

Delaware River Basin Commission

Hydrologic Conditions

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Water Resource Scientist

Water Management Advisory Committee

October 21, 2021



Delaware River Basin Commission

DELAWARE • NEW JERSEY
PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA

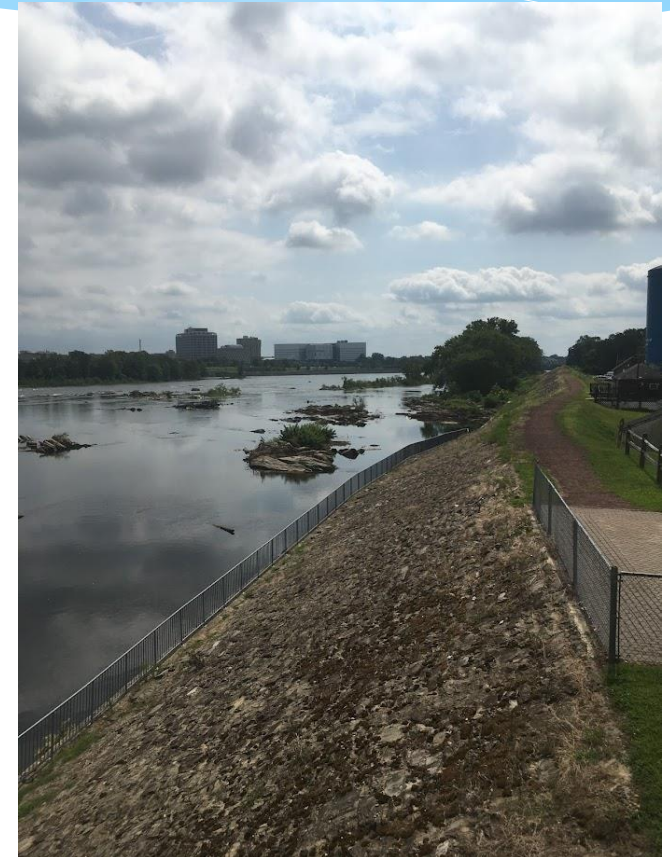
Presented to an advisory committee of the DRBC on October 21, 2021.
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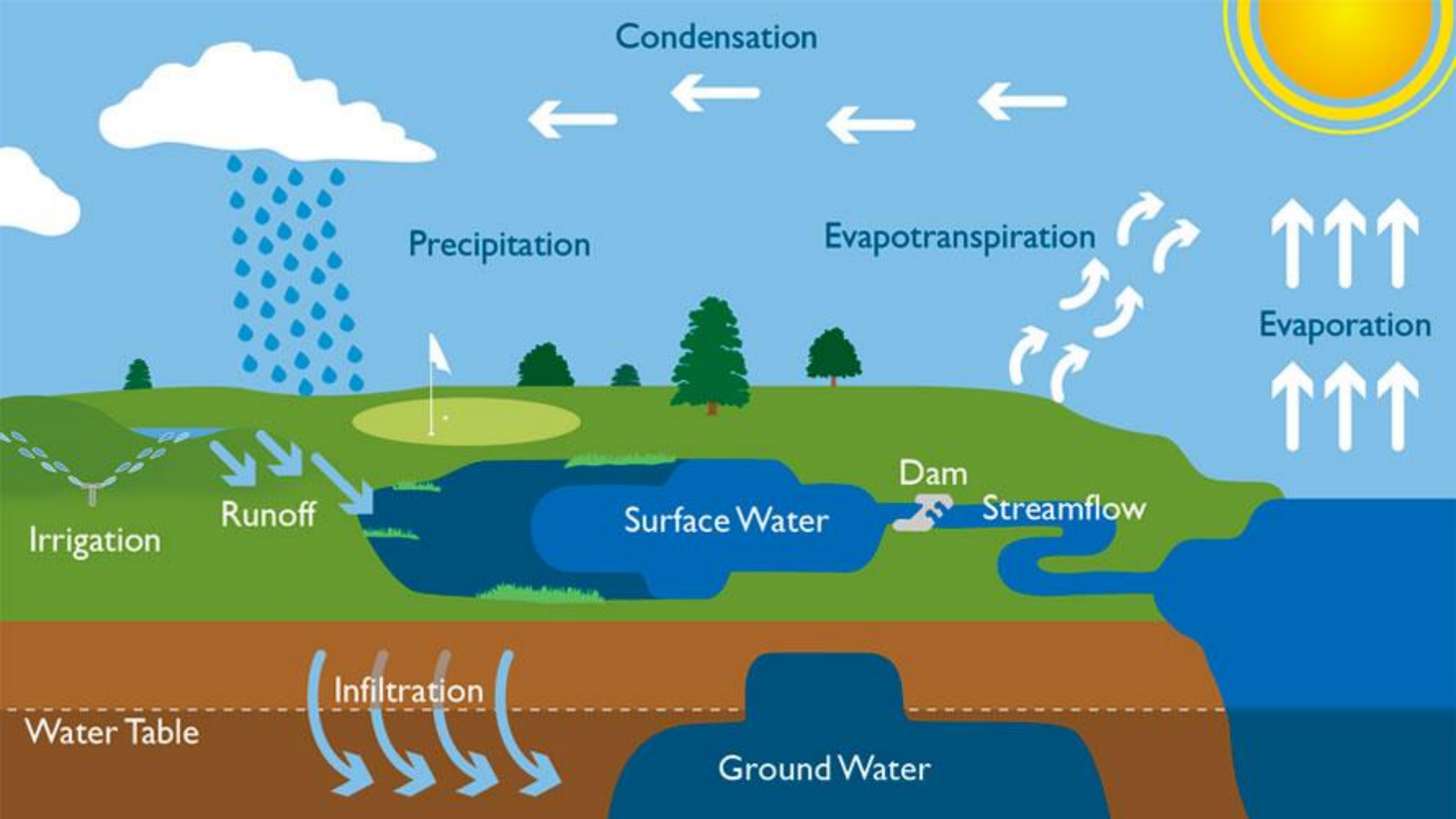
Today

**Imagine a Day
Without Water**
October 21, 2021



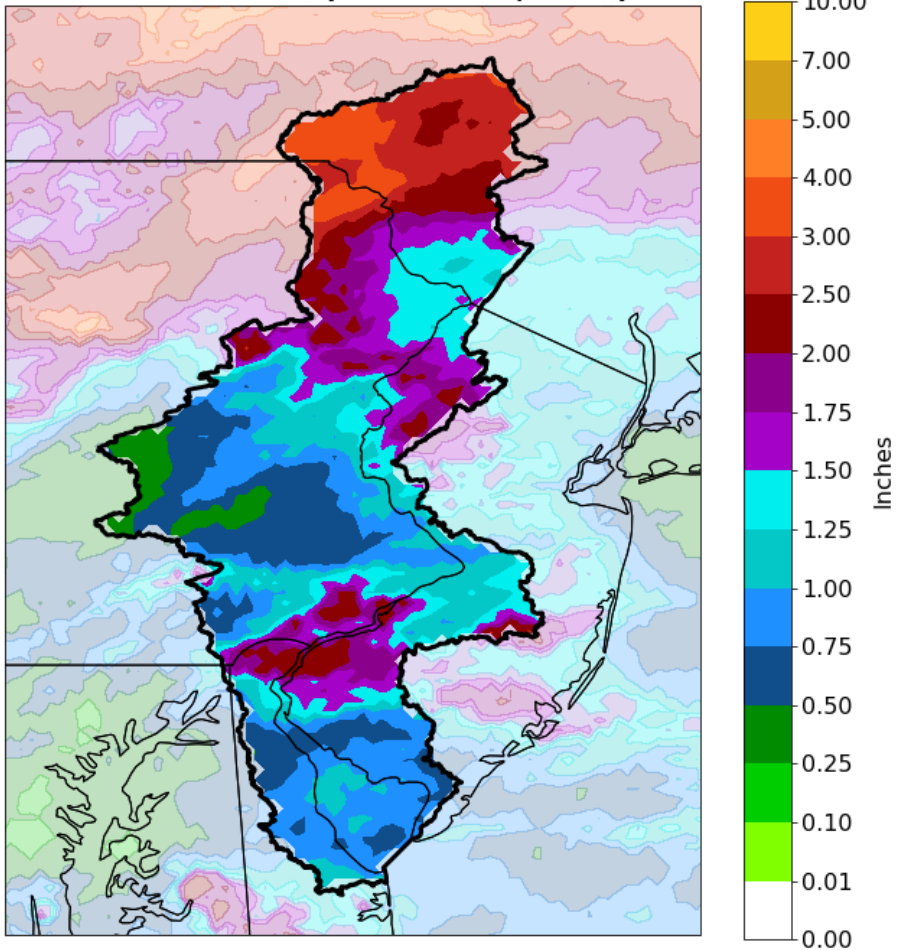
#ValueWater



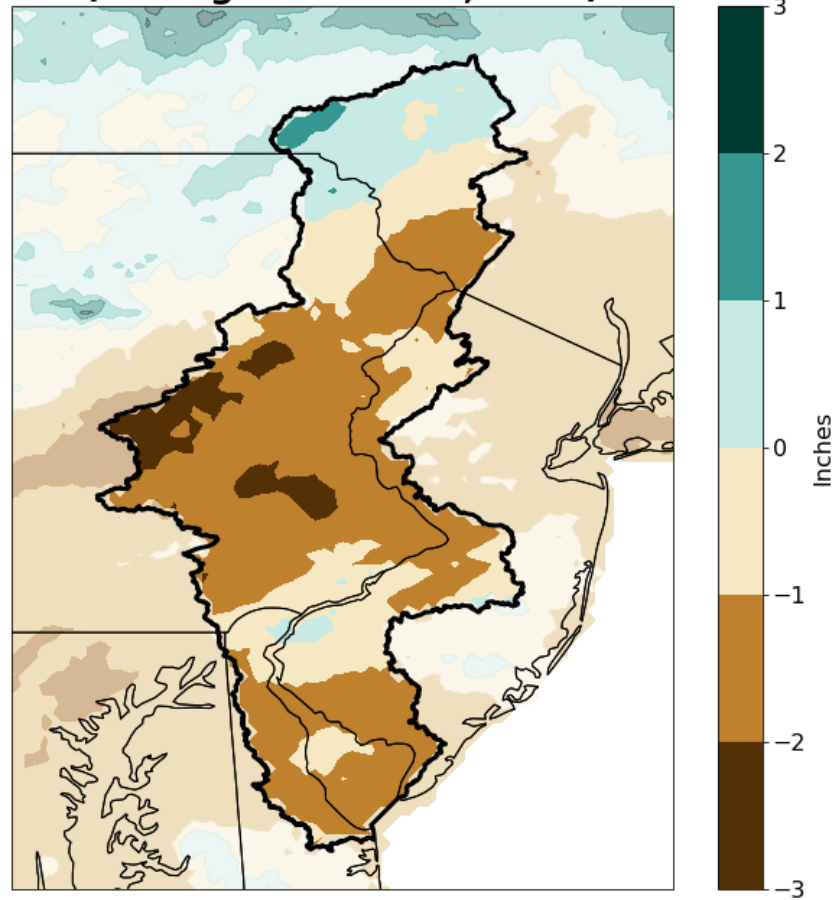


Precipitation

**Total Precipitation Accumulation
Month-to-Date (October 20, 2021)**



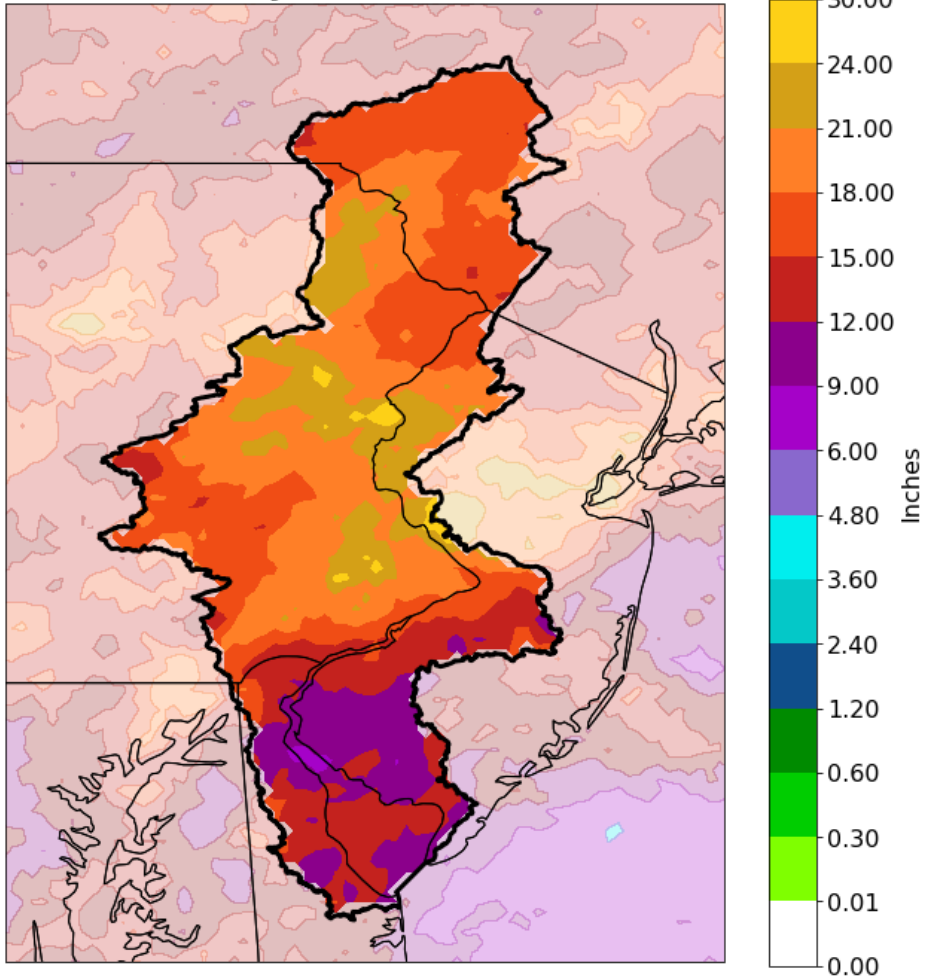
**Departure from Normal
Month-to-Date precipitation
(Ending October 20, 2021)**



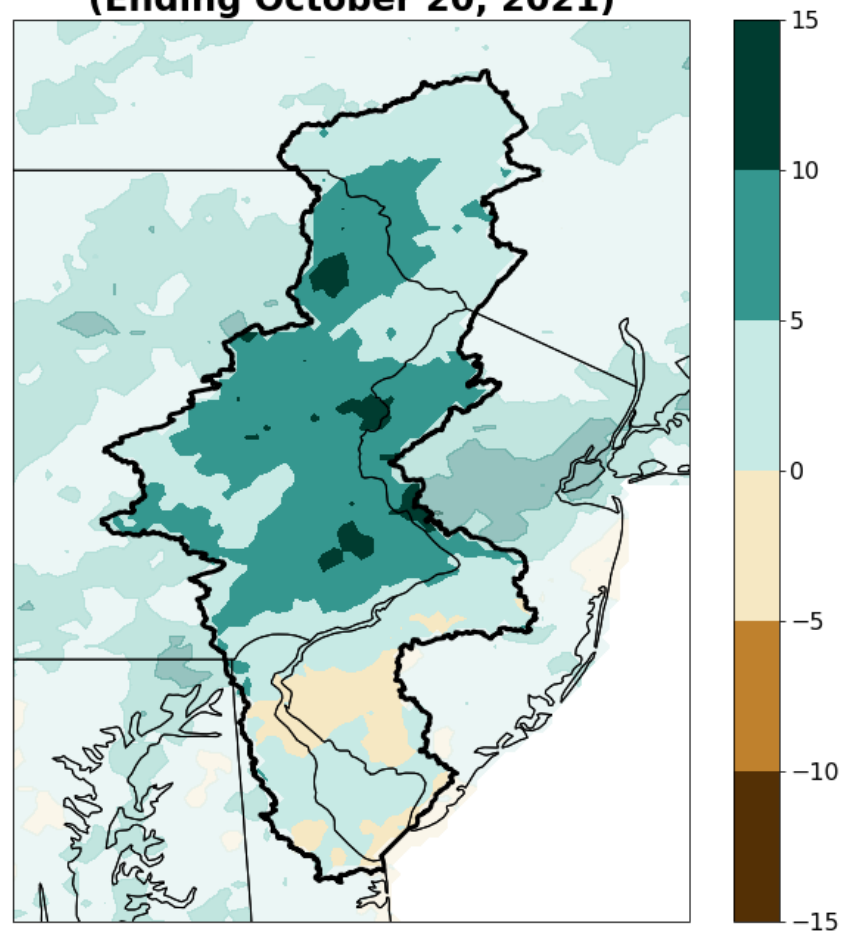
- * Below average conditions are present across much of the lower basin since the beginning of the month.
- * Far northern regions of the basin are <1 inches above average for October.

Precipitation

**Total Precipitation Accumulation
Last 90 days (October 20, 2021)**



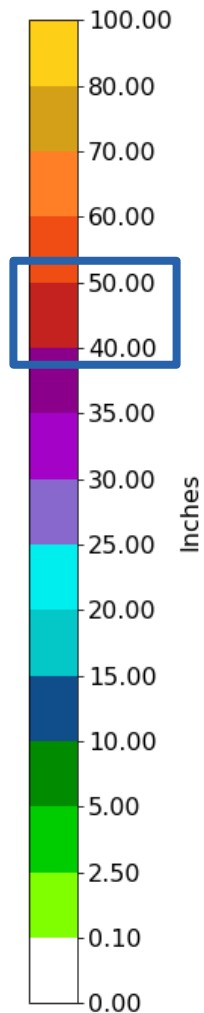
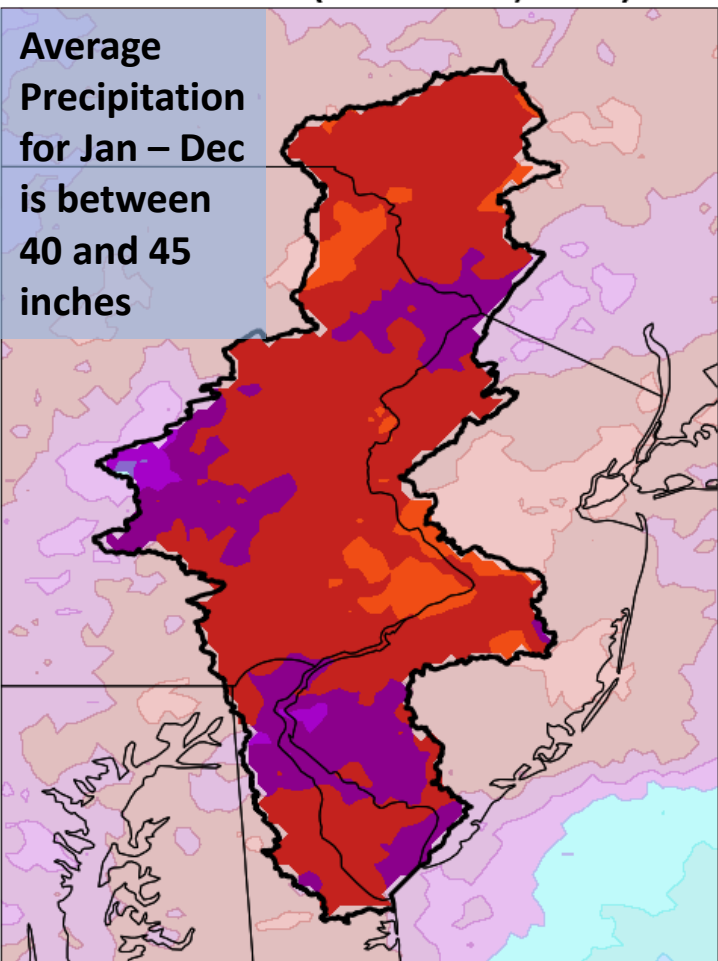
**Departure from Normal
Last 90 days precipitation
(Ending October 20, 2021)**



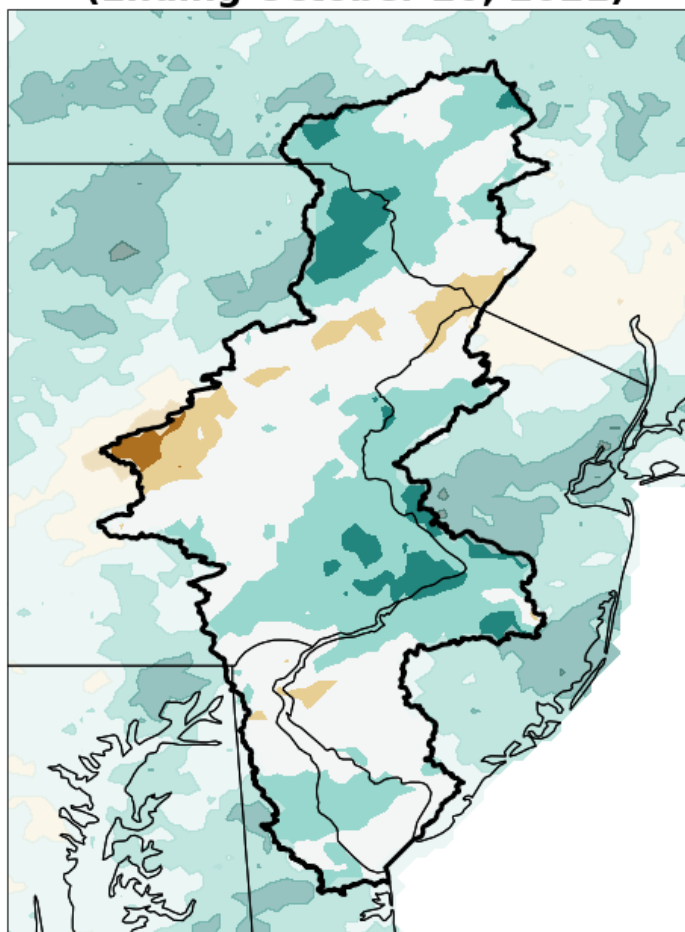
* Above average conditions over the past 90 days for much of the basin, due to impact from tropical systems this past summer

Precipitation

**Total Precipitation Accumulation
Year-to-Date (October 20, 2021)**



**Departure from Normal
Year-to-Date precipitation
(Ending October 20, 2021)**



- * Above average conditions are occurring though most of the basin
- * Below average conditions are present in the western central portion of the basin

Tropical Events 2021



2021 Atlantic Tropical Cyclone Names

Ana
Bill
Claudette
Danny
Elsa
Fred
Grace

Henri
Ida
Julian
Kate
Larry
Mindy
Nicholas

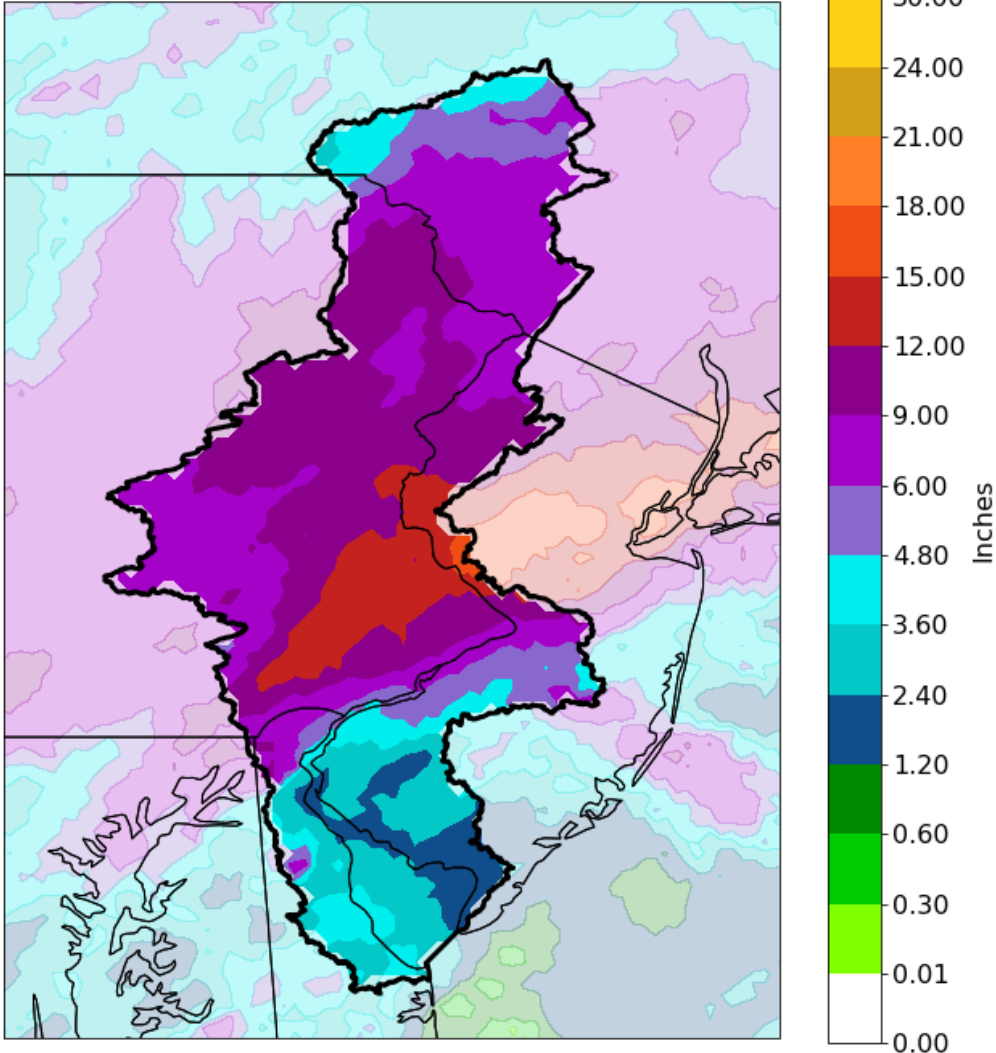
Odette
Peter
Rose
Sam
Teresa
Victor
Wanda

Names provided by the World Meteorological Organization

- * Official National Hurricane Center forecast was for 15-20 named storms (Aug 4 update)
- * Through October 20, 2021:
 - * **20 named storms**
 - * **7 of 20 were hurricanes (forecast 7-10)**
- * Boxes indicate the storms that impacted the Delaware River Basin
 - * Elsa – July 9, 2021
 - * Fred – August 18-19, 2021
 - * Henri – August 21-23, 2021
 - * Ida – September 1-2, 2021

Tropical Events 2021

**Total Tropical Storm Precipitation
Elsa, Fred, Henri, and Ida**

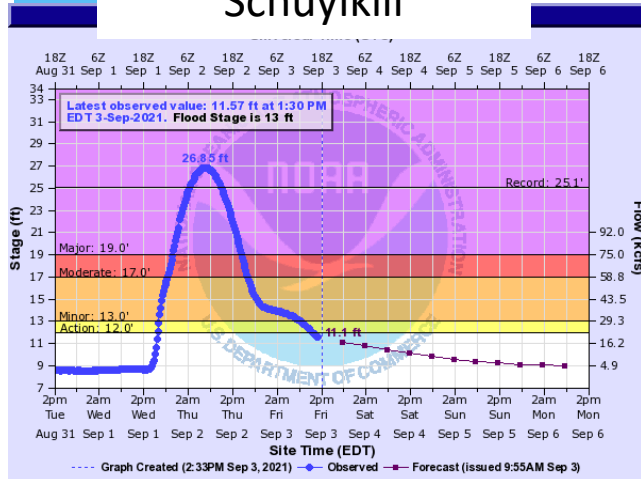


- * Total Precipitation from all Tropical Storms was approximately 6-12 inches across the basin, with locally higher amounts up to 15 inches combined.
- * Fred, Henri and Ida each caused flooding in the basin and Ida caused flooding along the main stem

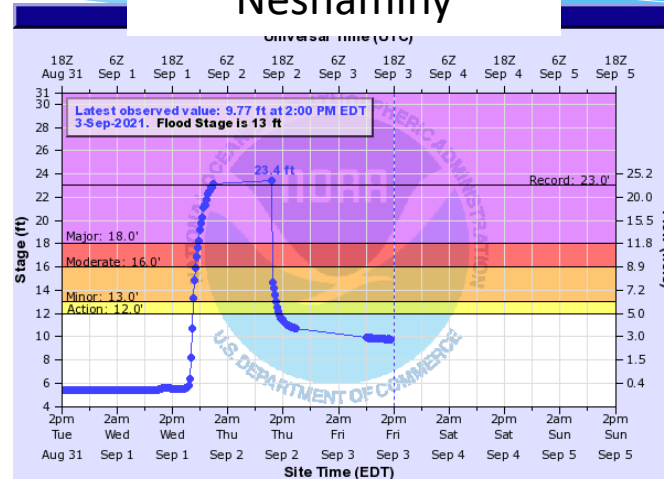
Tropical Events 2021

Major Flooding: 19 gages
Moderate Flooding: 17 gages
Minor Flooding: 21 gages
Action Stage: 6 gages
Total Gages: 63 gages

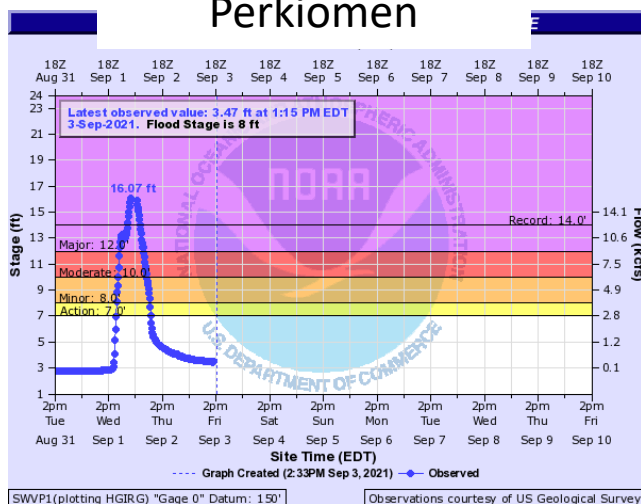
Schuylkill



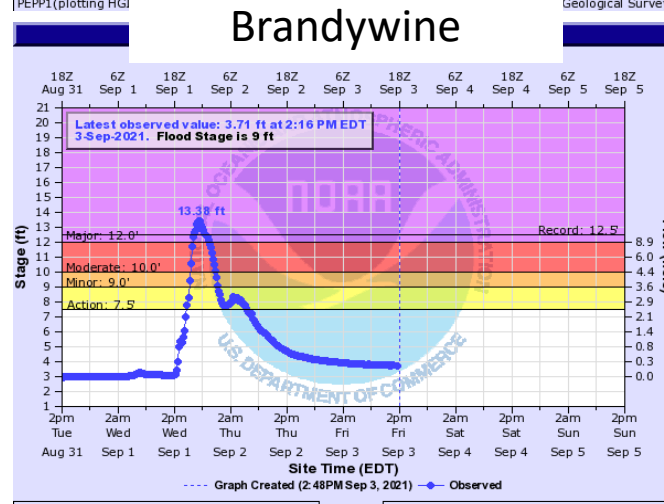
Neshaminy



Perkiomen



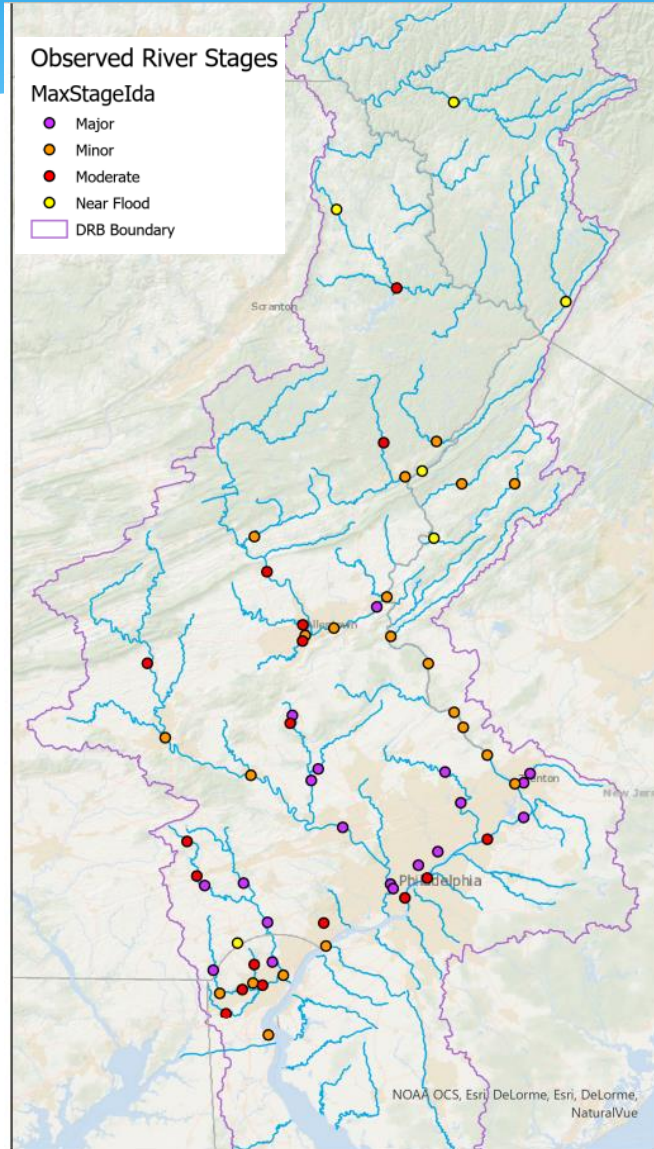
Brandywine



- * Ida caused Major flooding across much of the lower basin.
- * Flooding occurred at 63 gages, including 8 main stem gages.
- * 9 gages broke records for highest recorded stream stage
 - * Neshaminy Creek
 - * Schuylkill River + tributaries
 - * Brandywine Creek
 - * 2 gages in tidal Delaware

Tropical Events 2021

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Recent Temperatures

Southeastern Pennsylvania

Record Coolest	Bottom 1/10	Bottom 1/3	Normal	Top 1/3	Top 1/10	Record Warmest
PERIOD	VALUE	1901-2000 MEAN	ANOMALY	RANK (1895-2021)	WARMEST/COOLEST SINCE	RECORD
September 2021 1-Month	68.2°F (20.1°C)	64.7°F (18.2°C)	3.5°F (1.9°C)	115th Coolest	Coollest since: 2020	1917
				13th Warmest	Warmest since: 2019	1961
<i>Ties: 1980, 1998</i>						
Aug-Sep 2021 2-Month	72.3°F (22.4°C)	68.1°F (20.1°C)	4.2°F (2.3°C)	124th Coolest	Coollest since: 2020	1963
				4th Warmest	Warmest since: 2018	2016, 2018
Jul-Sep 2021 3-Month	73.5°F (23.1°C)	69.9°F (21.1°C)	3.6°F (2.0°C)	124th Coolest	Coollest since: 2020	1962
				4th Warmest	Warmest since: 2019	2016
<i>Ties: 2010, 2019</i>						
Jun-Sep 2021 4-Month	73.2°F (22.9°C)	69.7°F (20.9°C)	3.5°F (2.0°C)	124th Coolest	Coollest since: 2020	1903, 1927
				4th Warmest	Warmest since: 2016	2005, 2016

Southeastern New York

Record Coolest	Bottom 1/10	Bottom 1/3	Normal	Top 1/3	Top 1/10	Record Warmest
PERIOD	VALUE	1901-2000 MEAN	ANOMALY	RANK (1895-2021)	WARMEST/COOLEST SINCE	RECORD
September 2021 1-Month	61.2°F (16.2°C)	58.6°F (14.8°C)	2.6°F (1.4°C)	105th Coolest	Coollest since: 2020	1963
				23rd Warmest	Warmest since: 2018	1961
Aug-Sep 2021 2-Month	65.2°F (18.4°C)	62.0°F (16.7°C)	3.2°F (1.7°C)	119th Coolest	Coollest since: 2020	1963
				9th Warmest	Warmest since: 2018	2018
Jul-Sep 2021 3-Month	66.1°F (18.9°C)	63.9°F (17.7°C)	2.2°F (1.2°C)	114th Coolest	Coollest since: 2019	1963
				14th Warmest	Warmest since: 2020	2005
<i>Ties: 2012, 2015</i>						
Jun-Sep 2021 4-Month	66.0°F (18.9°C)	63.7°F (17.6°C)	2.3°F (1.3°C)	122nd Coolest	Coollest since: 2020	1903
				6th Warmest	Warmest since: 2018	2005
<i>Ties: 1949, 2010, 2016</i>						

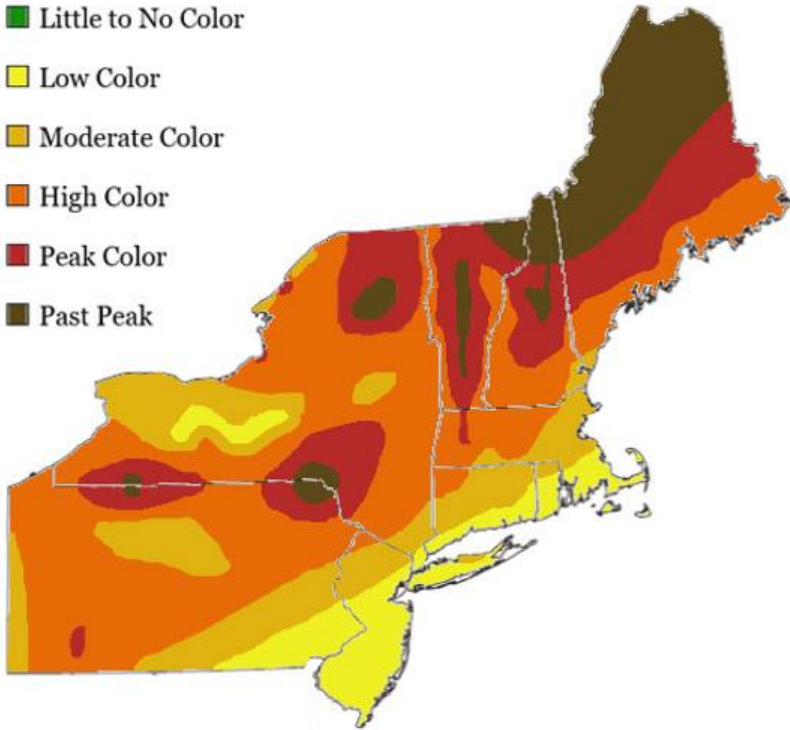
- * The Delaware River Basin has been warmer than average over the summer months.
- * New High Temperature Record set yesterday in Reading, PA and Trenton, NJ
 - * Three records set earlier in the month as well at Reading, PA

Source: National Centers for Environmental Information

Happy Fall!

Northeast

- Little to No Color
- Low Color
- Moderate Color
- High Color
- Peak Color
- Past Peak



October 18th, 2021
www.TheFoliageReport.com











Delaware River from Bowman's Tower - October 2016, Source: Linda Park

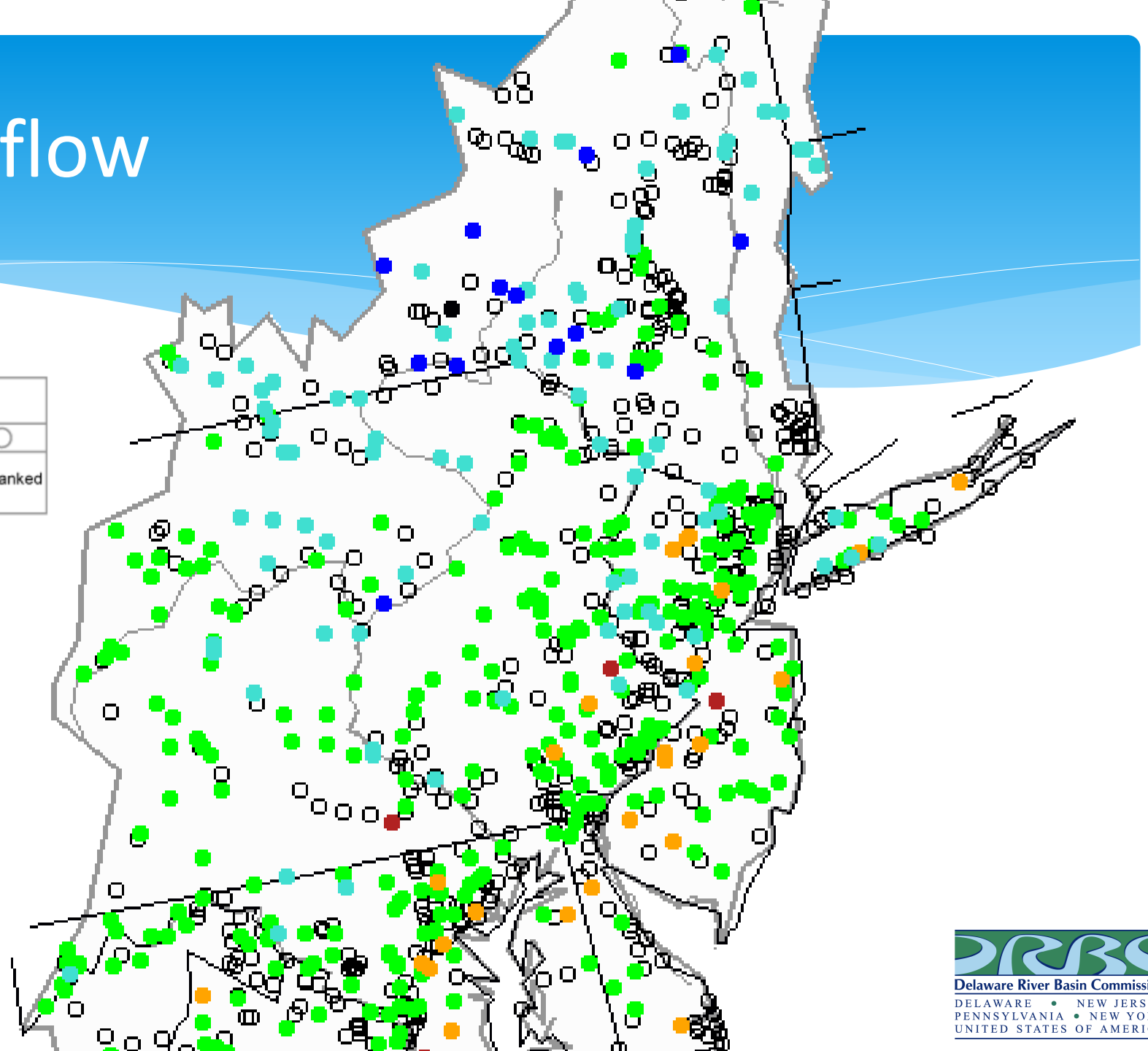
* Colors are late for our region this year due to the recent warm temperatures

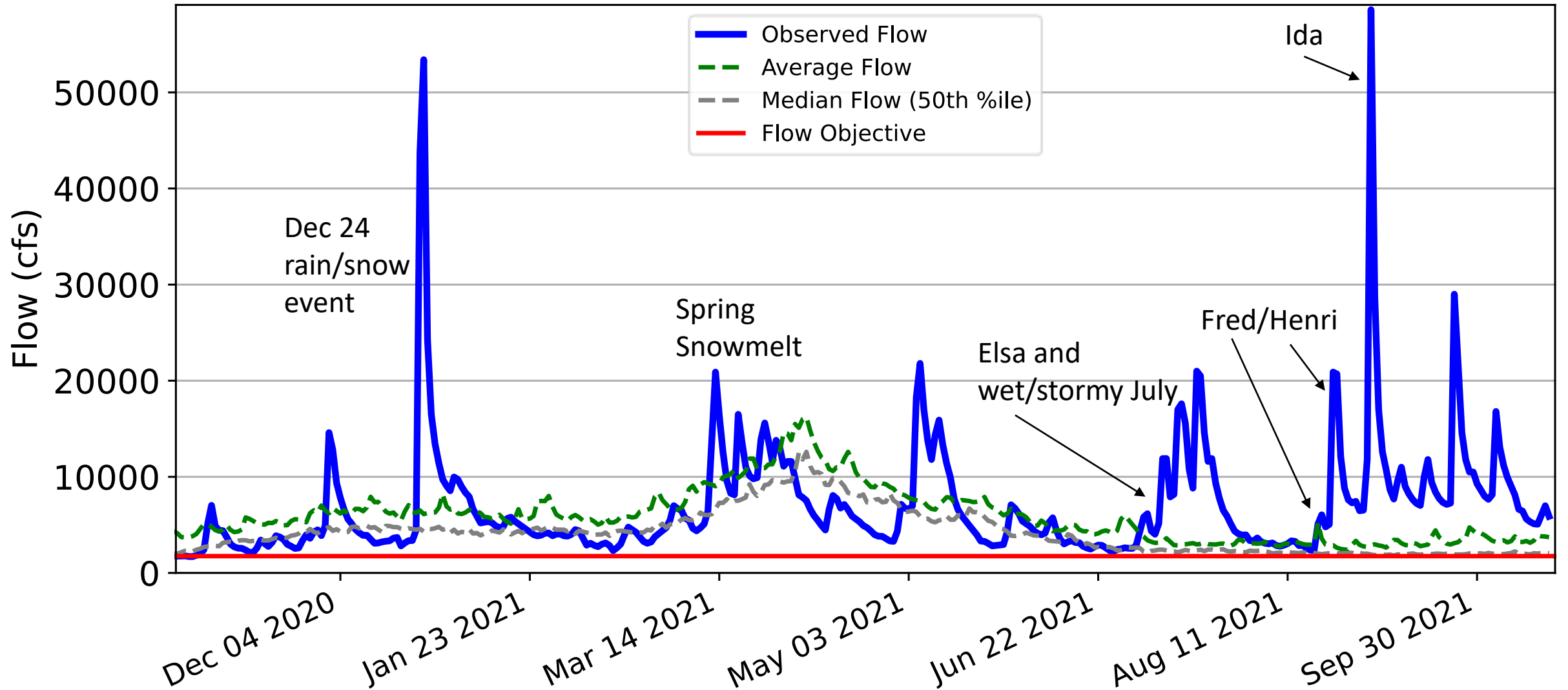
Streamflow

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		

- * October 21, 2021 - 8:00 am
- * Streamflows have been normal or above normal since Ida impacted the basin on September 1

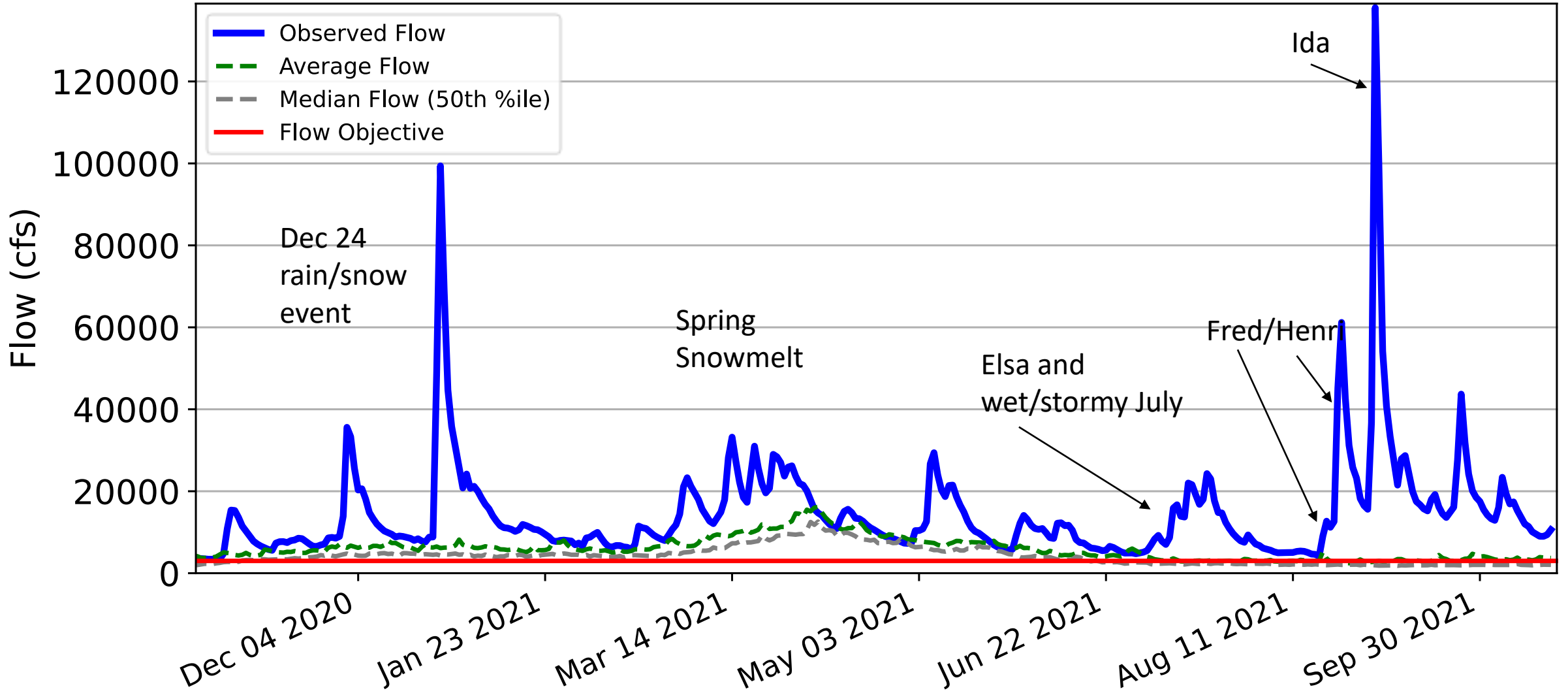




Data Source: USGS

Updated: 2021-10-20 14:14

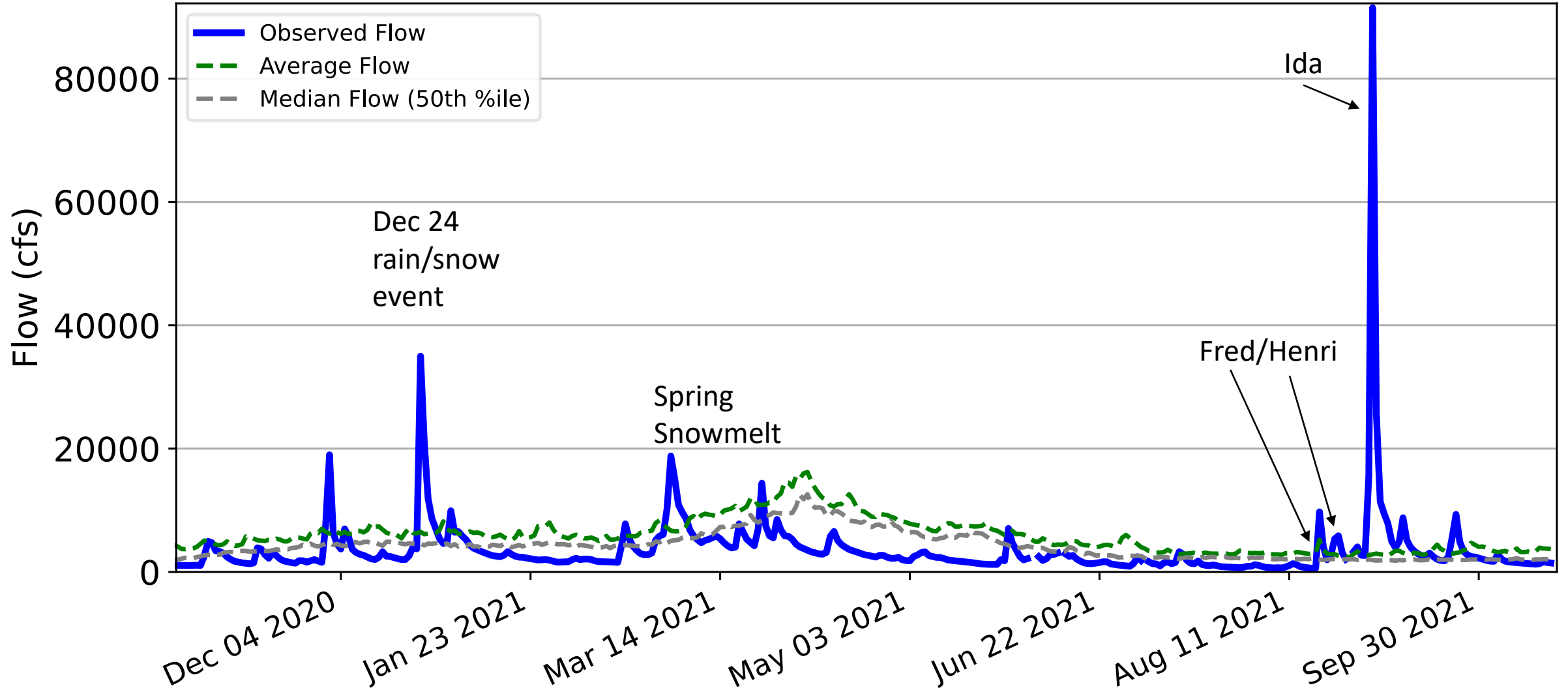
Flow at Trenton, NJ



Data Source: USGS



Updated: 2021-10-20 14:14 Flow at Philadelphia, PA

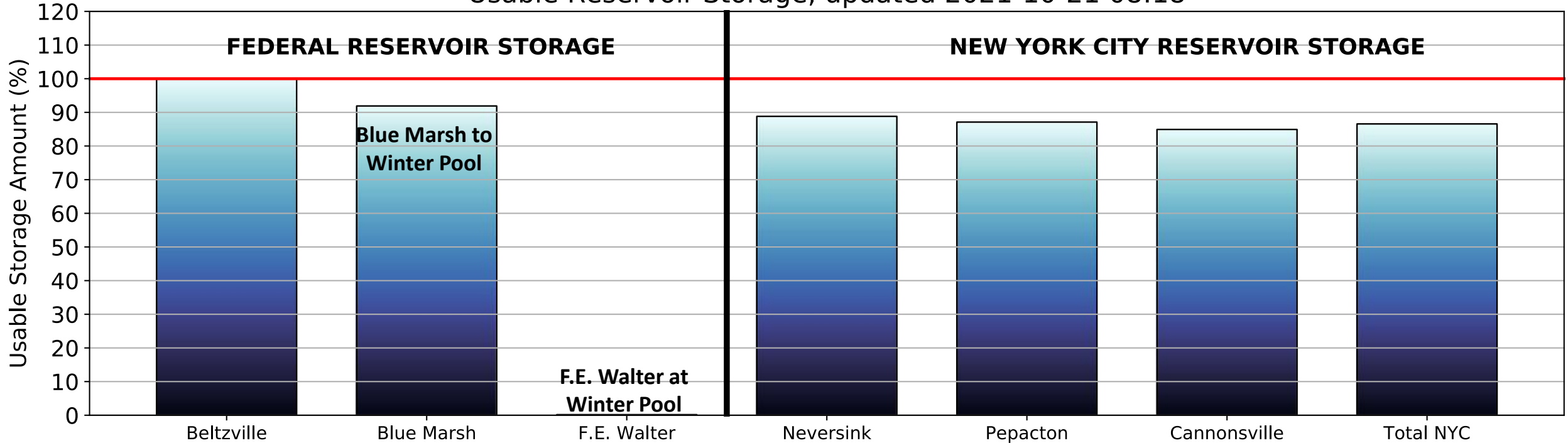


Data Source: USGS



Basin Storage

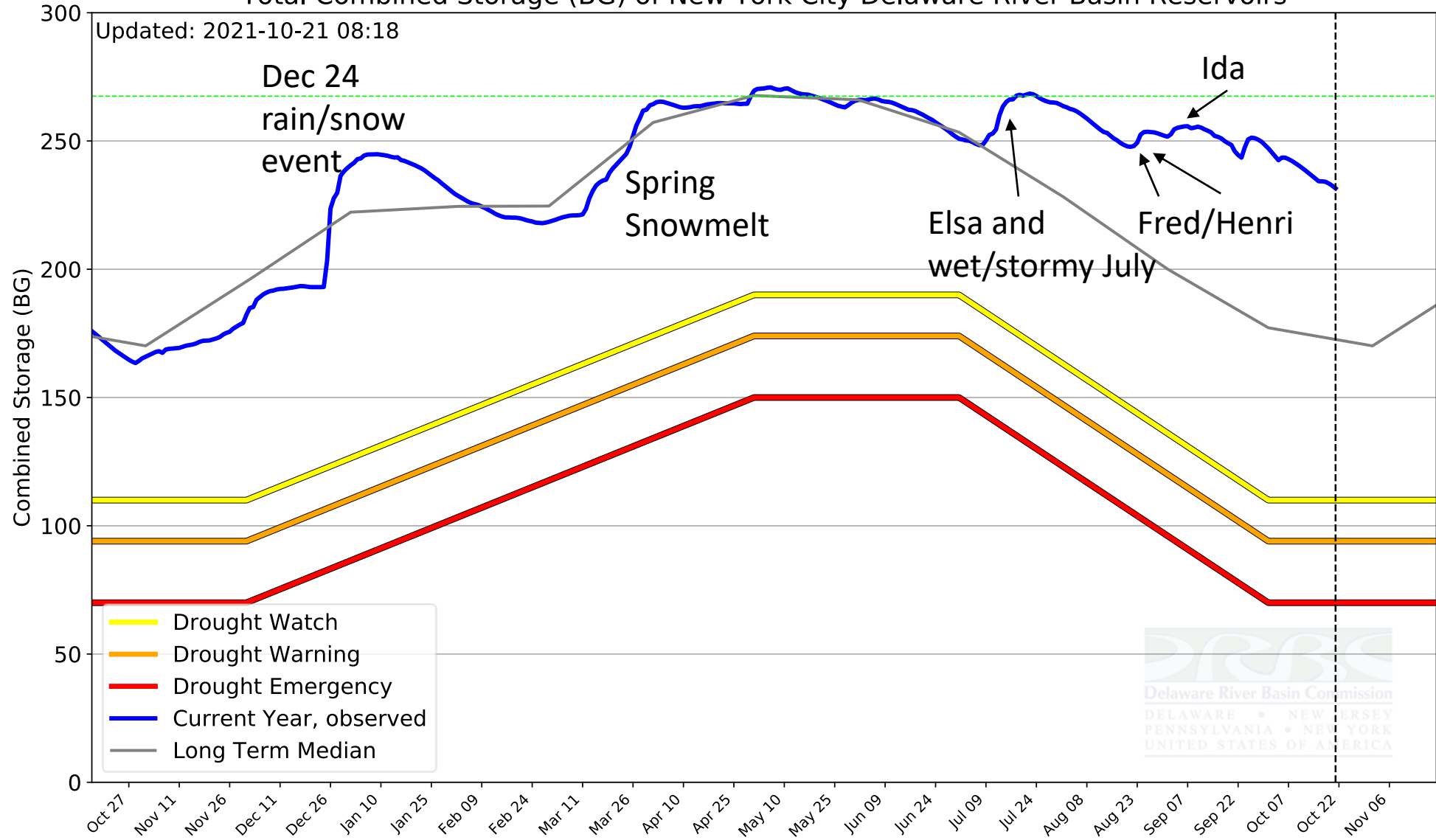
Usable Reservoir Storage, updated 2021-10-21 08:18



*** Storage below lowest outlet (pipe) is not taken into account ***



Total Combined Storage (BG) of New York City Delaware River Basin Reservoirs



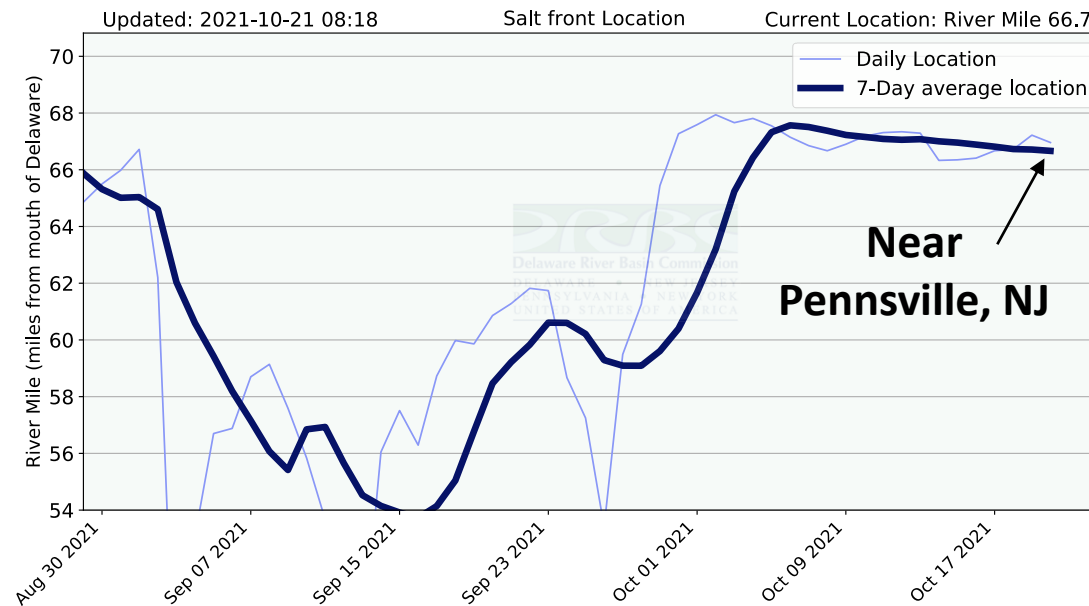
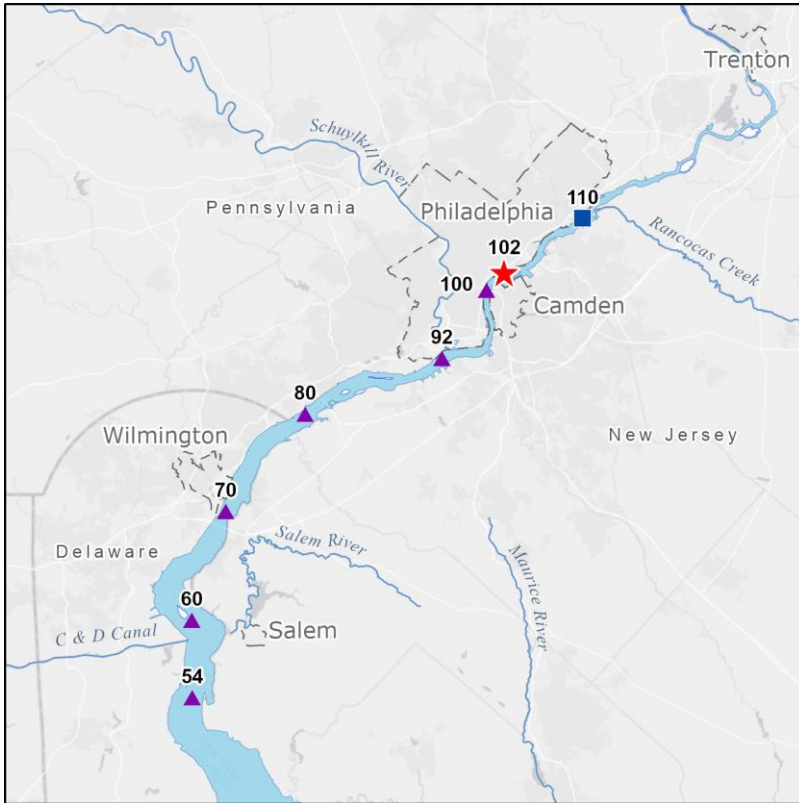
Usable Storage BG	Cannonsville	Pepacton	Neversink	Total	
	79.4	121.4	30.8	231.5	BG above drought watch = 121.5
%	84.9	87.1	88.8	86.6	BG above drought warning = 137.5
					BG above drought = 161.5

BG above median = 58.9
 BG above one year ago = 62.2



Data source: USGS

Salt Front



Note: DRBC does not calculate the location of the saltfront below river mile 54.

Chlorides
7-Day Average RM
Location of 250 mg/L

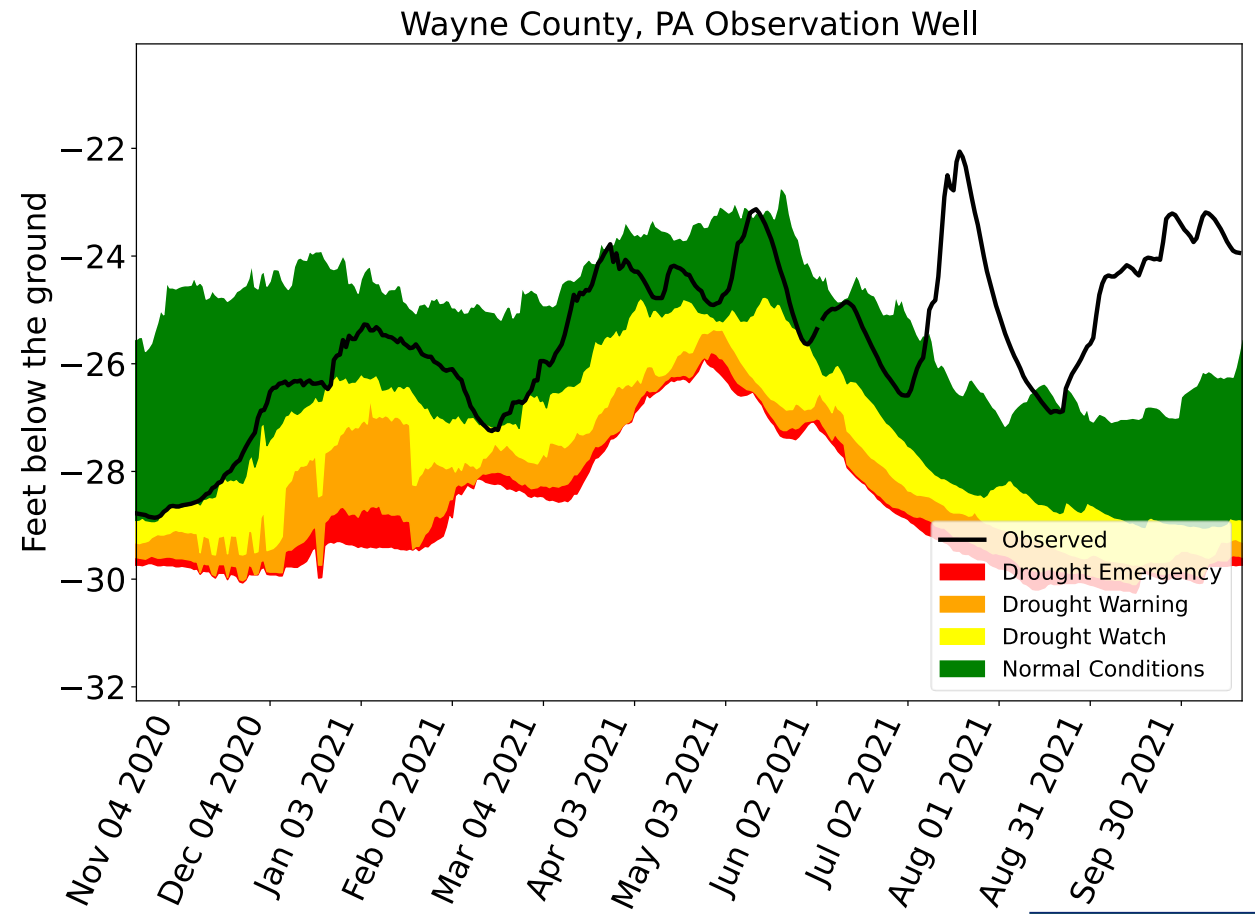
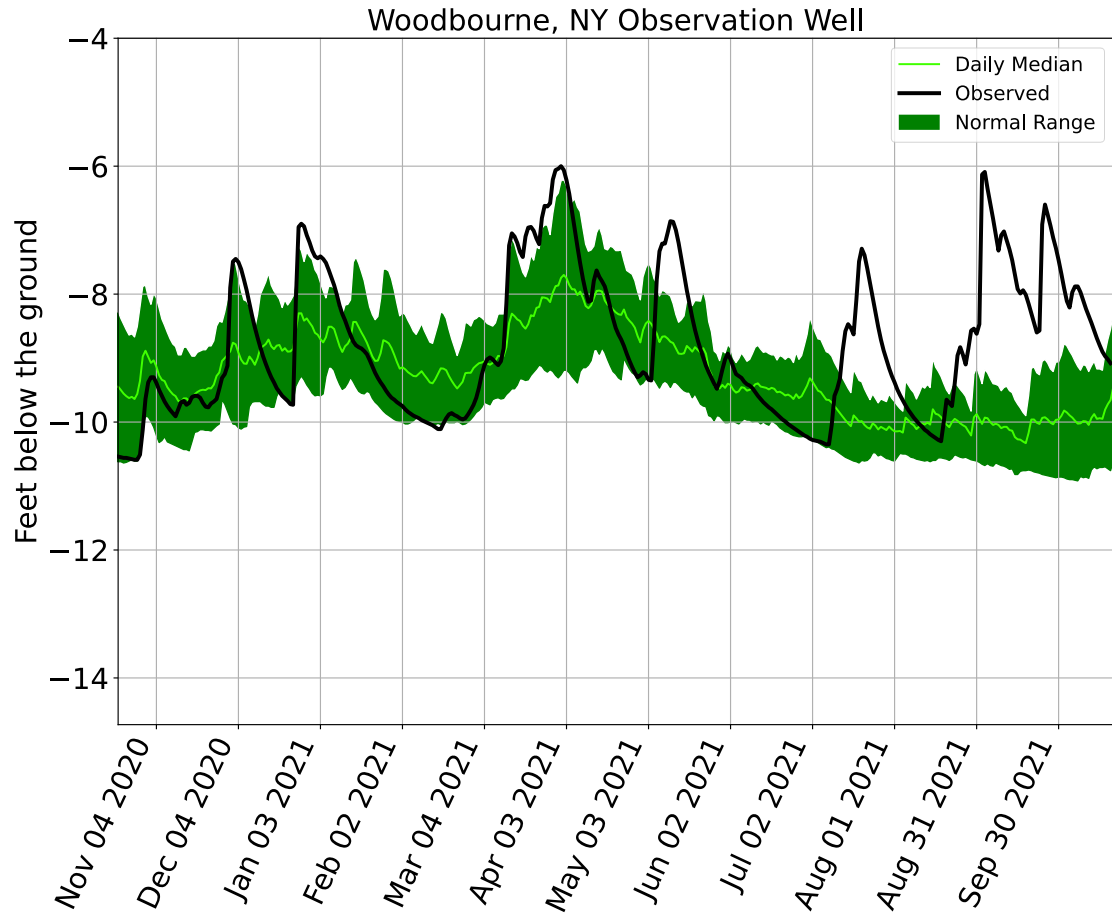
Current: 66.7
October Normal: 72

The Flow Objective at Trenton was designed to repel salinity for the protection of drinking water treatment facilities and industrial intakes.

Groundwater Conditions

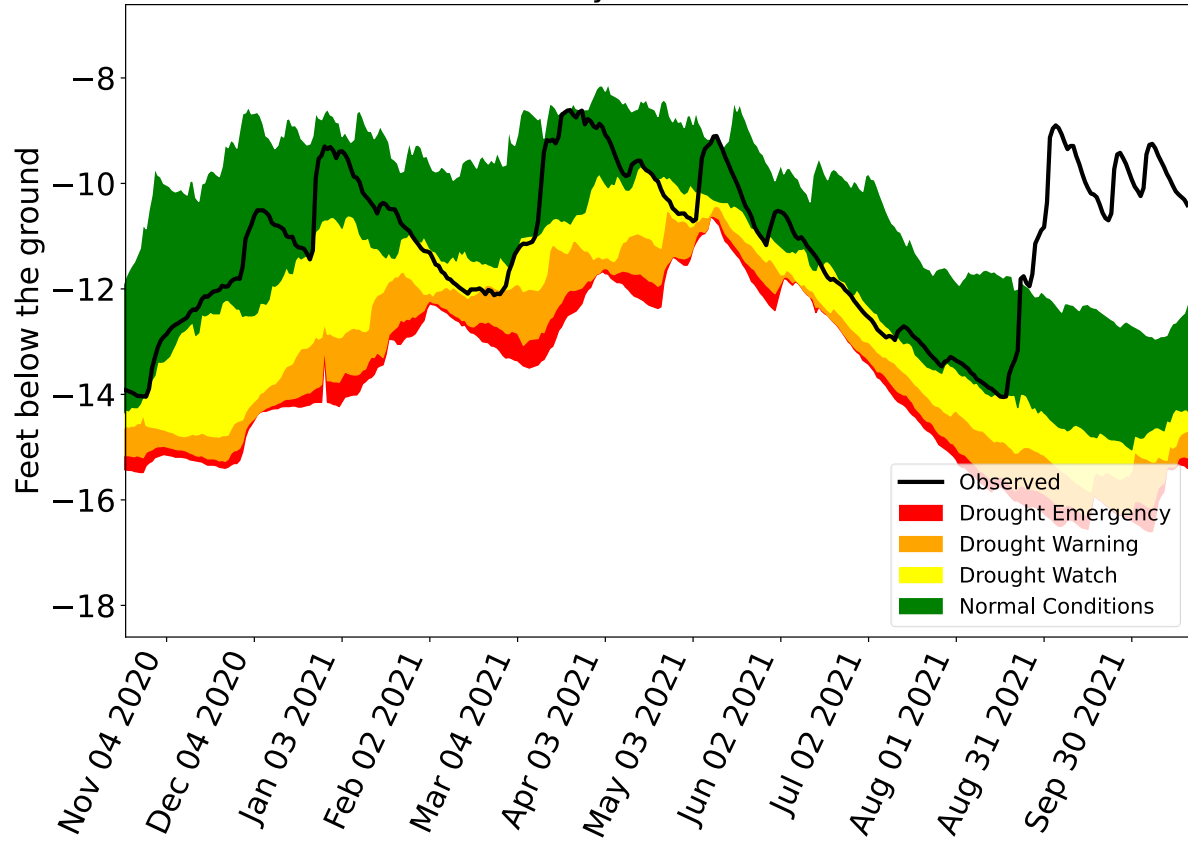
COUNTY	STATE	DATA SOURCE	WELL ID	INDICATOR AS OF 2021-10-20
Wayne	PA	USGS	WN 64	Above Normal
Monroe	PA	USGS	MO 190	Above Normal
Carbon	PA	USGS	CB 104	Normal
Schuylkill	PA	USGS	SC 296	Normal
Lehigh	PA	USGS	LE 372	Above Normal
Bucks	PA	USGS	BK 1020	Normal
Chester	PA	USGS	CH 10	Normal
Delaware	PA	USGS	DE 723	Normal
Lebanon	PA	USGS	LB 372	Normal
Burlington	NJ	USGS	050689	Normal
Cumberland	NJ	USGS	110042	Above Normal

Upper Basin

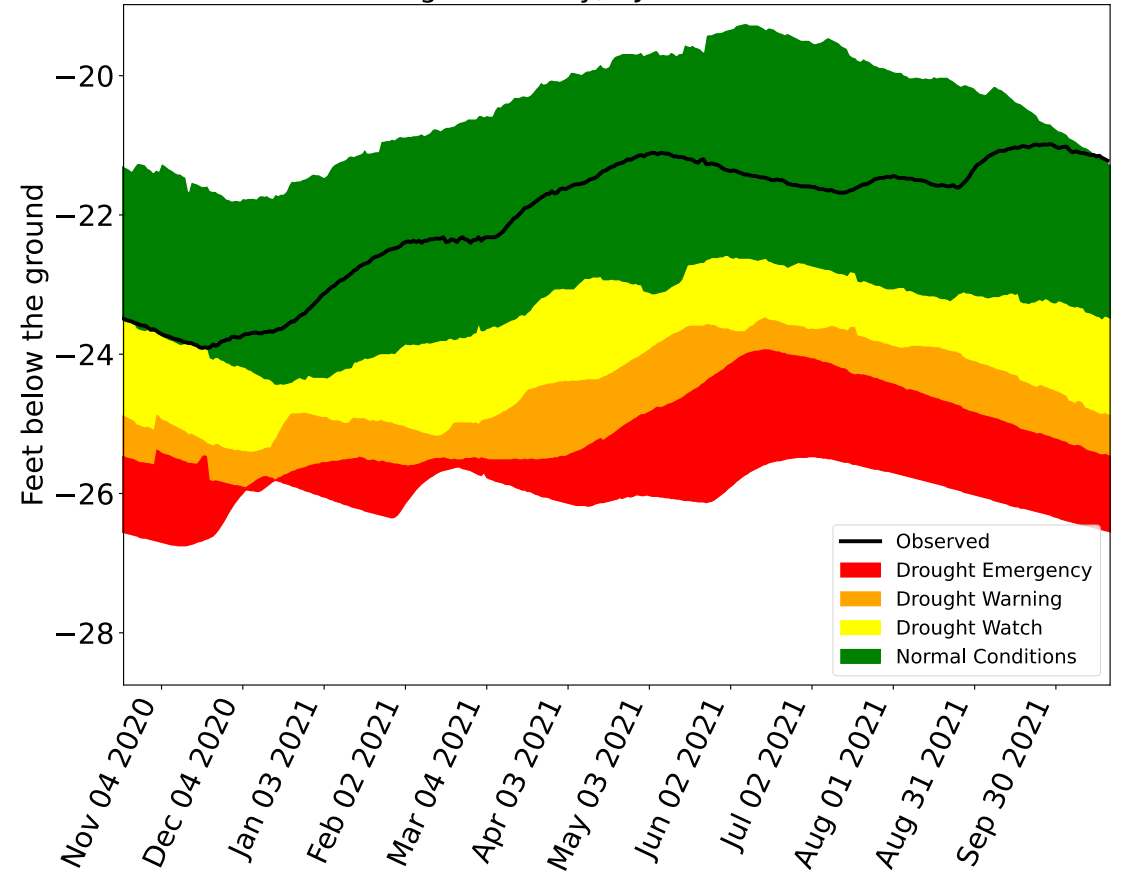


Middle Basin

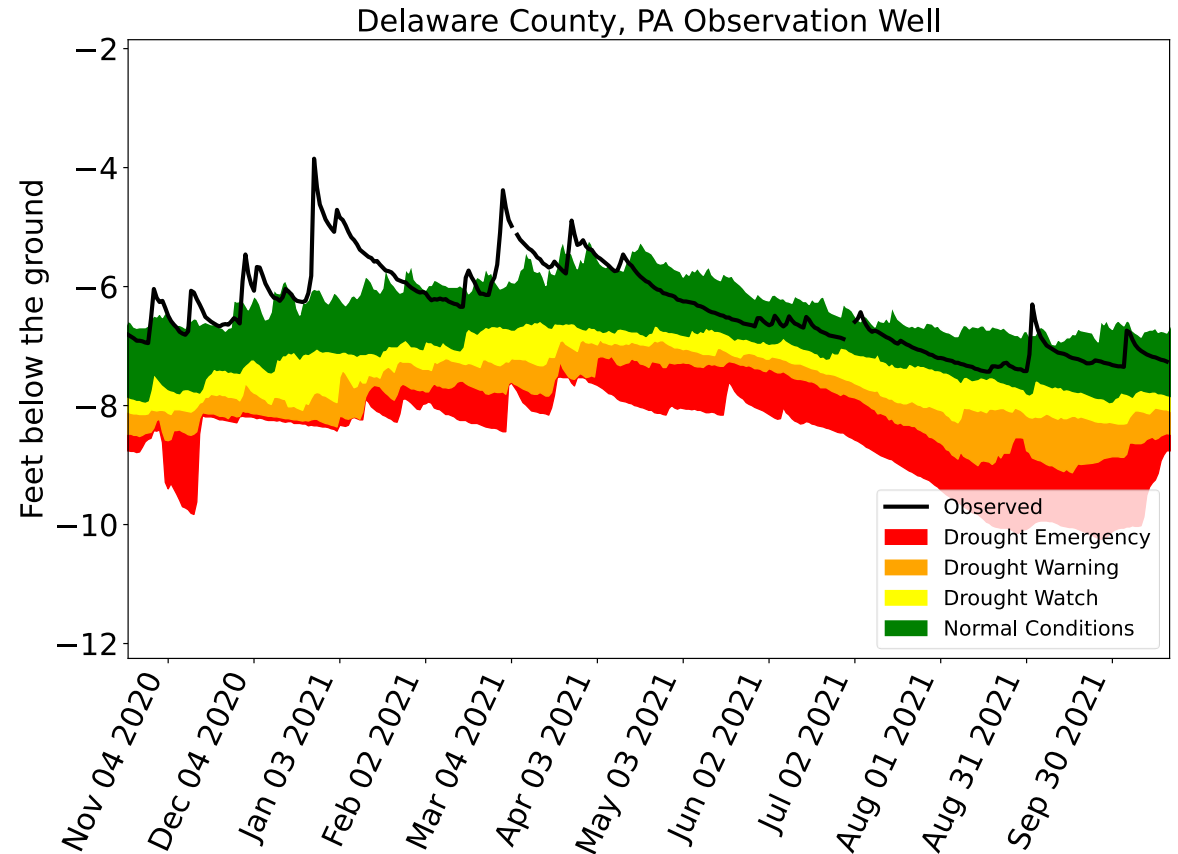
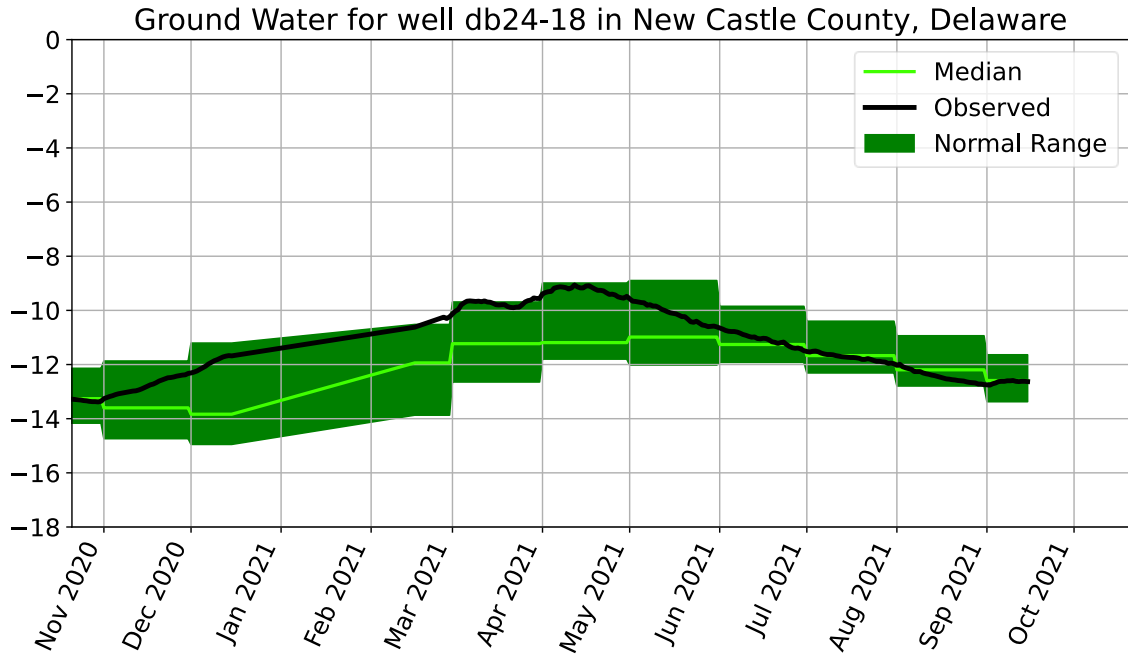
Monroe County, PA Observation Well



Burlington County, NJ Observation Well



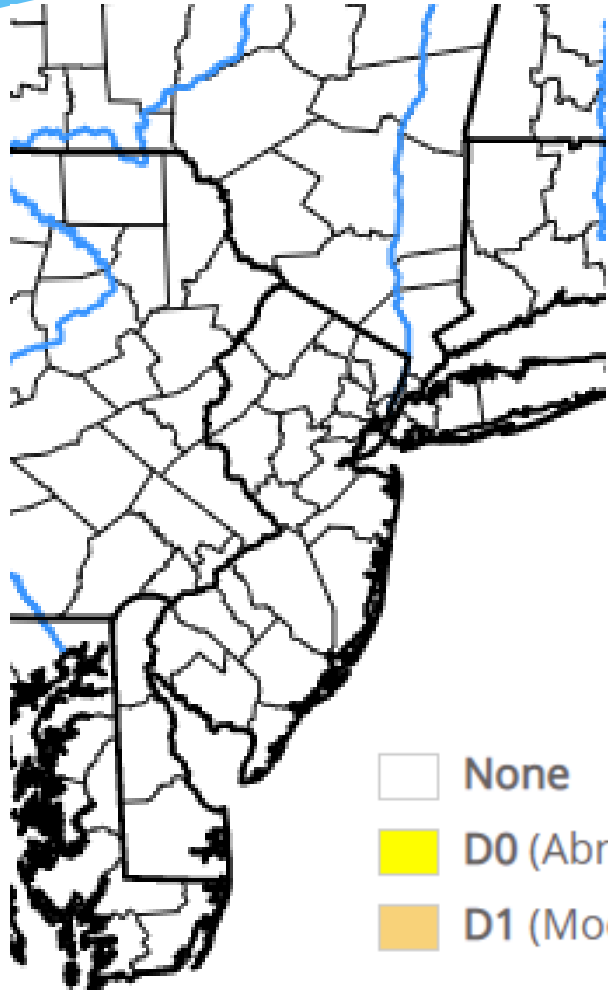
Lower Basin



Note: Data for New Castle County, DE is updated through September 14, 2020.

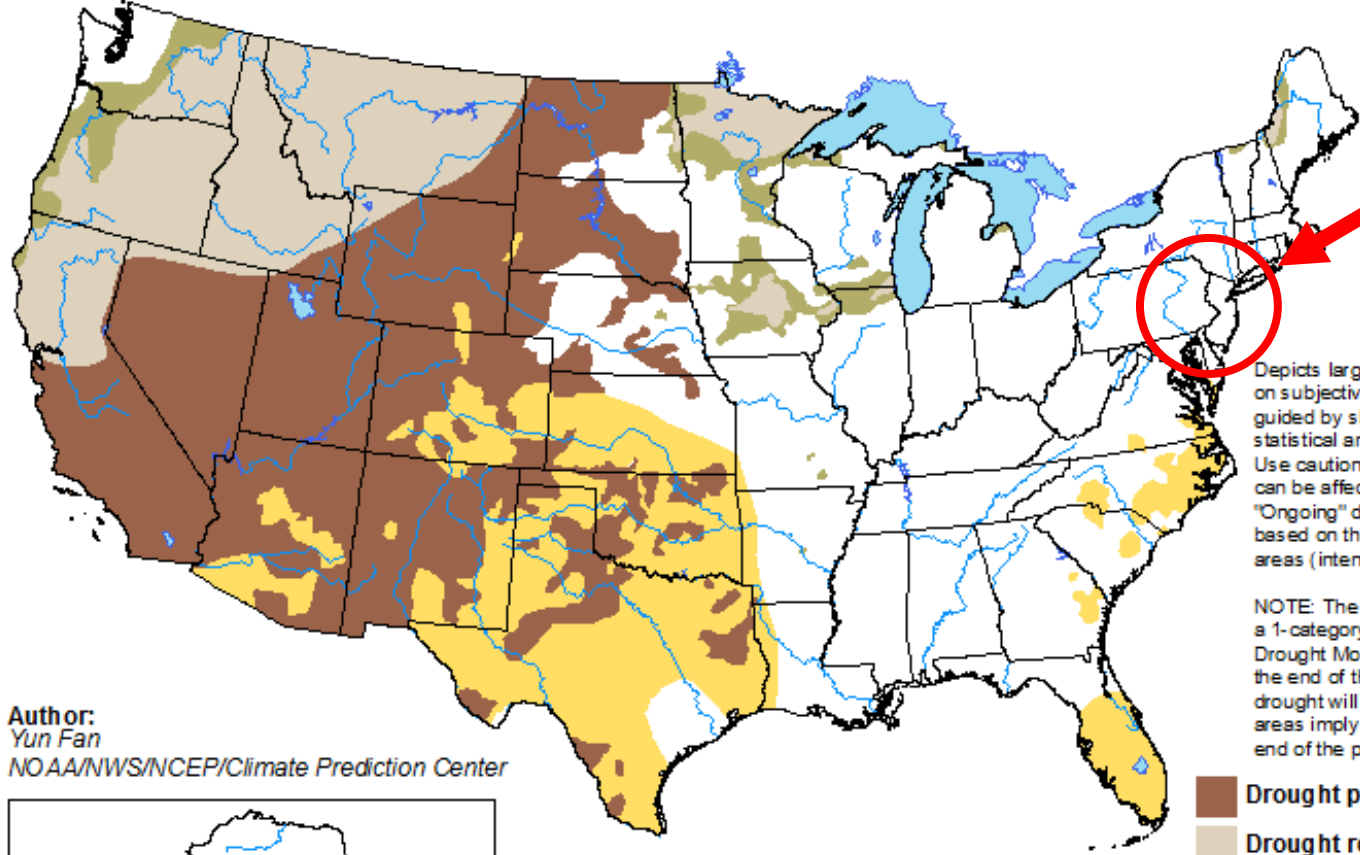
Drought Monitor

Valid: October 12, 2021



U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for October 21, 2021 - January 31, 2022
Released October 21, 2021

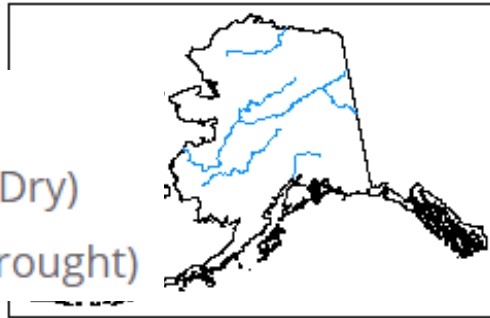


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Yun Fan
NOAA/NWS/NCEP/Climate Prediction Center

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)

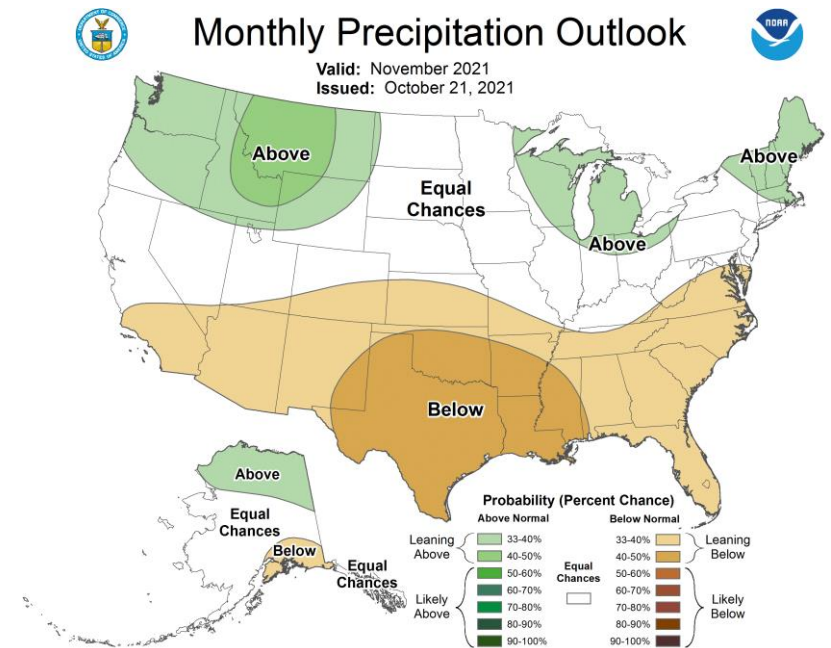
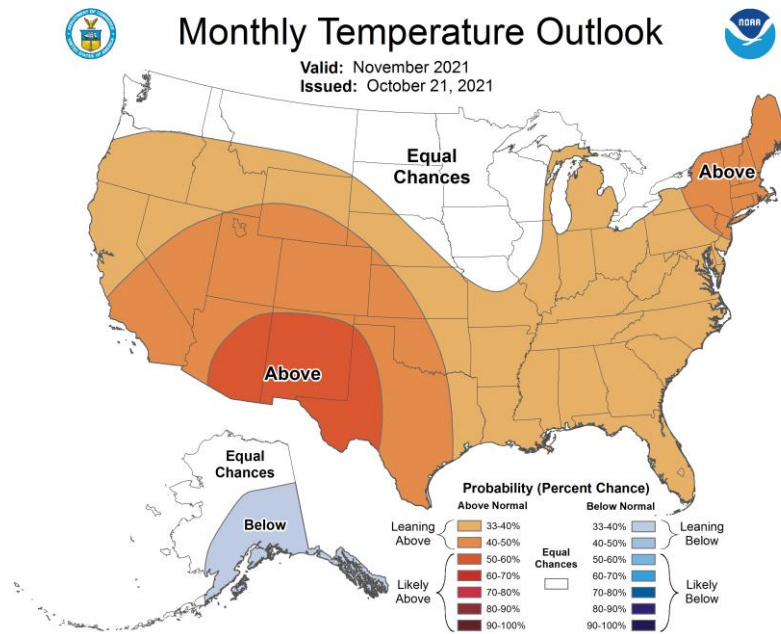


- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely

<http://go.drbc.gov>
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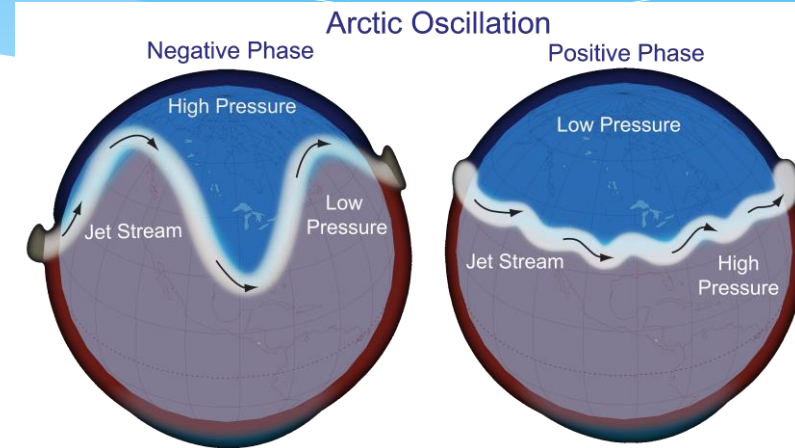
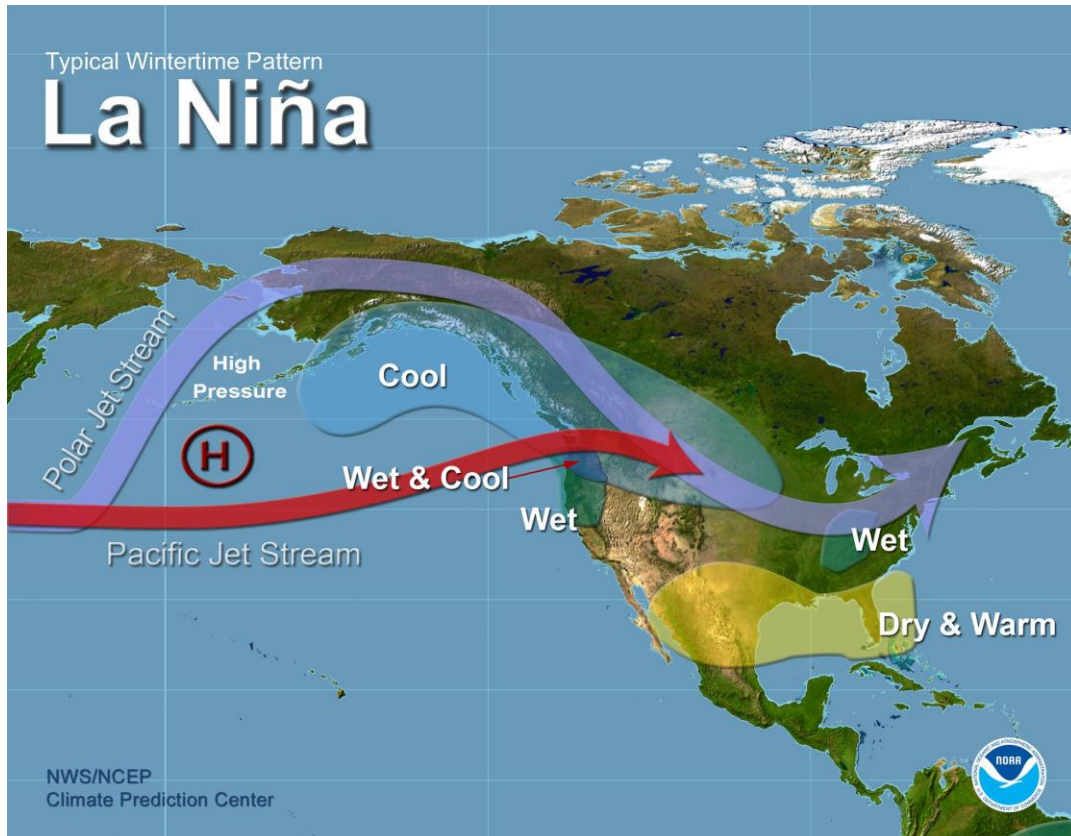
Short Term Forecast

- * Warmer than average for November
- * 1-2 inches of rain early next week, then drying out for November



One Month Outlook for **November** from Climate Prediction Center, issued October 21, 2021

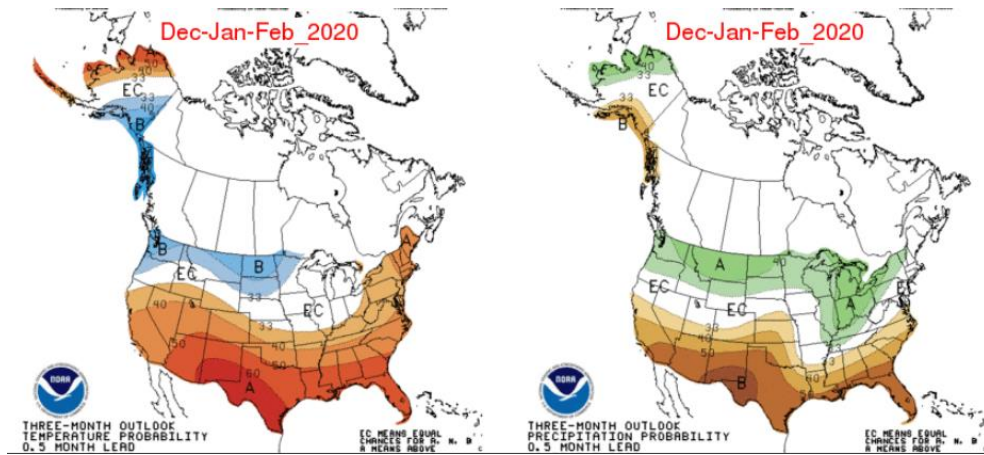
Seasonal Outlooks



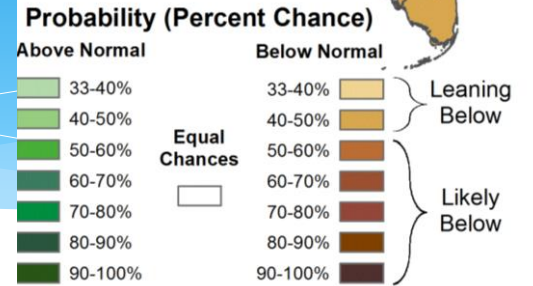
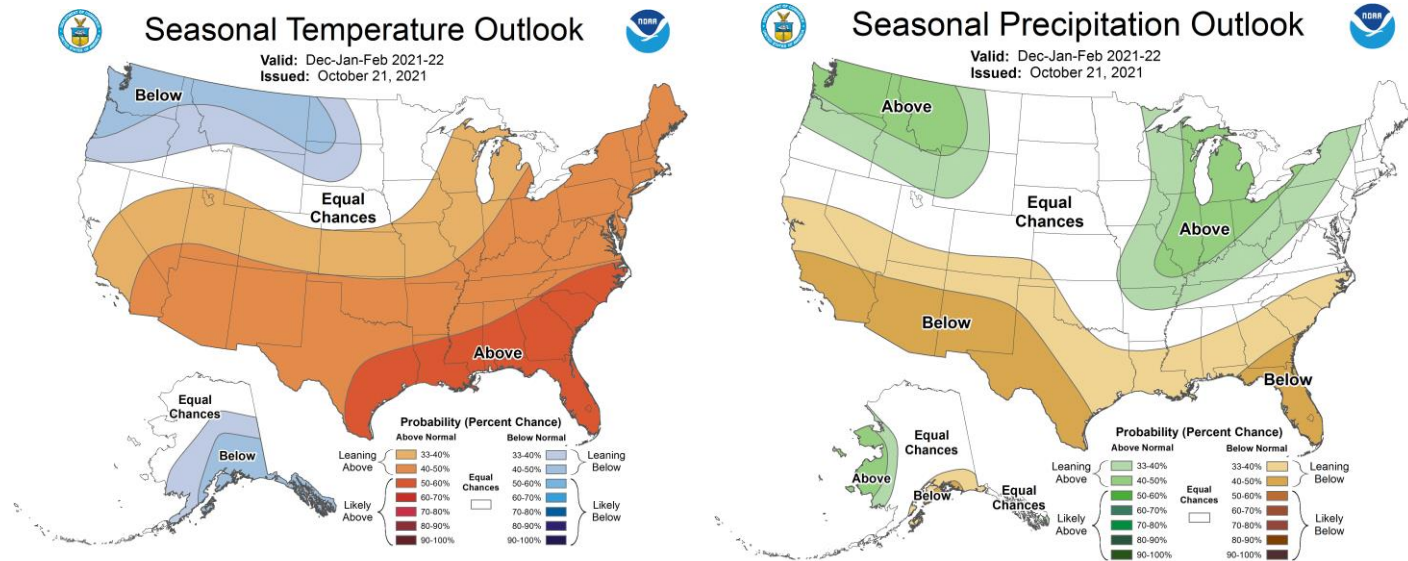
- * Current Conditions: La Niña
 - * The temperature of the ocean in the equatorial region of the Pacific Ocean is **cooler** than average!
- * Expected to last through the winter months
- * Last La Niña event: This past winter!

Winter Outlook 2021 - 2022

LAST YEAR



THIS YEAR



- * Above average temperatures
- * Variable Jet Stream, increased chance for storms
- * Rain/Snow determined by shorter scale weather patterns

Three Month Outlook for **December – February** from Climate Prediction Center, issued October 21, 2021



Presentation will be posted on DRBC's website
after the meeting.

For daily updates on hydrologic conditions, please use our dashboard!

hydrosnap.drbc.net