



Improving water quality with cover crops and fertilizer management during transition to no-till production

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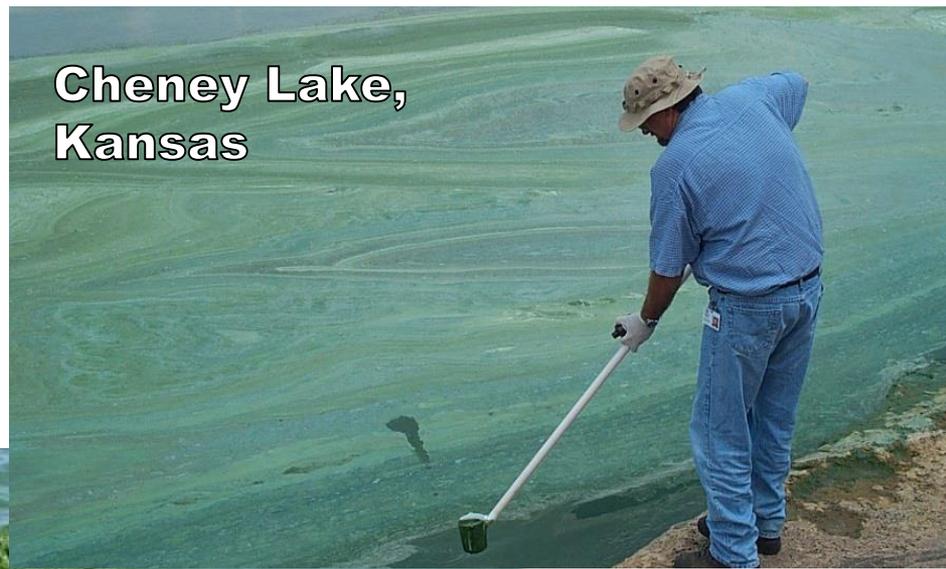
A toxic algal bloom caused a three-day ban on water usage for a half-million residents in SE Michigan and Toledo.

Experts say it's a 'wake-up call.'

**TAINTED
BLOOM**



**Cheney Lake,
Kansas**



**Milford Reservoir,
Kansas**

Application method can influence P loss



RIGHT PLACE

Keeps nutrients where
crops can use them.

Cropping system can influence P loss

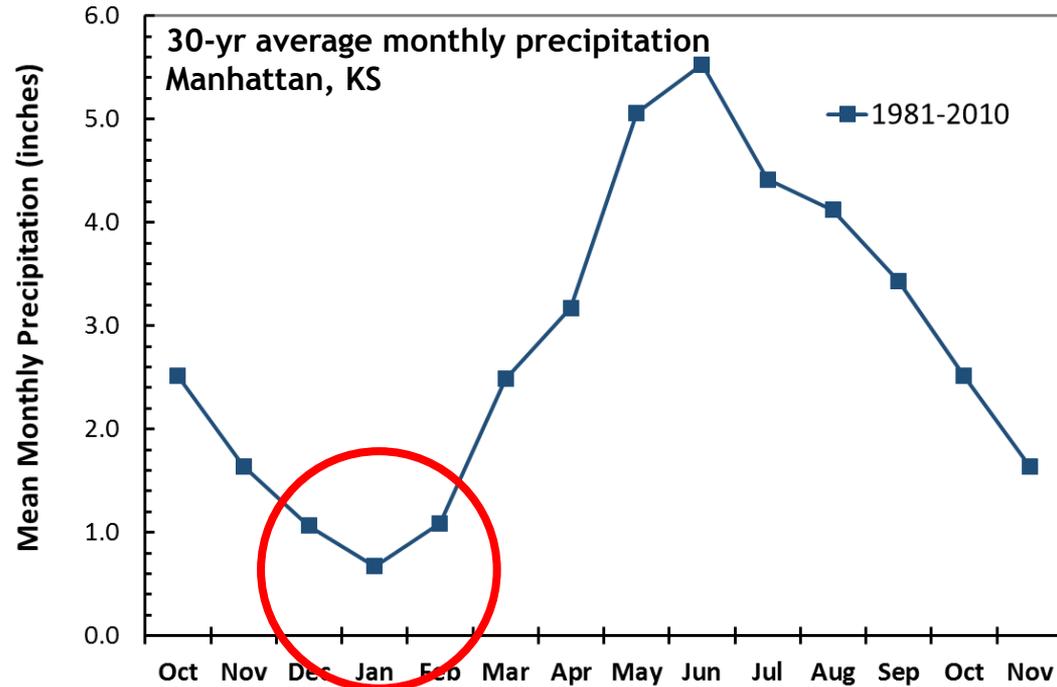




RIGHT TIME

Makes nutrients available when crops need them.

The time, or season, of application can influence P loss



How will cover crops affect sediment and P loss?

- How much does fertilizer placement affect P loss? (when at the right time)
- Will cover crops reduce P loss in no-till?
- Will cover crops reduce P loss from surface-broadcast fertilizer?











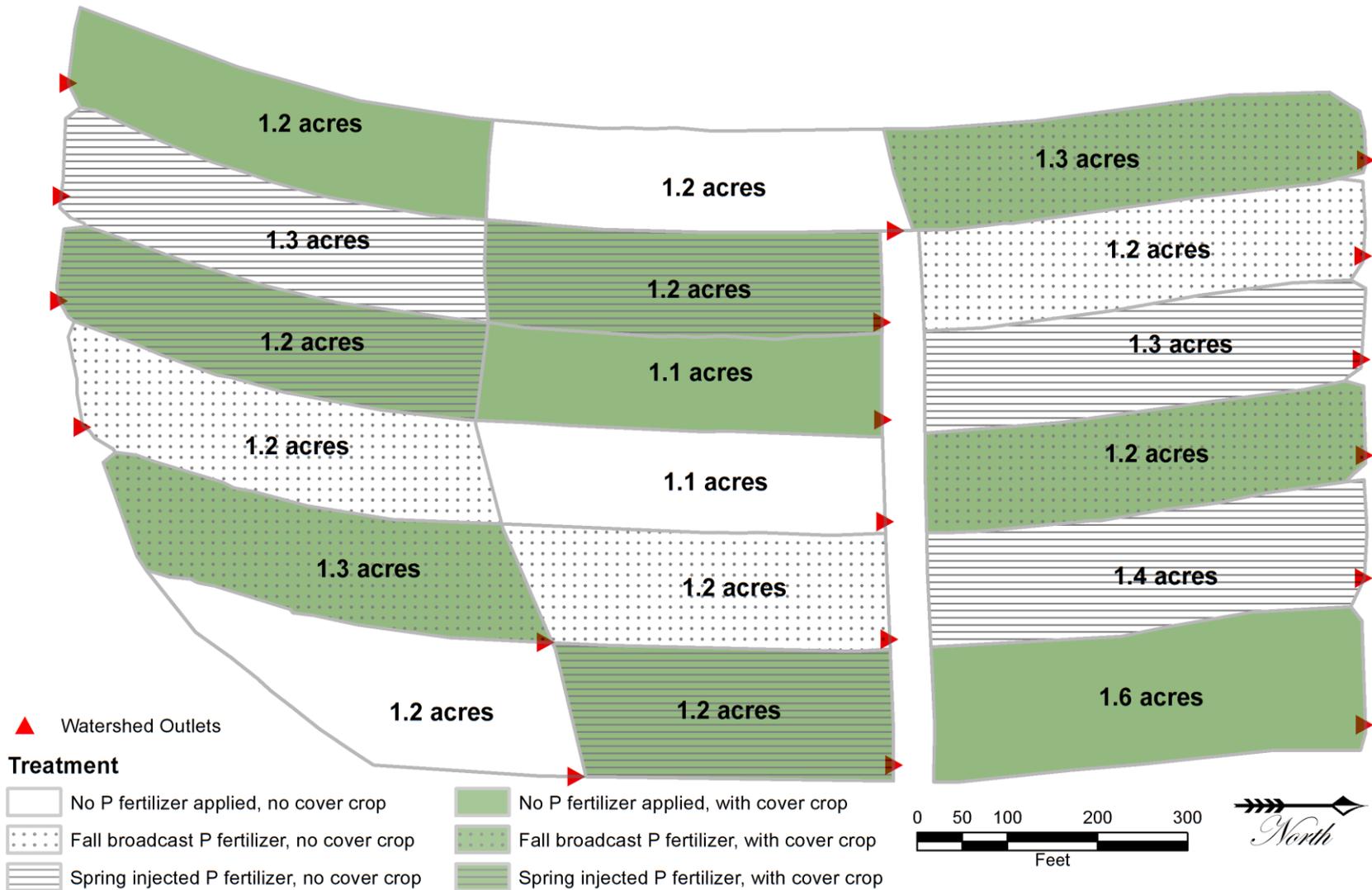




Data from 2016 and 2017

- no-till corn-soybean rotation
- P treatments
 - 0 lb P_2O_5 /ac
 - 55 lb P_2O_5 fall broadcast
 - 55 lb P_2O_5 2x2 at planting
- Cover crop
 - no cover crop
 - winter wheat cover (2016)
 - triticale & rapeseed (2017)





Data from 2016: Soybean

Environmental measures

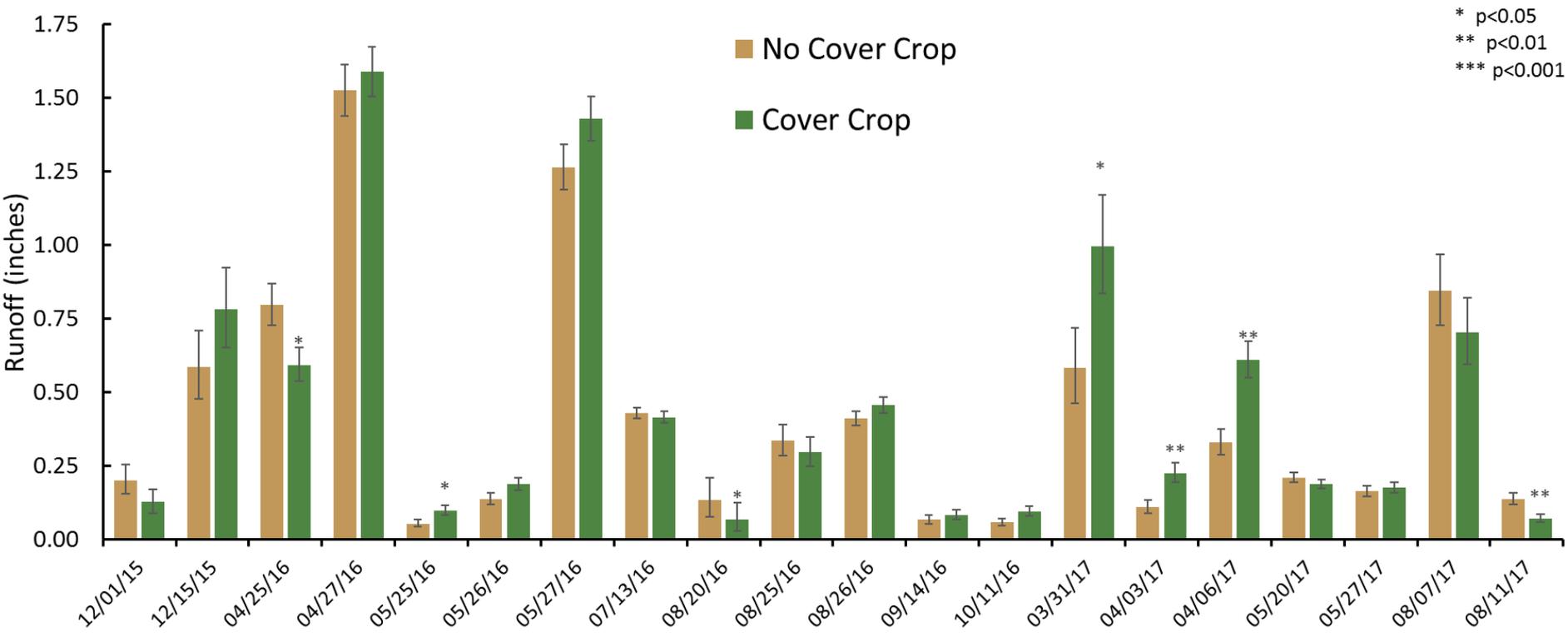
- Runoff
- Sediment
- Total P
- Dissolved P

Agronomic and economic measures

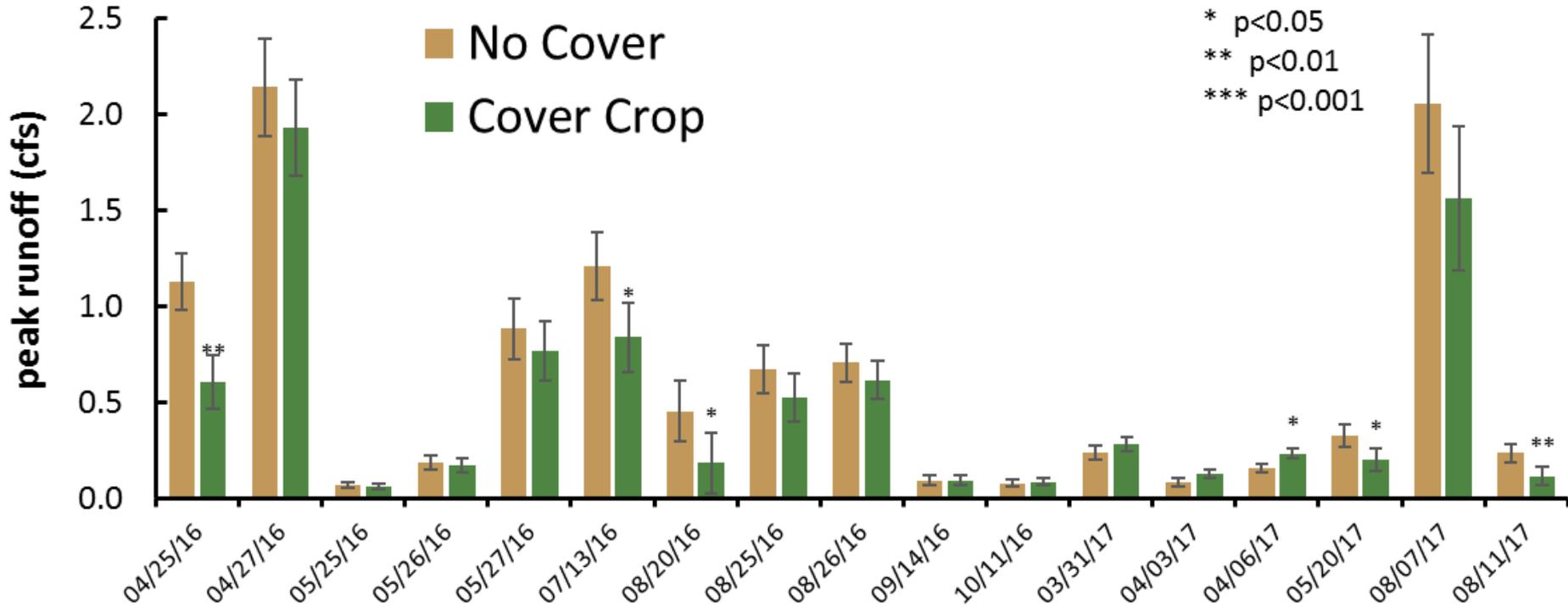
- Yield
- Costs
- Net returns



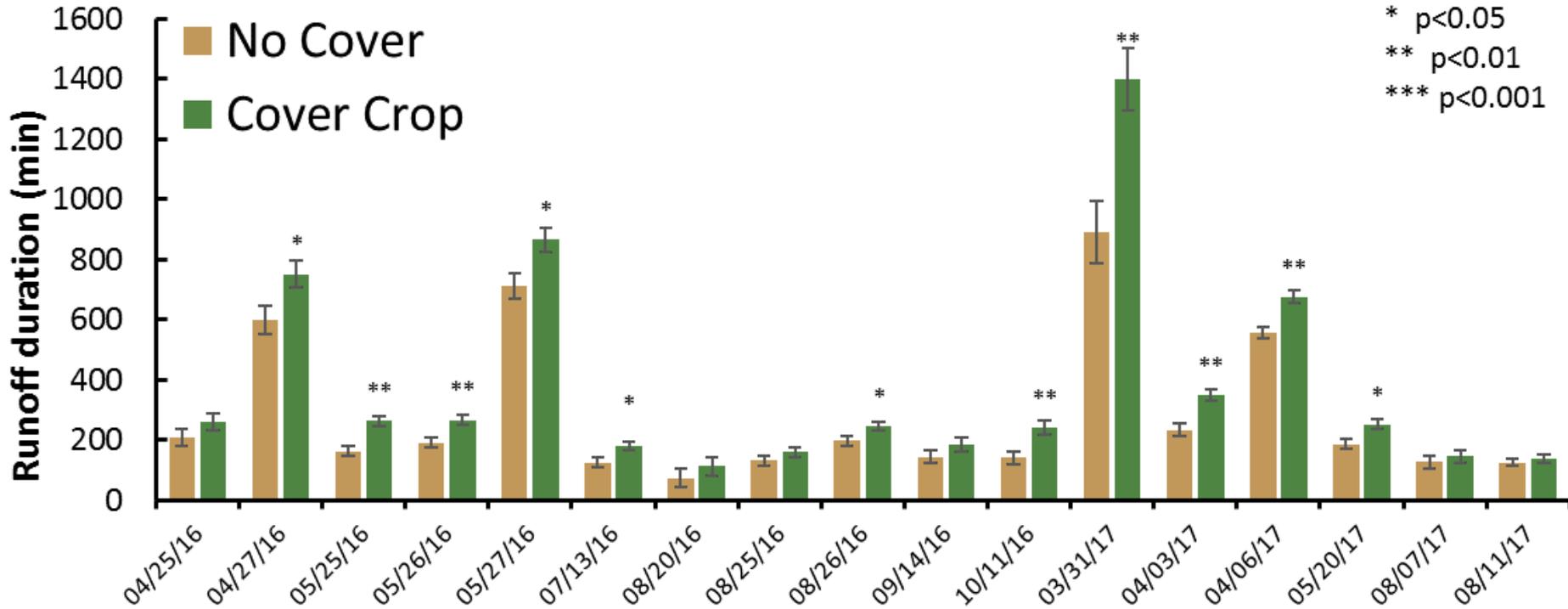
Cover crop effects on runoff



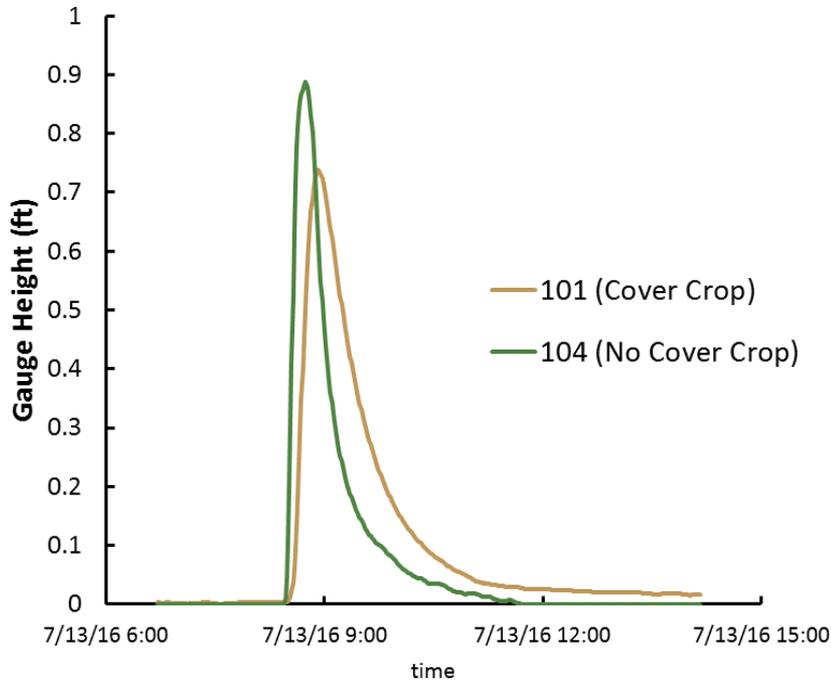
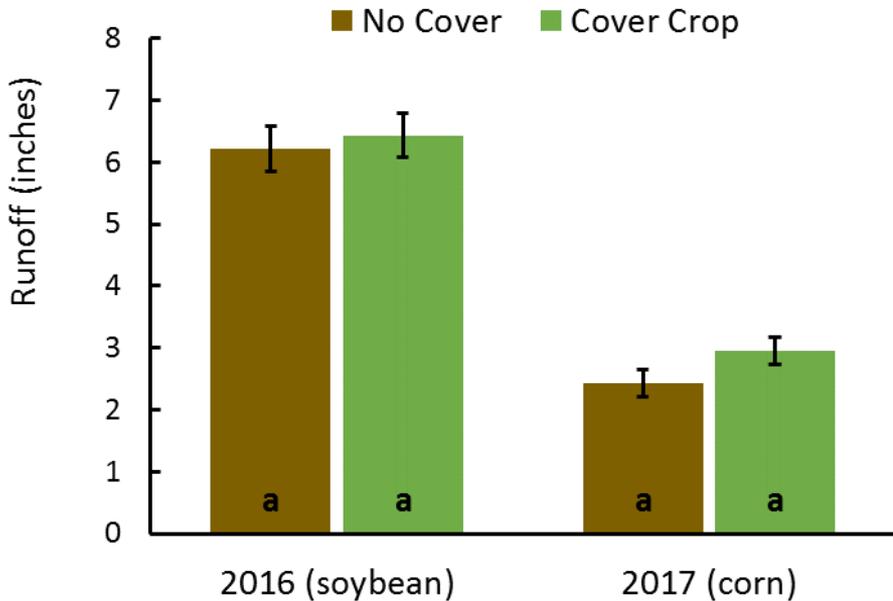
Cover crop effects on runoff



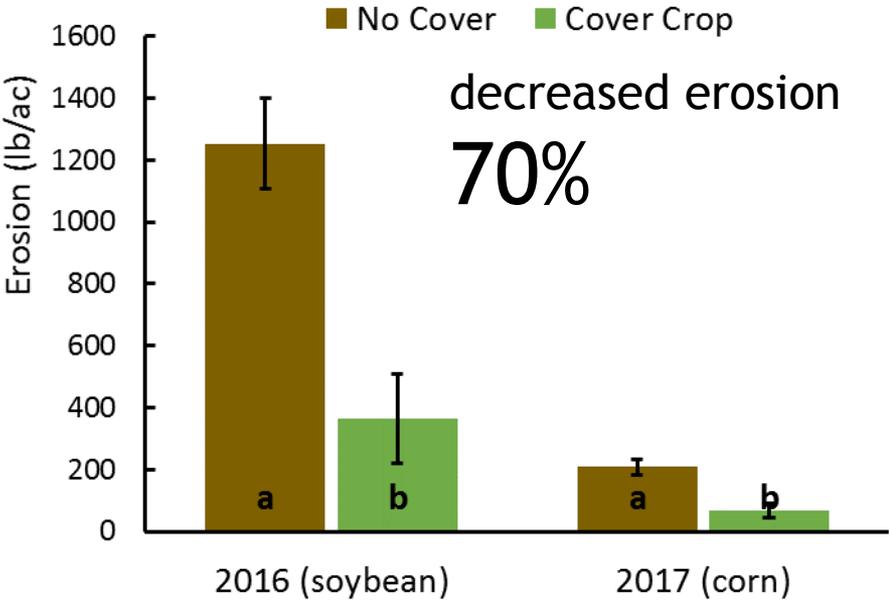
Cover crop effects on runoff



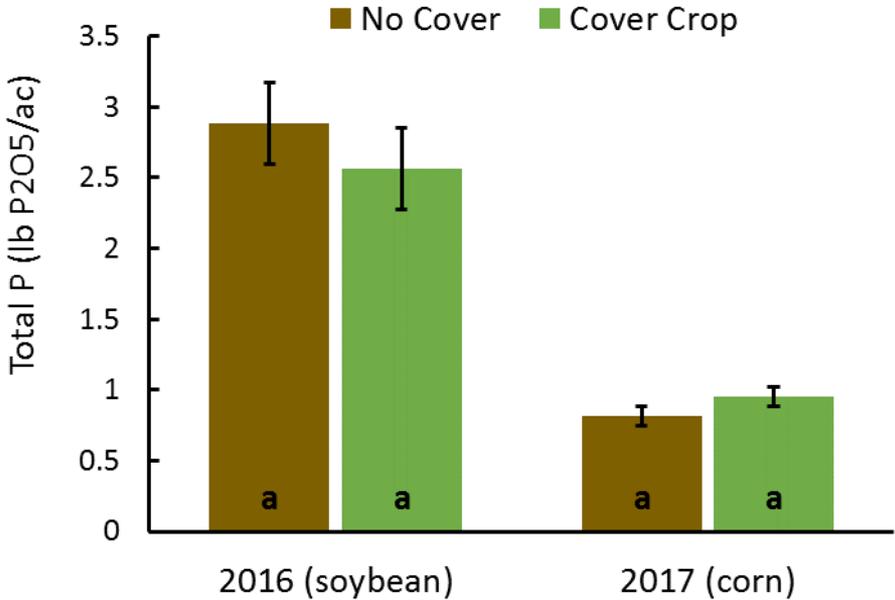
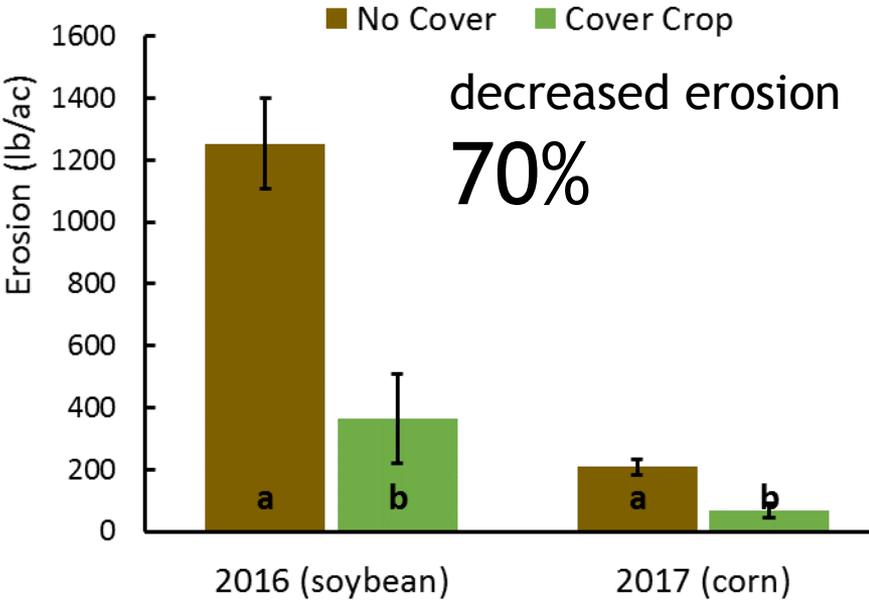
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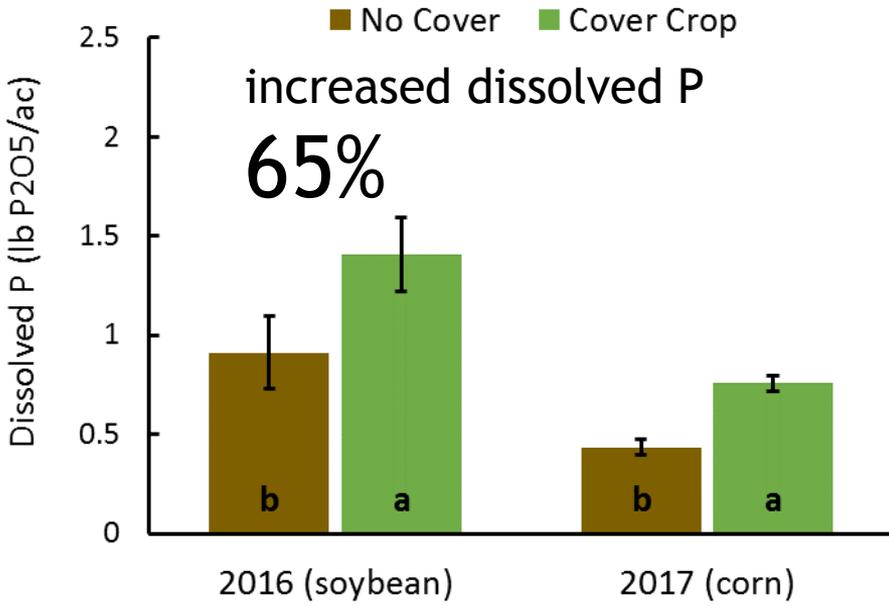
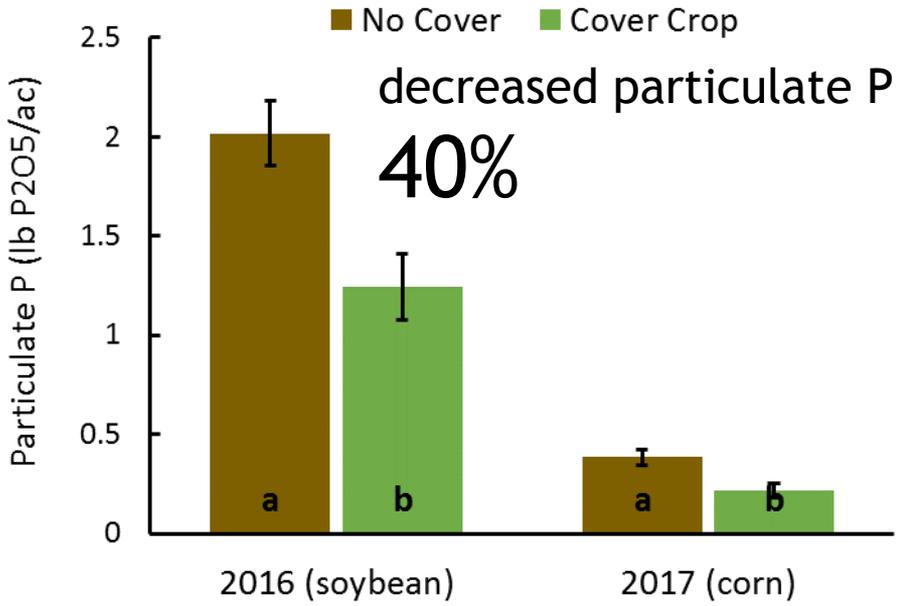
Cover crop effects on sediment & P loss



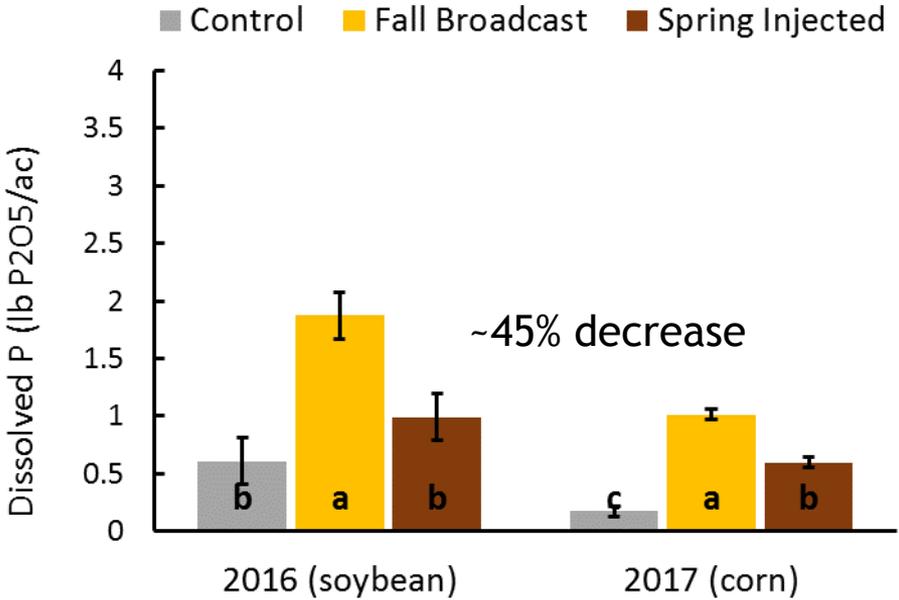
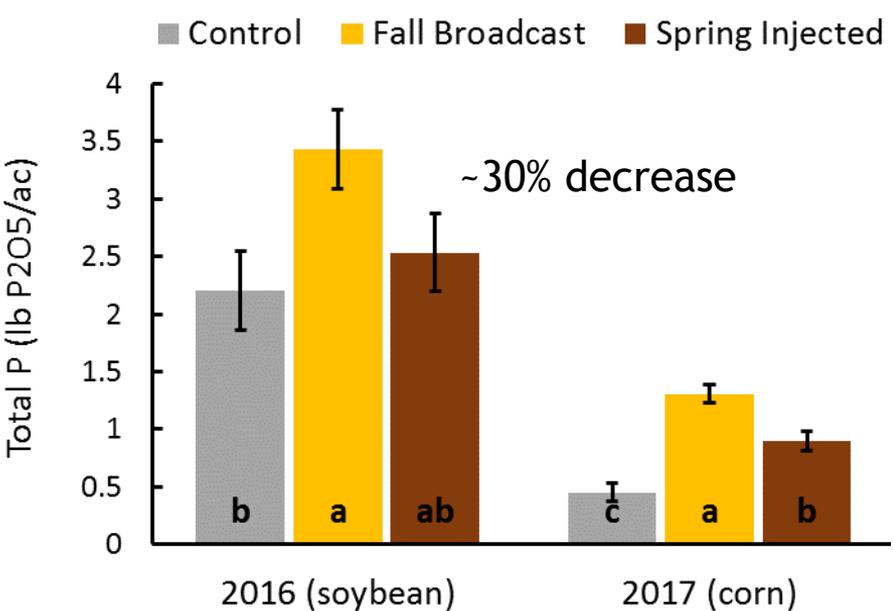
Cover crop effects on sediment & P loss



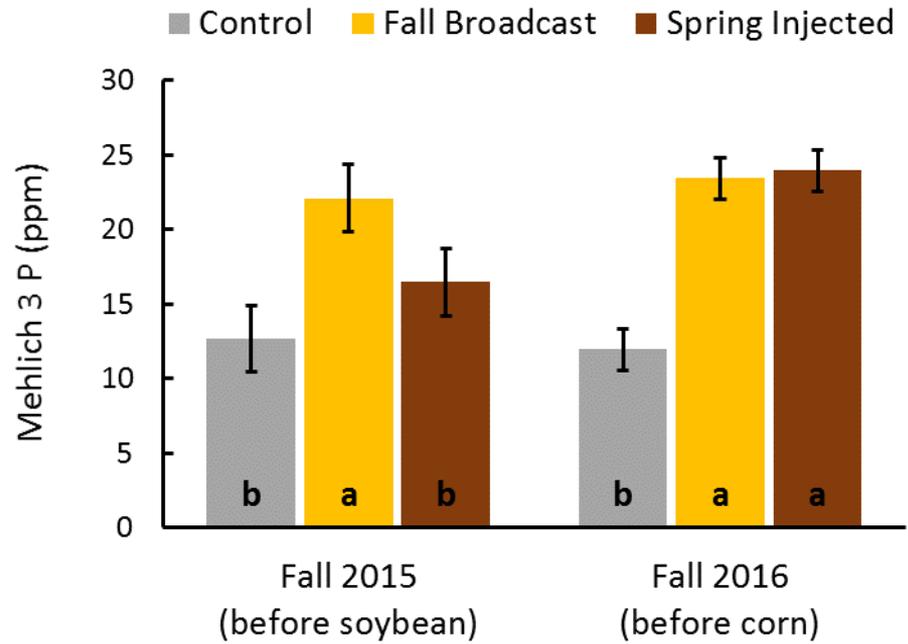
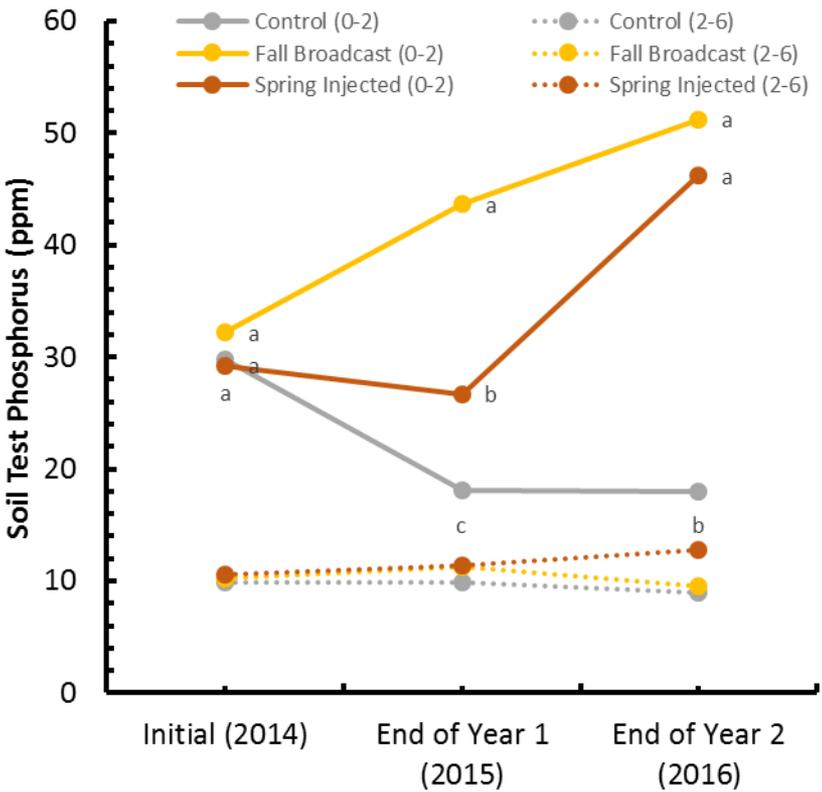
Cover crop effects on form of P loss



Fertilizer management effects on P loss

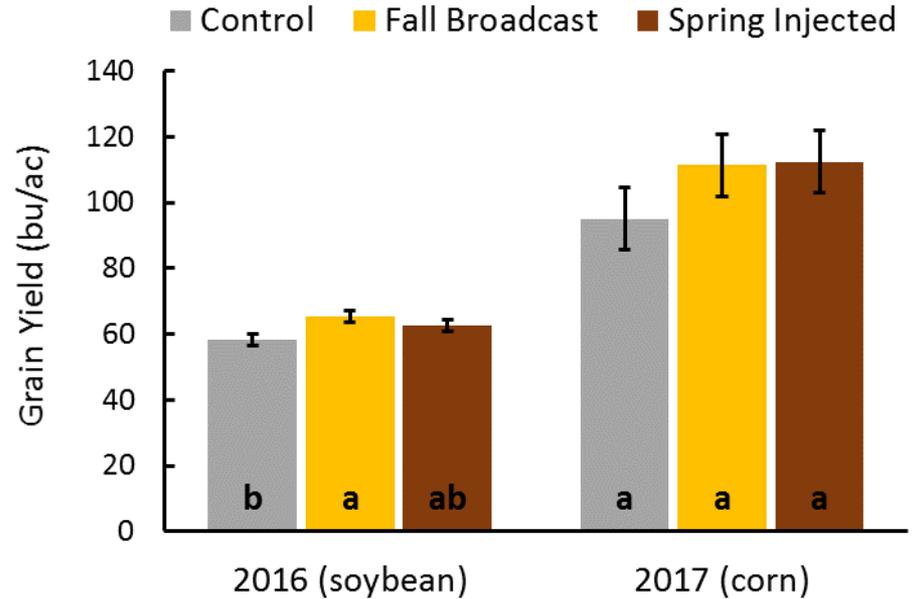
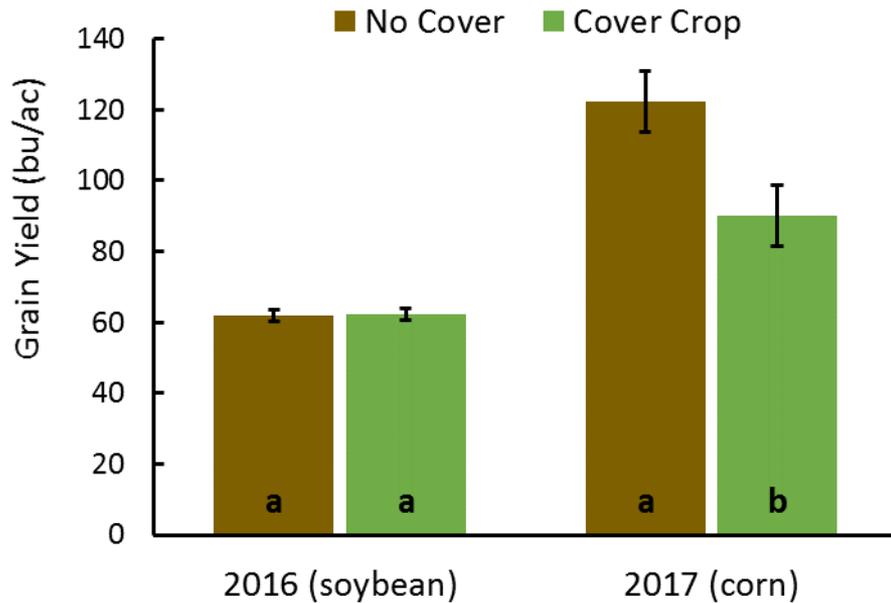


Fertilizer management effects on soil test P



0-6 inch Mehlich 3 P
(weighted average of 0-2 and 2-6 inch samples)

Cover crop and P fertilizer effects on grain yield



Summary of 2016 and 2017 Data

- Cover crop
 - decreased sediment loss
 - increased dissolved P loss
 - no effect on total P loss
- Subsurface P fertilizer placement
 - decreased dissolved P loss
 - decreased total P loss



*Still collecting data...
...need 2018, & 2019 data*

Thank you to our funding sources



Research
Fund

KANSAS STATE
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Department of Agronomy



United States Department of Agriculture
Natural Resources Conservation Service



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Questions?

