

City of Portsmouth

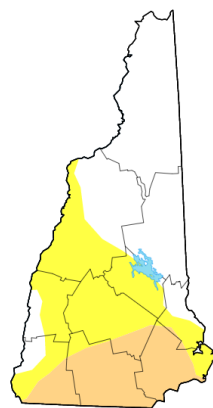
Department of Public Works



Portsmouth and Pease International Tradeport Drinking Water Status Report 2022 – 3rd Quarter

Precipitation and Weather

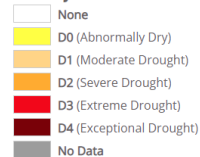
Currently, weather conditions in the Seacoast area are abnormally dry:



Map released: Thurs. October 20,
2022

Data valid: October 18, 2022 at 8 a.m. EDT

Intensity



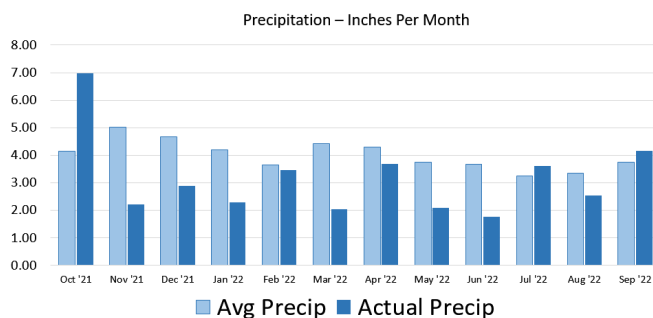
Authors

United States and Puerto Rico Author(s):
Adam Hartman, NOAA/NWS/NCEP/CPC

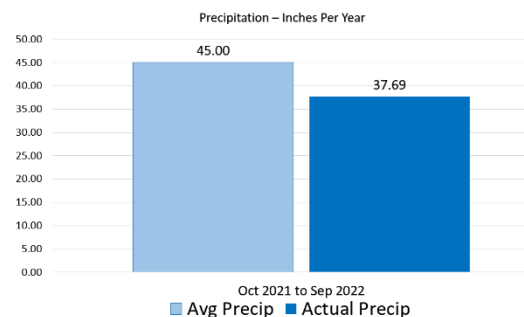
Pacific Islands and Virgin Islands Author(s):
Ahira Sanchez-Lugo, NOAA/NCEI

The following graphics show the monthly precipitation as recorded at the Pease NOAA weather station and the cumulative precipitation through the year. Currently, the total precipitation of 37.69 inches is below our normal of 45 inches. However, as the graphics show, the last three months of July, August and September have been near normal. Currently, the month of October is having normal amounts of precipitation as well.

Last 12 Months of Precipitation

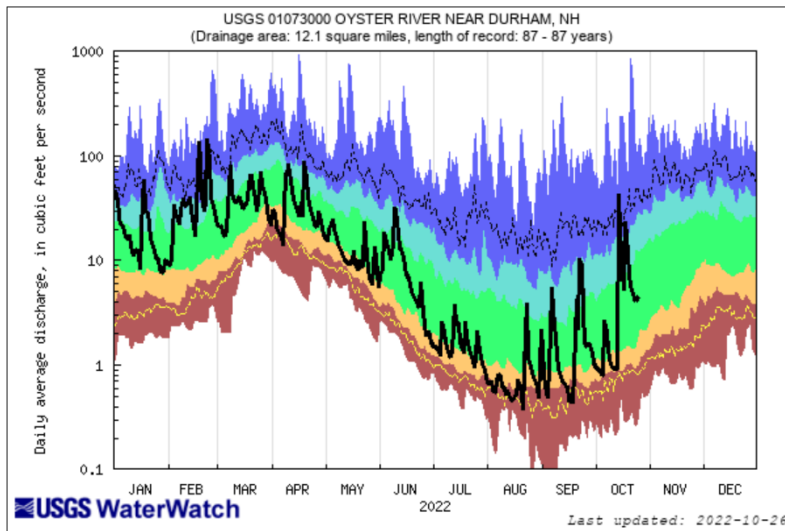


Rolling 12-Month Total Precipitation

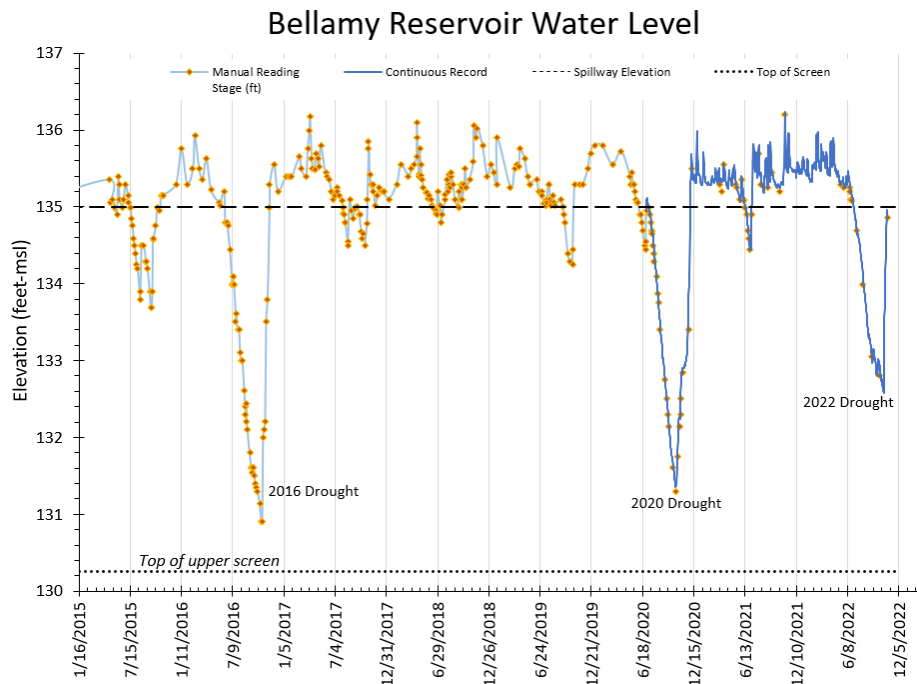


Reservoir Levels and Flow

The following graphic shows the flow trend, according to the gauged Oyster River, which we use to assess the flow into the Bellamy Reservoir. The low flow conditions that persisted until July are highlighted. Flows picked up after rainfall events that month. Recent rains have brought flows back into the normal range. Likewise, these events have increased the flow to the reservoir such that its level has recovered from the low experienced this summer.



Explanation - Percentile classes						
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile highest
Much below Normal	Below normal	Normal	Above normal	Much above normal		Flow



Groundwater Levels and Status

Groundwater levels in most of our water sources are much better than normal. This can be somewhat attributed to the way we received precipitation, however, it can also be attributed to our water operations staff's optimization of the use of surface water versus groundwater. Cutting back our groundwater withdrawals has allowed well levels to be maintained in a sustainable manner and more water availability for the system to meet peak demand. Each well has a continuous water level meter and the water pumped is also metered. This allows system operators the capability of assessing groundwater level trends and we are able to determine overall source of supply capability. Additionally, we recently activated our new Madbury Well 4r and Madbury Well 5. Each of these wells is capable of pumping approximately 450 gallons-per-minute into the water system and help to spread out the overall water capacity of the system to allow continued integrated management of all of our supply sources.

Water Production

The following table details the water produced by the combined Portsmouth/Pease water system averaged in July, August and September 2022. The pumpage reflects the changes in demand due to weather conditions this summer and last. Last year, July through September were wet and water demands were down. This year July and August were hot and dry until rains occurred in September. As soon as that happened the water demands in our system dropped.

Portsmouth & Pease Water Systems
Average Daily Water Production

	10-year average	2021	2022
July	5.23	4.14	5.24
August	5.17	3.92	5.23
September	4.57	4.07	4.10

Water Efficiency Rebates

The City also continues to offer water efficiency rebates of \$100 per low flow toilet and \$150 for the purchase of a high efficiency washing machine. These are available to all residential customers, including multi-family customers. To date, over 1,000 rebates have been issued. According to the NHDES we are currently the only public water system in New Hampshire offering these rebates.

Additional information on this program can be obtained from the City's water billing department or from the City's website:

<https://www.cityofportsmouth.com/publicworks/water-efficiency-rebate-program>

Water Quality Information

The Portsmouth Water Division routinely monitors water quality parameters and performs water quality sampling and analysis as directed by the Federal Safe Drinking Water Act and the New Hampshire Department of Environmental Services. Water sources are monitored for radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants. Critical water treatment parameters for turbidity, pH, chlorine, orthophosphate and fluoride are continually monitored and tracked by our system operators. The regulations require us to monitor for certain substances less often than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are reported, along with the year in which the sample was taken. Annual Water Quality Reports for both water systems detail these efforts and are mailed to each water system customer annually. They are also available on the City’s website at:

<https://www.cityofportsmouth.com/publicworks/water/drinking-water-quality>

- **PFAS Tracking**

Activated carbon filters treated the Harrison and Smith wells at Pease from 2016 to 2021 while an entirely new treatment facility was constructed to treat those two wells together with the reactivation of the Haven well. PFAS tracking of the other Portsmouth surface and groundwater drinking sources continues on a quarterly basis and all data is posted on the city’s website.



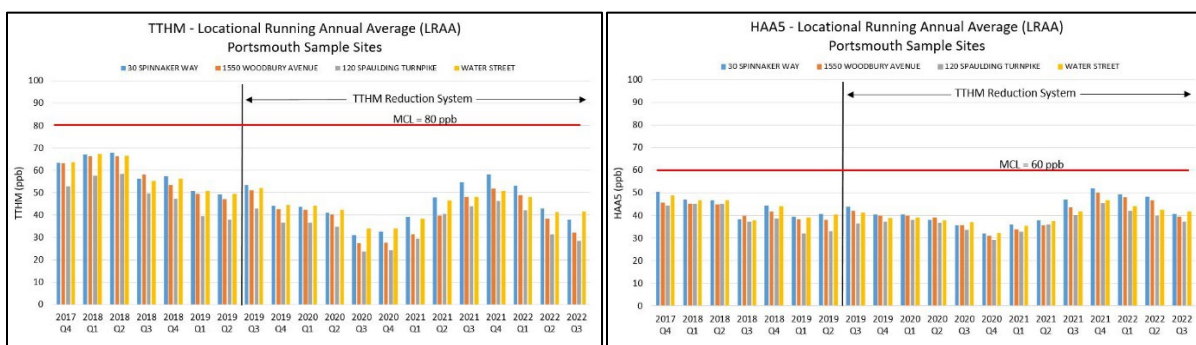
The State of New Hampshire promulgated maximum contaminant level (MCL) regulations for four compounds in 2019 – PFOA, PFOS, PFHxS and PFNA. The City has been sampling quarterly according to these regulations and periodically posts that data on the City’s website at: www.cityofportsmouth.com/publicworks/water. The following graphic provides a summary of the rolling average of the quarterly sampling of the Portsmouth water supply sources. All water sources are currently in compliance with these regulations:

PFAS Average – 12 Month Rolling New Hampshire Regulated Compounds - All Sources In Compliance (July 2021 – June 2022)

	Parts Per Trillion (PPT)	NH MCL	RAW*	MADBURY WTP FINISHED	MADBURY WELL 2	MADBURY WELL 3	MADBURY WELL 4	PORTSMOUTH WELL	COLLINS WELL	GREENLAND WELL	PEASE WTP
PFHxS	ng/L	18	0	0	0	0	0	8	2	1	0
PFOS	ng/L	15	0	0	0	0	0	6	4	4	0
PFOA	ng/L	12	3	2	4	3	0	7	4	5	0
PFNA	ng/L	11	0	0	0	0	0	0	0	0	0

- Total Trihalomethanes (TTHMs)**

Total Trihalomethanes (TTHMs) are disinfection byproducts (DBPs) which are created when chlorine, which is used for a disinfectant in the Portsmouth and Pease Water Systems, reacts with natural organic matter in the water. On average, the Water Treatment Facility in Madbury removes about 71% of the total organic carbon (TOC) through the treatment process. The EPA Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2) requires TOC removal of 50% for the type of water that is typical from the Bellamy Reservoir. The TOC that remains in the water after treatment reacts with the chlorine and creates DBPs. Historically the TTHM concentration in the Portsmouth Water System has averaged 56 parts per billion (ppb). The maximum contaminant level (MCL) for TTHM as a site-specific annual rolling average is 80 ppb. An important aspect of minimizing disinfection byproducts is the reduction of organics. Over the summer of 2022, the aeration system in the Bellamy Reservoir was upgraded to improve the water quality and increase the efficiency of the surface water treatment operations. These improvements are expected to help reduce the disinfection byproduct precursors and thus minimize concentrations of TTHM and HAA in the water supply.



The annual average TTHM levels in 2022 quarter 3 ranged from 29 to 42 ppb across the four Portsmouth monitoring sites. This remains considerably lower than the site averages of between 49 and 59 ppb that were typical prior to the installation of the TTHM removal system. Five haloacetic acids (HHA) are also regulated as disinfection byproducts. The annual rolling average limit for these are 60 ppb. The Portsmouth system has average total HAA's between 37 and 42 ppb by sampling site over the past four year. The 2022 quarter 3 rolling averages were between 37 and 41 ppb.

- **Lead Sampling**

Both of the water systems were sampled for lead in 2021, and they are all in compliance with the requirements for lead concentrations. The results from our lead sampling program in 2021 were below the lead action level of 15 parts-per-billion (ppb) at the 90th percentile value in each of the Portsmouth, Pease Tradeport, and New Castle water systems. Of the 31 residential samples collected in the Portsmouth system in 2021, 26 had no detected lead, 4 had less than 5 ppb, and one had higher than 15 ppb. That site was in the process of upgrading their plumbing. After the plumbing work was completed the site was resampled and there was no lead detected. In the New Castle water system, there were 8 of the 12 samples that had no lead detected, 2 samples that had less than 5 ppb measured, and 2 samples that had 5 ppb.

Due to the upgrades of the Pease Water Treatment Facility, at least 40 lead and copper samples were required for compliance during the first 6 months of operation. This was double the number of samples typically required for this system. The Pease Tradeport system samples resulted in 27 of the 41 samples having no detected lead, 5 had less than 2 ppb, and 9 had between 2 and 15 ppb. These results are typical of what have been measured over the past 16 years since our corrosion control program has been in effect. This is an annual sampling program, and we will be sampling 40 sites again in the Pease System in the spring of 2022 and 30 sites in the Portsmouth System again in the fall of 2022.

Lead is not present in the water when it leaves our treatment and well facilities, or in the water mains that run below the streets. However, lead can be present in old service line connections that tie homes to the water system or plumbing inside homes and businesses. Due to the age of many homes in Portsmouth and surrounding towns, and the associated potential for leaded plumbing components, we encourage customers to have their water tested by a certified laboratory, especially if there are children under six or pregnant women in the household. We actively adjust the water chemistry at the treatment facility and well facilities according to our Corrosion Control Program, to reduce the potential for lead in households to dissolve into the water and end up at the tap. But if lead is present in your plumbing system, and is in contact with water, some risk remains. Information about our Corrosion Control Program can be accessed online: cityofportsmouth.com/publicworks/water.

- **Safe Water Advisory Group (SWAG)**

The Safe Water Advisory Group was created with the approval of City Council on October 5, 2020. Its mission is to review and communicate the latest science on the health and environmental effects of drinking water contaminants (with a heavy focus on PFAS), to monitor federal and state level legislative changes, and to anticipate policy changes that could impact the city of Portsmouth. A community drinking water forum was held during National Drinking Water week on May, 3rd 2022 at City Hall.

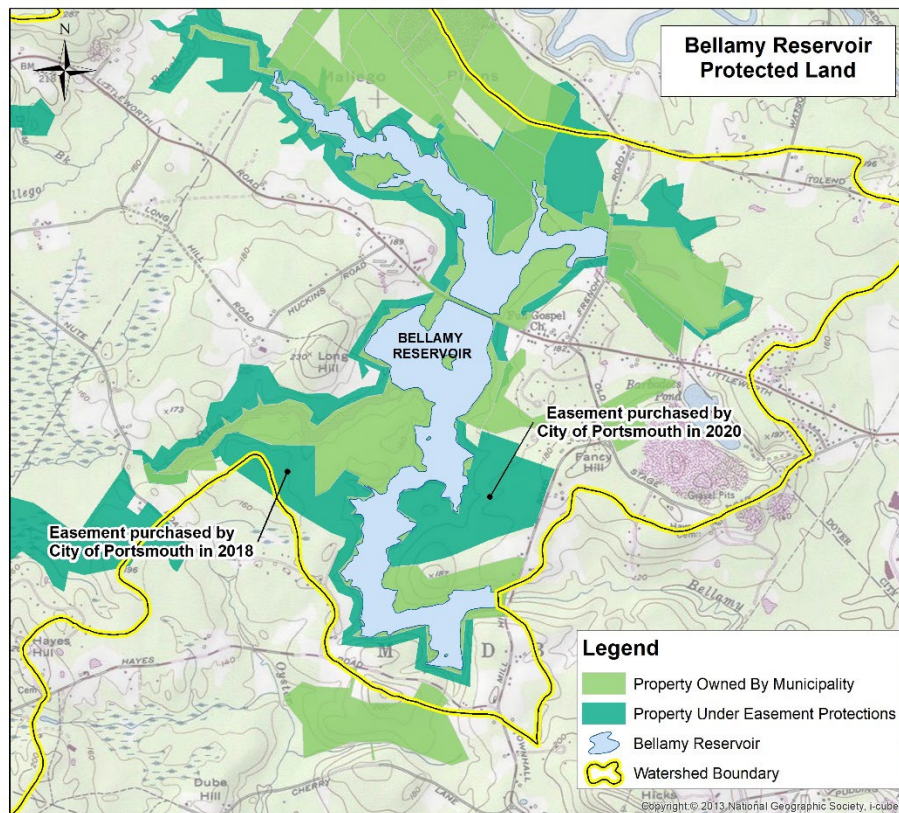
The 2022 Portsmouth City Council voted to reinstate the SWAG for another year. The public is invited to attend meetings and encouraged to be involved with the community and informed of all aspects of the City's water supply. Video recordings SWAG meetings are posted on the City's YouTube channel and linked from the SWAG webpage:

<https://www.cityofportsmouth.com/citycouncil/safe-water-advisory-group>

Source Water Protection

- **Bellamy Reservoir**

The City continues to work with the communities of Madbury and Dover to monitor and track the land within the Bellamy Reservoir watershed. The City of Portsmouth's water division either owns or has easements around the entire reservoir. This provides a protective water quality buffer for the surface water that is piped to and treated at the Madbury Water Treatment Facility. In addition to these buffers, the water division, in cooperation with the Town of Madbury and the New Hampshire Department of Environmental Services, has historically restricted activities in and around the reservoir. The following activities are not permitted; swimming, motor boats and campfires. Kayaks, canoes and other non-motorized boats are permitted on the reservoir.



The City has acquired conservation easements in 2018 and 2020 of properties that abut the Bellamy Reservoir. Easements on these parcels, totaling 179 acres, were obtained through the combined efforts of the City, Southeast Land Trust and the Town of Madbury to coordinate due diligence activities and prepare the easement documents. The City received approximately \$487,000 in grant funds for these easements from the New Hampshire Groundwater and Drinking Water Trust Fund and approximately \$14,500 from the Great Bay Resource Protection Partnership.

The protection of the Bellamy Reservoir is a high priority for the City of Portsmouth because the Reservoir is the primary water supply for the City. The Bellamy surface water is treated at the City's Water Treatment Facility in Madbury and delivered to regional communities around the seacoast. Conserving land within the watershed and areas that abut the reservoir and surrounding

wetlands, rivers, and streams, protect the water quality from the pressures of development and helps the municipal water system provide quality drinking water.

The City of Dover continues to update our water system staff about their efforts to track and remediate their closed landfill, which is in the Bellamy Reservoir watershed. Dover must comply with EPA and DES requirements regarding the level of remediation they need to perform to protect all water sources around their site. We will report any updated information about these efforts as it becomes available.

Water Supply Infrastructure Projects

- **Madbury Wells Upgrade Project**

The replacement Well 4 in Madbury along with the newly permitted Well 5 is complete. This involved testing, permitting and construction of new water mains, a water meter and treatment building and all associated controls, metering and pumping equipment. The wells were brought into service in August 2022 and will continue to help the water system expand our integrated water system management. Between the Portsmouth and Pease systems there are now 10 wells and a surface water treatment facility.



- **New Water Transmission Main Under Little Bay**

This project is in final design and awaiting agreements from abutting land owners. After negotiations with the abutting land owners are complete, the project can go through the final permitting through the NHDES which includes a public hearing. At this time it we are planning to bid the project in 2023, and the construction may occur during the winter (December – April) 2023/2024 to minimize impacts to the tidal ecosystem and fisheries.

- **Collins Well #2**

After investigating the geology in the area of the existing Collins Well through the drilling and construction of test wells, a hydrogeologically favorable location was identified for the construction of a new well, Collins Well #2. This well is intended to provide mechanical redundancy to the existing source as well as allow the water yield capacity to be recovered to the 450 gallons per minute that were originally available from the Collins Well. Over time the withdrawal rate from the Collins Well has declined and routine cleaning of the well screen and redevelopment of the gravel pack has resulted in only moderate recovery of the well yield.



Collins Well 2 has been drilled and constructed, and the City’s consultant, Emery & Garrett Groundwater Investigations (EGGI) is preparing a pumping test plan that will be submitted to the NH Department of Environmental Services to begin the well permitting process. An extensive network of monitoring wells will be used to assess the effect of pumping Collins Well #2.



Pump Testing Collins Well 2 – October 2022

- **PFAS Treatment Piloting**

The City continues to be at the forefront of exploring and testing options for treatment of PFAS in drinking water. Since the contamination was discovered at Pease in May 2014, city staff have worked with engineering consultants and vendors to run treatment pilots. The initial pilot was to determine the efficacy of granular activated carbon (GAC) on two of the Pease wells. This was followed by a full scale GAC demonstration project treating those wells. In 2017 resins were piloted utilizing the most contaminated water source to see how effective they would be in treating the PFAS. They proved to be very efficient. Therefore, the final design and construction of the Pease water treatment facility included both resin and carbon filters. Currently, the city continues to explore other filter medias and resins by utilizing an ongoing pilot system at the Pease facility. This system is concurrently filtering PFAS contaminated water through four separate columns, each with different filter media. Testing for PFAS occurs periodically to determine their comparative performance.



**Tim Green, Treatment Operations Foreman
In front of the treatment piloting system**



**Al Pratt, Water Resources Manager
Describing pilot efforts to the Pease RAB**



Tim Green describing the Pease Water Treatment Facility process to the Pease Restoration Advisory Board (RAB) - October 4, 2022

Further Updates and Information

This information will be distributed electronically on the City of Portsmouth's website in the Department of Public Works > Operations > Water section. If anyone needs additional information or has questions contact Al Pratt, Water Supply Operations Manager at 520-0622 or Brian Goetz, Deputy Director of Public Works at 766-1420.