

Flash Flood Guidance Verification

(or how do we know FFG's validity without verification)

Thomas Adams

thomas.adams@noaa.gov

National Weather Service

Ohio River Forecast Center, Wilmington, OH



Topics

- Some initial thoughts
- OHRFC Operational FFG
- Simple minded approach to FFG verification #1
- Simple minded approach to FFG verification #2
- The problems
- Concluding Remarks

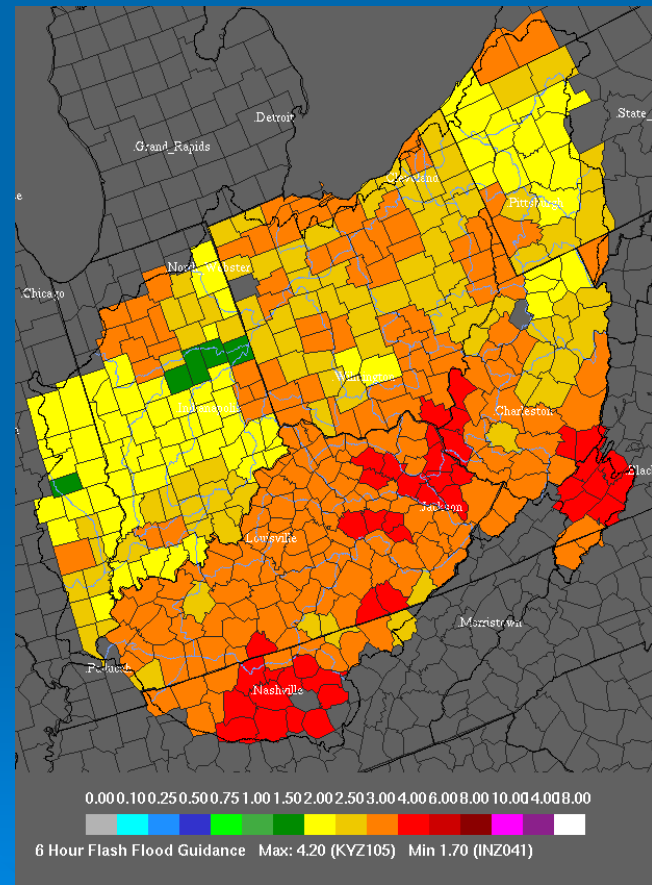
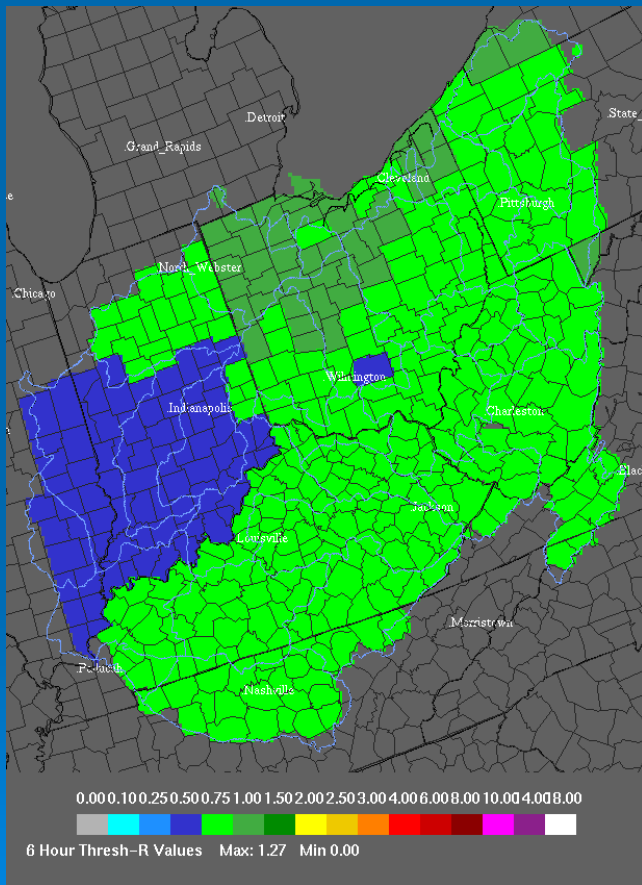


Some Initial Thoughts

1. Not a proposal for FFG verification — a starting point for discussion
2. The problem may be moot due to distributed hydrologic modeling & new approaches by OHD/Hydrology Lab.
3. FFG verification is largely an observational problem
 - Verifying when a FF has occurred
 - Verifying when a FF has *not* occurred
4. How does one approach FFG verification without the funding to support it?
5. To assess new or competing FFG approaches and existing FFG values some kind of verification is necessary
6. Look at FF cases:
 - when WFOs have issued warnings
 - FFG suggests a FF *should* have occurred

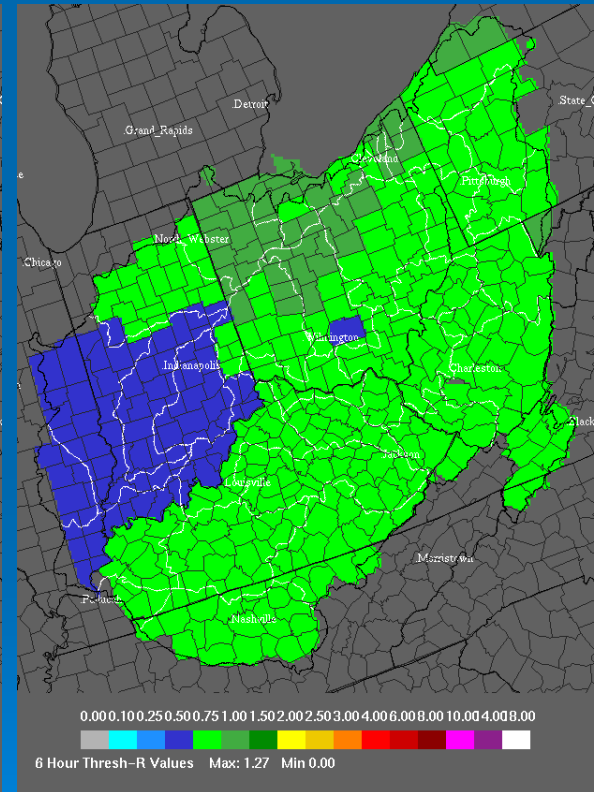
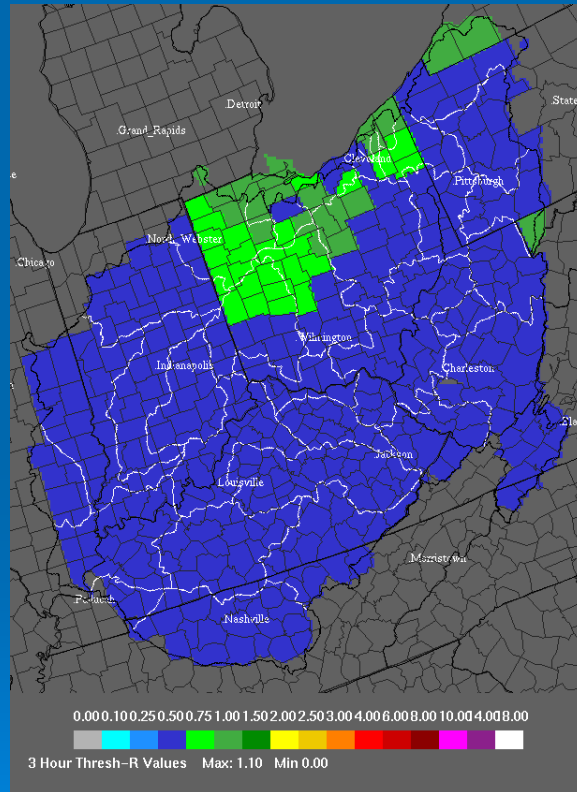
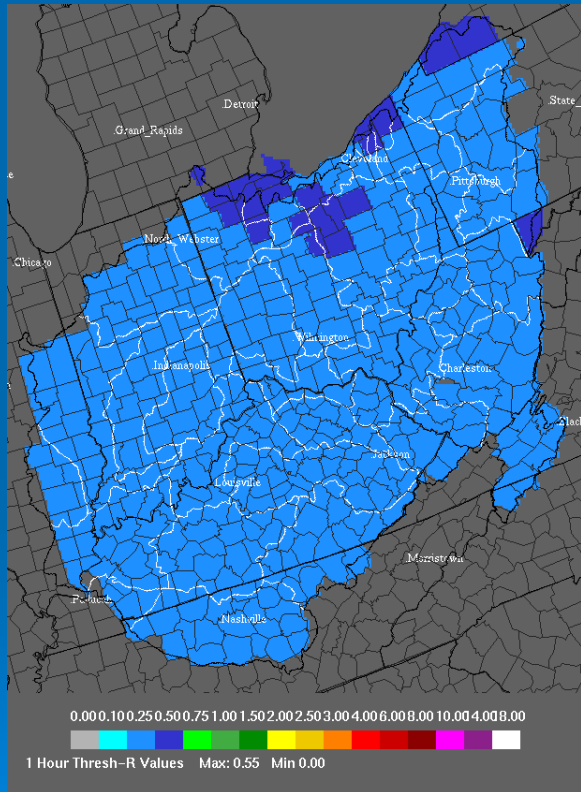


Current Operational County-based FFG



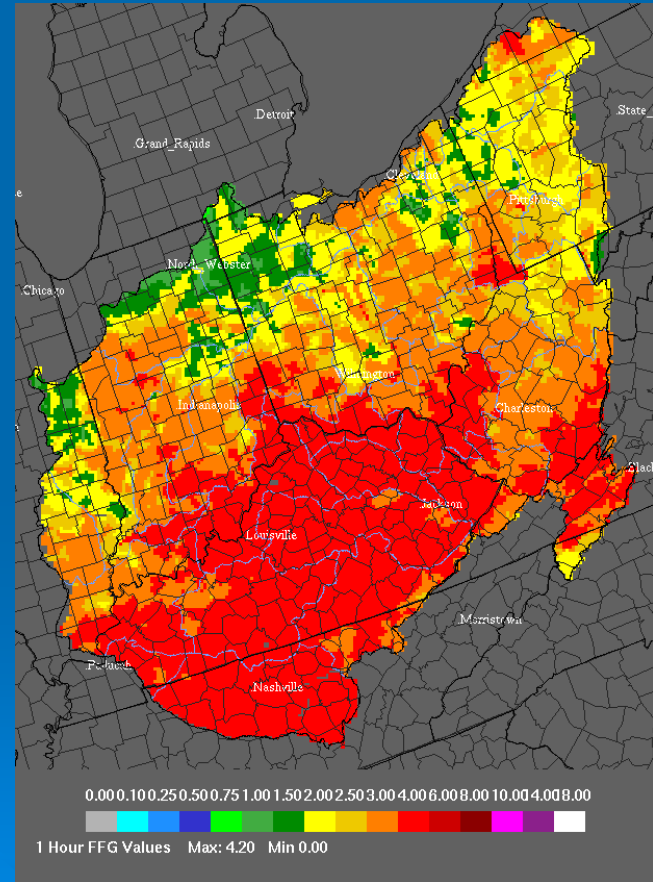
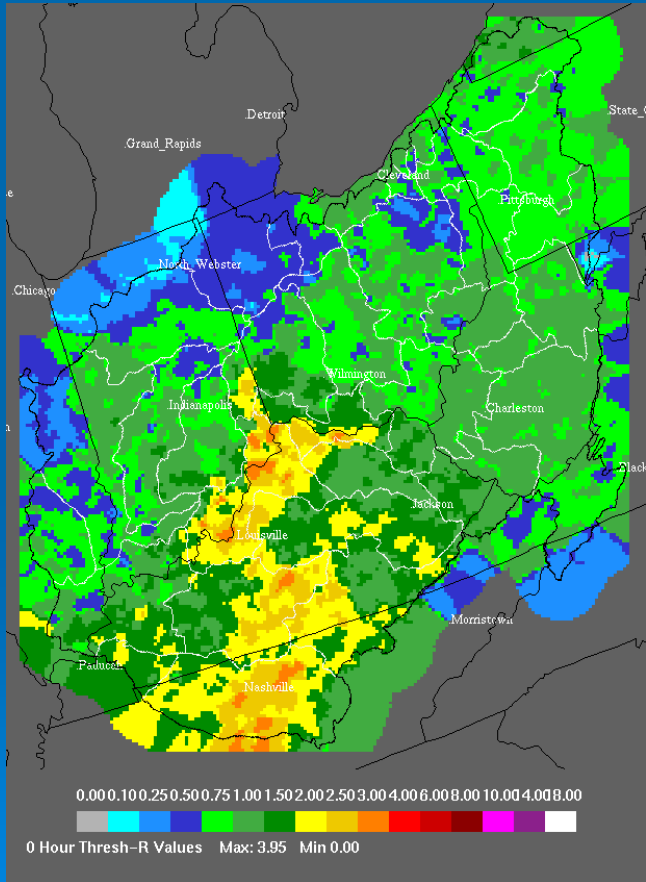


Differences between 1-, 3-, & 6-hour County based Threshold Runoff





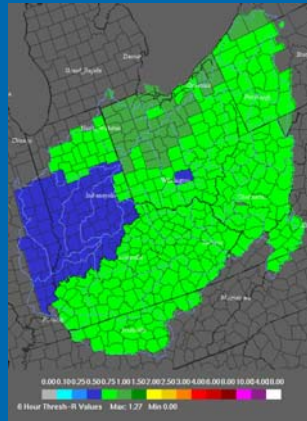
6-hour Gridded Threshold Runoff-based FFG



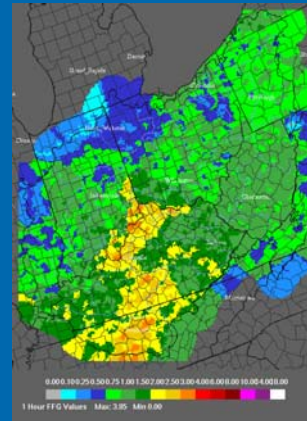


Comparison of County & Gridded Threshold Runoff based 6-hour FFG

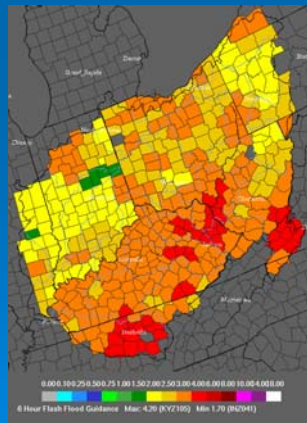
County based Threshold Runoff



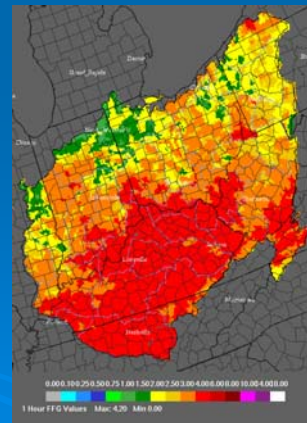
Gridded Threshold Runoff



County based FFG



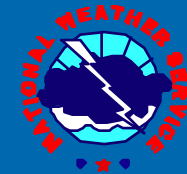
Gridded Threshold Runoff
based FFG





Approach #1

- Use WFO generated verification reports for Storm Data
- Analyze for selected events for 1-, 3-, 6-hr FFG values
- WFOs in OHRFC had very high verification statistics >90% for 2002
- Question of objectivity of WFO verification statistics



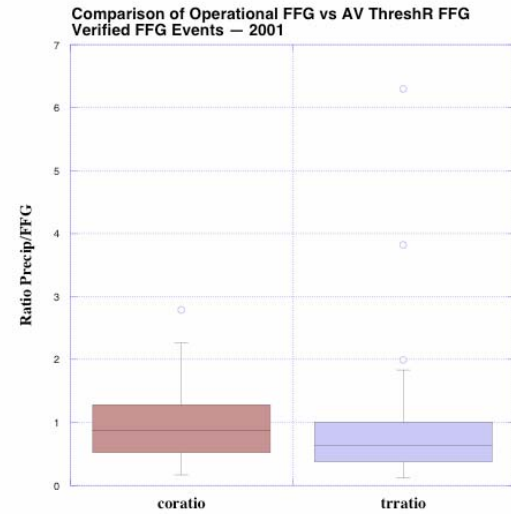
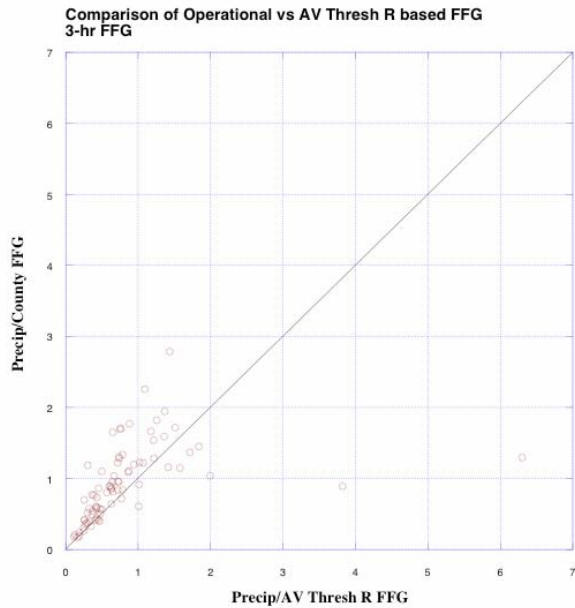
Flash Flood Verification Data

Storm Data

County	State	start-time-3	Warntime	precip	CoFFG	TRFFG	CoRatio	TRRatio
DEARBORN	IN	2001051819	2001051816	1.04	2	3.4	1.9231	0.305882353
DEARBORN	IN	2001071825	2001071822	1.88	1.1	2.47	0.5851	0.761133603
DEARBORN	IN	2001071902	2001071902	1.86	1.1	2.47	0.5914	0.753036437
DEARBORN	IN	2001102408	2001102405	0.95	0.8	3.09	0.8421	0.307443366
DEARBORN	IN	2001121713	2001121711	0.77	0.7	1.54	0.9091	0.5
FRANKLIN	IN	2001121710	2001121707	0.63	0.9	2.46	1.4286	0.256097561
RIPLEY	IN	2001051818	2001051816	1.1	1.9	3.4	1.7273	0.323529412
RIPLEY	IN	2001060620	2001060617	1.08	1.4	2.98	1.2963	0.362416107
RIPLEY	IN	2001071825	2001071822	1.59	1.3	2.22	0.8176	0.716216216
RIPLEY	IN	2001072811	2001072808	1.82	1.9	2.52	1.044	0.722222222
SWITZERLAND	IN	2001051819	2001051816	0.88	2.1	3.4	2.3864	0.258823529
UNION	IN	2001061226	2001061223	4	2.4	3.4	0.6	1.176470588
UNION	IN	2001071803	2001071800	1.98	1.2	3.05	0.6061	0.649180328
BOONE	KY	2001051819	2001051816	0.85	2.8	3.4	3.2941	0.25
BOONE	KY	2001081126	2001081123	1.61	2.8	3.4	1.7391	0.473529412
BRACKEN	KY	2001071805	2001071803	1.55	1.8	3.4	1.1613	0.455882353
GRANT	KY	2001060526	2001060523	3.39	1.5	3.1	0.4425	1.093548387
KENTON	KY	2001051820	2001051818	0.95	2.6	3.4	2.7368	0.279411765
LEWIS	KY	2001052121	2001052118	1.14	2.1	3.04	1.8421	0.375
LEWIS	KY	2001072822	2001072819	0.65	2.7	3.4	4.1538	0.191176471
MASON	KY	2001070818	2001070815	5.15	3	3.4	0.5825	1.514705882
MASON	KY	2001081125	2001081122	1.47	2	3.4	1.3605	0.432352941
OWEN	KY	2001060524	2001060521	4.45	1.6	3.1	0.3587	1.438709677
OWEN	KY	2001062012	2001062009	2.98	2.7	3.4	0.906	0.876470588



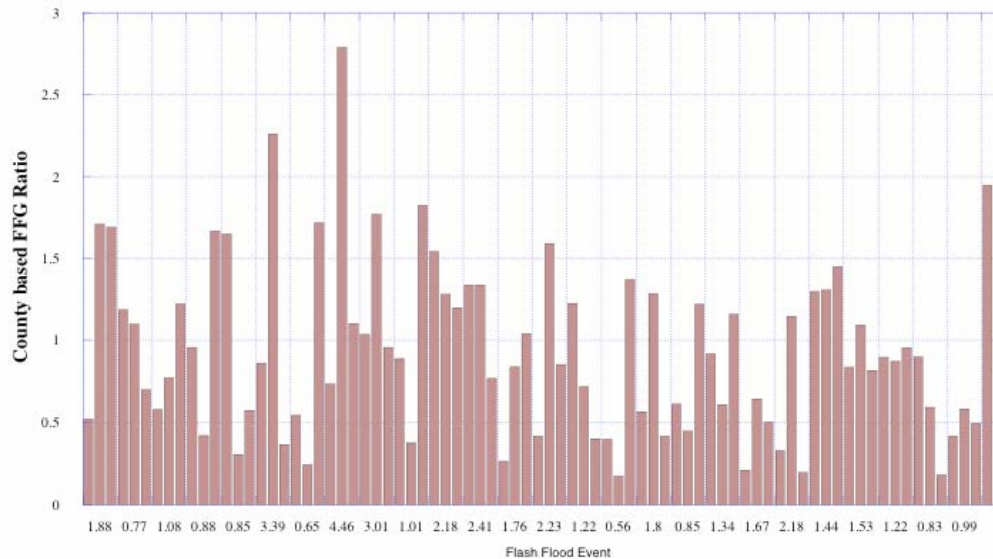
Comparison of County & AV TreshR based FFG





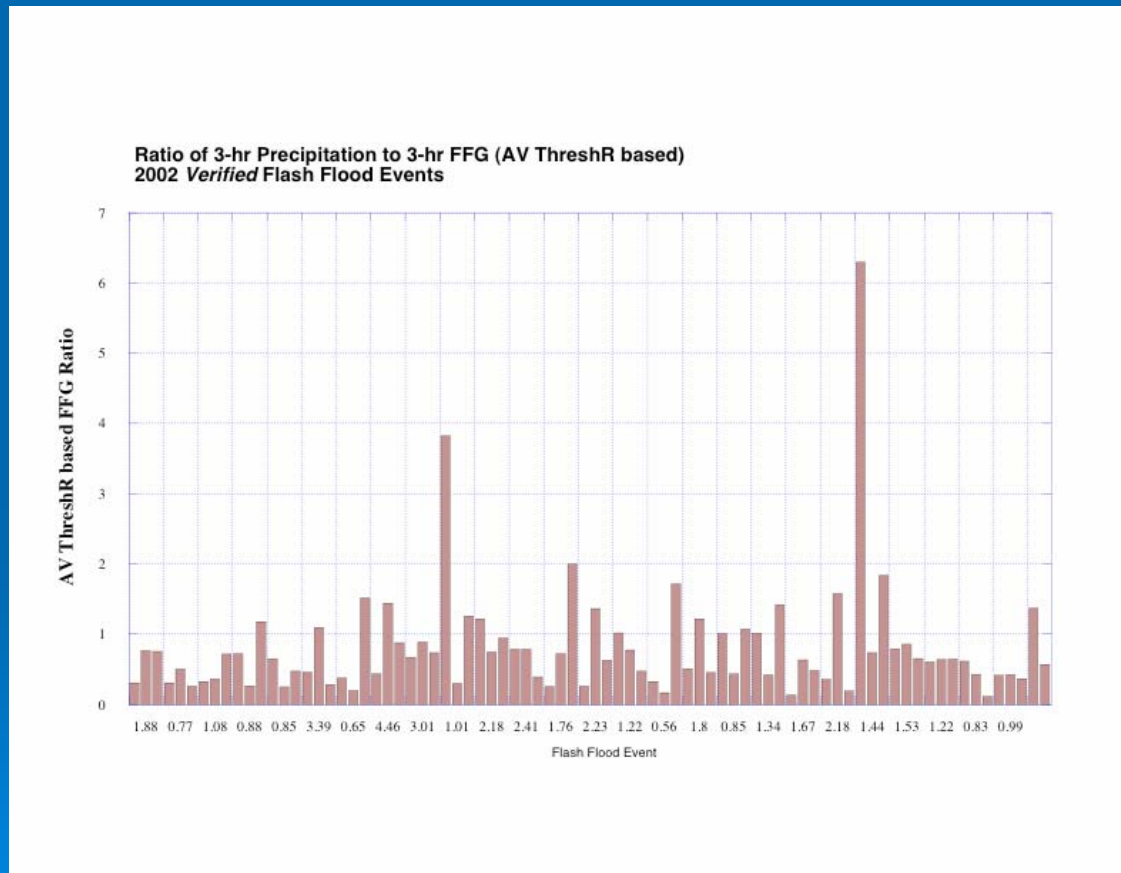
County based Ratio: Precip/FFG

Ratio of 3-hr Precipitation to 3-hr FFG (County based)
2002 Verified Flash Flood Events





AV ThreshR based Ratio: Precip/FFG



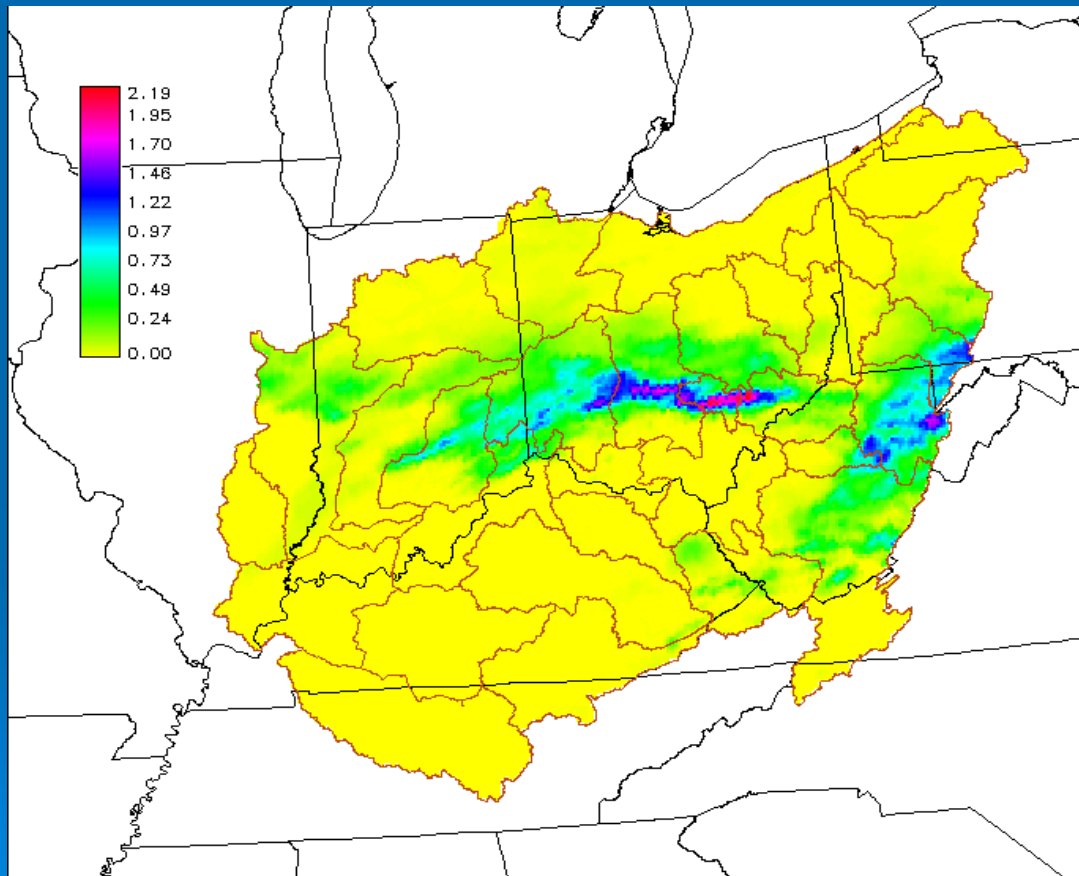


Approach #2

- Verify every event over RFC area using *GIS procedures*
- Could be automated
- Direct comparison of precipitation vs FFG values



Flood Producing Storm May 19, 2004 (3-hr accumulation)

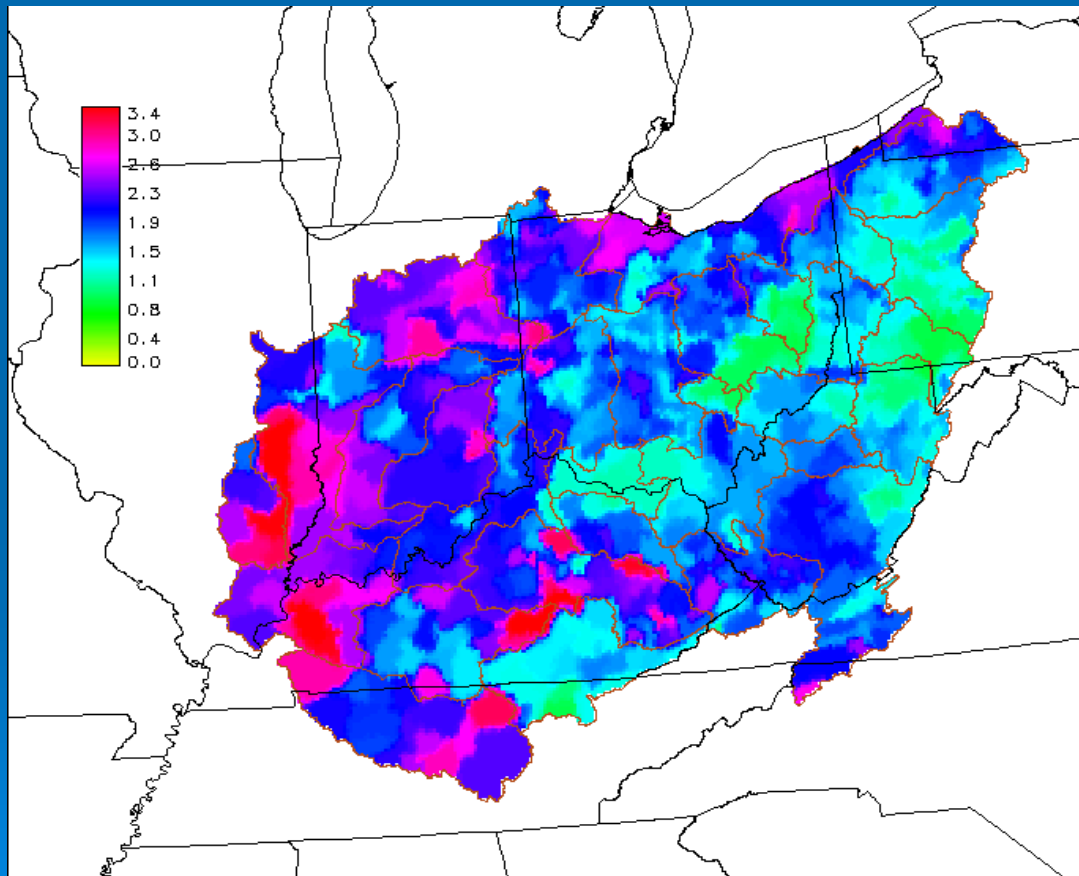


Wednesday, June 16, 2004

Ohio River Forecast Center



3-hr FFG May 19, 2004 Prior to Event

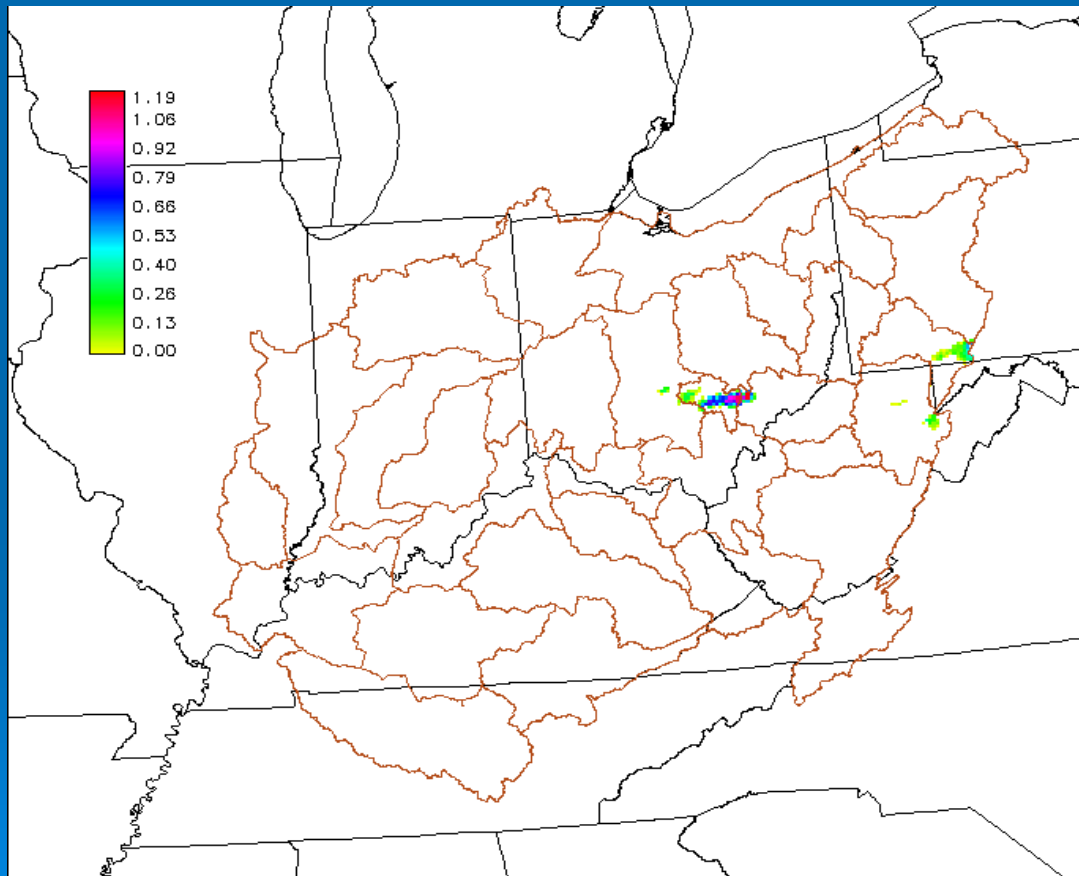


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Precipitation in Excess of 3-hr FFG May 19, 2004



Wednesday, June 16, 2004

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The Problems

1. No nationally accepted/supported FFG verification program
2. What data should be used to support FFG verification?
3. What methodology should be used?
4. FFG is not measurable; FFG verification for *only* warned Flash Floods?
5. Verification of both warned Flash Floods & those indicated by FFG values