City of
Portsmouth
Department of Public Works

Portsmouth and Pease International Tradeport
Water Supply Status Report
2020 Year in Review – January 26, 2021

Highlights of 2020

The following report provides a summary of the water system operations for the Portsmouth and Pease International Tradeport drinking water systems. Highlights from 2020 for both water systems include:

- The Portsmouth and Pease drinking water systems had no drinking water quality violations in 2020.
- Water Production:
  - 3.7 Million Gallons – Average Day
  - 6.1 Million Gallons – Maximum Day
  - 2.2 Million Gallons – Minimum Day
- Drought conditions persisted during the summer leading to restrictions:
  - June 22, 2020 – Moderate Drought declared
  - August 18, 2020 – Severe Drought declared – Voluntary Water Restrictions imposed
  - September 10, 2020 – Extreme Drought conditions – Odd/Even Water Restrictions imposed
  - Precipitation in late November and early December 2020 helped improve drought conditions
- Construction of a new water filtration system to treat PFAS contamination at Pease continued
- Staff implemented operating procedures to safely continue operations of water system during Covid-19 pandemic

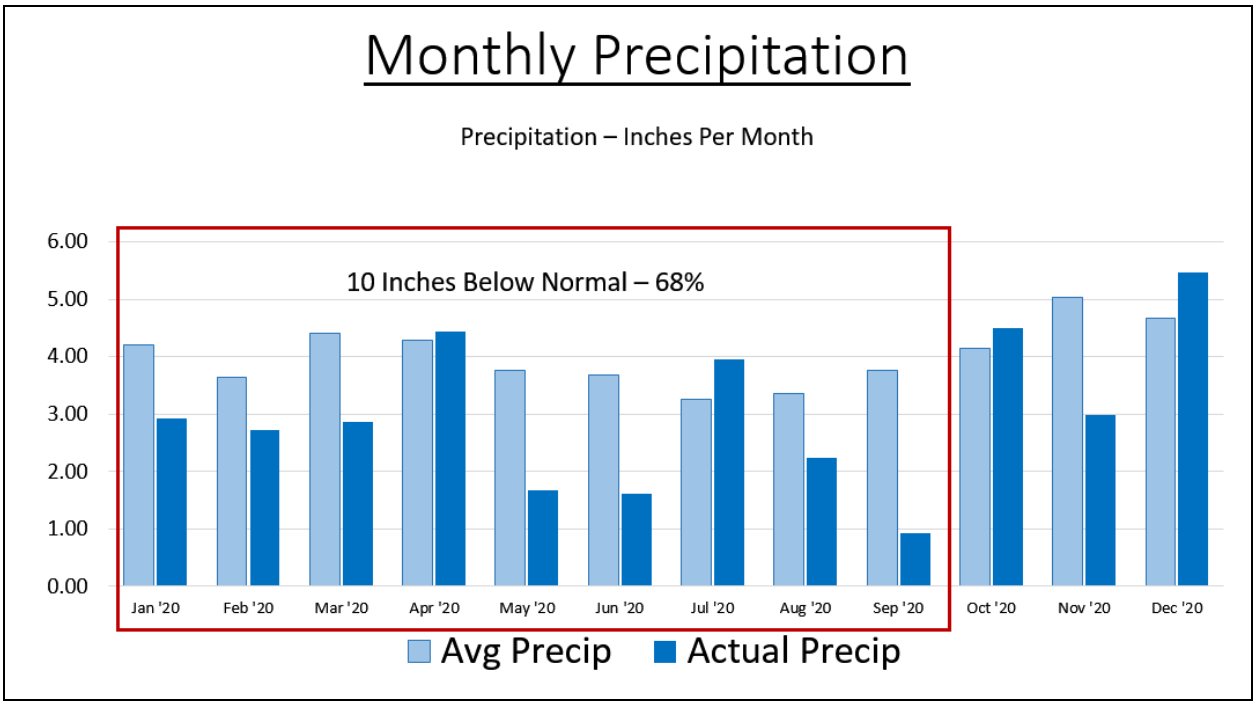
Water supplied to Portsmouth water system customers comes from a combination of surface water and groundwater sources. The surface water supply is the Bellamy Reservoir, which is located in Madbury and Dover. Water flows from the reservoir to the Water Treatment Facility (WTF) in Madbury, where it is 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

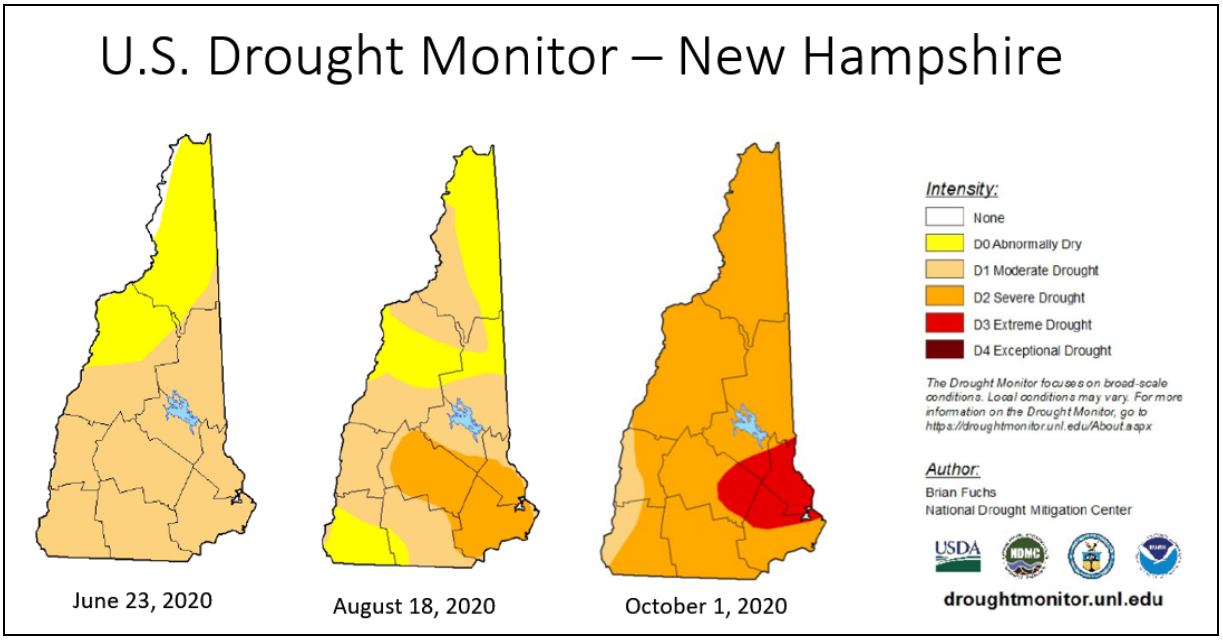
At year-end, the overall water supply conditions for the Portsmouth water system were recovering from a very dry period experienced throughout the year. May, June and September were very dry months. Showers in July and August helped to minimize the impact of the drought. The following graphic shows the monthly precipitation as recorded at the Pease NOAA weather station.



The State of New Hampshire activated their Drought Management Plan and convened their Drought Management Team during the summer of 2020. City water operations staff participated in the meetings. The Team consisted of state, federal, regional and municipal agencies, including the Portsmouth DPW Water Division. Actions included: assessing reservoir impacts and adjusting operations, working with drinking water systems statewide and ensuring the public is informed of the impacts and conservation measures that should be employed now to avoid

serious problems later in the summer. Throughout the drought our water system provided updates and encouraged water users to "Think Blue" and consider water-saving measures at home, including participating in the City's water efficiency rebate program.

The following graphics, from the U.S. Drought Monitor, show the progression of the drought during the summer of 2020 and the dry conditions, especially on the seacoast:

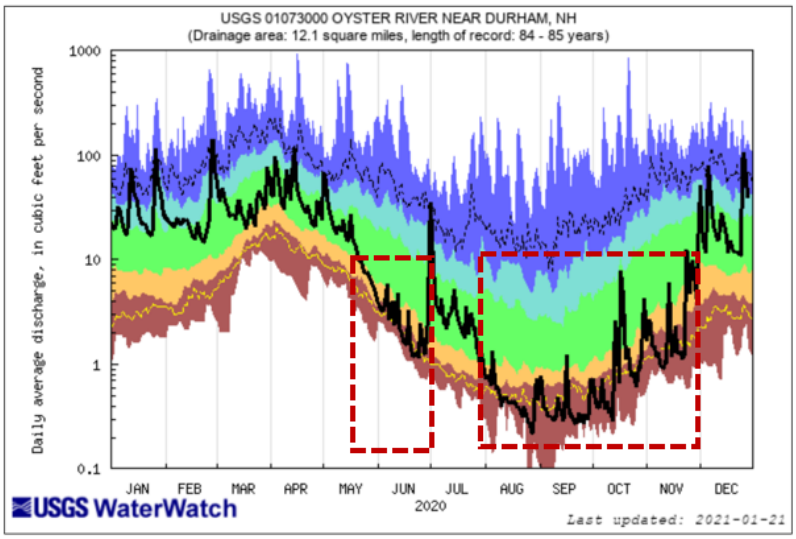


Reservoir Levels and Flow

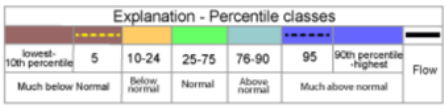
The following graphics show the river flow trend and reservoir level during 2020. The river data utilizes the Oyster River gage, which is used to assess the flow into the Bellamy Reservoir, for 2020. The low flow conditions that persisted throughout the summer are highlighted. Flows picked up after the late November and early December precipitation events.

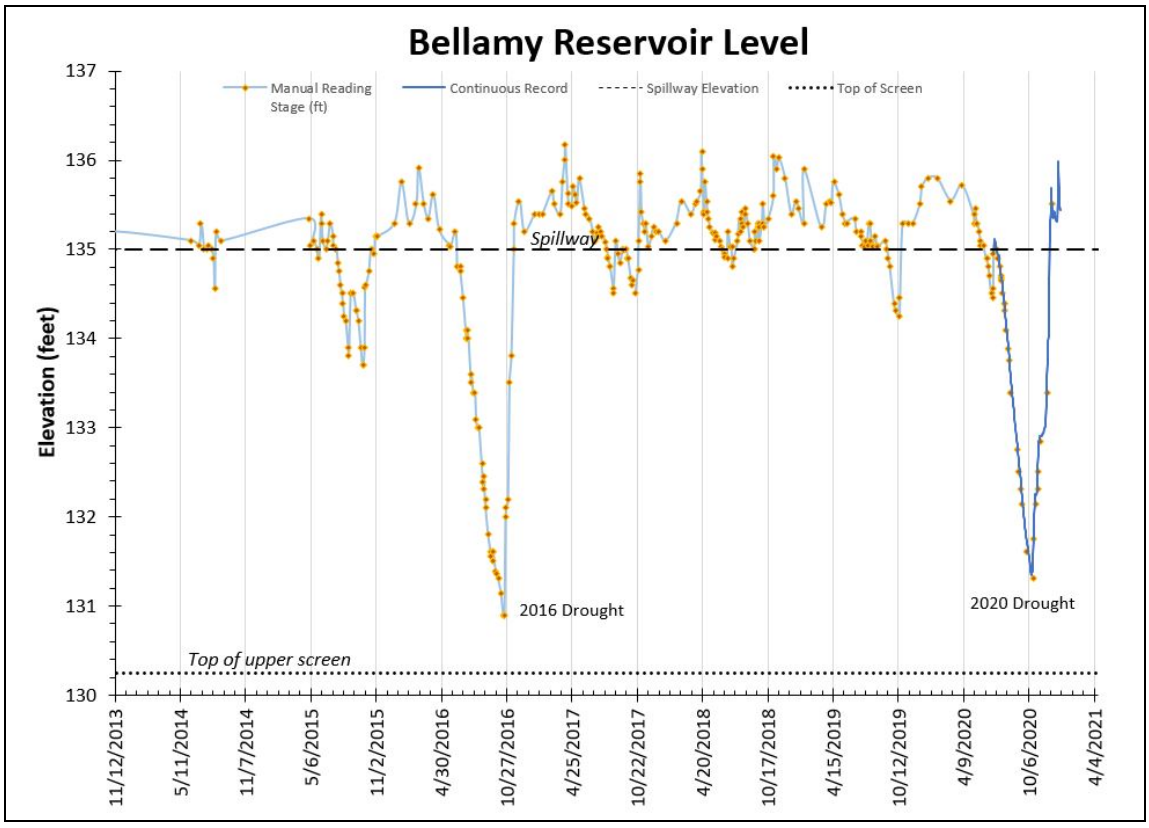
As the second graphic shows, the Bellamy Reservoir's water level dropped continuously during the dry summer and recovered after the precipitation in November and early December. At its lowest point, the water level was approaching the low level experienced during the historic drought of 2016. Fortunately, like what occurred in 2016, the precipitation events made flows come up quickly and currently water is flowing over the dam's spillway.

2020 River Flow Conditions



Very Low Flows Due to Lack of Precipitation



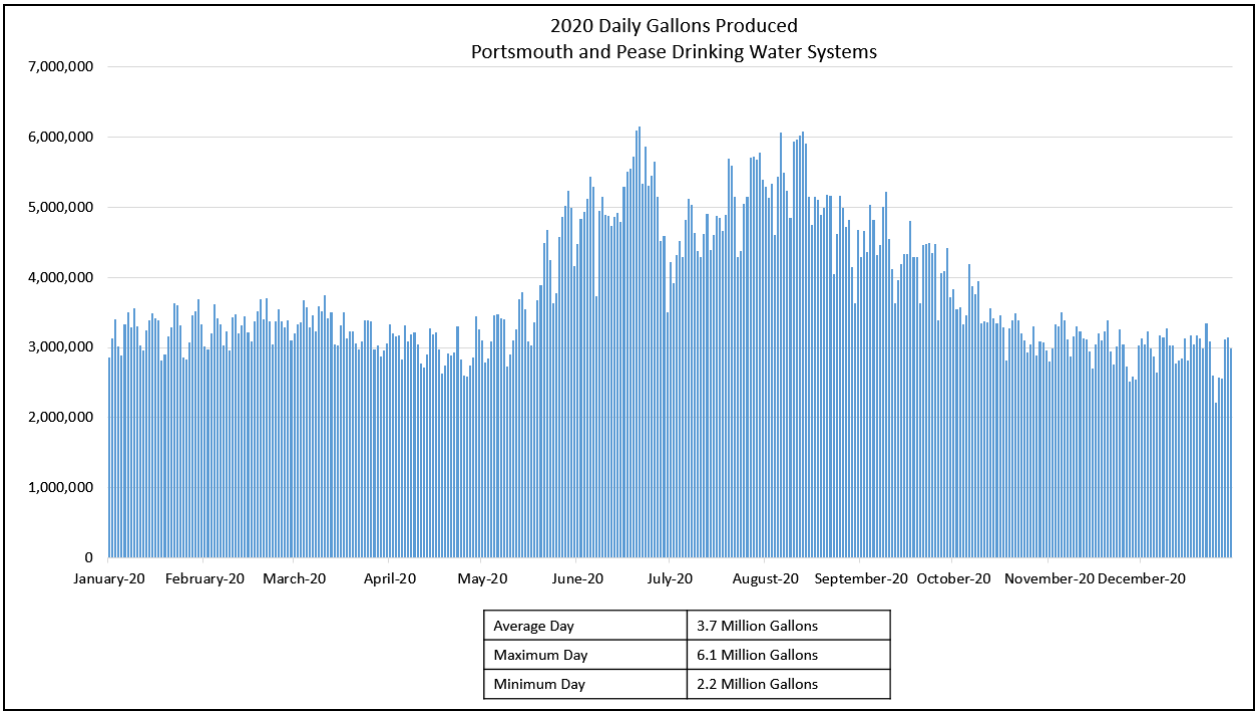


Groundwater Levels and Status

Prior to the summer drought the groundwater levels in most of our water sources were much better than normal. In fact, some of the well levels were higher than they have been in years. This can be 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. During normal conditions, the City's Integrated Water Supply Management procedures have our staff reducing the use of our groundwater well supply withdrawals and increasing the surface water supply. This allows our 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 3.7 million gallons per day. This is the lowest average production since 1986 – 34 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:



Average Day	3.7 Million Gallons
Maximum Day	6.1 Million Gallons
Minimum Day	2.2 Million Gallons

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. 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

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.

November 10, 2020

PEASE TRADEPORT WATER SUPPLY UPDATE

Construction of New Drinking Water Treatment Facility Upgrade – October 2020

Construction of the final treatment system, which includes both resin and activated carbon filtration systems, began in April 2019. Recent work includes the installation of new Activated Carbon (GAC) vessels and delivery of the IOX Resin Filter vessels. Work installing new piping, pumps and controls is underway.

New Granular Activated Carbon (GAC) Filters

IOX Resin Filter Vessels

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 water and groundwater supply sources continues on a quarterly basis and all data is posted on the city's website:

cityofportsmouth.com/publicworks/water/pease-tradeport-water-system

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 was postponed due to a legal injunction. Through a legislative action, the rule went

back into effect in early 2020. The City has continued to sample quarterly since April 2019 according to these regulations and posts all PFAS results on the City's website at:

cityofportsmouth.com/publicworks/water.

- **Total Trihalomethanes (TTHMs)**

We experienced a reduction in Total Trihalomethanes (TTHMs) in our water system in 2019 and 2020 over previous years 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 continues to help 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 Portsmouth and New Castle water systems continued to sample for lead in 2020. Both water systems are in compliance with the EPA Lead and Copper Rule requirements. All of the results from our lead sampling program in 2020 were below the lead action level of 15 parts-per-billion (ppb) at the 90th percentile value. Of the 31 residential samples collected in the Portsmouth system in 2020, 27 had no detected lead, 4 had less than 8 ppb. In the New Castle system, 11 of the 13 samples had no detected lead, and 2 had less than 5 ppb. These results are typical of what have been measured over the past 17 years since our corrosion control program has been in effect. This is an annual sampling program, and we will be sampling again in the summer and fall of 2021.

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)**

Founded by Council action on October 5, 2020, the Safe Water Advisory Group's stated mission is:

> To review and communicate the latest science on the health and environmental effects of PFAS, to monitor federal and state level legislative changes, and to anticipate policy changes that could impact the city of Portsmouth.

The group's activities are to conduct reviews of periodic City well monitoring results, legislative trends in NH and other states, current science on PFAS exposure. Providing periodic report back to the City Council as needed.

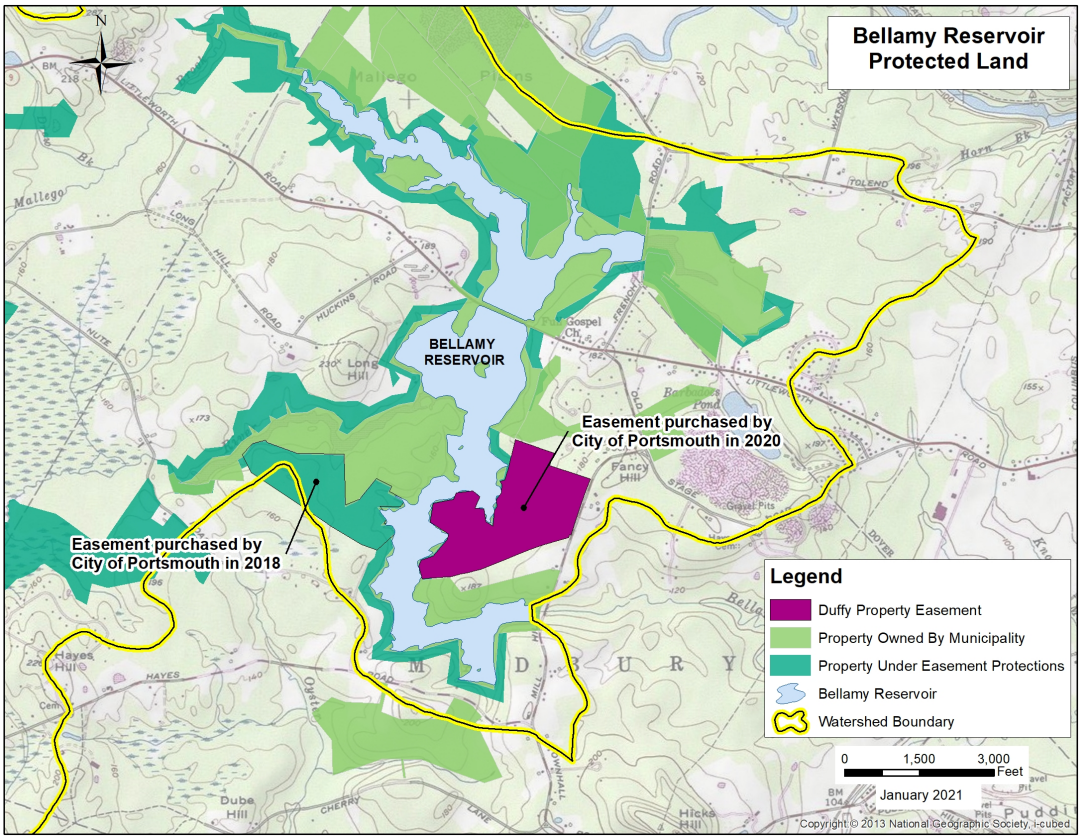
Additional information on meeting dates, agendas and how to attend can be accessed at:

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, fuel-powered motor boats and campfires. Kayaks, canoes and other non-motorized boats are permitted on the reservoir.



Taking another significant step in its effort to protect the City of Portsmouth's surface water supply by conserving lands surrounding the Bellamy Reservoir, the City's Department of Public Works Water Division has partnered with Southeast Land Trust (SELT) to purchase a conservation easement on approximately 107 acres owned by Mary Ellen Duffy, adjacent to the Reservoir. The transaction closed on December 29, 2020.

This acquisition complements the conservation easement secured in 2018 on 72 acres of property owned by David Olson, also adjacent to the Bellamy Reservoir in Madbury. Both easements were obtained through the combined efforts of the City, SELT and the Town of Madbury to coordinate due diligence activities and prepare the easement documents. With their help, the City applied for and received a $287,000 grant from the New Hampshire Groundwater and Drinking Water Trust Fund and approximately $11,500 from the Great Bay Resource Protection Partnership. The Portsmouth City Council authorized the use of $287,300 from the City's Water Enterprise Fund to complete the purchase of the Duffy easement.

The protection of the Bellamy Reservoir is a high priority for the City of Portsmouth because the Reservoir is the primary supply of the fresh water treated at the City's Madbury Water Treatment Facility and delivered to regional communities around the seacoast. Conserving land that surrounds or includes wetlands, rivers, streams and larger bodies of water like the Reservoir protects water resources 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 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.

In 2020, the City purchased a 3.11 acre parcel within the 400-foot protective buffer around the Greenland Well. By purchasing this parcel, the City has protected the water supply from potential contaminants that could have occurred if the lot was developed with construction of a house and septic system. .

Further Updates and Information

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.