City of
Portsmouth
Department of Public Works

Portsmouth and Pease International Tradeport
Water Supply Status Report
2019 Year in Review – January 23, 2020

Highlights of 2019

The following report provides a summary of the water system operations for the Portsmouth and Pease International Tradeport drinking water systems. Highlights from 2019 for both water systems include:

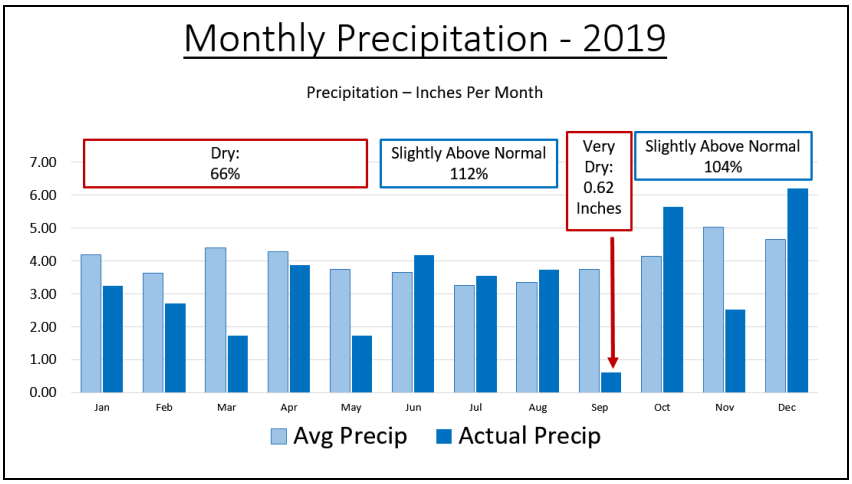
- The Portsmouth and Pease drinking water systems had no drinking water quality violations in 2019.
- Water production was the lowest it has been in 33 years due to success in tracking, locating and fixing leaks throughout both water systems
- Groundwater capacity in active wells is better than normal due to optimization of system
- Average daily residential water use is down 22% since 2010
- Construction of a new water filtration system to treat PFAS contamination in the Pease wells continues

Water supplied to Portsmouth water system customers comes from a combination of surface water and groundwater sources. The surface water supply is the Bellamy Reservoir, which is located in Madbury and Dover. Water flows from the reservoir to the Water Treatment Facility (WTF) in Madbury, where it is treated using a coagulation, dissolved air floatation and dual media filtration process. The treated water is chlorinated with sodium hypochlorite before distribution into the system. Sodium hydroxide (used to adjust the final pH and alkalinity), fluoride as hydrofluorosilicic acid (used to prevent tooth decay) and poly/ortho-phosphate (a sequestering chemical to reduce precipitation of iron and manganese, and inhibit corrosion is used to protect distribution system pipes) are also added before distribution to our regionally served water customers.

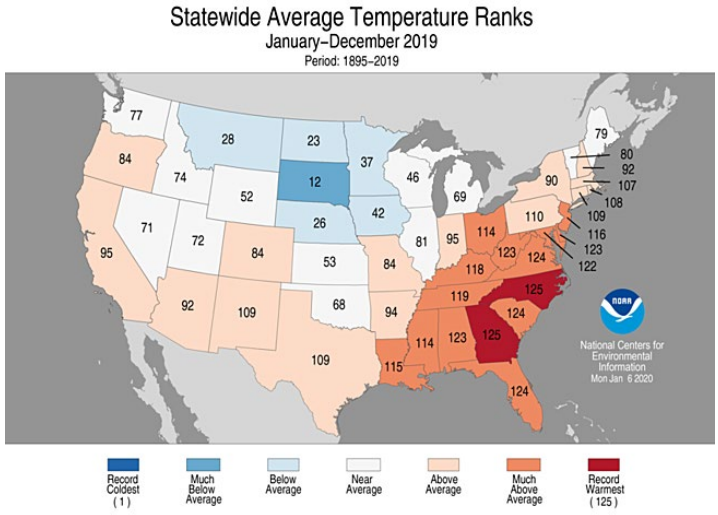
Water supplied to Pease Tradeport water system customers comes primarily from the groundwater wells located on the Tradeport (Harrison Well and Smith Well). Portsmouth water system (EPA PWSID# 1951010) supplies water to the Pease Tradeport water system as needed.

Precipitation and Weather

At year-end, the overall water supply conditions for the Portsmouth water system are in good condition. We received just above normal precipitation for the Portsmouth area in the final three months of 2019. This followed a very dry September when we received only 0.6 inches of precipitation, which was the fourth driest month in 20 years. The current 12-month rolling average precipitation totals 40 inches, which is just below normal. However, the earlier rainfall events this year were mostly long in duration rather than brief showers, which allowed the water to soak into the ground and recharge our water sources. The following graphic shows the monthly precipitation as recorded at the Pease NOAA weather station.

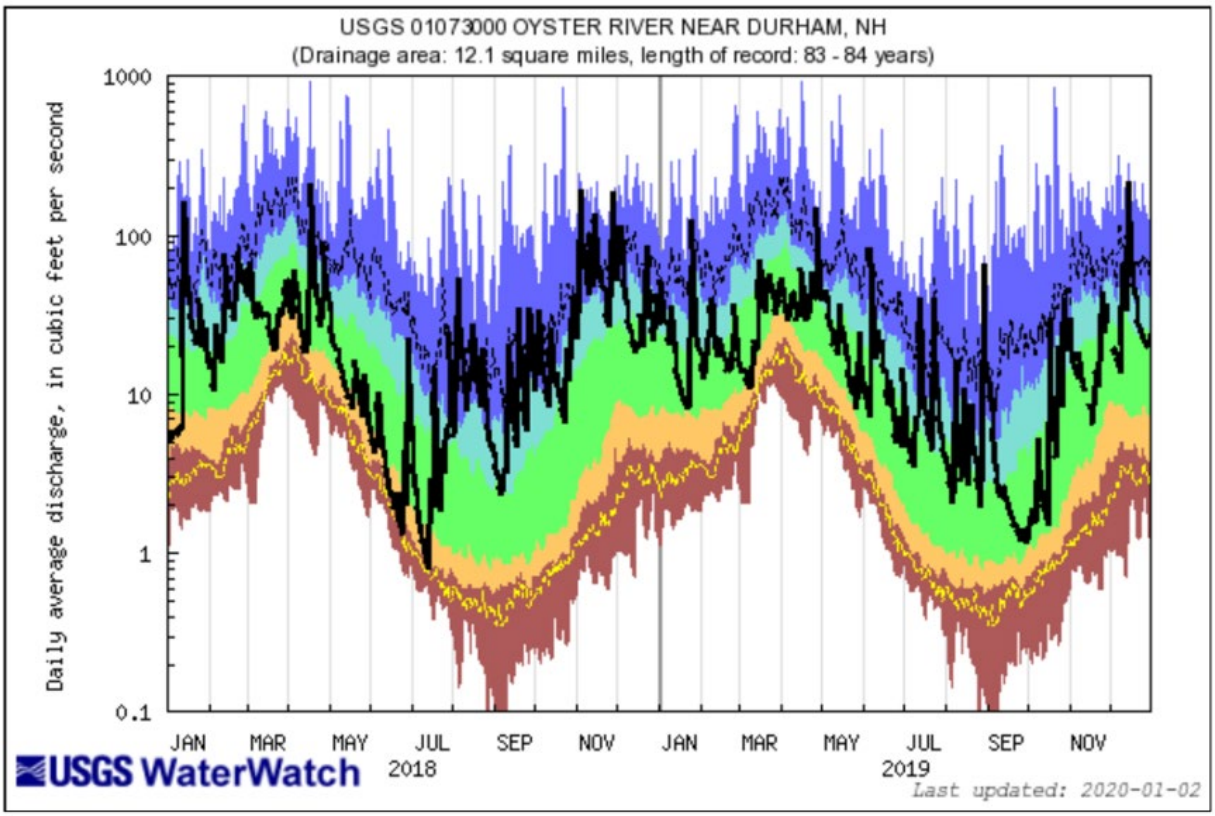


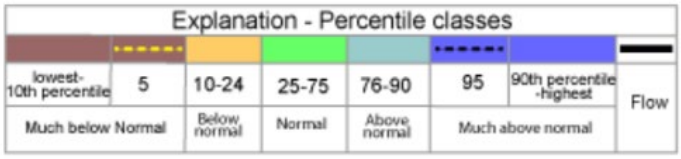
A good portion of the country experienced the warmest weather in 125 years in 2019. New Hampshire weather was above average for the year, with 2019 ranking the 92nd warmest year since 1895. Water demands in our water systems reflected this pattern. However, moderate summer temperatures, coupled with precipitation in June, July and August helped to keep our water supply in good condition.



Reservoir Levels and Flow

The current river flow, according to the gauged Oyster River, which we use to assess the flow into the Bellamy Reservoir, is above normal for this time of year per the following USGS graphic:





The above graphic shows two years of gauged flow in the stream compared to below normal, normal and above normal flows. With the exception of June and July 2018, streamflows have been at or above normal for this period. The trend also shows the effect of the dry period of September 2019 when streamflows were approaching below normal conditions, only to bounce back up with the rainfall in October through December.

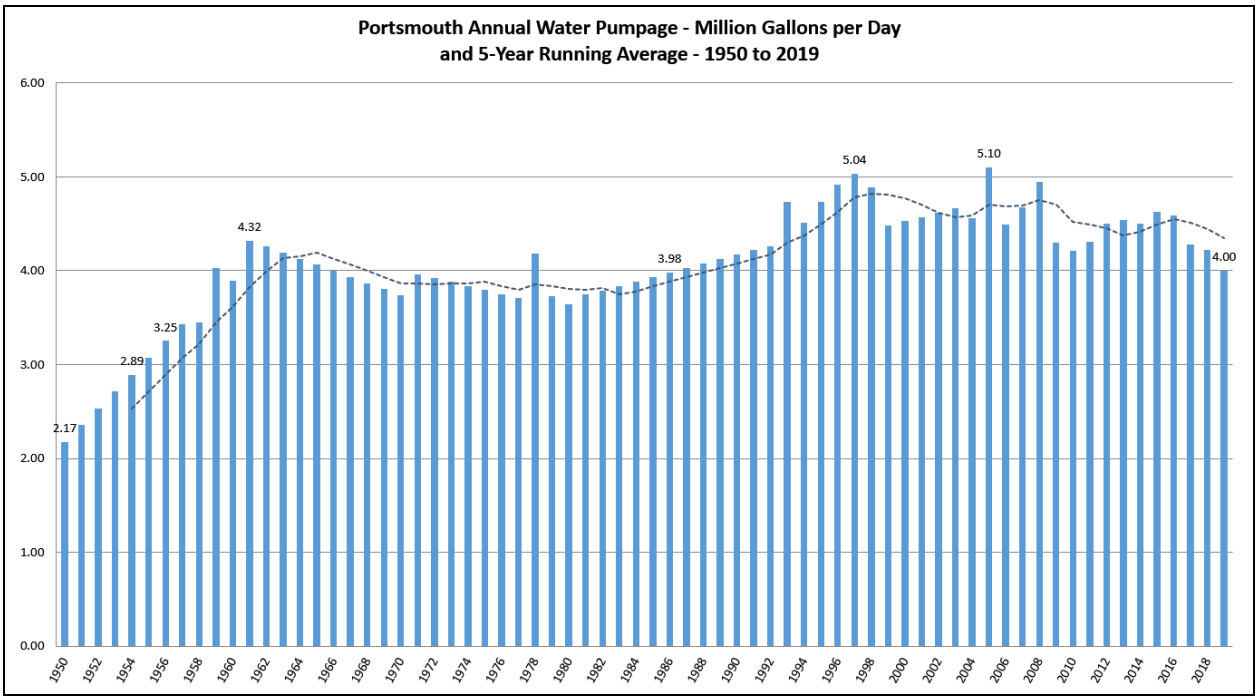
Groundwater Levels and Status

Groundwater levels in most of our water sources are much better than normal. In fact, some of the well levels are higher than they have been in years. 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.

Water Production

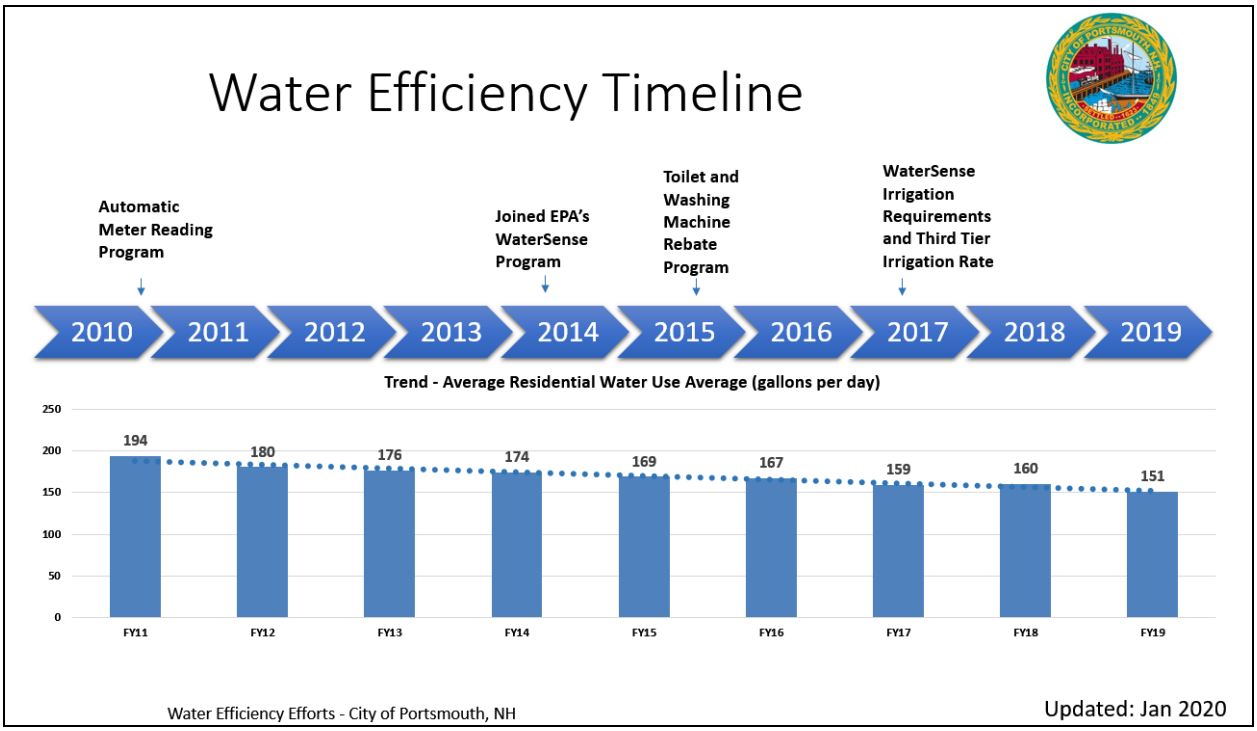
The water produced by the combined Portsmouth/Pease water system averaged 4 million gallons per day. This is the lowest average production since 1986 – 33 years. Through diligent management of our water distribution system and service pipelines we have been able to identify and fix a number of leaking pipes. The reduction of water lost in these pipes has reduced the overall water production needs in the systems. It is now standard practice for our staff to continually inspect our water system for leaks. With 200 plus miles of water pipelines this is a lot of effort. The following graphics show the monthly and annual trends in water supply production for the Portsmouth and Pease Tradeport water systems:



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, nearly 1,000 rebates have been issued. 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

The following graphic shows the success of the water efficiency program:



As the graphic shows, average residential water use has gone from 194 gallons per day down to 151 in the last 10 years, a 22% reduction. We intend to continue with the rebate program and expand our outreach efforts to focus on ways that customers can be more efficient with summertime water use for irrigation and cooling needs.

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**

Our efforts to track and treat the PFAS contamination at the Pease International Tradeport continue. PFAS stands for a broad group of perfluoroalkyl and polyfluoroalkyl substances, produced and found in many commercial products and also used in firefighting foam. Per- and polyfluoroalkyl substances (PFAS) are currently unregulated by the Safe Drinking Water Act. However, the EPA Health Advisory concentration standard is 70 parts per trillion (ppt) for perfluorooctane-sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). In response to the discovery of PFOS in the Haven Well in May 2014 at levels that exceeded the EPA Provisional Health Advisory (200 ppt at that time), the Haven Well was removed from service. This well has remained disconnected from the Pease Tradeport water system since this finding. The source of the PFAS at the Tradeport was aqueous film-forming foam that had been used to extinguish fires and in training exercises at the former Air Force Base. Since 2014, the Harrison Well and Smith Well on the Pease Tradeport water system, and Portsmouth Well #1 and Collins Well in the Portsmouth water system, have been routinely monitored for PFAS by the Air Force.

Activated carbon filters continue to treat the Harrison and Smith wells at Pease while an entirely new treatment facility is constructed to treat those two wells together with the reactivation of the Haven well when the construction is completed in the summer of 2021. 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. However, enforcement of these regulations is currently on hold due to a lawsuit filed in late 2019. Despite this, we are continuing to sample quarterly according to these regulations and post that data on the City's website at: www.cityofportsmouth.com/publicworks/water.

- **Total Trihalomethanes (TTHMs)**

We experienced a reduction in Total Trihalomethanes (TTHMs) in our water system in 2019 due to improved operations of our aeration system at the reservoir together with adjustments to our surface water treatment facility. Additionally, a new aeration system was installed in the Newington booster station as part of facility and pumping upgrades completed in 2019. This system helped to reduce the TTHMs that can form after treatment. We are currently in compliance with the regulatory standards for these compounds and will continue to sample quarterly in both water systems as required.

- **Lead Sampling**

The two water systems continued to sample for lead in 2019. Both water systems are in compliance with the requirements for lead concentrations with the results from our lead sampling program in 2019 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 32 residential samples collected in the Portsmouth system in 2019, 29 had no detected lead, 2

had less than 2 ppb, and one had slightly higher than 15 ppb. In the Pease Tradeport system, 17 of the 22 sample had no detected lead, 4 had less than 3 ppb, and one had 7 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 again in the fall of 2020.

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.

- **Fluoride Optimization**

The City of Portsmouth's water operations staff were recently awarded a NH Safe Lives certificate for fluoride optimization in our Portsmouth water system. This award recognized our water treatment operators for achieving optimal level of fluoride levels (0.7 parts per million) in our drinking water system.

NH Healthy Lives – Optimal Fluoridation Award Ceremony – January 17, 2020
Arthur Bartlett – Water Treatment Operator, Karen Conard – City Manager, Regina Blaney – NH Healthy Lives, Mike Unger – NH DES, Karen Craver – NH Healthy Lives, Al Pratt – Water Supply Operations Manager, Brian Shea – Water Treatment Operator, Brian Foote – Water Treatment Operator, Mark Young – Chief Plant Operator, Mason Caceres – Water Quality Specialist, David Lippmeier – Water Treatment Operator

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 water division recently acquired a conservation easement on 72 acres of property adjacent to the Bellamy Reservoir in Madbury, New Hampshire. This easement was realized through the combined efforts of the City, the Southeast Land Trust (SELT), the Town of Madbury and the State of New Hampshire's Drinking Water and Groundwater Trust Fund, which funded half of the purchase. We are currently working on acquiring other properties and easements as the opportunities arise.

The City of Dover continues to update our water system staff about their efforts to track and remediate their closed landfill, which is in our 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.

- **Greenland Well**

City staff worked in cooperation with the Town of Greenland to install fencing around the Greenland Well's 400-foot wellhead protection buffer adjacent to the recreation fields that the Town owns and operates. This fencing will provide a buffered area where no parking will be allowed within that protective zone.

We are also working with a property owner to acquire 3.2 acres of developable property within the 400-foot protective buffer. The State's Drinking Water Trust has agreed to match approximately 50% of the purchase price for this acquisition.

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.