Northeast U.S. Drought Conditions September 29, 2016

Streamflow and Groundwater Levels

William Coon, Hydrologist

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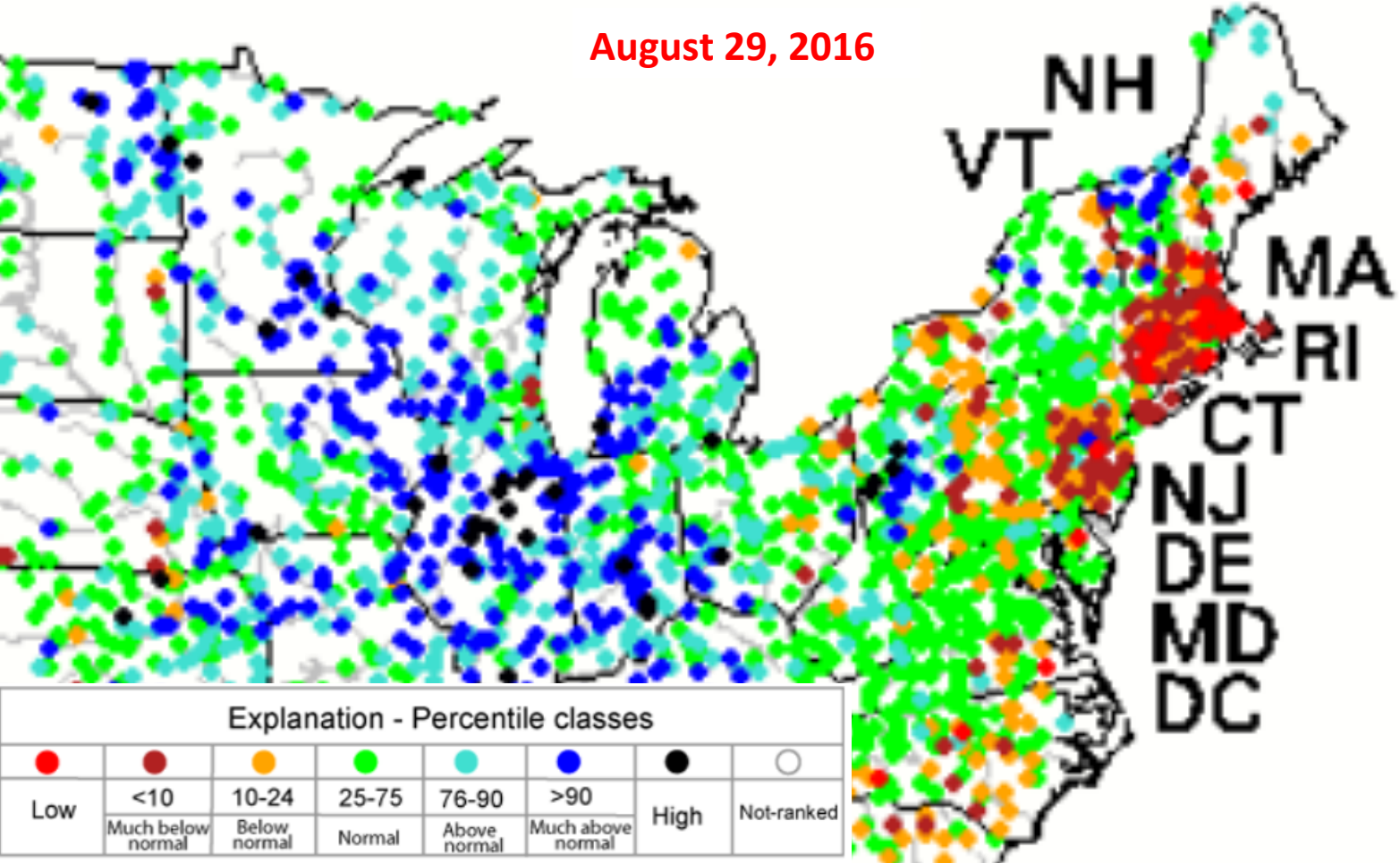
Daily Streamflow – Compared to Historical Streamflow

August 29, 2016



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

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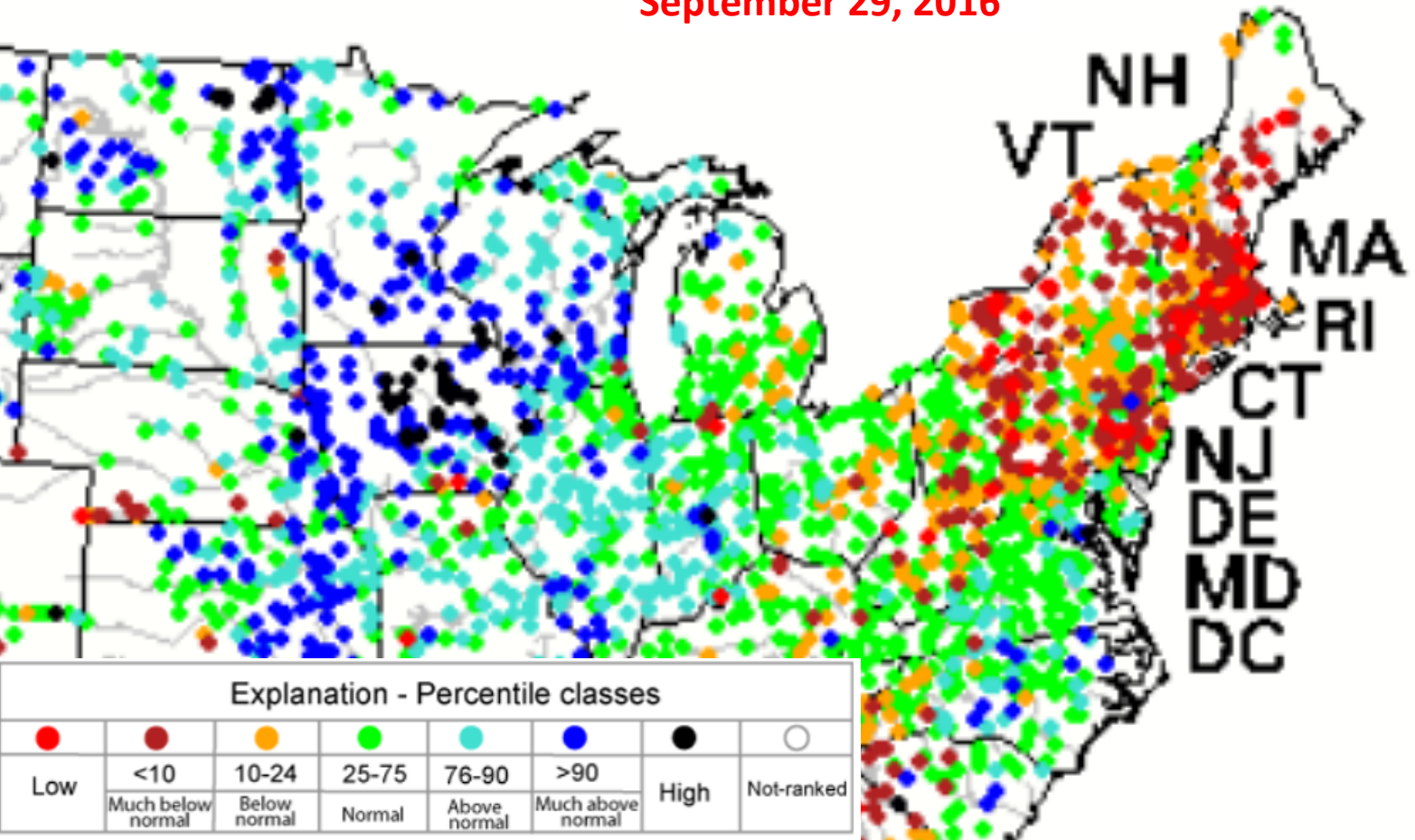

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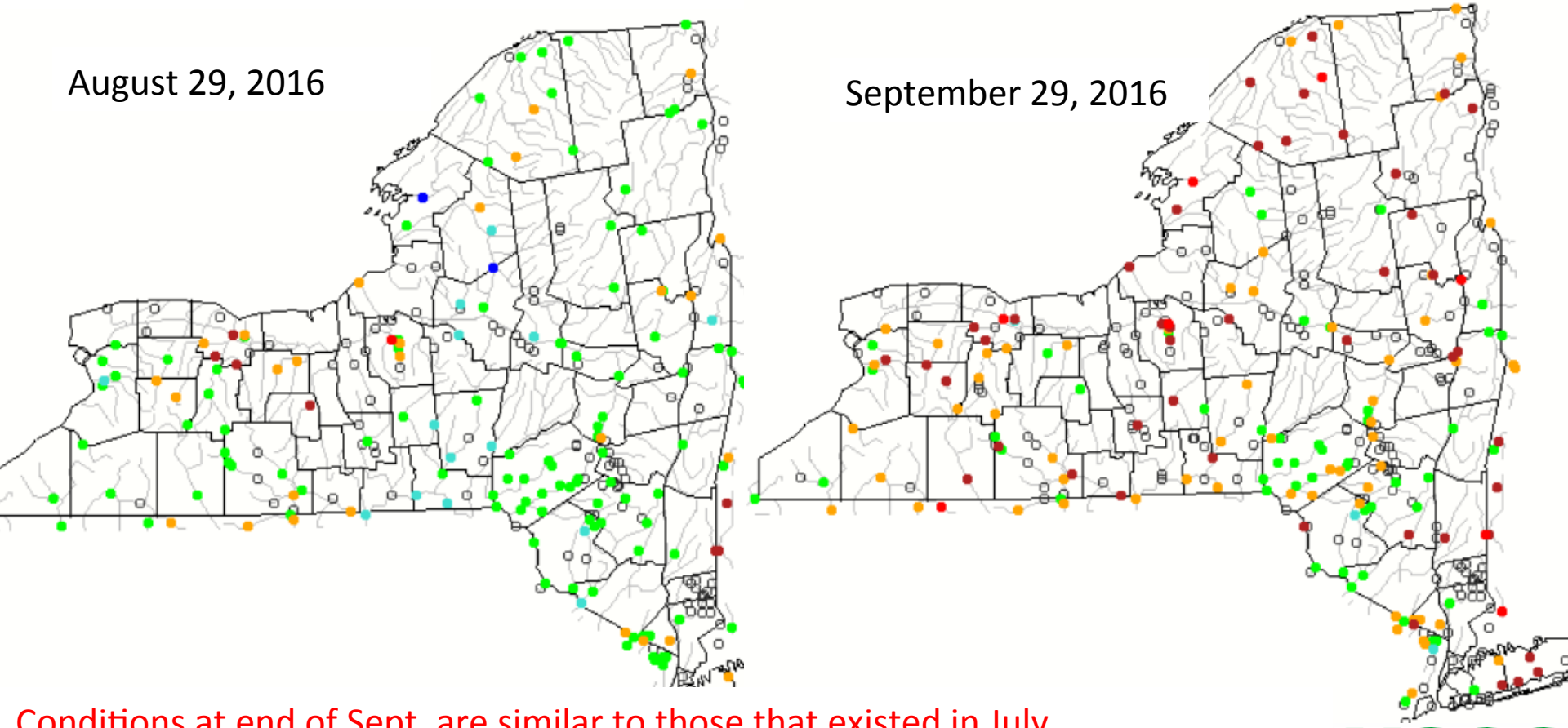
Daily Streamflow



Conditions at end of Sept. are similar to those that existed in July.
Rain that increased flows in some streams during August, has not been sustained.

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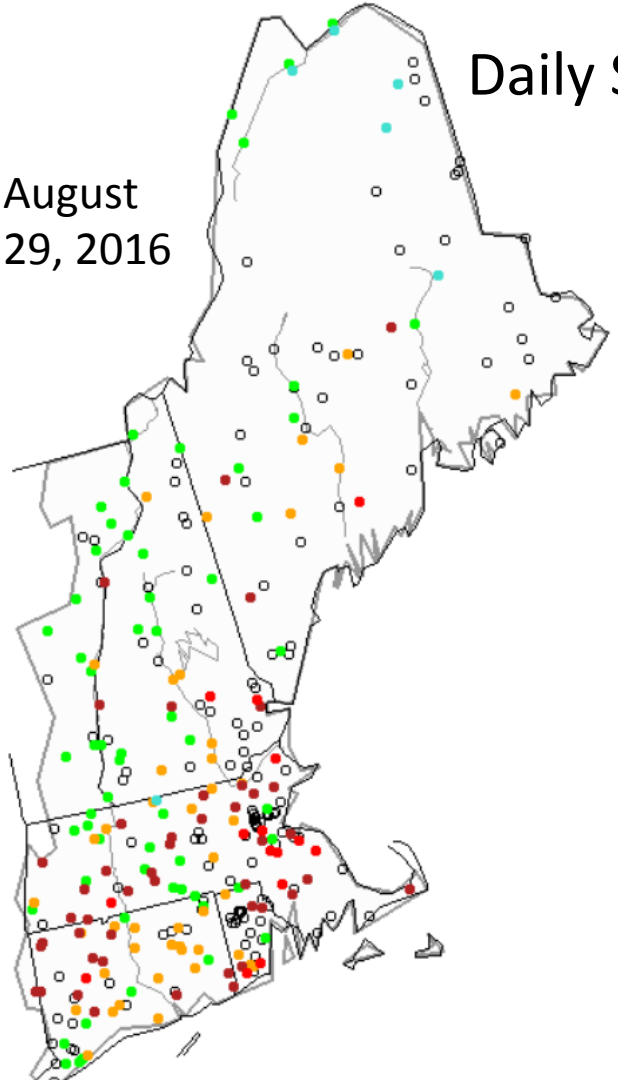
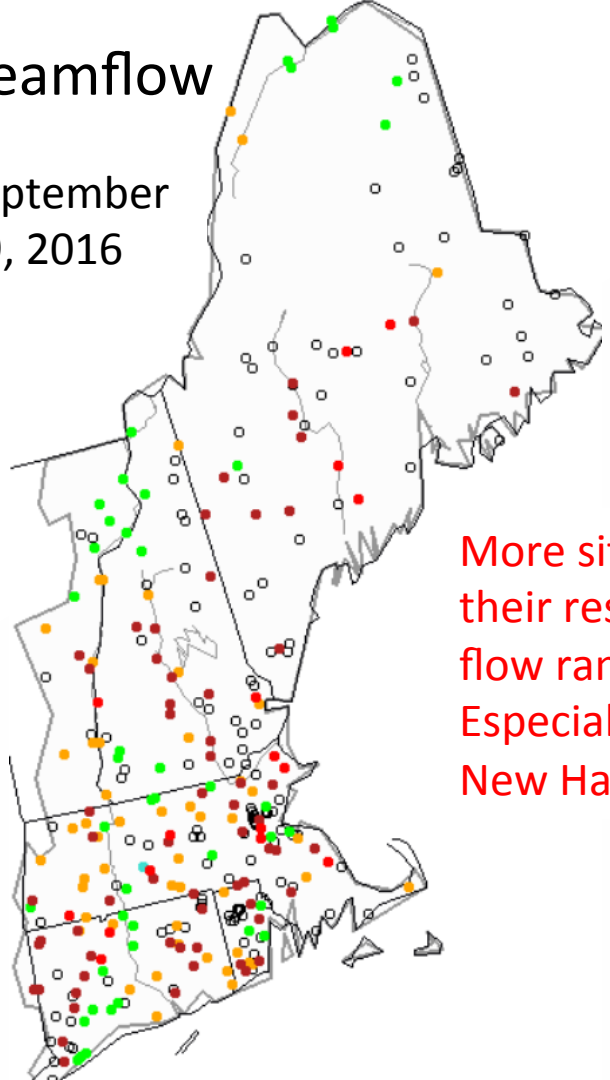
Daily Streamflow

August
29, 2016



September
29, 2016



More sites have fallen into their respective below-normal flow ranges.
Especially in Vermont, New Hampshire, and Maine.

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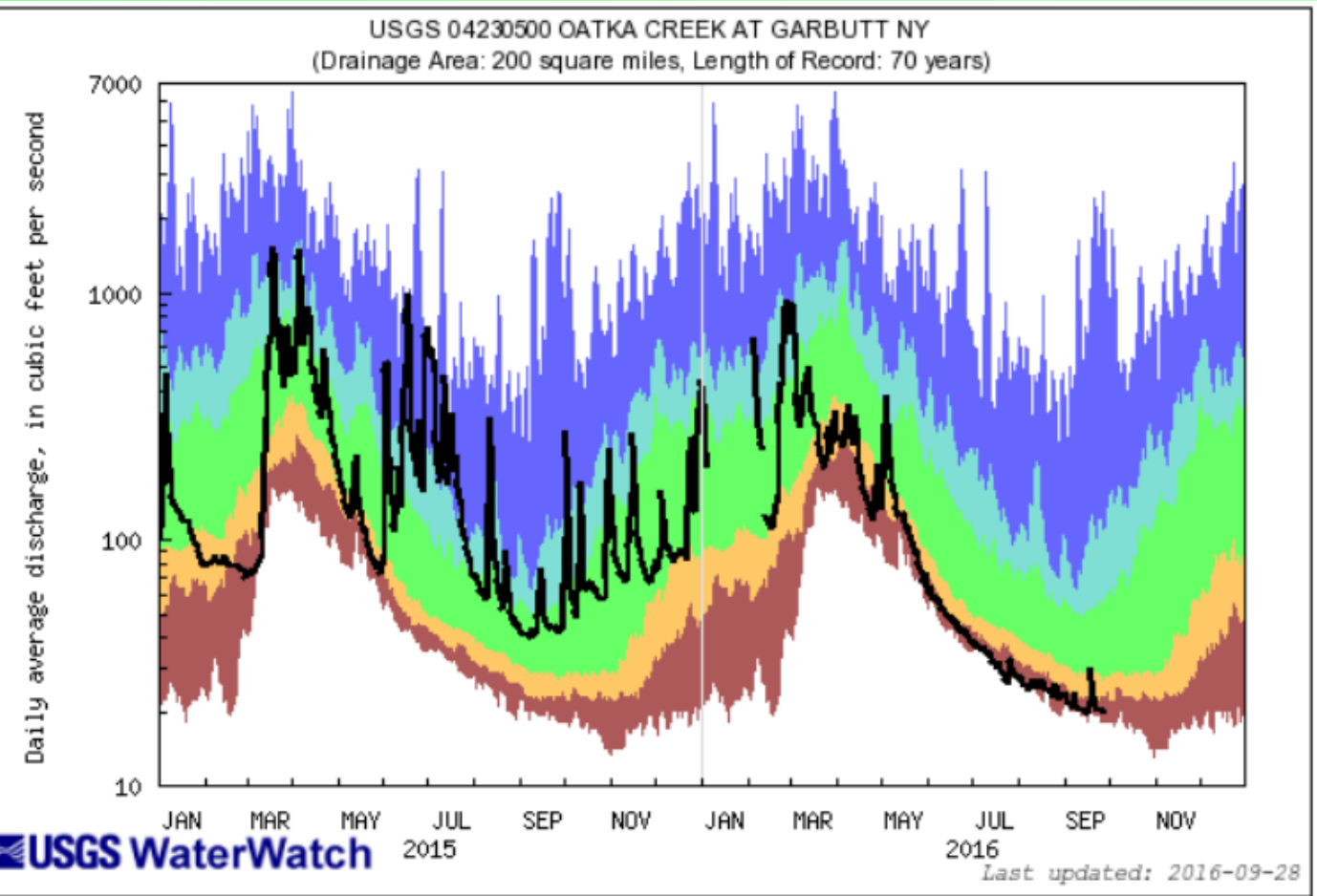
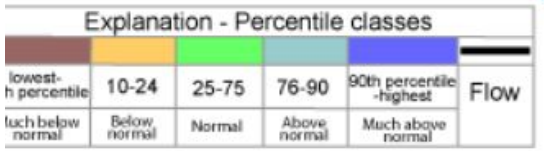
Oatka Creek at Garbutt, NY – 70 years of record





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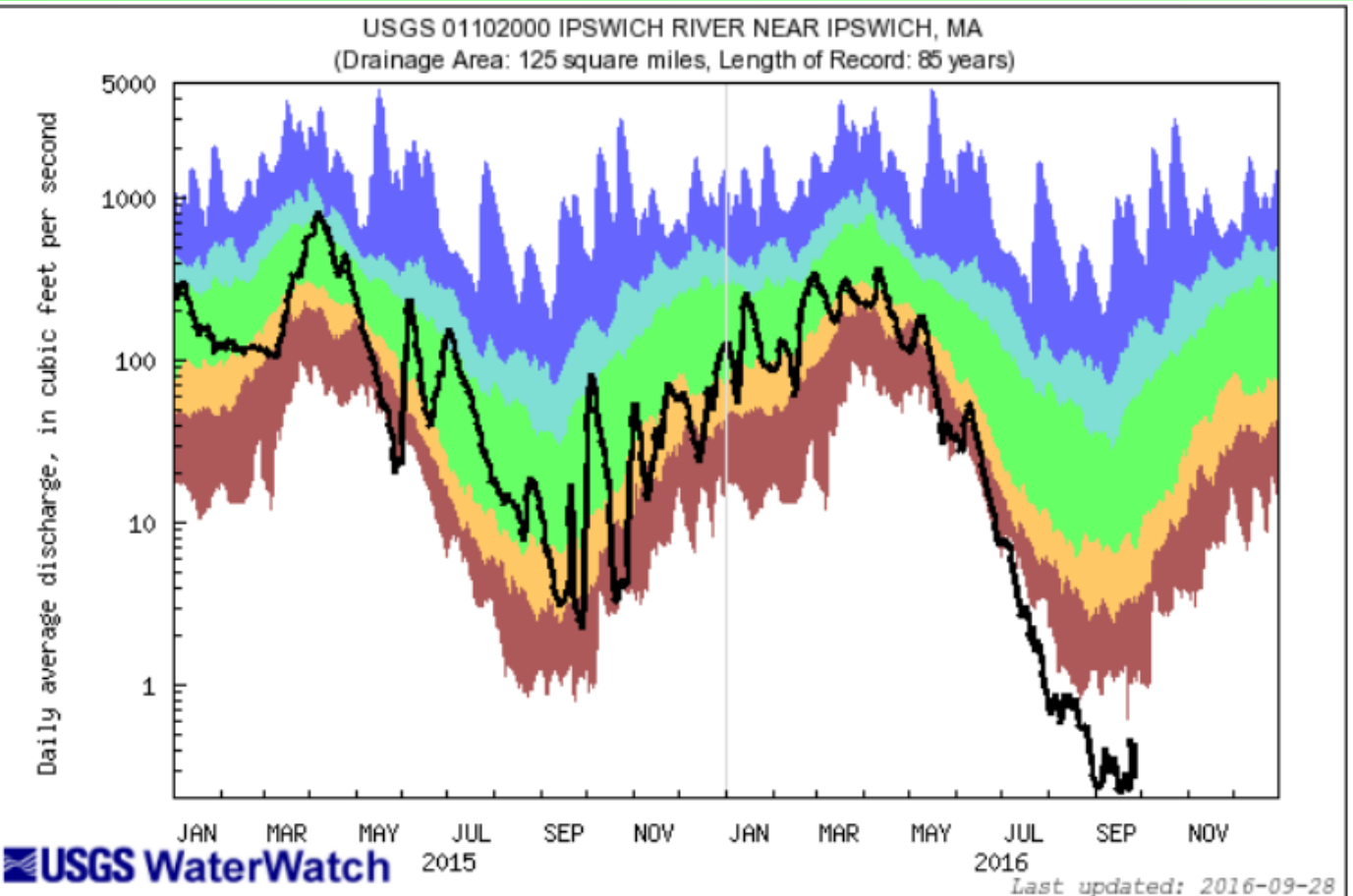
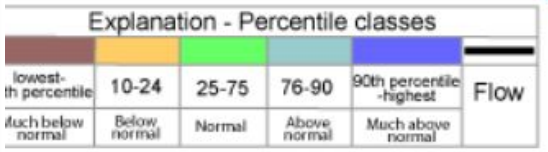
Ipswich River near Ipswich, MA – 85 years of record (affected by withdrawals and regulation)





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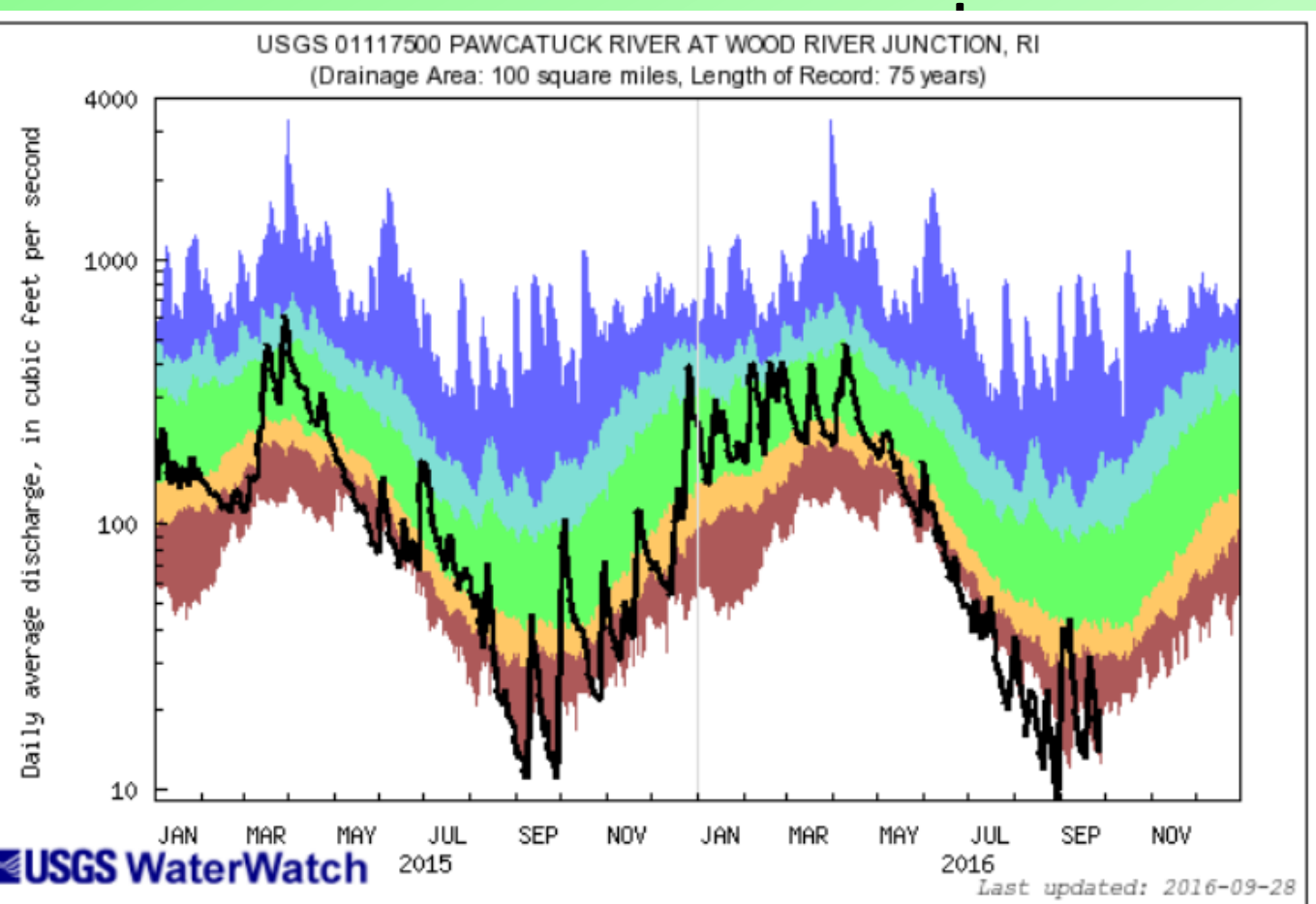
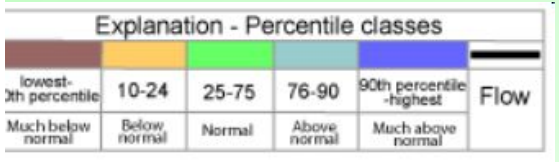
Pawcatuck River at Wood River Junction, RI – 75 years of





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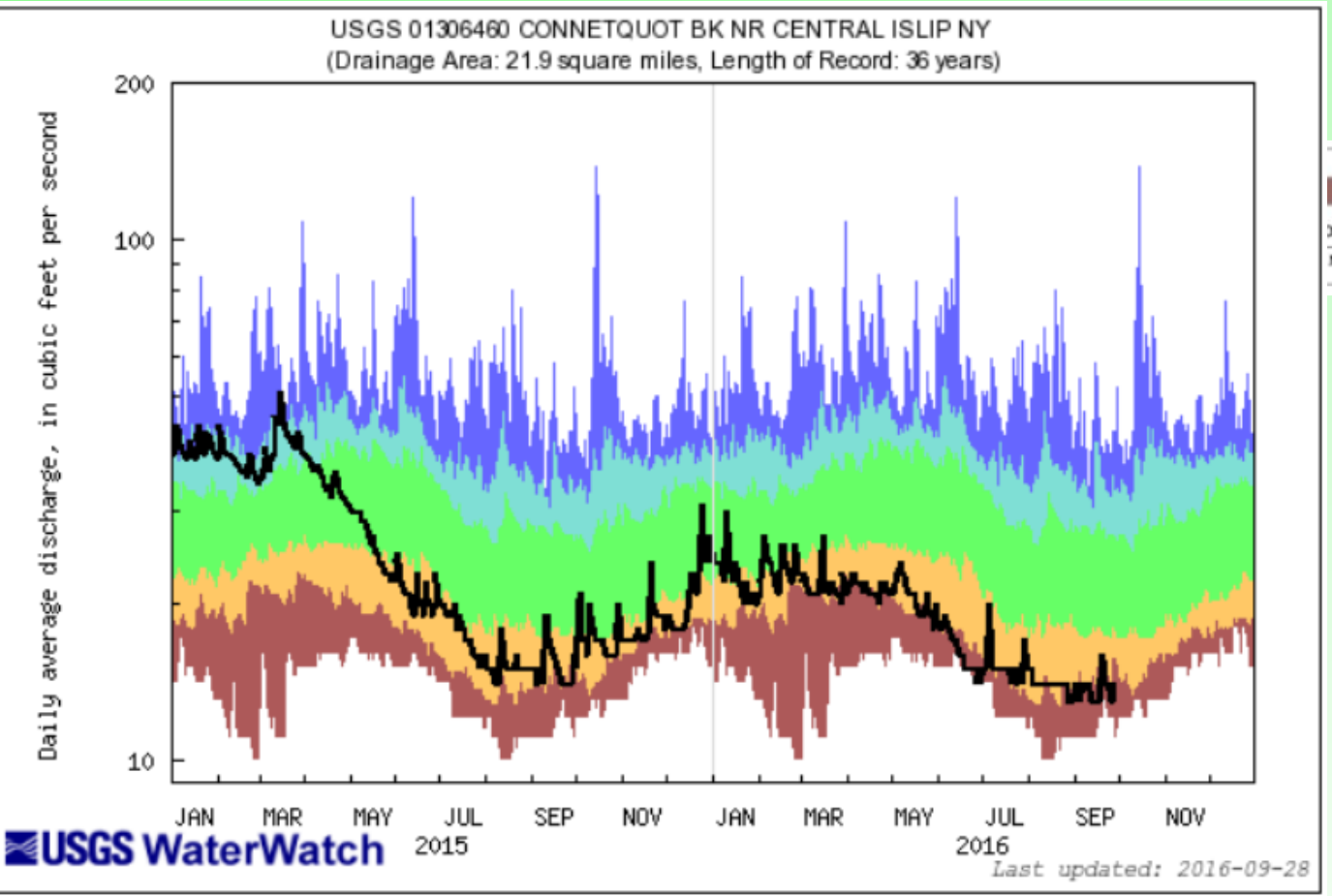
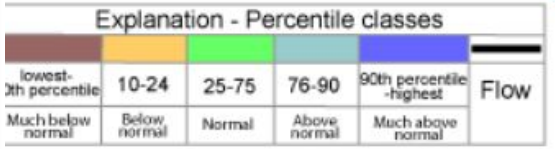
Connetquot Brook near Central Islip, NY – 36 years of record





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Massachusetts Reservoirs

(September 1, 2016)

http://geology.com/state-map/maps/massachusetts-rivers-map.gif

Quabbin Reservoir
– 85.1% of capacity

Wachusett Reservoir
– 91.0 % of capacity

"Normal"

Source: Massachusetts Water Resources Authority

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New York City Reservoirs

(September 28, 2016)

http://www.dos.ny.gov/watershed/images/lgmap.jpg

West of Hudson Reservoirs

(collectively)

Current storage – 70.7%

Normal storage – 76.0%

Source: New York City Environmental Protection

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Groundwater Climate Response Network

Includes wells:

- Located in aquifers that respond to climatic fluctuations
- Minimally affected by pumpage
- Essentially unaffected by sources of artificial recharge (from irrigation, canals, etc.)
- Have never gone dry or are not susceptible to going dry

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Groundwater Climate Response Network

Response to rainfall depends on:

- Type of aquifer – sand-gravel, bedrock
- Depth to water table – increases with ET and lack of rain
- Density of fractures to convey water in bedrock

Apparent response depends on:

- Length of period of record
- Does well record extend back to 1960s drought?

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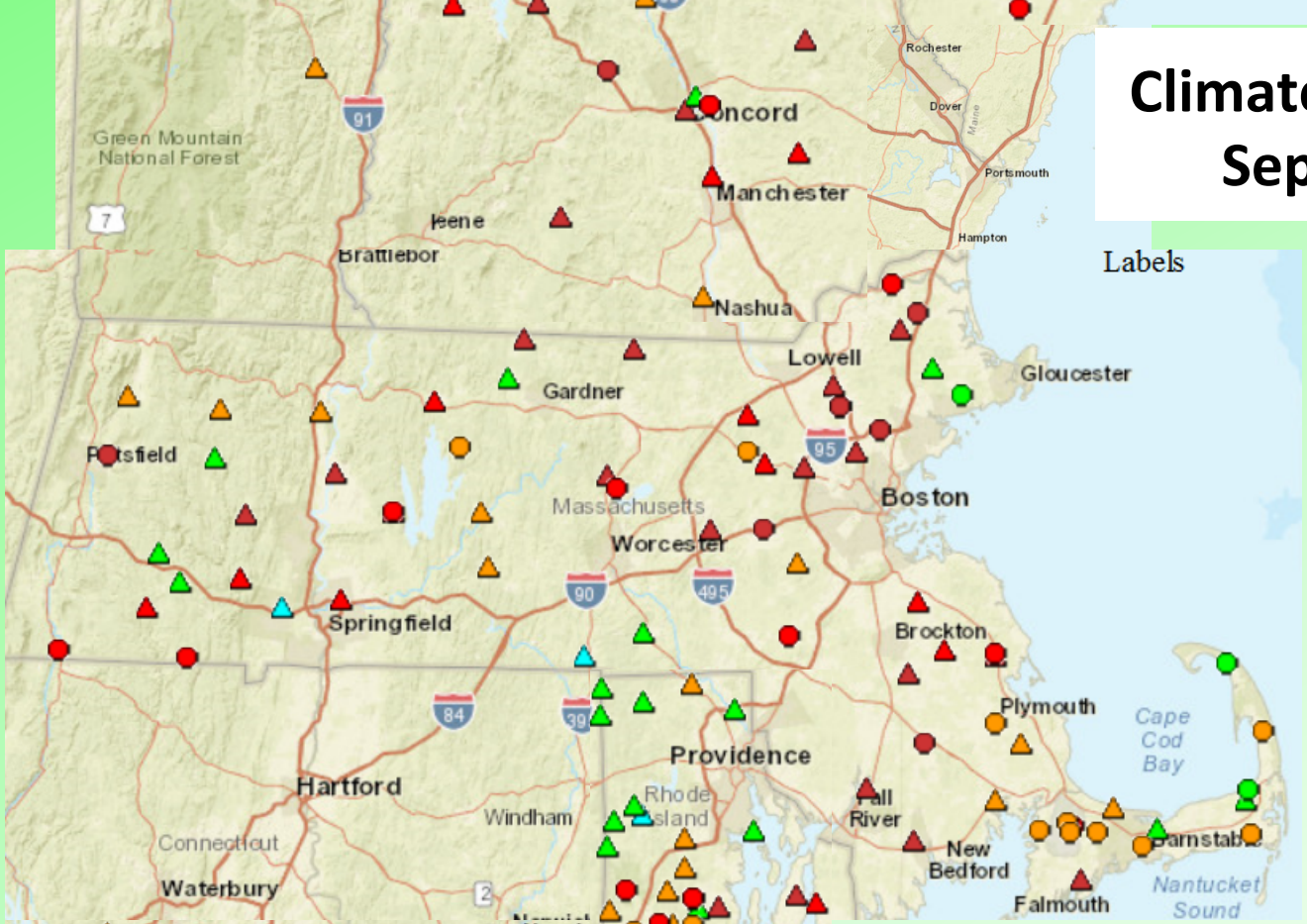
Climate Response Network
September 28, 2016



Explanation - Percentile classes (symbol color based on most recent measurement)

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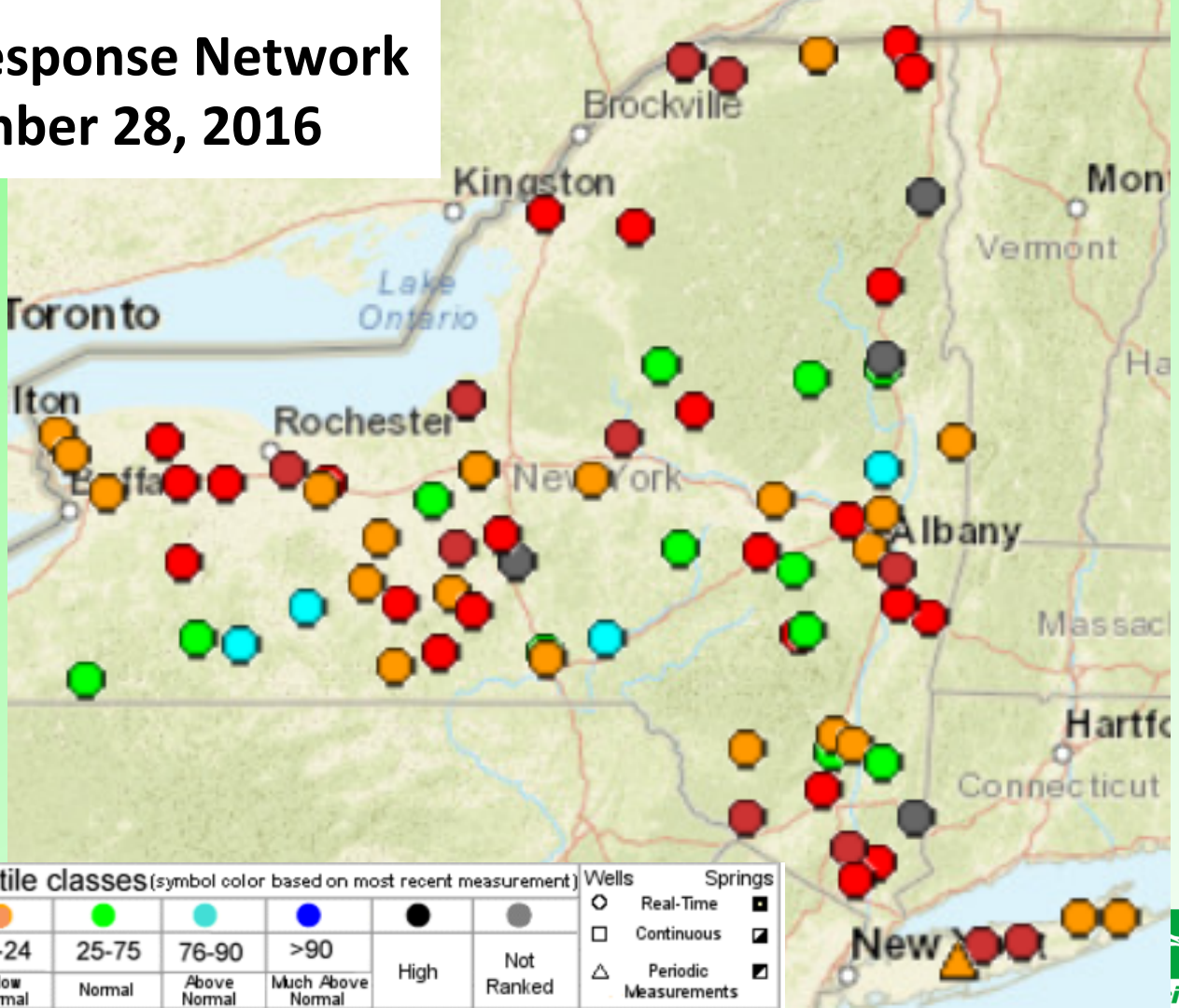
Wells / Springs
- Real-Time
- Continuous
- Periodic Measurements

Climate Response Network
September 28, 2016



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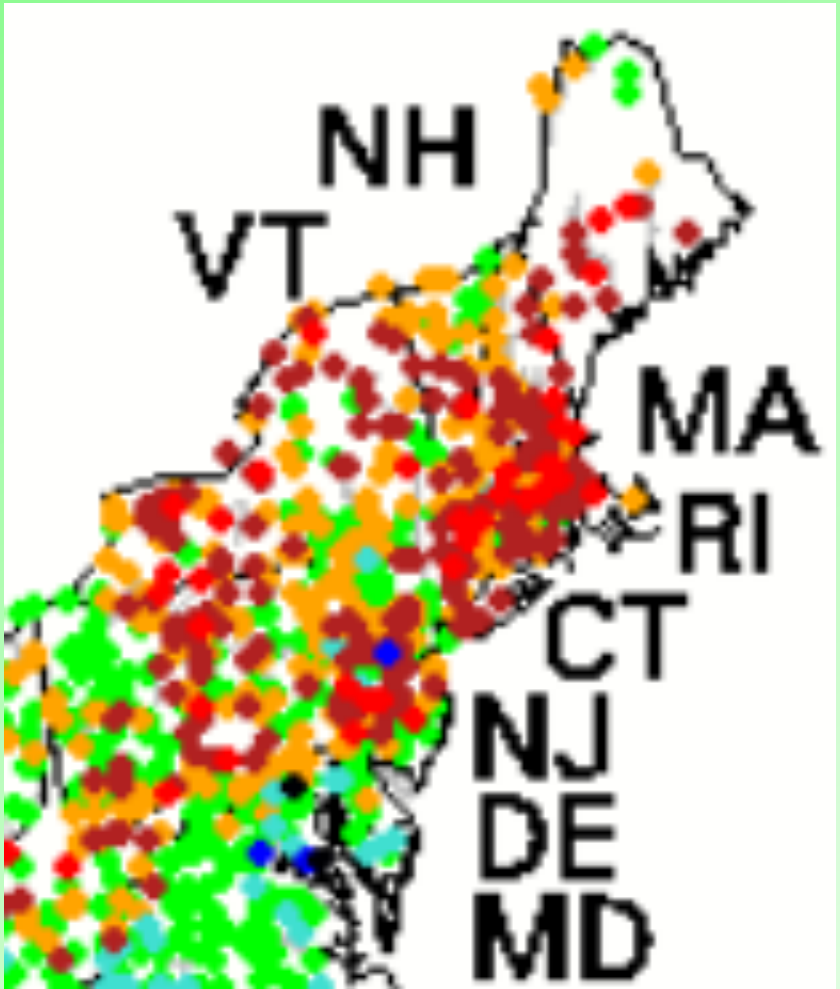
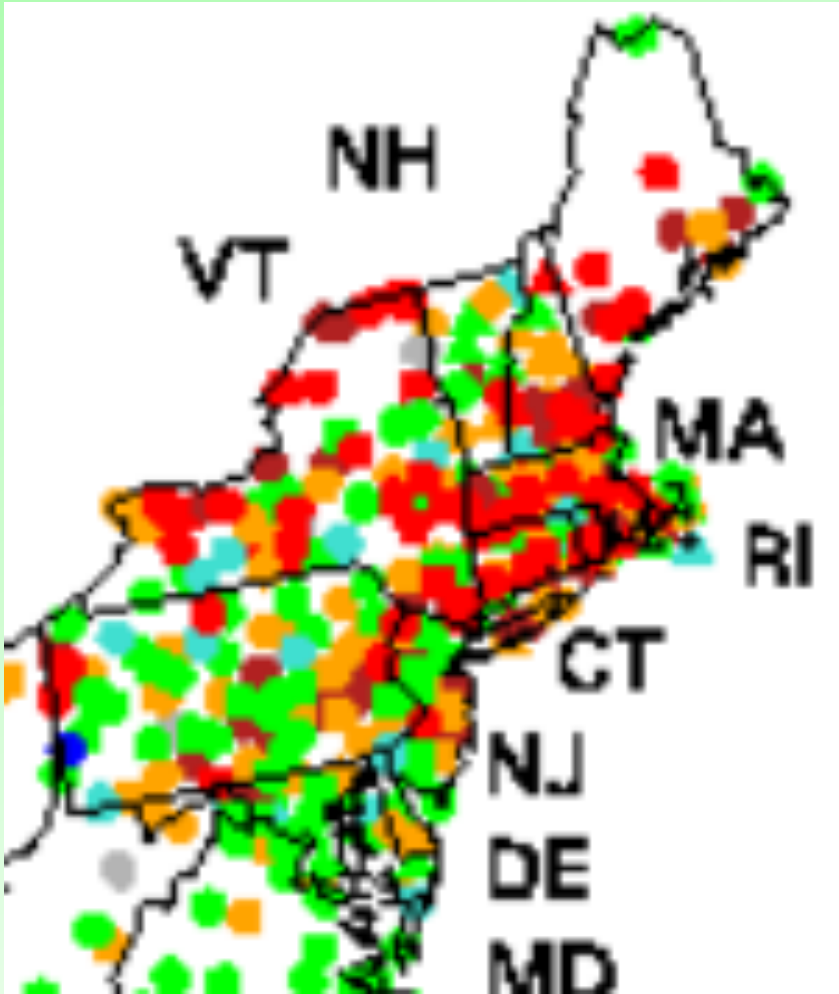
Streamflow



Groundwater Levels



Hydrologic Response to Predicted Rainfall

Low-intensity, long-duration rainfall

- Low amounts of runoff
- Rain will soak into dry ground
- Infiltrated water will wet soil particles before reaching water table
- ET will continue until leaf-off

Effects on Streamflow – Probably negligible

Groundwater levels – Likely increase, but dependent on aquifer characteristics

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Hydrologic Response to Predicted Rainfall

High-intensity, short-duration rainfall

- Larger percentage of rain will run off
- Less infiltration

Effect on Streamflow

- Flash flood potential in small steep basins & urban areas.
- Large streams may rise but unlikely to flood.

Effect on Groundwater levels

- Small, if any, increase; dependent on aquifer characteristics
- ET will continue until leaf-off

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Hydrologic Response to Predicted Rainfall

Best Scenario to End Drought

Medium-intensity, long-duration rainfall

- Some run off
- Large amount of infiltration

Effect on Streamflow

- Flows will increase; flooding is unlikely.

Effect on Groundwater levels

- Gradual increase

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