

Nutrient Management: Best Management Practices to Adapt to Extreme Rainfall Events

**Agriculture in a Changing Climate
August 24, 2011**

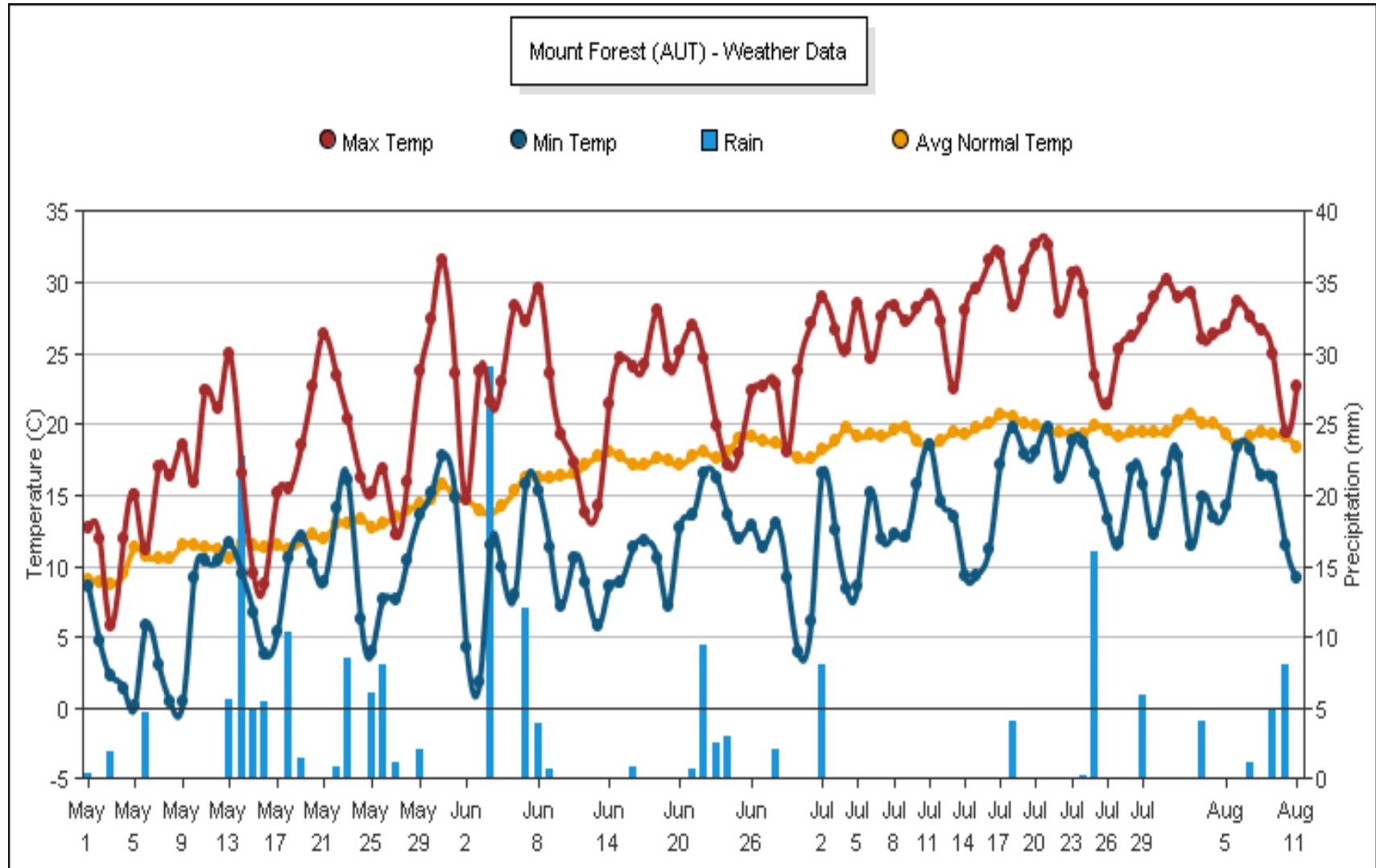
Dr. Bonnie Ball; Dave Bray

Changing Weather Patterns!

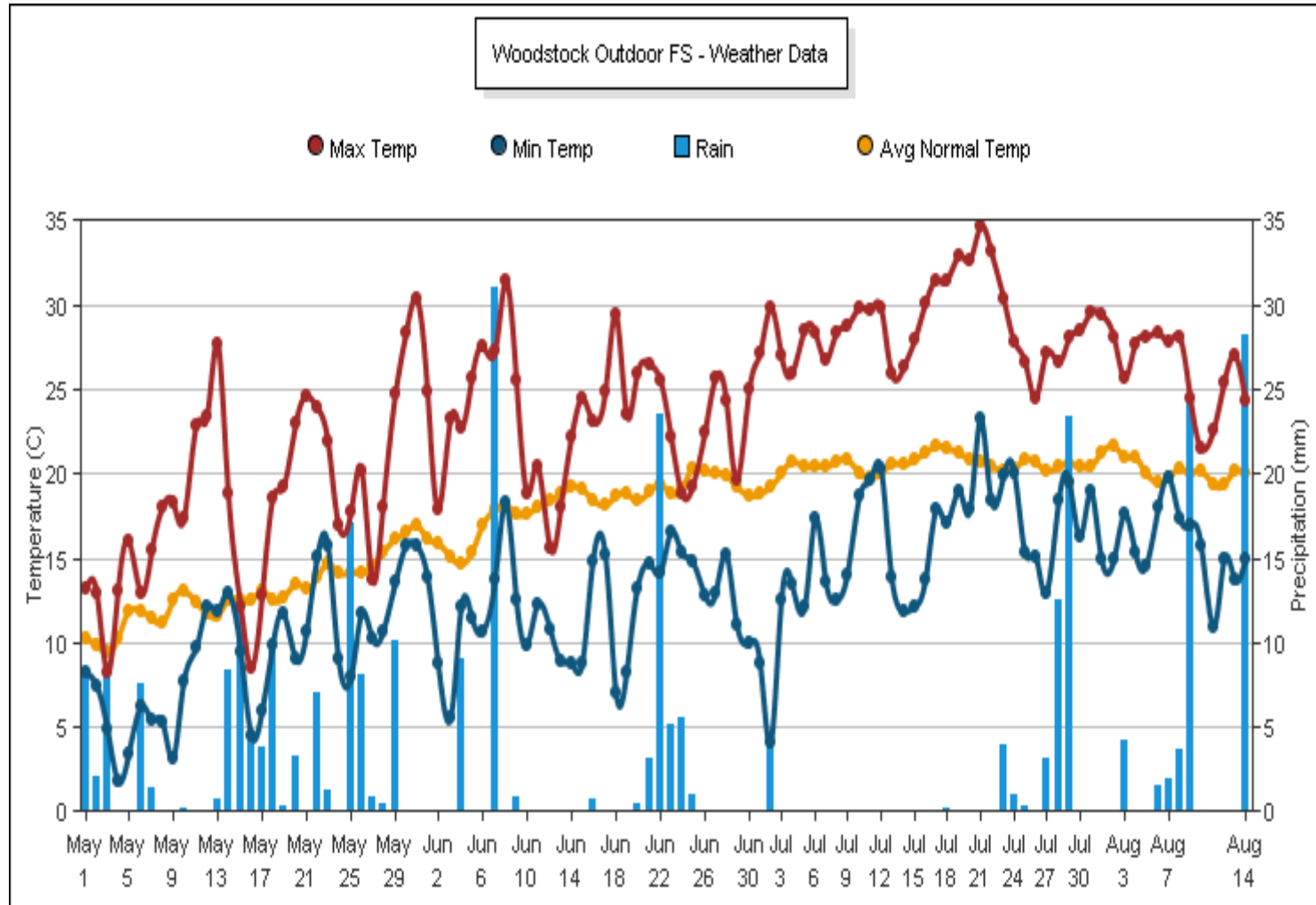
“We know that extreme weather is becoming more frequent. Across the province we have seen an increase in prolonged heat waves, torrential rainstorms, windstorms, even drought.”

**Climate Ready - Ontario's Adaptation Strategy
and Action Plan
2011 - 2014**

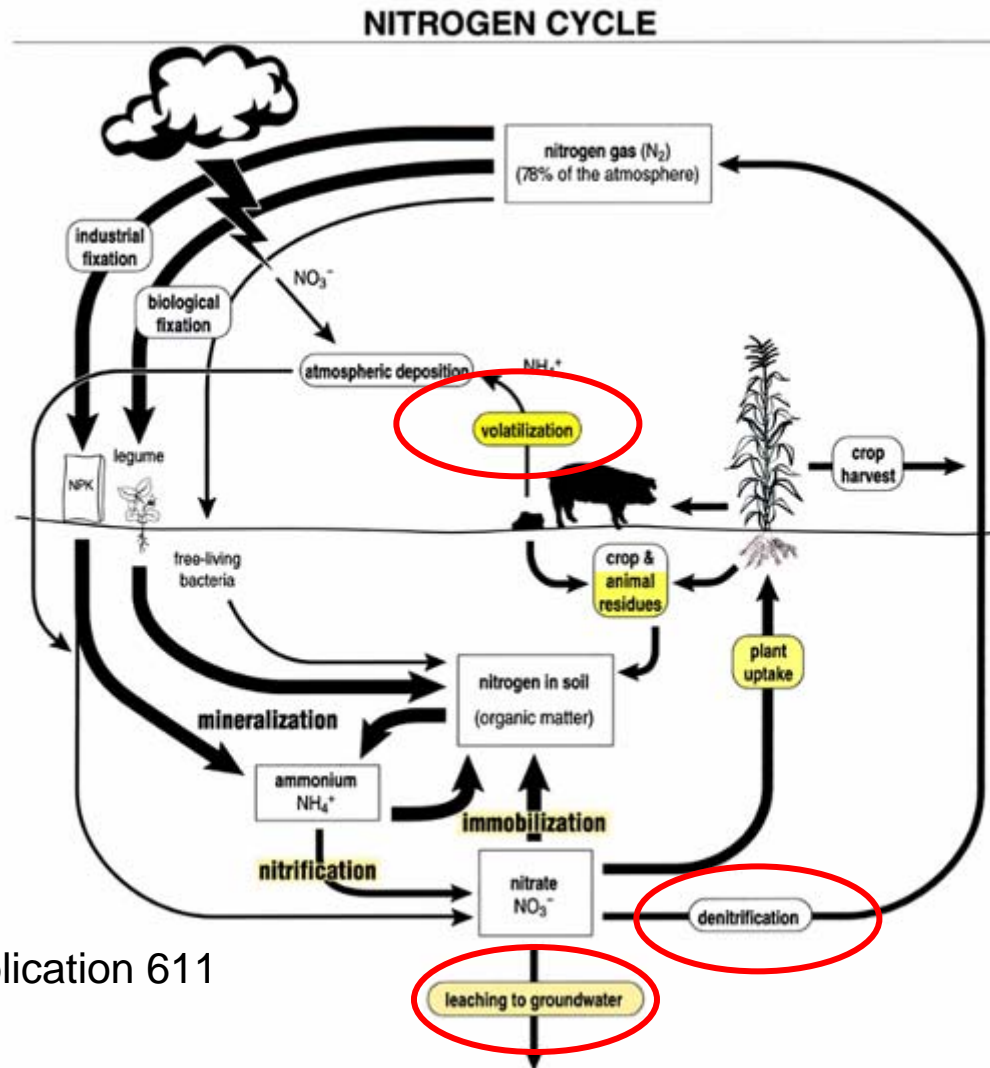
How Much Rain Did You Get?



How Much Rain Did You Get?

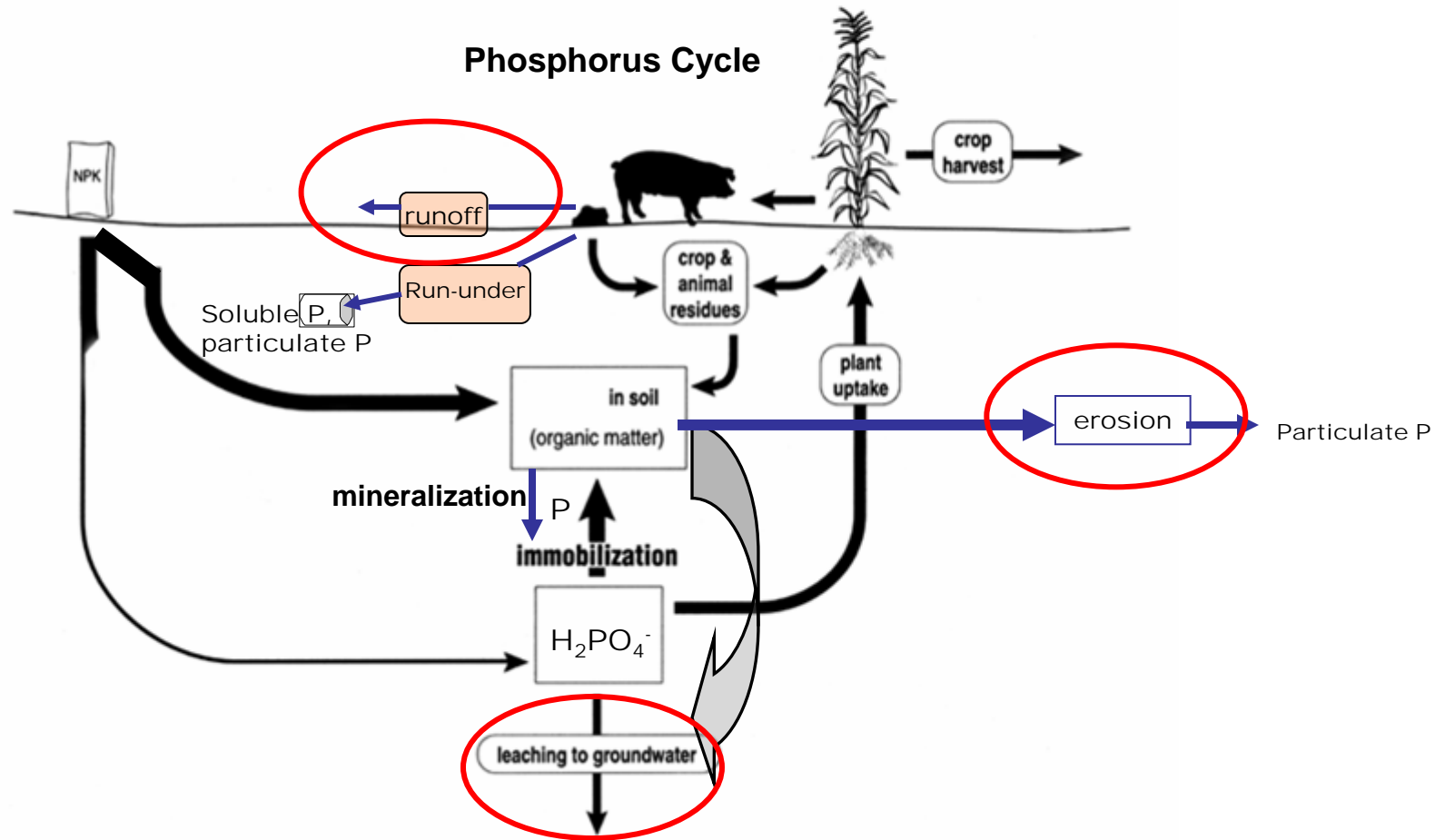


What Happens to My Nutrients?



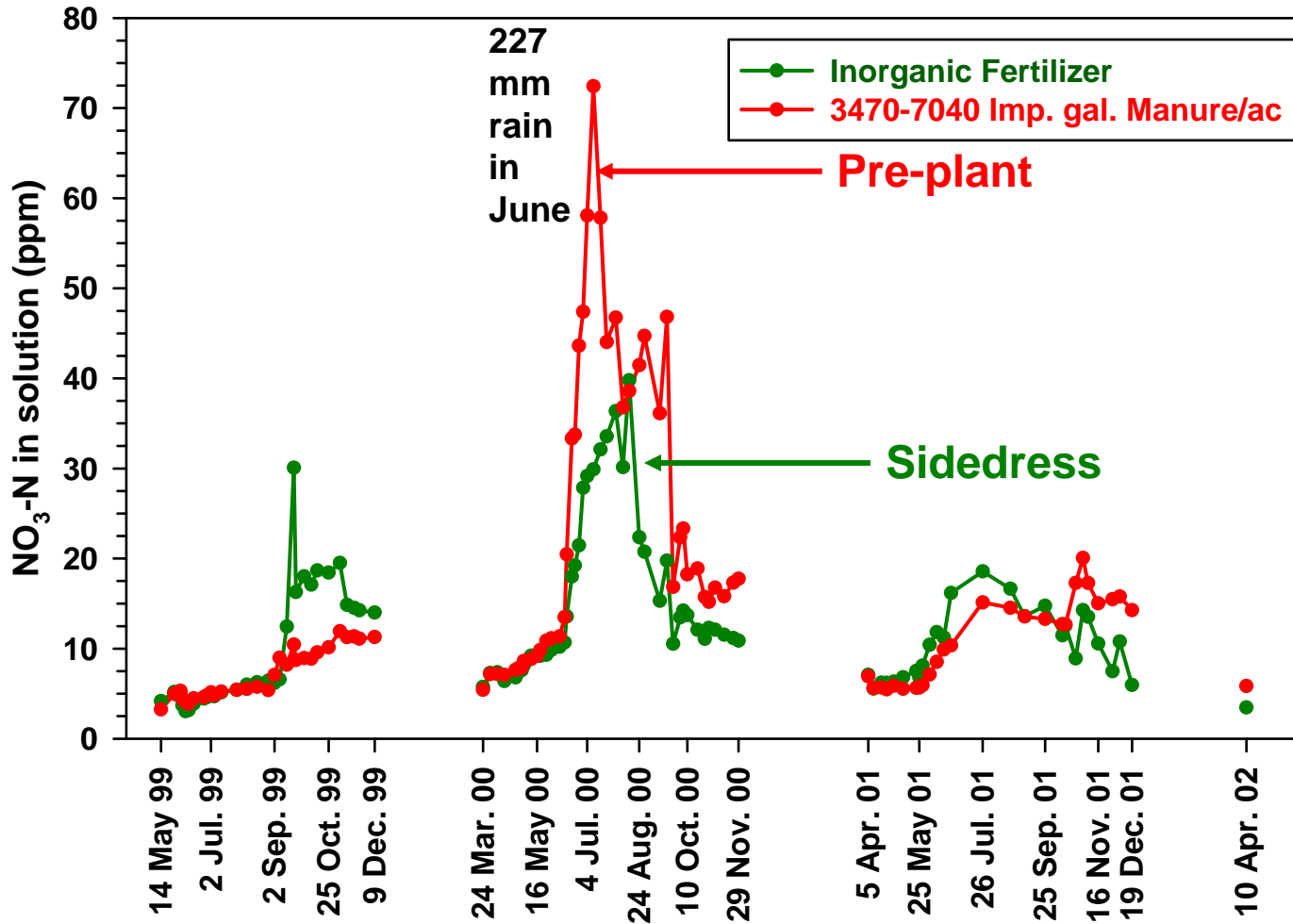
Soil Fertility Handbook Publication 611
OMAF/TFIO ed. K. Reid

What Happens to My Nutrients?



Nitrate leaching is reduced with later N application

Nitrate Concentration 1.5m below Pre-plant Injected Manure or Sidedressed Fertilizer N on Loamy Sand



Sidedress Nitrogen Sources

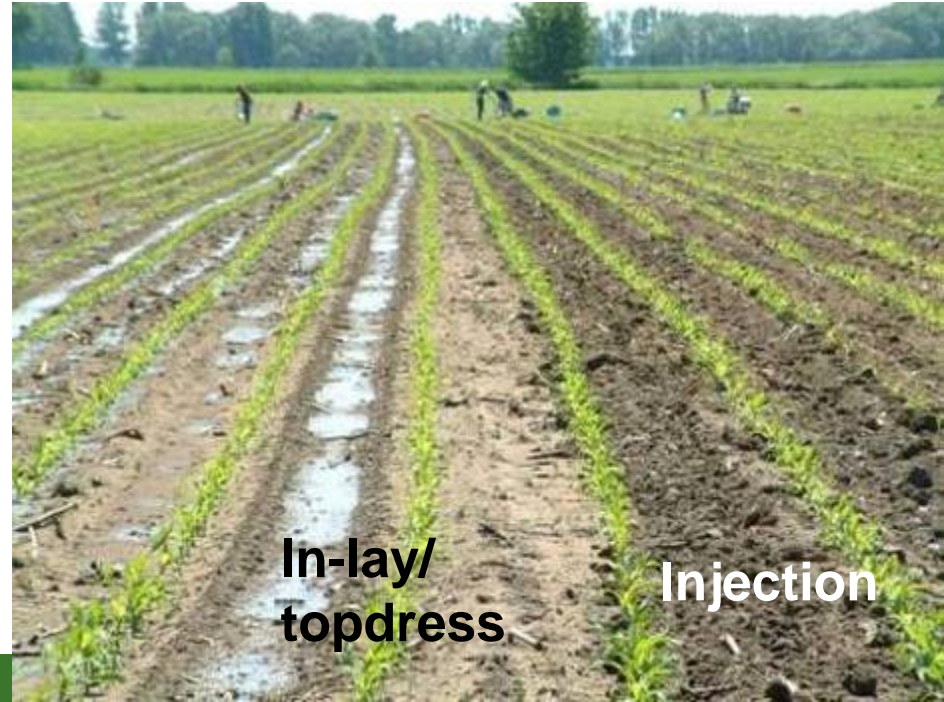
Fertilizers

Anhydrous ammonia



Sidedress Sources

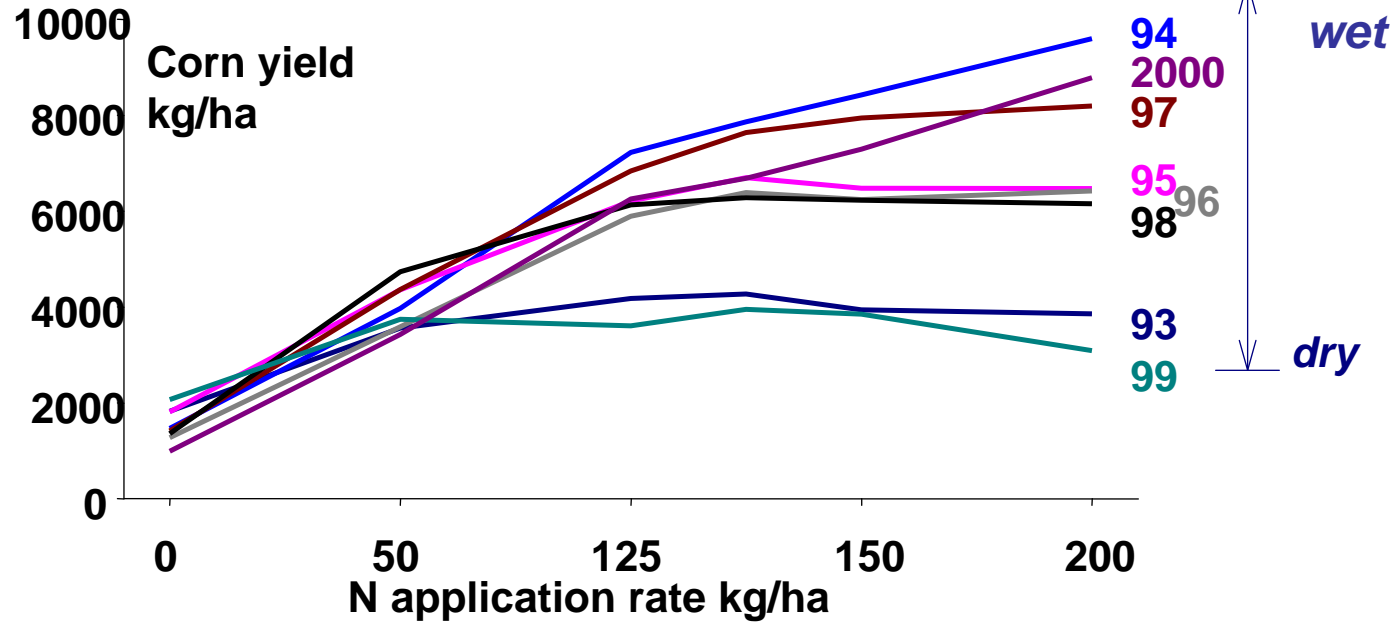
Manure



Rain Quantity

Not enough

**Reduces
crop
demand**



**Cover crops
absorb excess nitrate**

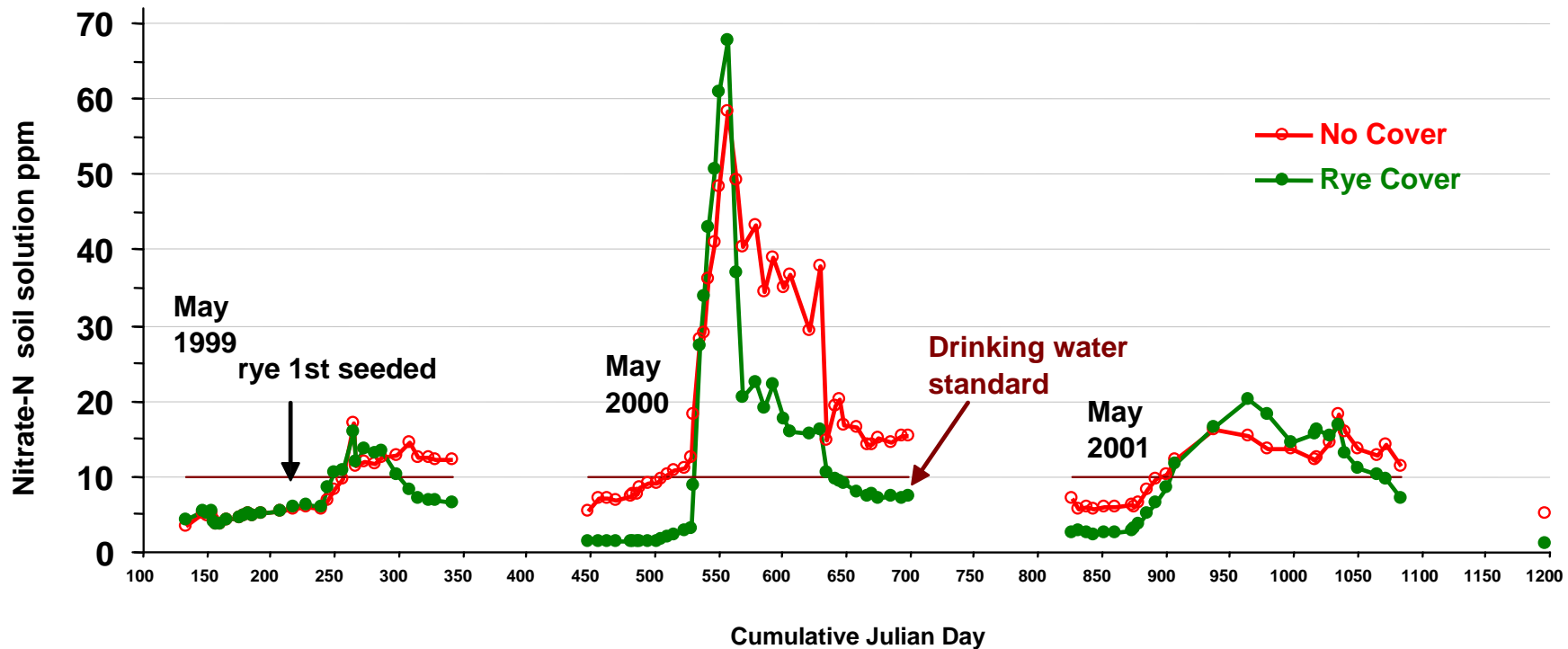
**Cereal rye overseeded
into standing corn
by airplane**



Rain Quantity

Not enough

Nitrate leaching is reduced by cover crop in fall and spring



Rain Intensity

Keeping soil covered



Rolling cover crop & planting

Tool bar of the
Sub-Surface Tiller Transplanter
Virginia Tech



Rain Intensity

Snowmelt events

**Erosion
Runoff**



**Rain on
frozen ground**

Cleaner runoff



**Conventional
till**



Minimum till

Rain Intensity

Band or subsurface placement instead of broadcast



Fertilizer



Biosolids



Manure

Plant into tilled manured zone

Conclusions

Time nutrient application to crop use
Keep soil covered
Don't leave nutrients on the surface

Thank you