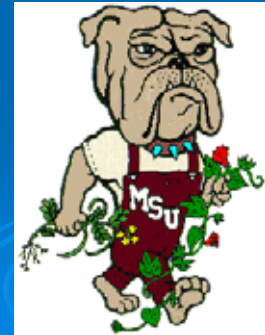
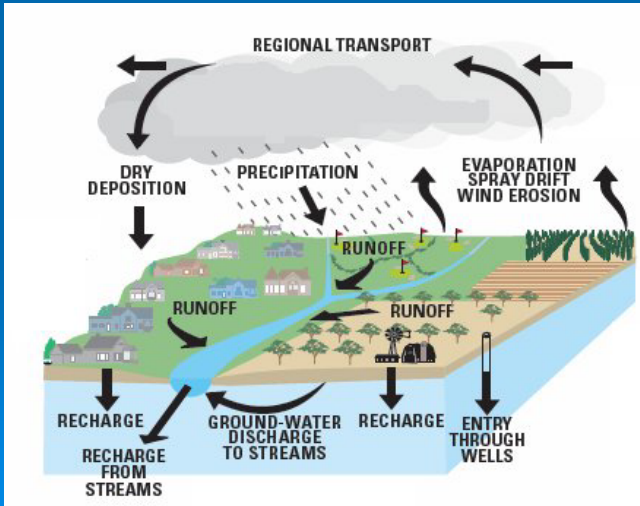


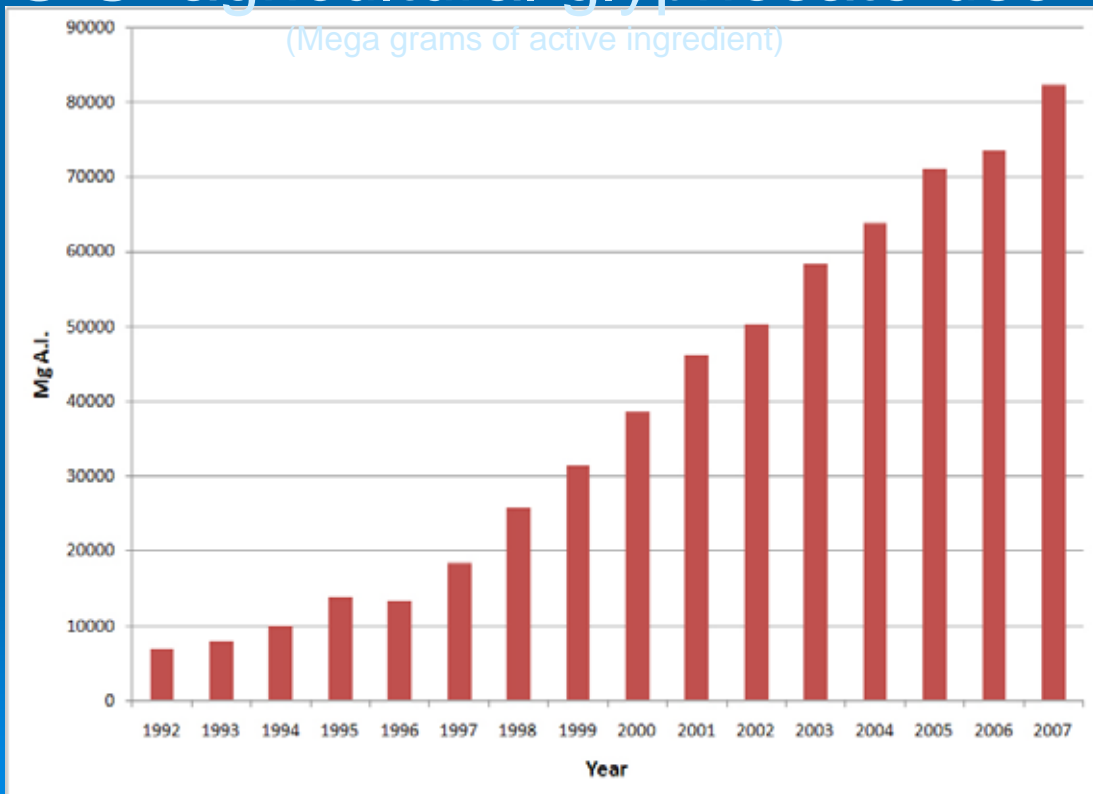
The Transport of Glyphosate and AMPA in Surface Waters of Agricultural Watersheds

Richard Coupe (MS), Steve Kalkhof (IA), Paul Capel (MN), Caroline Gregoire (FR)

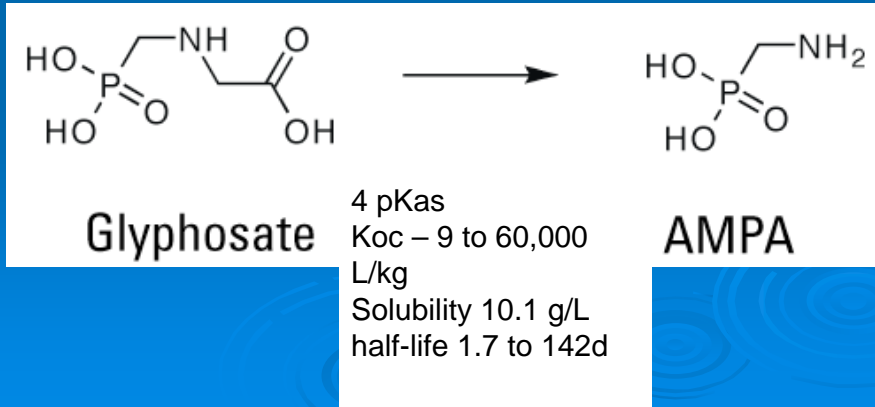


U.S. agricultural glyphosate use

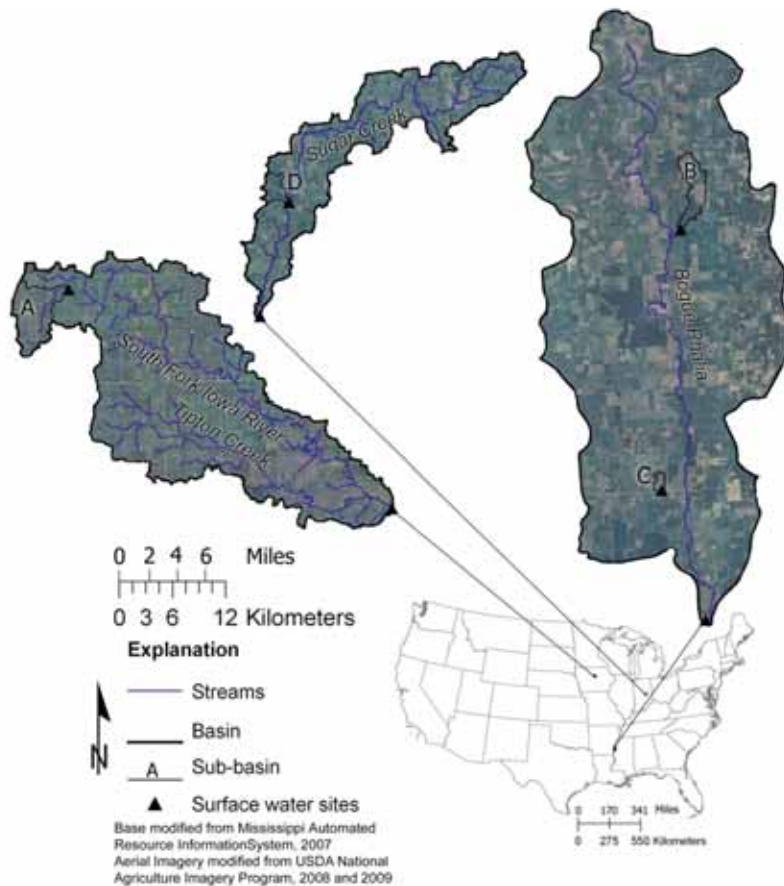
(Mega grams of active ingredient)



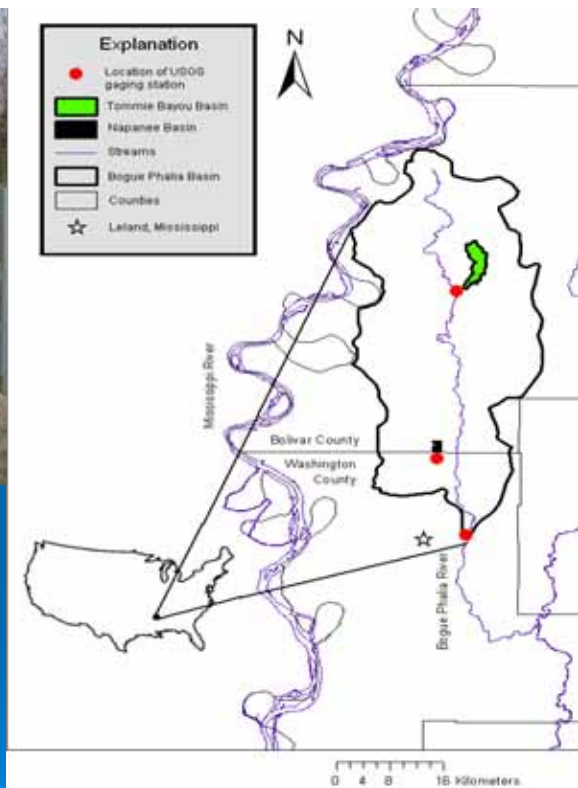
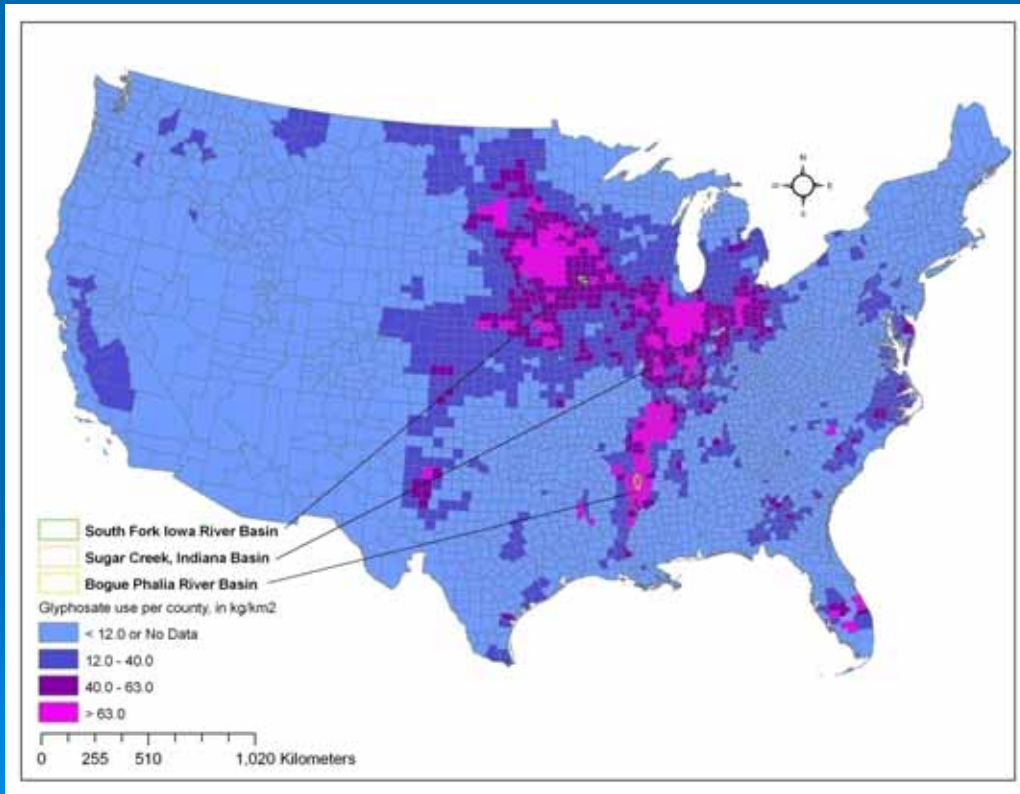
Glyphosate is purported to be more environmentally friendly than many other herbicides because of stronger adsorption, decreased mobility, a generally shorter half-life, a smaller number of herbicide applications, lower fossil fuel use due an increase in conservation tillage and lower toxicity.



South Fork Iowa River Basin, IA,
 Bogue Phalia Basin, MS, and
 Sugar Creek, IN



Agricultural glyphosate use in 2007 (kg/km²)



Bogue Phalia



□ Horhain catchment (Rouffach, Bas-Rhin, France)
Area = 42 ha ; mean slope = 15% ; vineyard = 64%



Catchment outlet



Automatic
sampling device



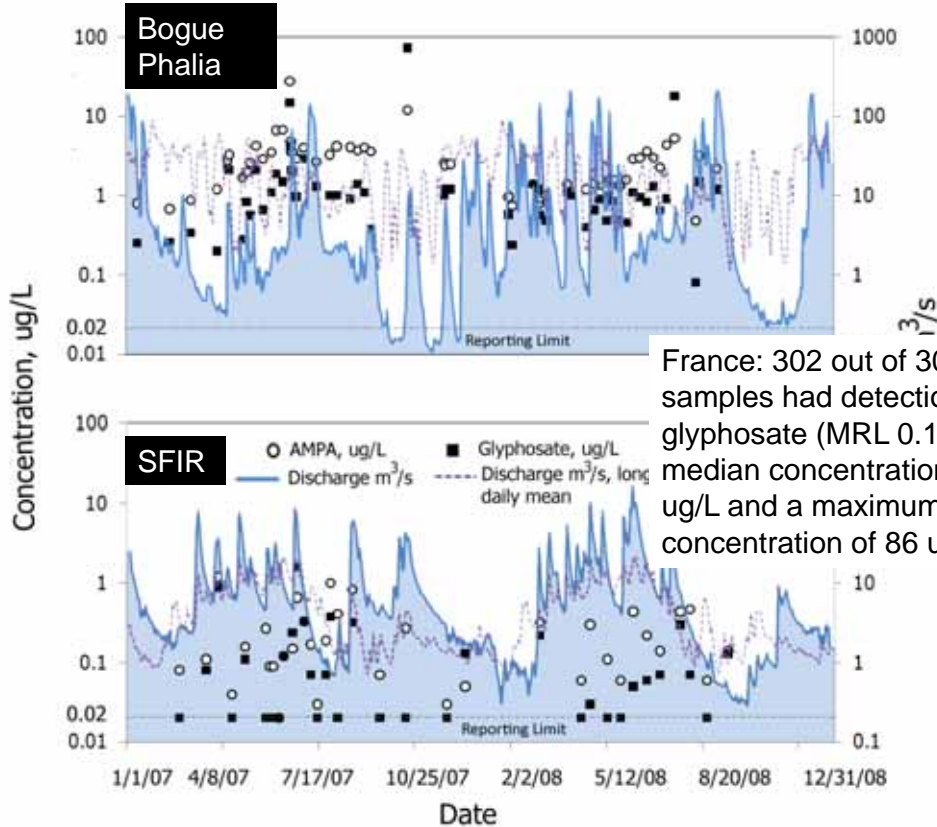
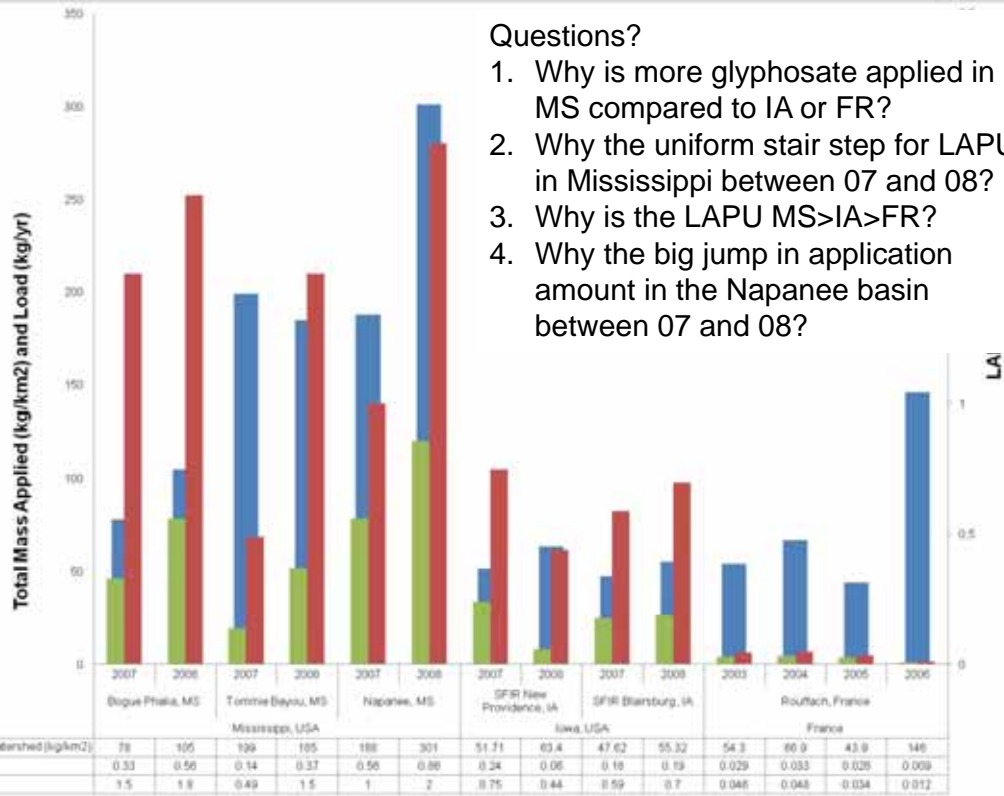
58 runoff events (2003-2006)
Rainfall/Discharge/Concentration



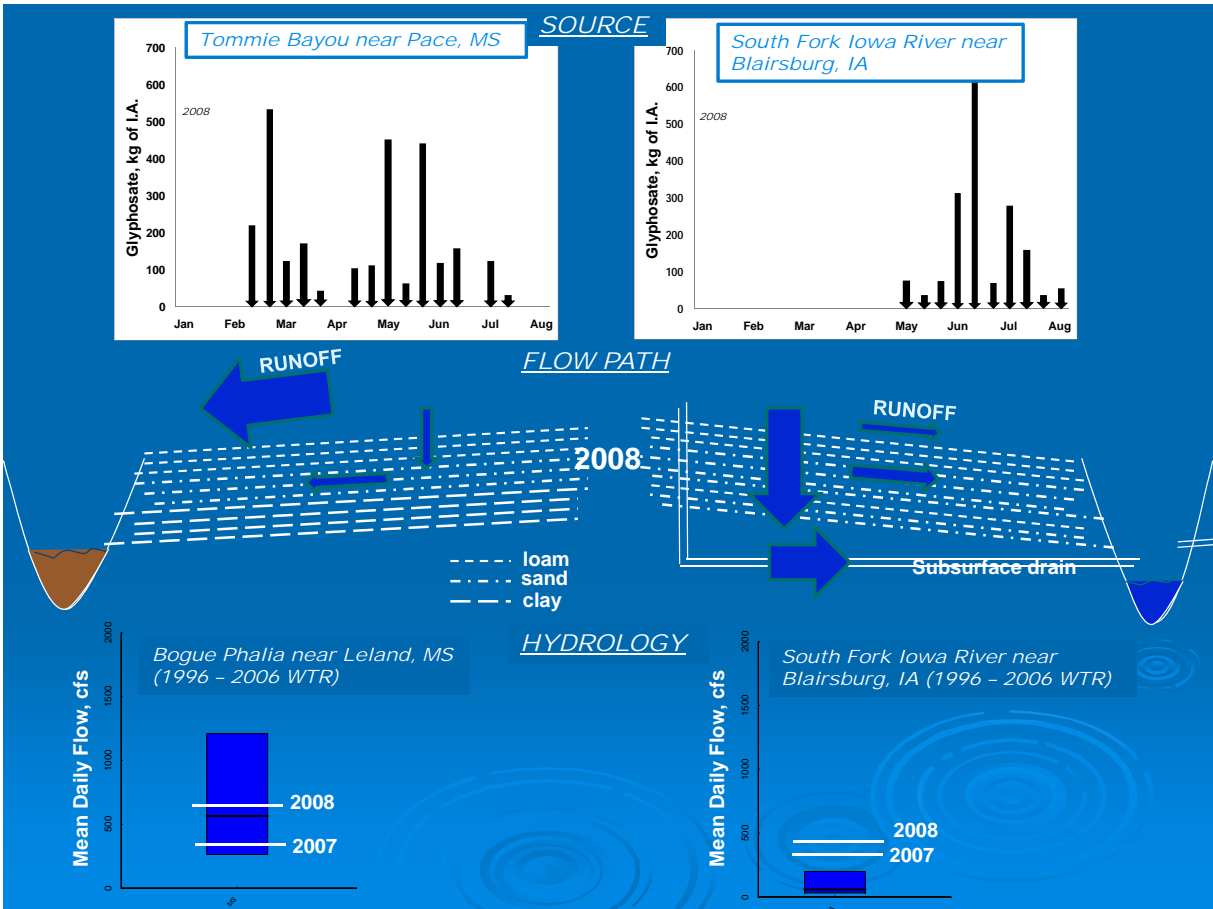
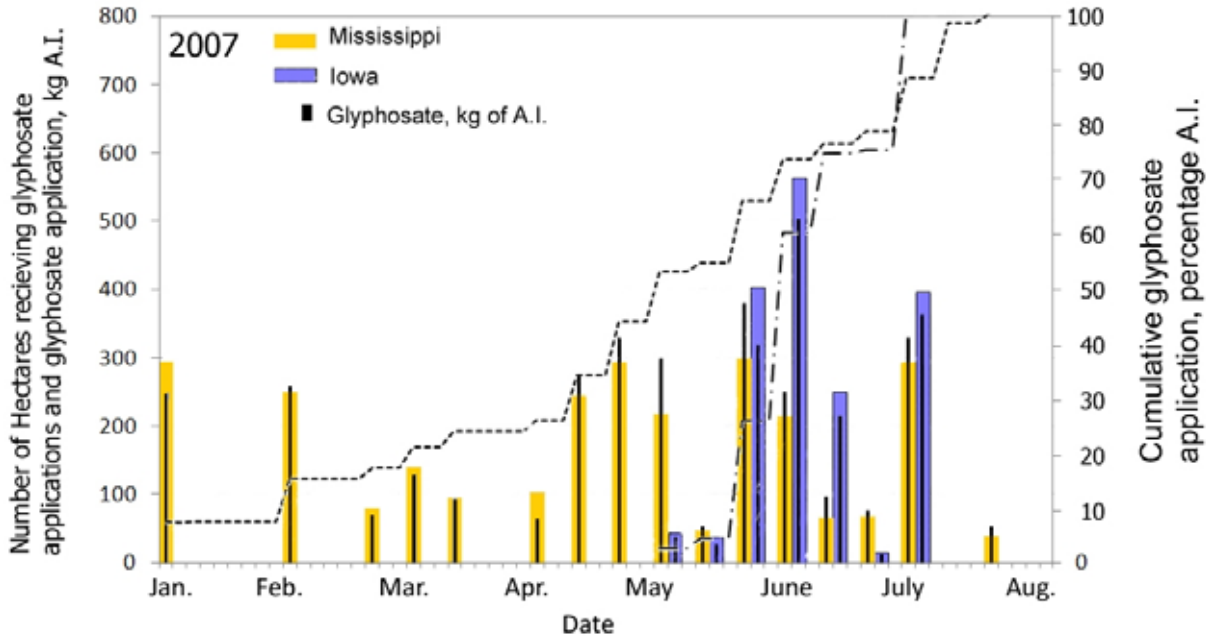


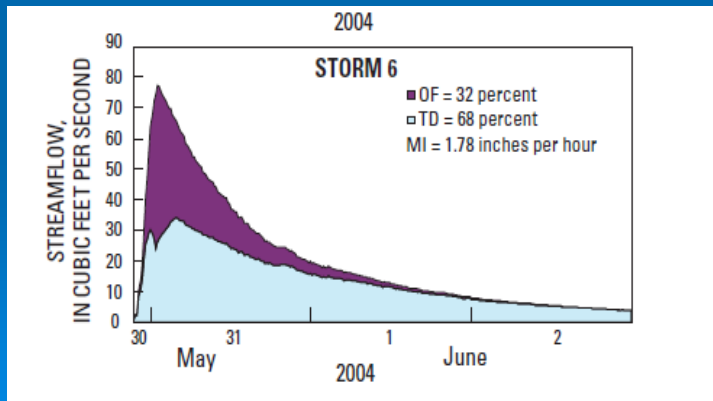
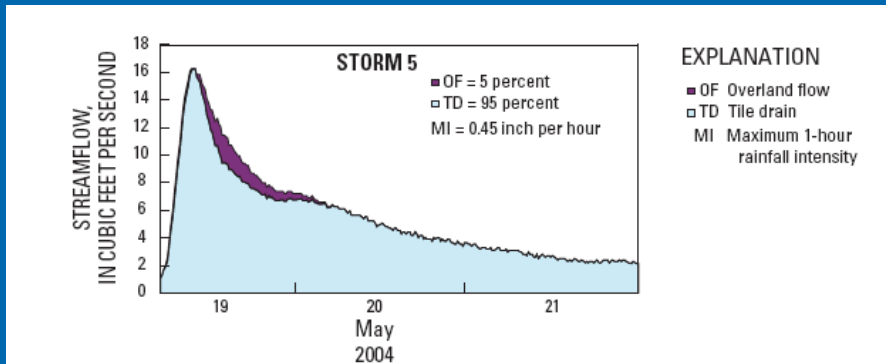
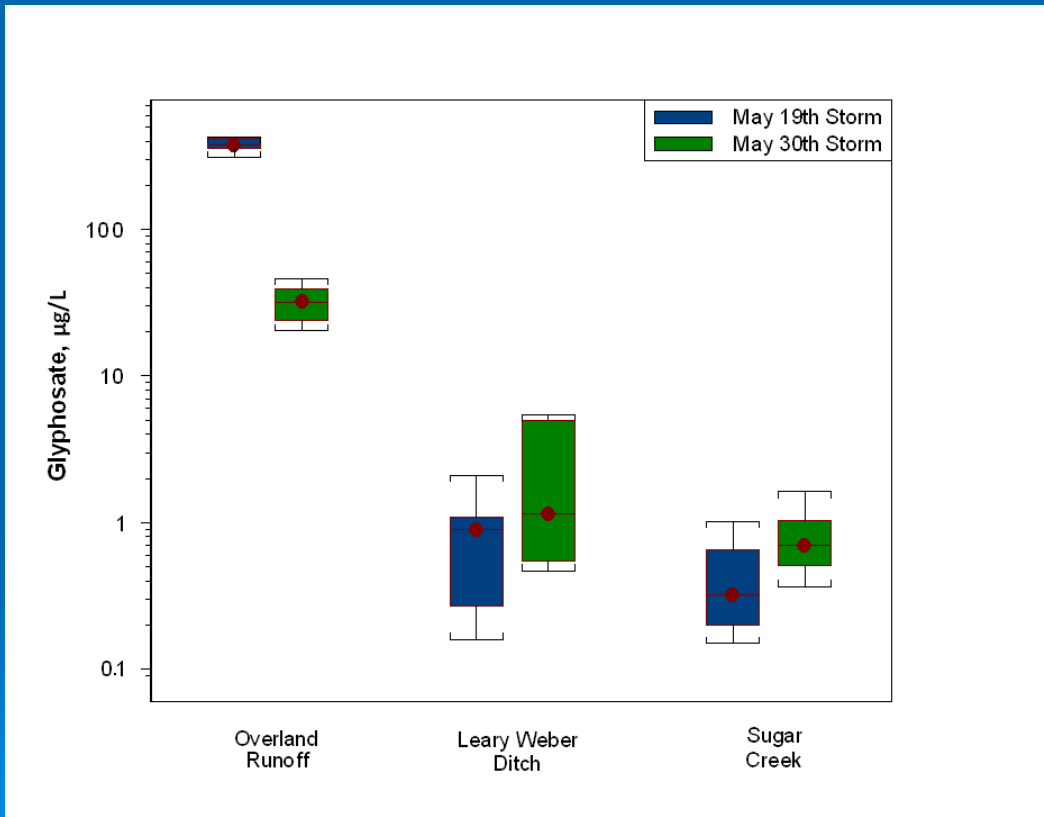
Results & Discussion

*Glyphosate or AMPA = A (source) t +
B(hydrology)t + (flowpath)*



France: 302 out of 303 samples had detections of glyphosate (MRL 0.1) with a median concentration of 4.7 ug/L and a maximum concentration of 86 ug/L.





Indiana – May 19 storm vs. May 30 storm

May 19th, 2004

- Source Strength – very high, application just a few days before.
- Hydrology – medium, rainfall intensity was 0.45 in/hr
- Flowpath – most of the water reached the stream via subsurface path

May 30th, 2004

- Source Strength – low, no application for several weeks, additionally storm on May 19th depleted readily available material.
- Hydrology – very high, rainfall intensity was 1.78 in/hr!
- Flowpath – 32 % of the water reaching the stream was from overland runoff.

Rouffach, France

Function

- Source Strength –high, application rates between those in Iowa and Mississippi.
- Hydrology – low, only 1.8% of rainfall runs off
- Flowpath – all water is from overland runoff

Results

- LAPU is extremely low, an order of magnitude less than Mississippi or Iowa.
- Yet 302 of 303 samples had detectable levels of glyphosate and AMPA with a median event concentration of 4.7 ug/L.

Summary

- Source
 - Influences the annual detection rate
- Flowroute
 - Influences the magnitude of the concentration
- Hydrology
 - Influences the mass of glyphosate/AMPA transported

Thank You

Catfish ponds in
the Delta of MS