

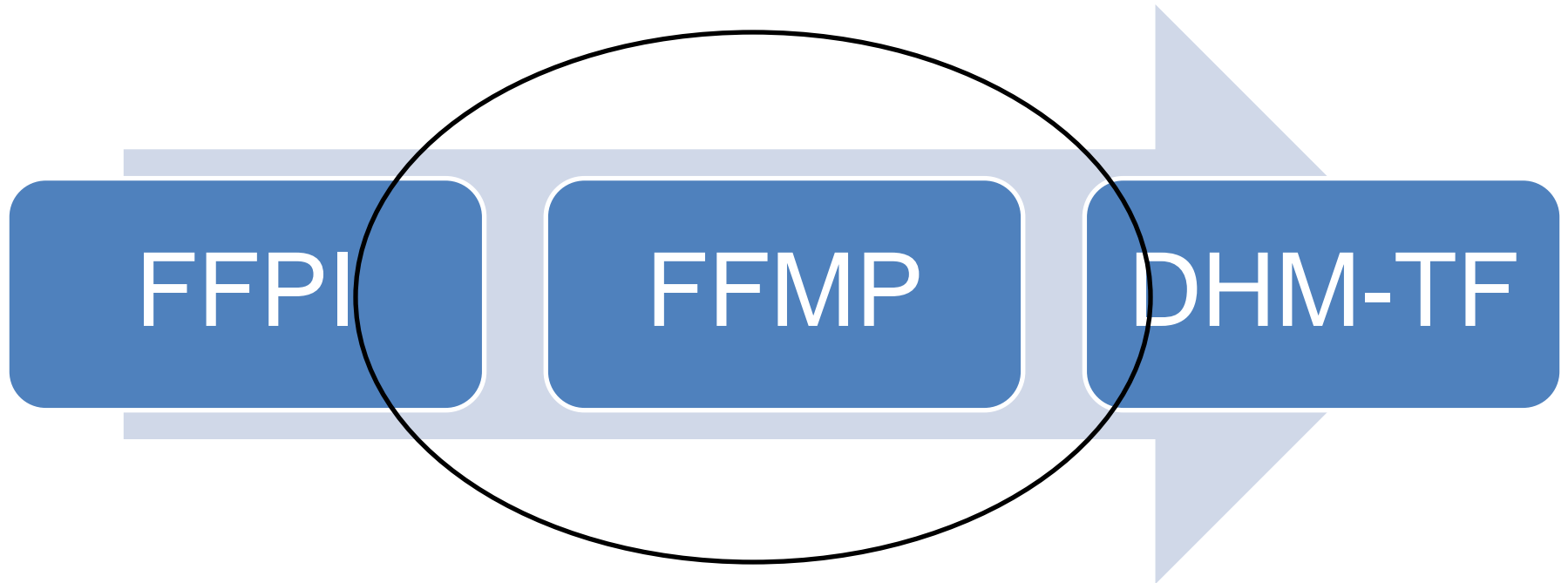


# Flash Flood Monitoring and Prediction (FFMP)

## Flash Flood Monitoring and Prediction-Advanced (FFMPA)

Reggina Cabrera  
NOAA/National Weather Service  
Eastern Region

# Tools



# FFPI FFMPA

## FFPI

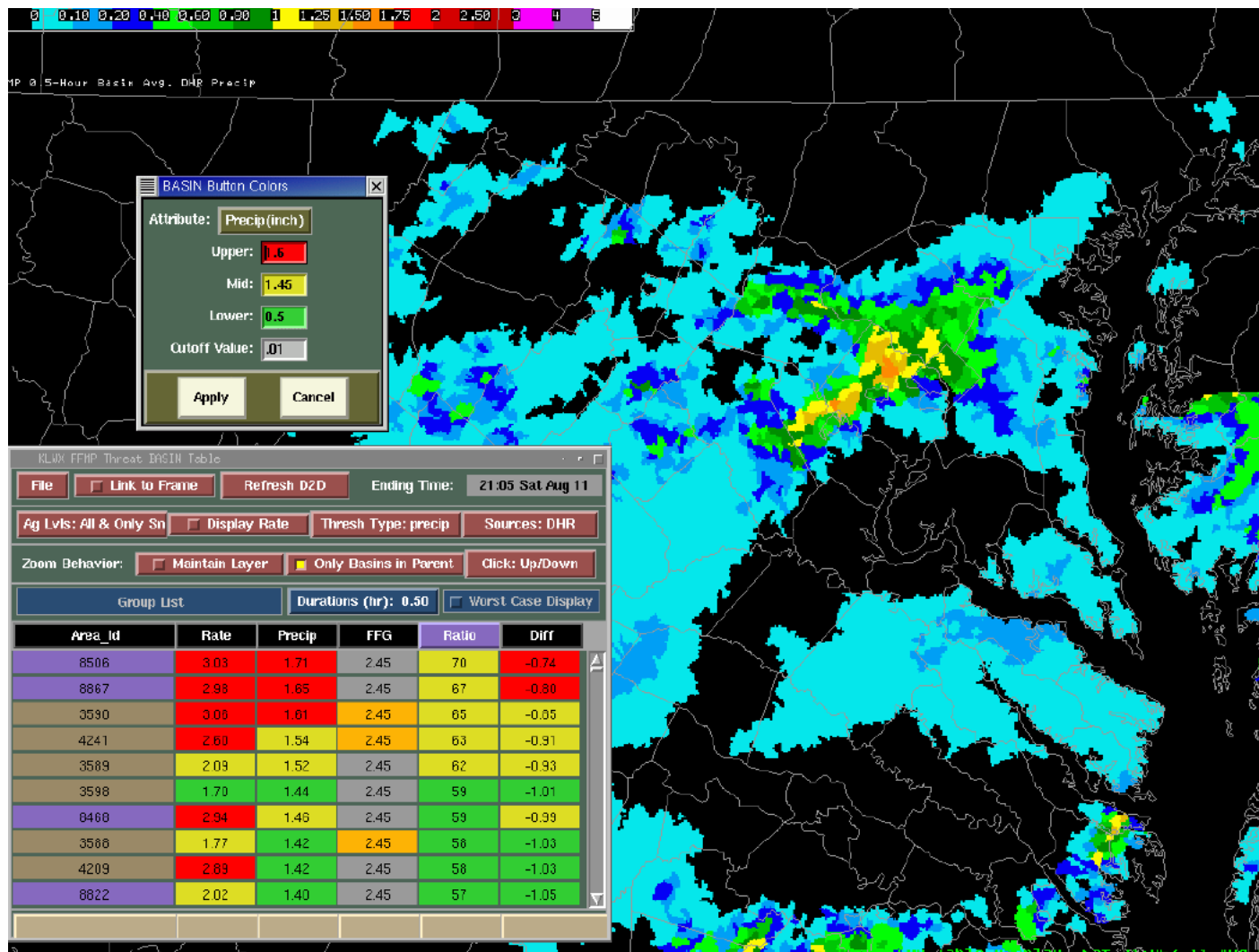
- Shows you areas that you should be concerned, where flash flooding could occur. It is static

## FFMPA

- Monitors areas where current/future rainfall might prompt a warning. It is dynamic

# FFMP

- Flash Flood Monitoring and Prediction (FFMP) is a Decision Assistance tool specifically designed to help forecasters **monitor and evaluate the flash flood threat and decide** whether or not to issue flash flood warnings
- It does this by using **radar data** to calculate precipitation accumulation in hydrologic water basins over various time periods and compare to the suggested **Flash Flood Guidance (FFG)**, provided by River Forecast Centers (RFCs).



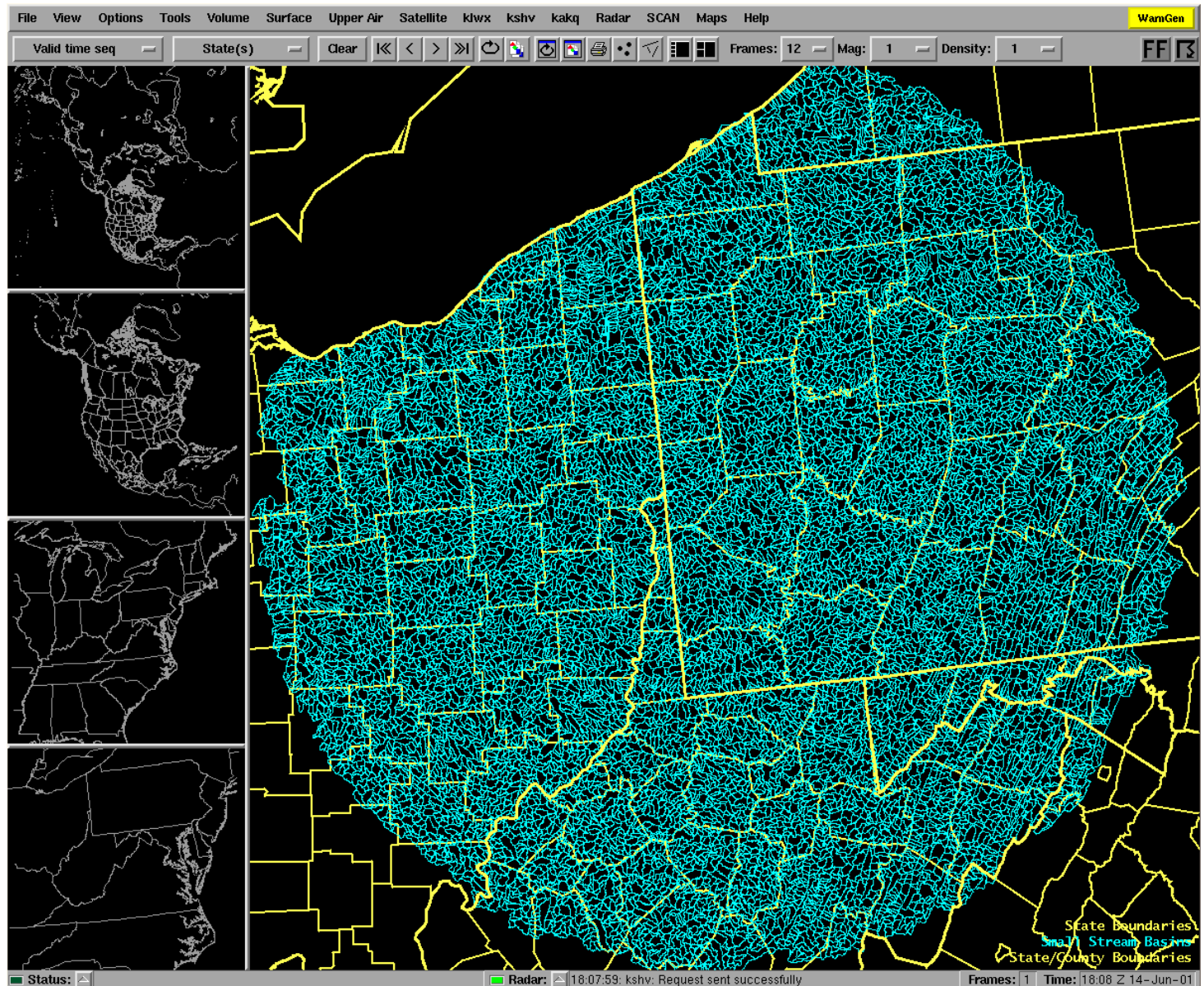
Flash Flood Monitoring and Prediction tool used by National Weather Service forecasters to track the precipitation rates and accumulations in small basins (typically 5 to 25 square kilometers) as compared to flash flood guidance. Information is updated every 4.5 to 6 minutes. The stream name and county can also be displayed so more specific information can be included in flash flood warning messages.



# Data Requirements

- Radar: DHR product for each applicable radar
- Basin shapefile for each applicable radar
- Radar Bin shapefile for each applicable radar
- Flash Flood Guidance (FFG) issued by the RFCs.

# Basins



2-20 mi<sup>2</sup>

# Basic Components

## ➤ **Processor**

- Creates input data

## ➤ **Display**

- Displays data as an image (map)
- Displays data in a table
- Displays data in a time trend

## ➤ **Flash Flood Threat Indicator (FFTI)**

- The Monitor



# Processor

## Ingests

- Localization
- Radar data
- Flash Flood Guidance (FFG)

Writes output for each radar volume scan:

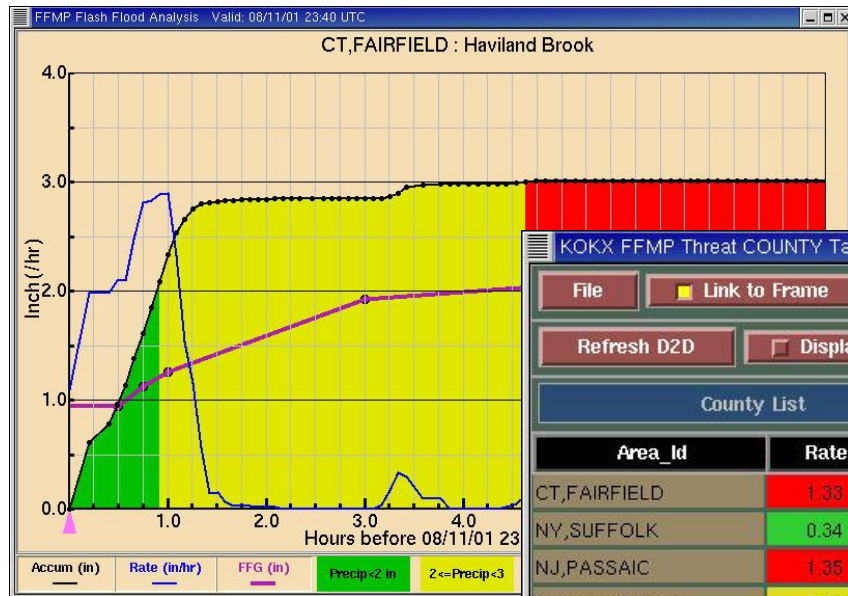
- /data/fxa/radar/@ @ @ @/ffmp/yyyymmdd\_hhmm\*
- /data/fxa/radar/@ @ @ @/ffmp/accumulation\*

# Display

- Image: displays Counties or Basins
- Basin Table: GUI presenting data in tabular form
- Basin Trend: launched from Basin Table or D2D Image (if made active)

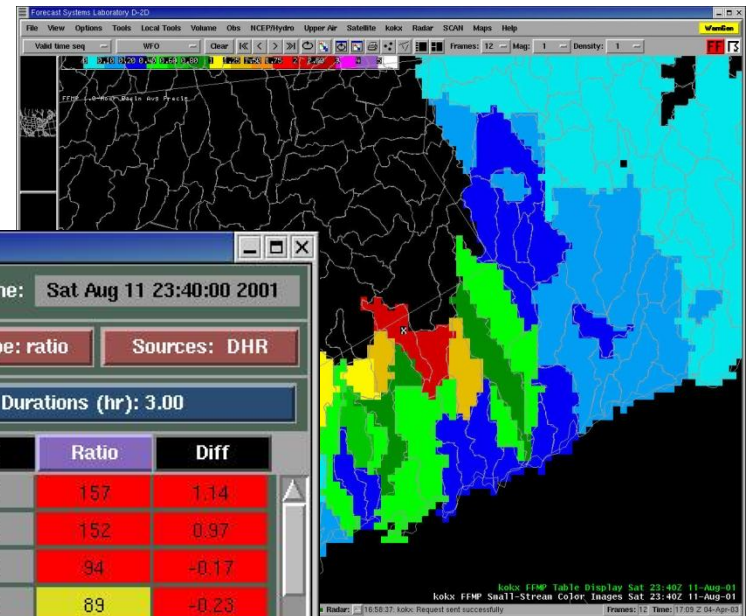
# Set of Displays

## Basin Trend Graph



## Basin Table

## D2D Image



KOKX FFMP Threat COUNTY Table

File ☐ Link to Frame Ending Time: Sat Aug 11 23:40:00 2001

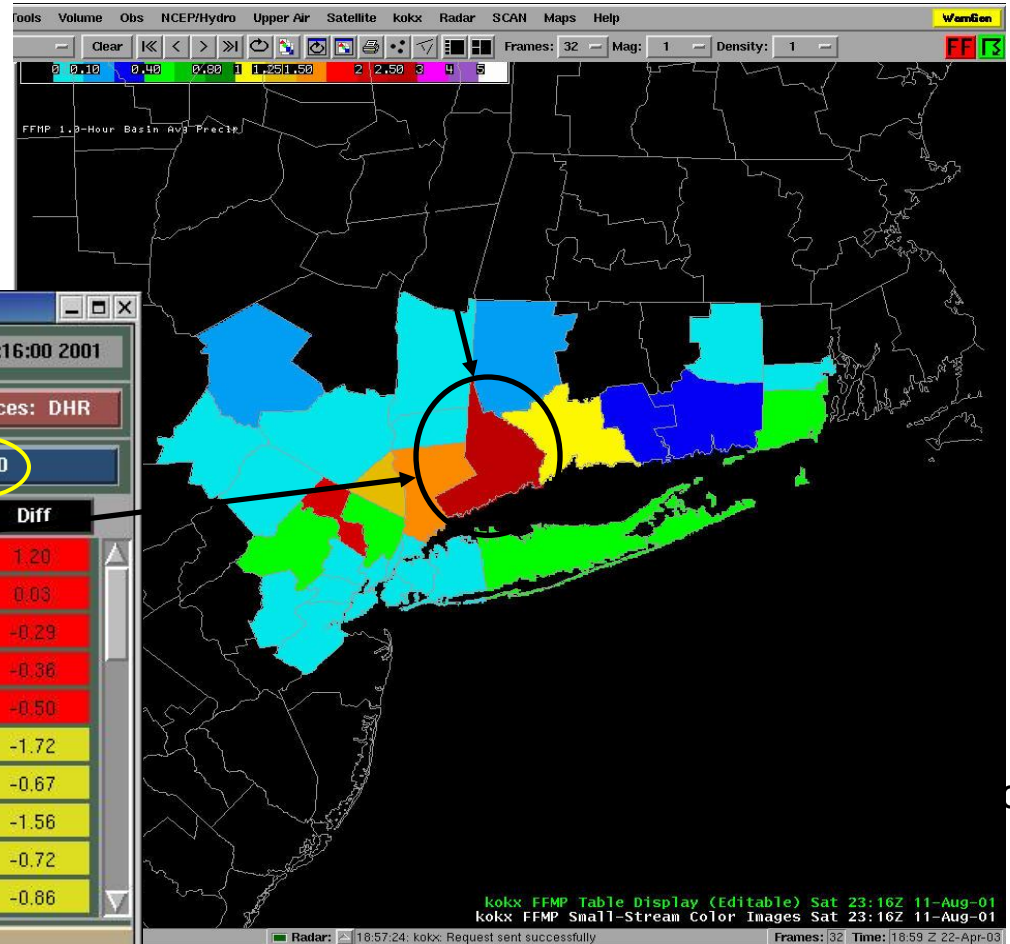
Refresh D2D ☐ Display Rate Thresh Type: ratio Sources: DHR

County List Durations (hr): 3.00

Area_Id	Rate	Precip	FFG	Ratio	Diff
CT,FAIRFIELD	1.33	3.13	1.99	157	1.14
NY,SUFFOLK	0.34	2.83	1.86	152	0.97
NJ,PASSAIC	1.35	2.58	2.75	94	-0.17
NY,ROCKLAND	0.58	1.81	2.05	89	-0.23
NY,WESTCHESTER	1.80	1.96	2.45	80	-0.49
NJ,MORRIS	1.15	1.73	2.42	72	-0.69
CT,NEW HAVEN	0.79	1.27	2.31	55	-1.04
NY,NASSAU	0.40	0.86	2.02	43	-1.16
CT,LITCHFIELD	2.76	1.02	2.75	37	-1.73
NJ,UNION	0.10	0.96	2.62	37	-1.66

# County Precipitation Accumulation Display

Left Click on  
County Name  
To zoom in



KOKX FFMP Threat COUNTY Table

File

Link to Frame

Ending Time: Sat Aug 11 23:16:00 2001

Refresh D2D

Display Rate

Thresh Type: precip

Sources: DHR

County List

Durations (hr): 1.00

Area_Id	Rate	Precip	FFG	Ratio	Diff
CT,FAIRFIELD	1.96	2.51	1.81	192	1.20
NJ,PASSAIC	1.51	2.02	1.99	102	0.03
NY,WESTCHESTER	1.96	1.56	1.86	84	-0.29
NY,ROCKLAND	1.16	1.46	1.83	80	-0.36
CT,NEW HAVEN	1.24	1.06	1.56	68	-0.50
NJ,BERGEN	0.69	0.60	2.32	26	-1.72
NY,SUFFOLK	0.33	0.55	1.23	45	-0.67
NJ,MORRIS	1.35	0.51	2.07	25	-1.56
RI,WASHINGTON	0.84	0.43	1.14	37	-0.72
CT,NEW LONDON	0.70	0.34	1.19	28	-0.86

# Basin Precipitation Accumulation Display

- Only displays those basins within the county area selected.

KOKX FFMP Threat BASIN Table

File  Ending Time: Sat Aug 11 23:16:00 2001

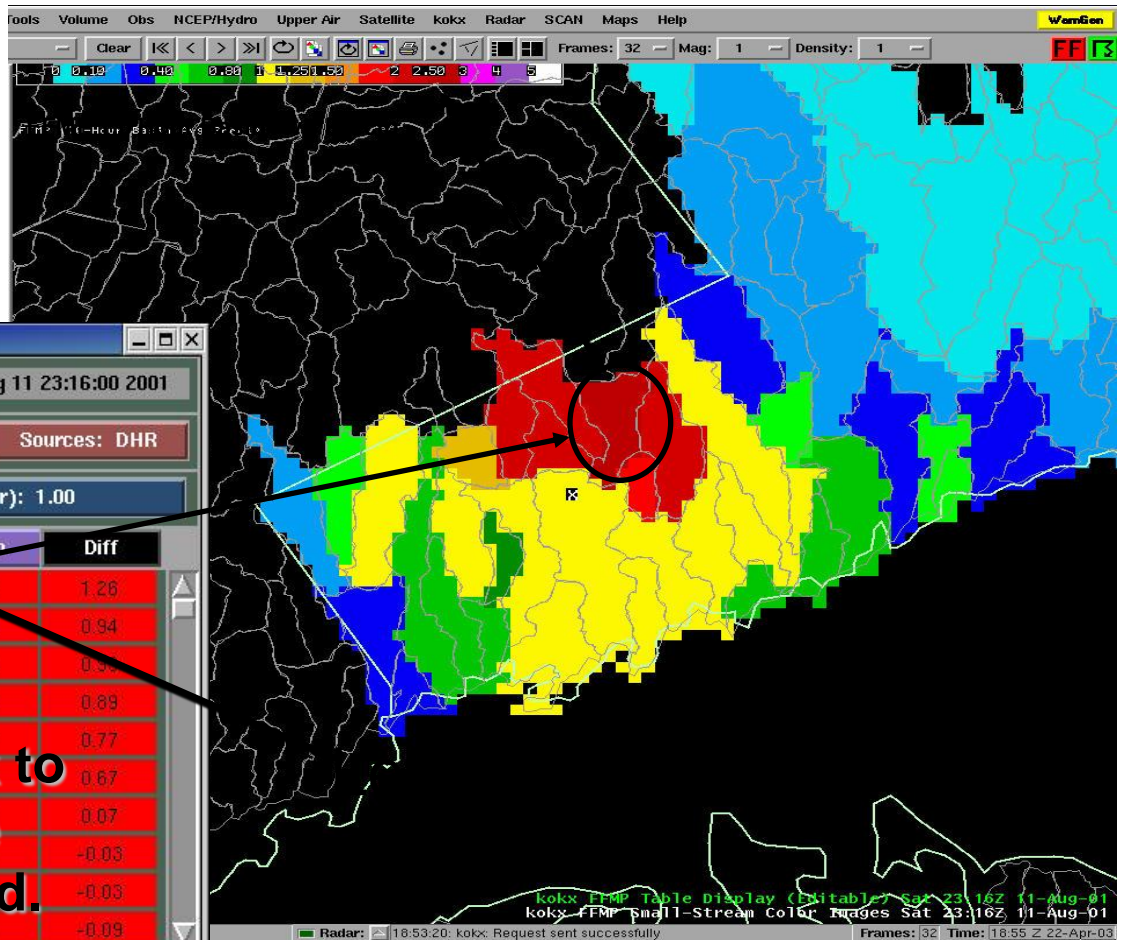
☐ Display Rate Thresh Type: precip Sources: DHR

County: CT,FAIRFIELD Durations (hr): 1.00

Area_Id	Rate	Precip	TSG	Ratio	Diff
295	1.47	2.51	1.26	200	1.26
294	1.96	2.20	1.26	174	0.94
1132	0.72	2.19	1.26	174	0.56
1129	0.57	2.15	1.26	170	0.89
1131	0.49	2.03	1.26	161	0.77
1128	0.17	1.33	1.26	106	0.67
274	0.96	1.13	1.26	106	0.07
271	0.08	1.23	1.26	96	-0.03
252	0.26	1.17	1.26	93	-0.09

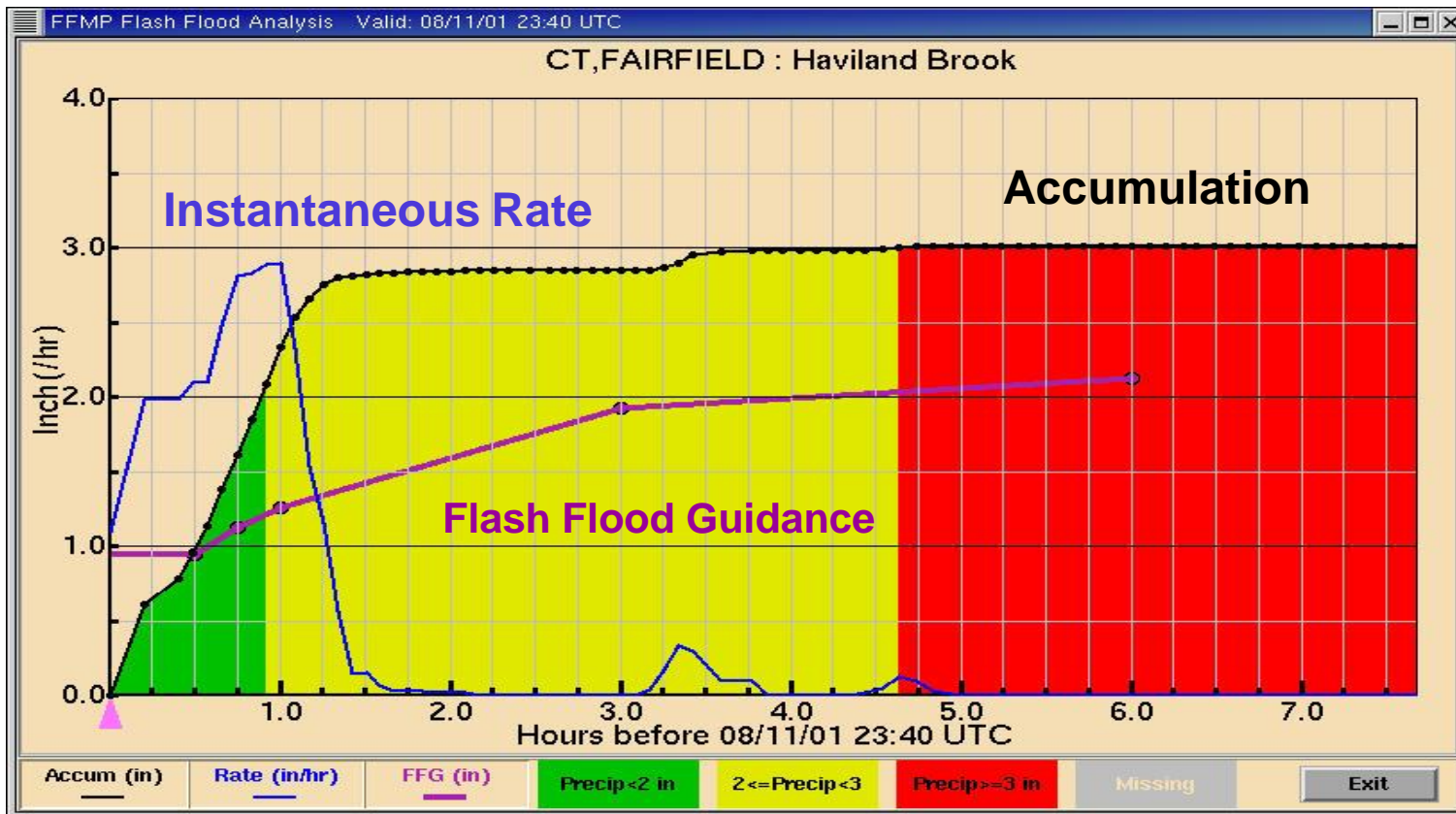
Left Click to  
Zoom in more.

Right Click to  
display the  
Basin Trend.





# Basin Trend Graph

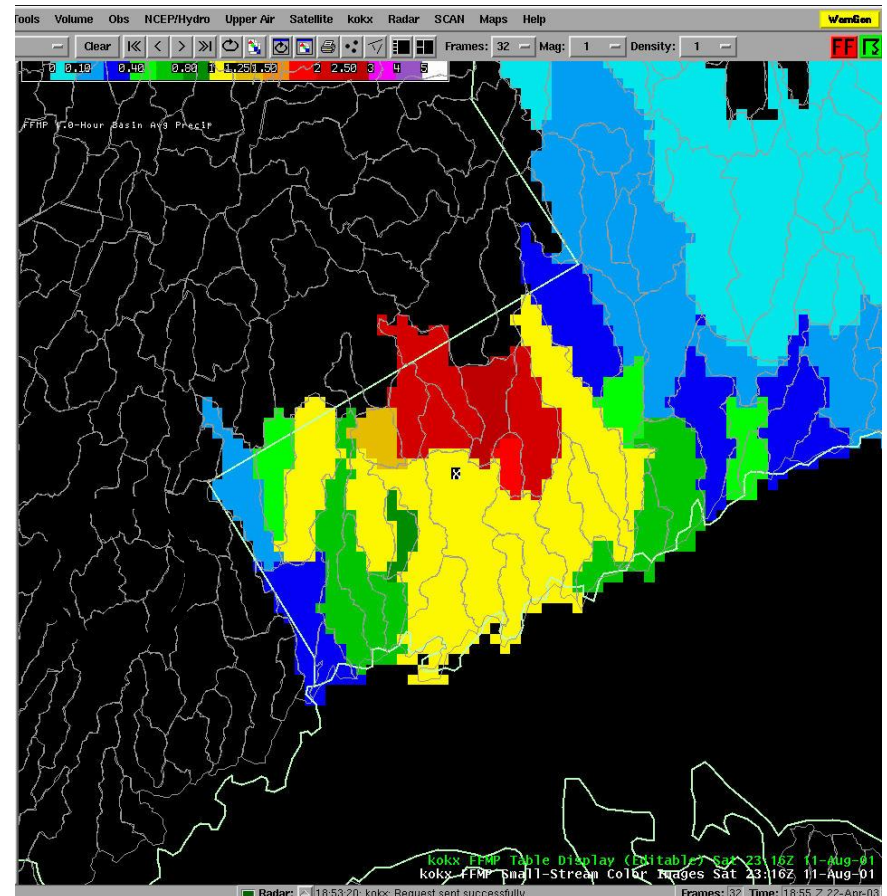
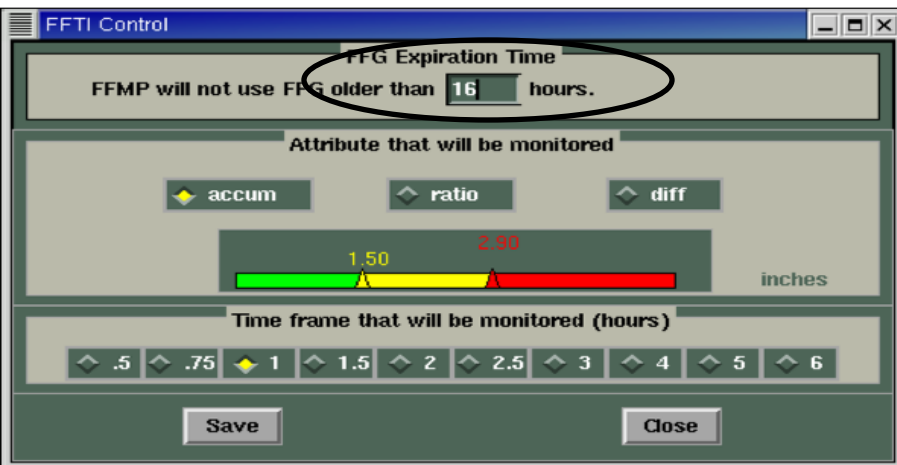


Where the accumulation is above the FFG there is a threat of flash flooding

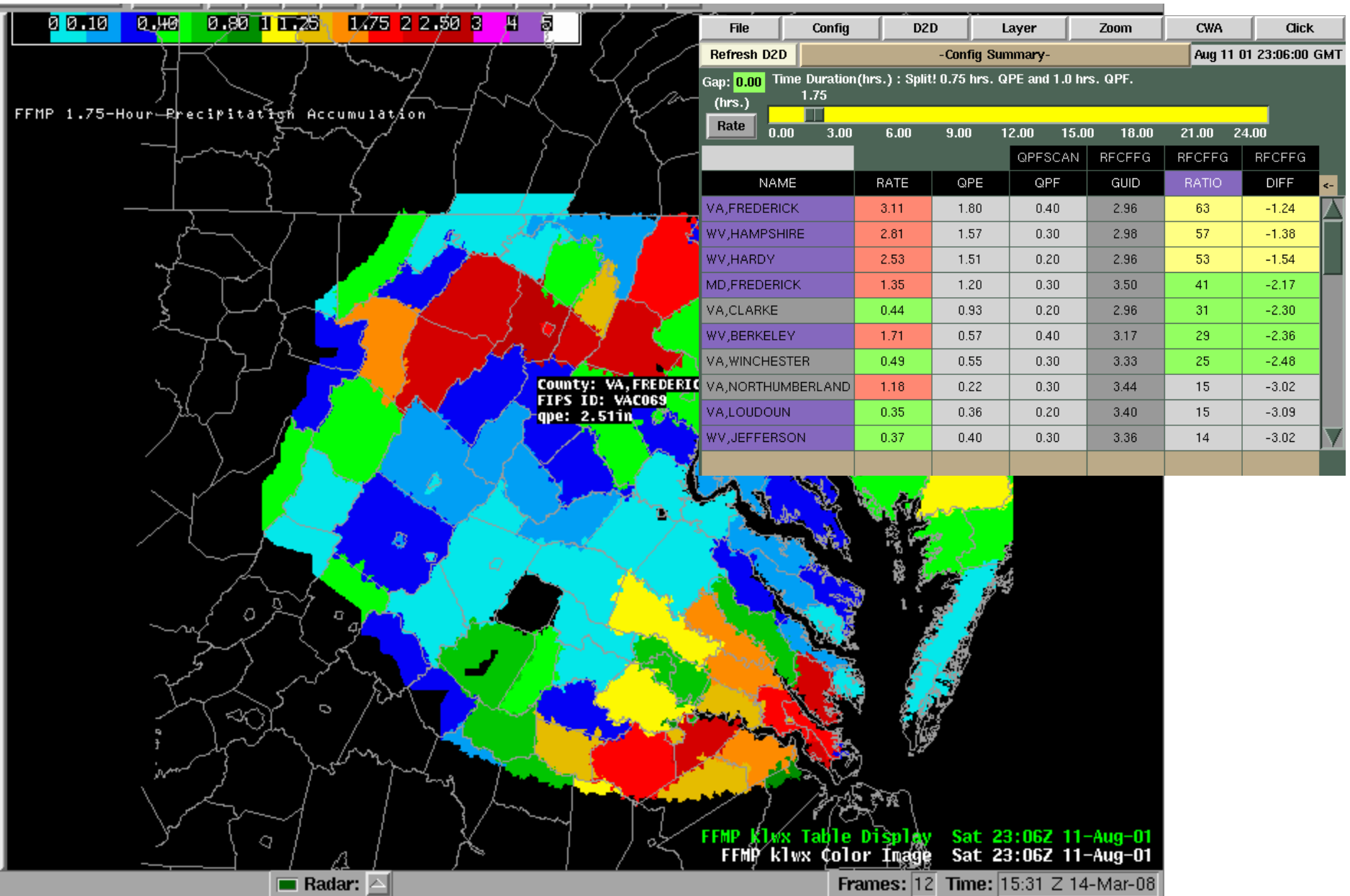
# Flash Flood Threat Indicator (FFTI).

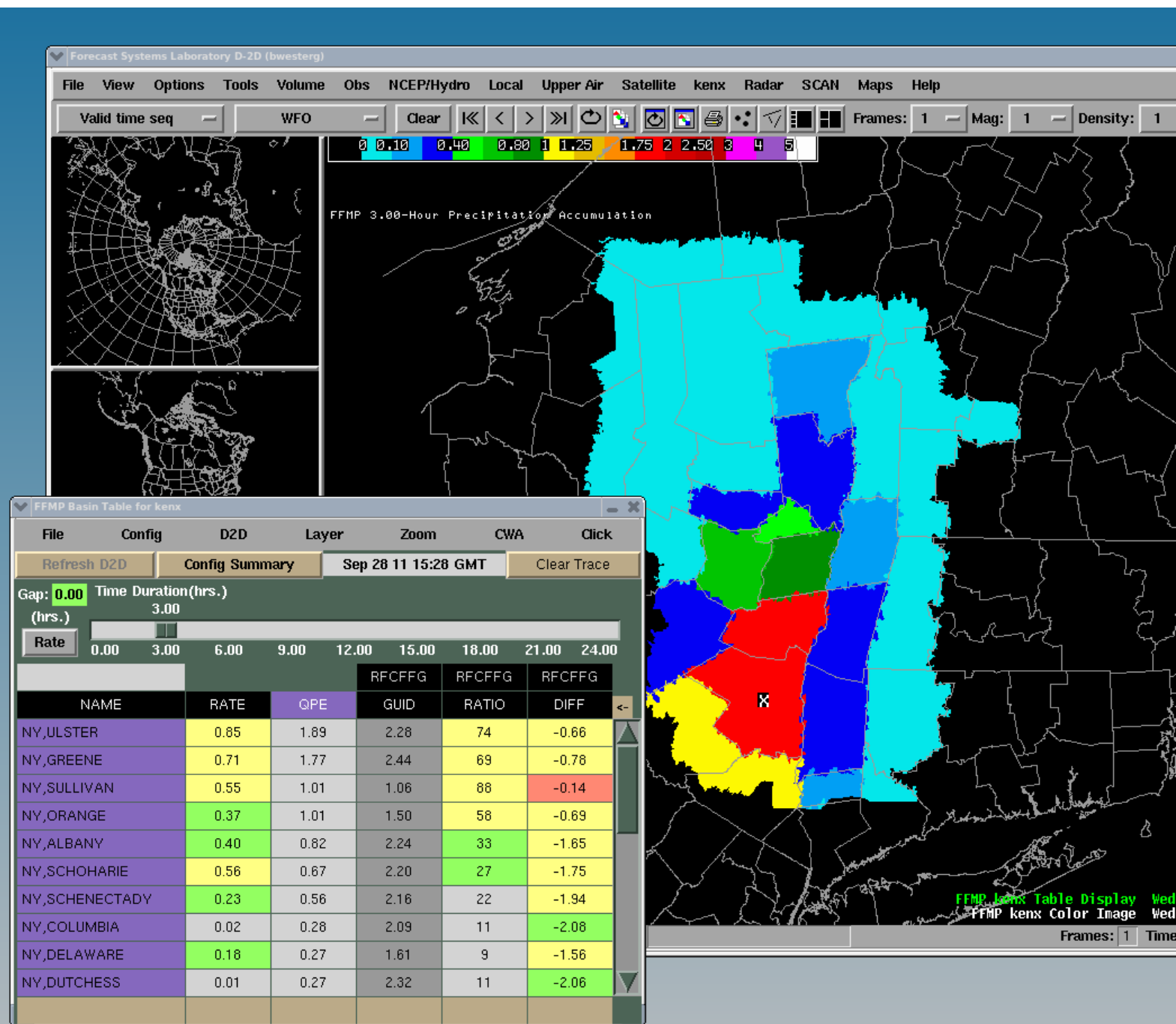
Provides GUI to define settings.

Note: FFG Expiration  
definition is here.



# FFMPA: Display

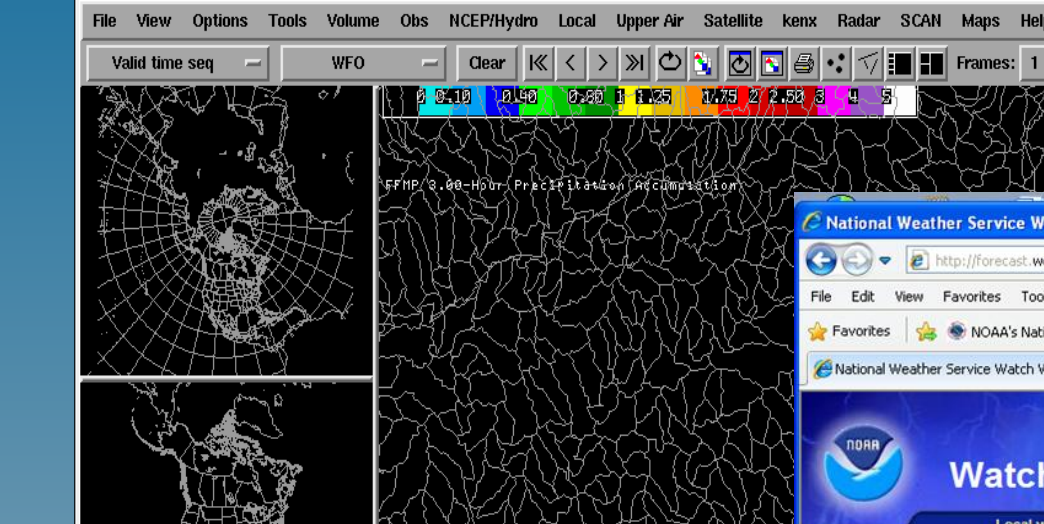








# 28<sup>th</sup> September, 2011



National Weather Service Watch Warning Advisory Summary - Windows Internet Explorer

http://forecast.weather.gov/showsigwx.php?warnzone=NY2063&warncounty=NYC111&firewxzone=NY2063&local\_pla

File Edit View Favorites Tools Help

★ Favorites NOAA's National Weather S...

National Weather Service Watch Warning Advisory Su...

National Weather Service

## Watches, Warnings & Advisories

Local weather forecast by "City, St" or zip code City, St Go

4 products issued by NWS for: 4 Miles NW Accord NY

### Flood Warning

FLOOD WARNING  
NATIONAL WEATHER SERVICE ALBANY NY  
1043 AM EDT WED SEP 28 2011

NYC111-290243-  
/O.NEW.KALY.FL.W.0162.110928T1603Z-110929T0315Z/  
/MTRN6.1.ER.110928T1603Z.110928T1800Z.110928T2115Z.NO/  
1043 AM EDT WED SEP 28 2011

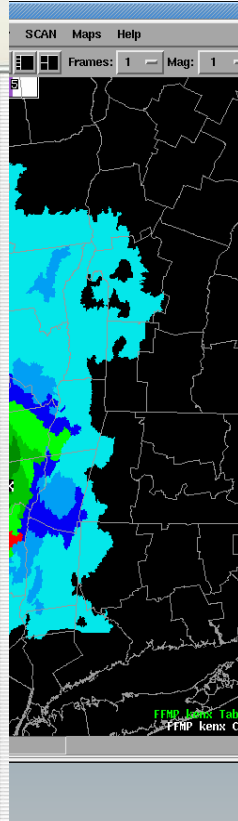
THE NATIONAL WEATHER SERVICE IN ALBANY HAS ISSUED A

- \* FLOOD WARNING FOR  
THE ESOPUS CREEK AT COLD BROOK.
- \* FROM THIS AFTERNOON UNTIL THIS EVENING.
- \* AT 10 AM WEDNESDAY THE STAGE WAS...9.2 FEET.
- \* FLOOD STAGE IS 11 FEET.
- \* MINOR FLOODING IS FORECAST.
- \* FORECAST...THE RIVER IS FORECAST TO REACH FLOOD STAGE BY 12 PM  
WEDNESDAY AND FORECAST TO CONTINUE TO RISE TO NEAR 13.5 FEET AROUND  
2 PM WEDNESDAY. THE RIVER IS FORECAST TO FALL BELOW FLOOD STAGE  
AFTER 5 PM WEDNESDAY.

66

LOCATION	STG	OBSERVED	FORECAST					
			2 PM WED	8 PM WED	2 AM THU	8 AM THU	2 PM THU	
MID HUDSON TRIBUTARIES								
COLD BROOK	11.0	9.2 WED 11 AM	13.5	8.9	8.4	8.5	8.2	

66



FFMP Basin Table for kenz

File Config D2D Layer Zoom CWA Click

Refresh D2D Config Summary Sep 28 11 15:38 GMT Clear Trace

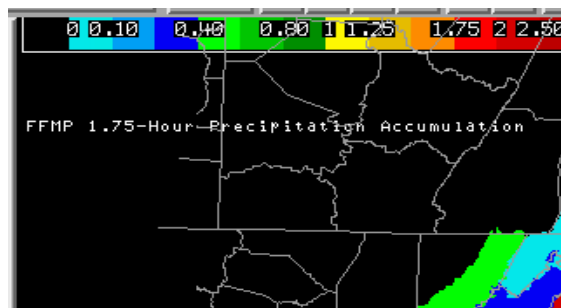
Gap: 0.00 Time Duration(hrs.)  
(hrs.) 3.00

Rate

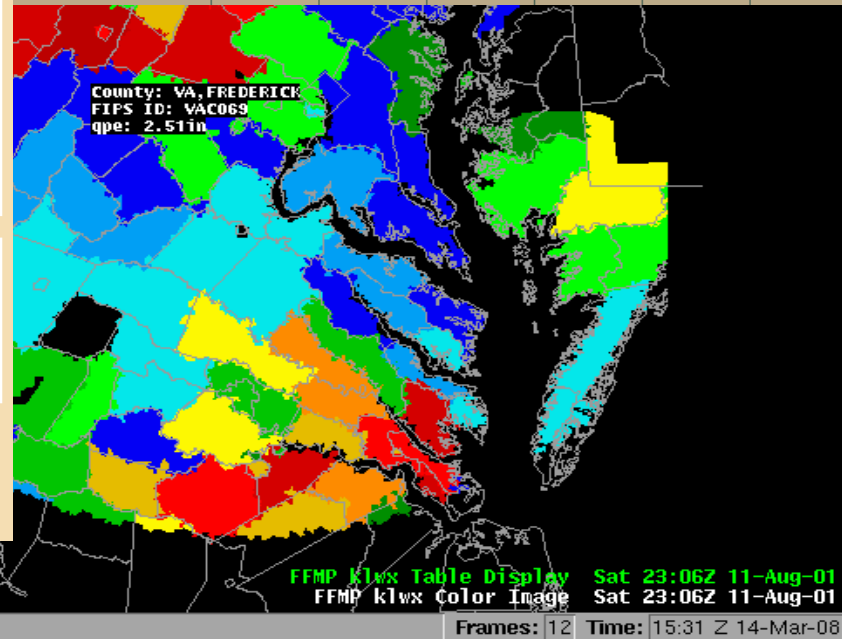
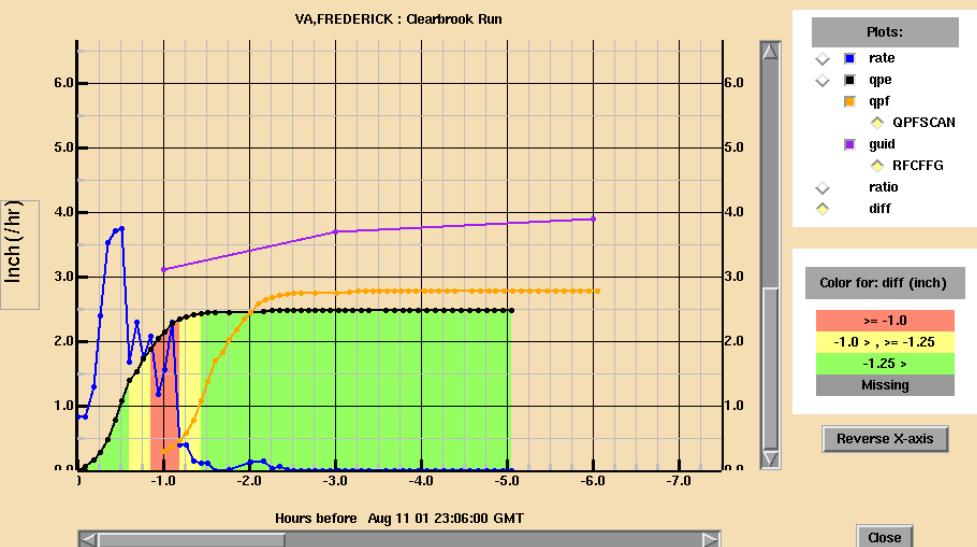
NAME	RATE	QPE	GUID	RATIO	DIFF
Esopus Creek	0.01	1.48	2.64	56	-1.15
Woodland Creek	0.01	1.43	2.60	55	-1.17
xxxx	0.11	1.38	2.68	51	-1.30
PHON6--Phoenicia	0.00	1.33	2.68	50	-1.34
Esopus Creek	0.02	1.26	2.68	47	-1.42
xxxx	0.07	1.22	2.72	45	-1.50
Esopus Creek	0.07	1.10	2.64	42	-1.54
Woodland Creek	0.01	1.06	2.68	40	-1.62
Panther Kill	0.00	0.97	2.68	36	-1.70
Woodland Creek	0.04	0.94	2.60	36	-1.65

# Highlights/Strengths: Split Window

- Combine **QPE** with **QPF**, then compare to guidance
- Brings much more of a predictive quality to FFMP



File	Config	D2D	Layer	Zoom	CWA	Click
Refresh D2D		-Config Summary-				Aug 11 01 23:06:00 GMT
Gap: 0.00 Time Duration(hrs.) : Split! 0.75 hrs. QPE and 1.0 hrs. QPF.						
(hrs.) 1.75						
<div><div></div></div>						
Rate 0.00 3.00 6.00 9.00 12.00 15.00 18.00 21.00 24.00						
		QPFSCAN		RFCFFG	RFCFFG	RFCFFG
NAME	RATE	QPE	QPF	GUID	RATIO	DIFF
VA,FREDERICK	3.11	1.80	0.40	2.96	63	-1.24
WV,HAMPSHIRE	2.81	1.57	0.30	2.98	57	-1.38
WV,HARDY	2.53	1.51	0.20	2.96	53	-1.54
MD,FREDERICK	1.35	1.20	0.30	3.50	41	-2.17
VA,CLARKE	0.44	0.93	0.20	2.96	31	-2.30
WV,BERKELEY	1.71	0.57	0.40	3.17	29	-2.36
VA,WINCHESTER	0.49	0.55	0.30	3.33	25	-2.48
VA,NORTHUMBERLAND	1.18	0.22	0.30	3.44	15	-3.02
VA,LOUDOUN	0.35	0.36	0.20	3.40	15	-3.09
WV,JEFFERSON	0.37	0.40	0.30	3.36	14	-3.02



**Tom Filiaggi** [Tom.Filiaggi@noaa.gov](mailto:Tom.Filiaggi@noaa.gov)



An aerial photograph showing a town in Binghamton, NY, completely inundated with floodwater. The water is a murky, brownish-yellow color, reaching the roofs of many buildings. The town features a mix of architectural styles, including large, multi-story brick buildings with many windows, smaller commercial structures, and a prominent white building with a red roof in the foreground. A large, multi-story brick building with a central tower and arched windows is visible on the right side. The surrounding area is filled with trees and more buildings, all partially submerged. The overall scene depicts a severe flooding event.

# Questions?

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