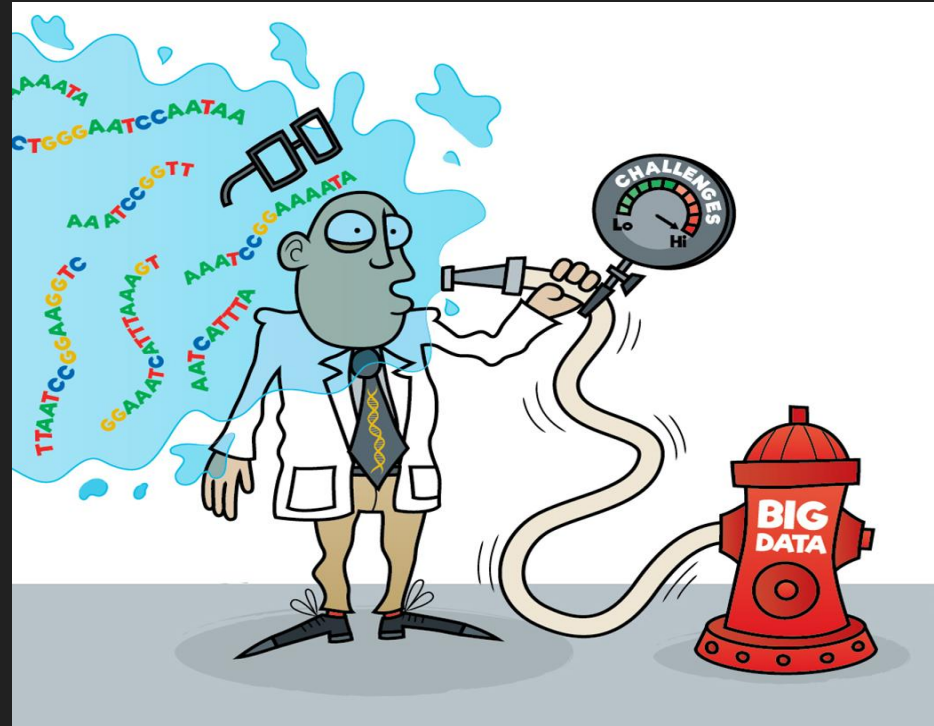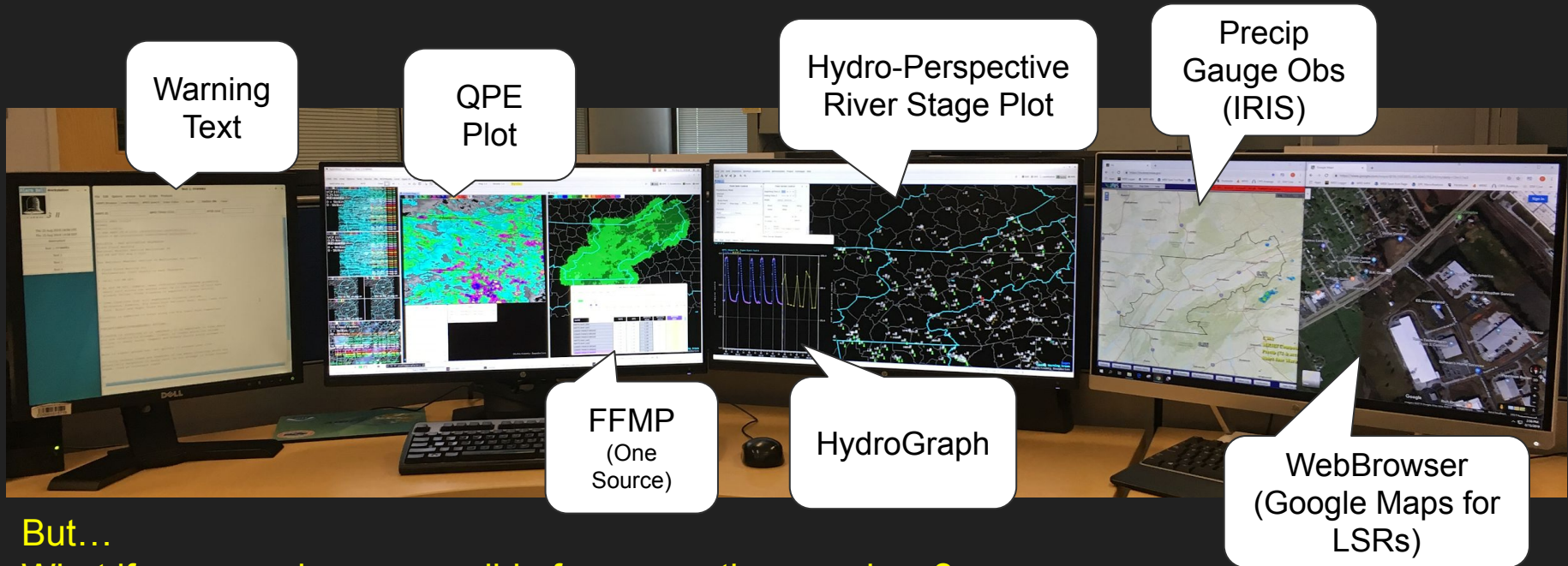Charles (Danny) Gant
Senior Forecaster
WFO Morristown
Tennessee

Ever felt like this?

Sample AWIPS Hydro Configuration

Warning Text

QPE Plot

Hydro-Perspective River Stage Plot

Precip Gauge Obs (IRIS)

FFMP (One Source)

HydroGraph

WebBrowser (Google Maps for LSRs)

But…
What if you are also responsible for convective warnings?
What about multiple RDAs and FFMP Sources?
What about differing time scales?
What about "River Monitor" tables?

Why does this have to be so complicated???

- Only so much AWIPS real estate!
  - QPE Data
  - Multiple RDA's
  - Multiple FFMP Sources
  - Precip Gauge Data
    - AWIPS
    - IRIS
    - Internet
  - River Gauge Data
  - Mesonet Data
  - Warning Text
  - Spotters
  - LSR's

"Wouldn't it be nice" if we could..

- **Consolidate all hydro data to ONE application using only ONE monitor!**

- Maybe that application could…
  - Be AWIPS independent
  - Use GIS mapping
  - Composite QPE from multiple RDAs
  - Toggle QPE and FFMP sources easily
  - Toggle between time domains easily
  - View river stage tables
  - View warning log tables
  - Archive data for training
  - And more...

Larry Lee's 2013 Vision
(Retired WFO GSP SOO)

5 Years and Many Revisions Later…

HydroViewer Advanced Version 5
(Firefox, Chrome, and Opera Browsers)

What am I looking at, and where does it come from?

- **Dual synchronized map layout**
- **Lat/Long Cursor readout**
- **Live point precipitation, river stage, temperature, and wind chill plots via IRIS and local Hydro Database**
- **Topographic and imagery basemaps**
- **Preset zoom features**
- **Weather data plotting**
  - **Radar, Watches, Warnings (via nowCOAST)**
- **Fire WX Spot forecasts via the NWS Spot Forecast page (JSON)**
- **Basin/River Tables**
- **HydroGraph Plots**

- **Live plotting of aggregated basin FFG/QPE from all raw FFMP sources**
  - **Ratio and Difference**
- **Live QPE imagery from all AWIPS sources (except HPE and BiasHPE)**
- **Additional (Derived) basin and QPE imagery sources**
  - **WorstCase/BestCase/ AllBlend**
  - **Top Performer**
  - **SmartBlend**
- **User selectable filtering of precipitation point and basin plotting**
- **Audible threshold alerts (basin ratio and river stage thresholds)**
- **Multiple RDA composite**

Precipitation Plot Controls
Showing Precip >= 0.10"

1HR 3HR 6HR 12HR 24HR 12z-12z

10% QPE Transparency

Last Updated: 2019-02-22 13:47:35Z
☑ Archive Mode 20190222_1348 ▾

Map Layers

☑ Precip Obs ☐ Radar ☐ NWS CWA's ☑ LSRs
☑ QPE Image ☐ Temps ☐ Spotters ☐ Spot Fcsts
☐ Basins ☐ Heat Index ☐ Fire ☐ Ob Sites
☐ Rivers ☐ WindChill ☐ Police
☑ Hydro Warn ☐ Winds ☐ Post
☐ Conv Warn ☐ Rel Humidity ☐ Schools
☐ Watches ☐ Highways ☐ Others

Geo-Locator
Enter Address
Enter Lat / Enter Long
Locate Clear

Basin Plot Controls
QPE Ratio Diff FFG ☑ AutoFilter
Showing Ratio|Diff|QPE >= 1%|-2.50|0.01" FFG <= 10.00"

DualPol Legacy HPE BIASHPE MRMS
TopPerf WorstCase BestCase AllBlend SmartBlend

10% Basin Transparency

CWA MRX CHA TYS TRI LNP GSMNP Southeast US CONUS Western ATL Basin Full ATL Basin

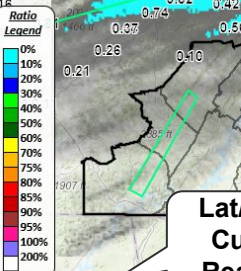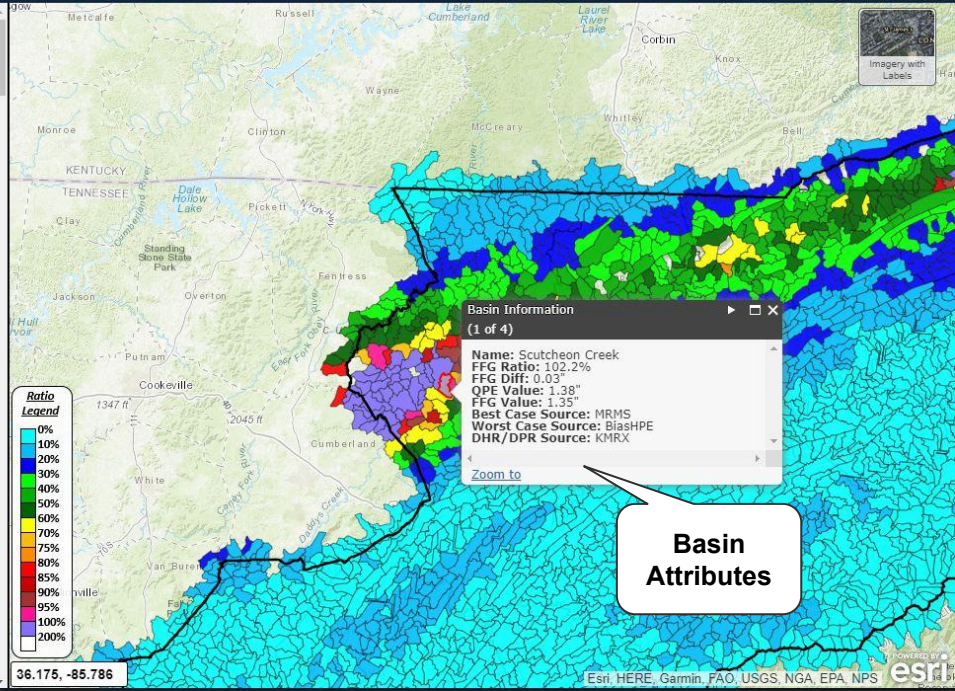Map | Basin Table | Stream Table | WWA Table | NWSChat | Help | Map | Basin Table | Stream Table | WWA Table | NWSChat

Basin Name	QPE	FFG	Ratio	Diff
Cox Branch	2.20	1.18	186.4%	1.02
Obed River	1.96	1.06	184.9%	0.90
Tom Branch	1.91	1.06	180.2%	0.85
Clear Creek	2.18	1.22	178.7%	0.96
Lyons Branch	2.07	1.18	175.4%	0.89
White Creek	2.03	1.18	172.0%	0.85
White Creek	1.94	1.14	170.2%	0.80
Little Clear Creek	2.08	1.23	169.1%	0.85
White Creek	1.90	1.14	166.7%	0.76
White Creek	1.93	1.17	165.0%	0.76
Otter Creek	1.72	1.08	159.3%	0.64
Hegler Branch	1.91	1.21	157.9%	0.70
Clear Creek	1.94	1.29	150.4%	0.65
Obed River	1.87	1.26	148.4%	0.61
Clear Creek	1.86	1.26	147.6%	0.60
Mill Branch	1.80	1.22	147.5%	0.58
Obed River	1.88	1.28	146.9%	0.60
Shell Creek	1.85	1.27	145.7%	0.58
Toms Branch	1.70	1.18	144.1%	0.52
Bobs Creek	1.79	1.30	137.7%	0.49
Long Branch	1.71	1.26	135.7%	0.45
Stony Creek	1.40	1.06	132.1%	0.34
Obed River	1.77	1.37	129.2%	0.40
Rock Creek	1.69	1.31	129.0%	0.38
Little Rock Creek	1.69	1.34	126.1%	0.35
Dry Creek	1.77	1.42	124.6%	0.35
Cove Creek	1.77	1.42	124.6%	0.35
Allen Branch	1.49	1.24	120.2%	0.25

Basin Table Active

Ratio Legend
0%
10%
20%
30%
40%
50%
60%
70%
75%
80%
85%
90%
95%
100%
200%

Basin Information
(1 of 4)
Name: Scutcheon Creek
FFG Ratio: 102.2%
FFG Diff: 0.03"
QPE Value: 1.38"
FFG Value: 1.35"
Best Case Source: MRMS
Worst Case Source: BiasHPE
DHR/DPR Source: KMRX
Zoom to

Basin Attributes

36.175, -85.786

Esri, HERE, Garmin, FAO, USGS, NGA, EPA, NPS

Precipitation Plot Controls

Showing Precip >= 0.10"

1HR | 3HR | 6HR | 12HR | 24HR | 12z-12z

10% QPE Transparency

Last Updated: 2019-02-22 13:47:35Z

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Map Layers

☑ Precip Obs ☐ Radar ☐ NWS CWA's ☑ LSRs
☑ QPE Image ☐ Temps ☐ Spotters ☐ Spot Fcsts
☐ Basins ☐ Heat Index ☐ Fire ☐ Ob Sites
 ☐ WindChill ☐ Police
 ☐ Winds ☐ Post
 ☐ Rel Humidity ☐ Schools
 ☐ Highways ☐ Others

Geo-Locator

Enter Address

Enter Lat | Enter Long

Locate | Clear

Basin Plot Controls

QPE | Ratio | Diff | FFG ☑ AutoFilter

Showing Ratio|Diff|QPE >= 1%|-2.50|0.01" FFG <= 10.00"

DualPol | Legacy | HPE | BIASHPE | MRMS
TopPerf | WorstCase | BestCase | AllBlend | SmartBlend

10% Basin Transparency

CWA | MRX | CHA | TYS | TRI | LNP | GSMNP | Southeast US | CONUS | Western ATL Basin | Full ATL Basin

Map | Basin Table | Stream Table | WWA Table | NWSChat | Help | Map | Basin Table | Stream Table | WWA Table | NWSChat

☑ Show HG ☑ Show HP

Stream Name Active Warning Active Advisory	County	Ac/Mi/Mo/Ma	Current Level	Upgrade Departure
NEPT1: Newport Tn	Cocke	6/8/10/12	8.11	-1.89
TAZT1: Tazewell Tn	Claiborne	10/12/16/21	12.54	-3.46
CHCG1: Keiths Mill Near Dalton	Whitfield	14/16/28/32	19.55	-8.45
CHKT1: Chickamauga Tn	Hamilton	16/18/22/27	17.98	
ARTT1: Arthur Tn	Claiborne	15/17/22/26	16.82	
WHTT1: Whitwell Tn	Marion	12/14/18/19	13.64	
SFYV2: Speers Ferry Va	Scott	16/18/28/32	15.47	
CLVV2: Cleveland Va	Russell	12/14/19/24	9.05	
JNSV2: Jonesville Va	Lee	15/18/30/35	7.69	
SCKV2: Stoney Creek Above Fort Blackmore	Scott	4/6.5//	4.40	
TMVN7: Tomotla	NC	6/12/13/14	7.29	-4.71
OAKT1: Oakdale Tn	Morgan	12/27/28/30	11.97	-0.03
GATV2: Gate City Va	Scott	10/12/15/18	9.54	-0.46
NWPT1: Newport Tn	Cocke	8/10/16/20	6.77	-1.23
CPHT1: Copperhill Tn	Polk	6/8/12/14	4.71	-1.29
RVLT1: Rogersville	Hawkins	5/7/8/9	3.58	-1.42
BCDV2: Big Stone Gap - Big Cherry Dam	Wise	46/48//	44.10	-1.90
TWNT1: Little River At Townsend	Blount	6/8//	3.99	-2.01
EZBT1: Watauga River At Elizabethton	Carter	7/8.5/11.5/14	4.89	-2.11
BMCV2: Big Moccasin Creek At Gate City	Scott	6/8.5//	3.80	-2.20
DOET1: Elizabethton	Carter	5/8/9/10	2.72	-2.28
FTBV2: Clinch River At Fort Blackmore	Scott	10/12//	7.30	-2.70
HJBT1: Gatlinburg	Sevier	7/8//	3.55	-3.45
BCBV2: Beaver Creek At Bristol	City of Bristol	10/12//	5.37	-4.63
SNCV2: Stone Creek At Pennington Gap	Lee	10/12//	5.20	-4.80
MYVT1: Little River At Maryville	Blount	15/18/21/24	10.13	-4.87
SEVT1: Sevierville Tn	Sevier	10/11/14/16	4.91	-5.09

Important Note!

Check your NEPT1: Newport Tn stream levels, partner!

Attributes

Location ID = TMVN7
Value = 7.29
Valid Time = 2019-02-22 13:31:00Z
Action Stage = 6
Minor Flood = 12
Moderate Flood = 13
Major Flood = 14
Current Stage Category = Action
Departure From Upgrade = -4.71
HydroGraph Page = Open In New Tab

Impact Statements =
6 (ft) : ALTHOUGH WELL BELOW OFFICIAL FLOOD STAGE, CAMPGROUNDS AND BUILDINGS DOWNSTREAM WILL HAVE PROBLEMS.

12 (ft) : PROPERIES AND BUILDINGS IN THE FLOOD PLAIN ARE FLOODED AND MAY BE INACCESSIBLE. NEARBY FIELDS ARE FLOODED. THE CITY OF MURPHY BEGINS TO BE THREATENED.

13 (ft) : ROADS IN THE VICINITY OF THE GAGE AND DOWNSTREAM ARE CLOSED.

Zoom to

Stage Legend
Black — Normal
Yellow — Action
Orange — Minor
Red — Moderate
Magenta — Major

34.562, -85.586

Esri, HERE, Garmin, FAO, USGS, EPA, NPS

1HR 3HR 6HR 12HR 24HR 12z-12z

10% QPE Transparency

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☑ Archive Mode 20190222_1348 ▾

Map Layers
☑ Precip Obs   ☐ Radar   ☑ NWS CWA's   ☑ LSRs
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Basin Plot Controls
QPE Ratio Diff FFG   ☑ AutoFilter
Showing Ratio|Diff|QPE >= 1%|-2.50|0.01" FFG <= 10.00"

DualPol Legacy HPE BIASHPE MRMS
TopPerf WorstCase BestCase AllBlend SmartBlend

10% Basin Transparency

CWA MRX CHA TYS TRI LNP GSMNP Southeast US CONUS Western ATL Basin Full ATL Basin

Map | Basin Table | Stream Table | WWA Table | NWSChat | Help | Map | Basin Table | Stream Table | WWA Table | NWSChat
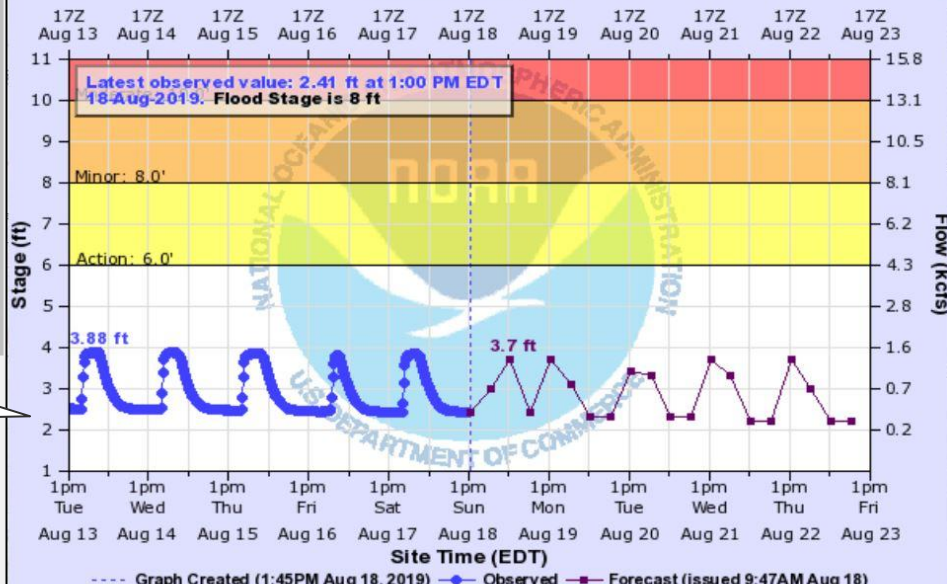
☑ Show HG   ☑ Show HP

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ARTT1: Arthur Tn	Claiborne	15/17/22/26	16.82	-0.18
WHTT1: Whitwell Tn	Marion	12/14/18/19	13.64	-0.36
SFYV2: Speers Ferry Va	Scott	16/18/28/32	15.47	-0.53
CLVV2: Cleveland Va	Russell	12/14/19/24	9.05	-2.95
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SCKV2: Stoney Creek Above Fort Blackmore	Scott	4/6.5//	4.40	-2.10
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BCDV2: Big Stone Gap - Big Cherry Dam	Wise	46		
TWNT1: Little River At Townsend	Blount	6		
EZBT1: Watauga River At Elizabethton	Carter	7/8.5		.11
BMCV2: Big Moccasin Creek At Gate City	Scott	6/		.20
DOET1: Elizabethton	Carter	5/8		.28
FTBV2: Clinch River At Fort Blackmore	Scott	10/12//	7.30	-2.70
HJBT1: Gatlinburg	Sevier	7/8//	3.55	-3.45
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SNCV2: Stone Creek At Pennington Gap	Lee	10/12//	5.20	-4.80
MYVT1: Little River At Maryville	Blount	15/18/21/24	10.13	-4.87
SEVT1: Sevierville Tn	Sevier	10/11/14/16	4.91	-5.09

HydroGraph Popup Via MouseOver Stream Name

PIGEON RIVER AT NEWPORT
Universal Time (UTC)

17Z Aug 13 17Z Aug 14 17Z Aug 15 17Z Aug 16 17Z Aug 17 17Z Aug 18 17Z Aug 19 17Z Aug 20 17Z Aug 21 17Z Aug 22 17Z Aug 23

Latest observed value: 2.41 ft at 1:00 PM EDT 18-Aug-2019. Flood Stage is 8 ft

Minor: 8.0'

Action: 6.0'

Stage (ft)   Flow (kcfs)

3.88 ft   3.7 ft

1pm Tue Aug 13 1pm Wed Aug 14 1pm Thu Aug 15 1pm Fri Aug 16 1pm Sat Aug 17 1pm Sun Aug 18 1pm Mon Aug 19 1pm Tue Aug 20 1pm Wed Aug 21 1pm Thu Aug 22 1pm Fri Aug 23

Site Time (EDT)

- - - Graph Created (1:45PM Aug 18, 2019) ● Observed ■ Forecast (issued 9:47AM Aug 18)

NEPT1(plotting HGIRG) "Gage 0" Datum: 1038.76'   Observations courtesy of US Geological Survey

User Testimonials…
Currently Installed in 12 WFOs in 4 NWS Regions...

"It is a favorite among many of the staff for the efficient way data from many sources is displayed, leading to the ultimate goal of issuing timely and accurate hydrologic warnings."

"identified long-standing deficiencies in legacy FFM & P tools and, for the first time, made mitigation of those deficiencies a priority."

"gives me a more knowledgeable grip and confidence in the event situational awareness."

" game changer for flood/flash flooding monitoring."

"Finally, a place where FFMP data from multiple sources could be compared and combined easily in one place."

"extremely valuable tool for monitoring a wide variety of ongoing flooding hazards."

"5/5 Stars, would definitely recommend to a friend."

Contact Me: Charles.Gant@noaa.gov
HydroViewer VLAB Wiki:
https://vlab.ncep.noaa.gov/redmine/projects/nwsscp/wiki/HydroViewer