tested each fall

Does K fertilizer rate change %K on soil test? Manitoba site



Sandy Clay Loam, salts 2.0, carbonates 6.0%, pH 8.0

Effect of 1000 lb/a K_2O on K Soil Test ppm UffDa Treatment – Manitoba, Site



salts 0.45, carbonates 13-14%, pH 8.7