Sixty-Third

Annual Report

BANGOR WATER DISTRICT

Bangor, Maine

for the year ending

December 31, 2020

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TRUSTEES OF BANGOR WATER
2020

Ralph Foss, vice chair	.Term expires Jan. 1, 2021*
Patricia Hamilton	.Term expires Jan. 1, 2022*
John Hwalek	.Term expires Jan. 1, 2023*
Gerry Palmer, chair	.Term expires Jan. 1, 2021*
Robert Sypitkowski	.Term expires Jan. 1, 2023*
Michael Timpson	.Term expires Jan. 1, 2023*
Dan Wellington, clerk	.Term expires Jan. 1, 2022*

**Trustees served until replaced/re-appointed.*

OFFICERS OF BANGOR WATER
2020

Kathy Moriarty	General Manager
Rachel Bailey	Treasurer*

* resigned October 2020

BANGOR WATER
GENERAL INFORMATION

Did you know that

- Bangor Water pumps and treats approximately 4,300,000 gallons of water each day.
- The water is delivered through 200 miles of pipeline ranging up to 30 inches in diameter.
- Bangor Water supplies more than 30,000 people in the greater Bangor area.
- The water comes from Floods Pond in Otis, and is piped under the Penobscot River to reach Bangor. The Penobscot River was abandoned as a water source more than 60 years ago.
- Bangor Water is a quasi-municipal corporation, chartered by the State of Maine, and is a separate entity from the City of Bangor. The formation of the District was approved by voters in 1957. The only source of revenue is money raised through water bills, public and private fire protection, and other utility services.

History

The history of public water in Bangor began in 1875 when officials contracted with the Holly Co. for the installation of 77,000 feet of water mains to be used for domestic, industrial and fire protection. Water from the Penobscot River replaced the individual wells and cisterns as the source of supply.

Later in the century and into the 1900's, Bangor experienced typhoid epidemics nearly every year. Local officials appointed a citizen committee to determine the cause of the problem, and during the investigation it found that among the local schools, only those using "City" water had an incident of the disease. Other signs also indicated that the water supply was the principal carrier. To correct this situation, a filter plant was completed in 1908. This plant utilized coagulation, sedimentation, and filtration, and was capable of handling 8,000,000 gallons of water per day. Later, chlorination facilities were installed to provide disinfection.

Expansion of the system continued until 1957 when it was agreed--after long debate--that Bangor must switch its water supply from the river (heavily polluted by upstream dumping of sewage and mill waste) to some other source if the quality of water provided to the citizens was to be improved.

An act of the Maine Legislature in 1957 created the Bangor Water District, which was approved in a City referendum. After formation of a Board of Trustees, the title to the City water system was handed to the new water utility. In essence, the act authorized Bangor Water to control a number of ponds to supply water to Bangor and surrounding towns. Floods Pond in Otis was chosen following careful testing over a number of years by staff. A total of $4,000,000 in Series "A" bonds financed construction of a new pump station at Floods Pond and a transmission line from the pond to Bangor.

With the new system in operation in 1959, the water-powered Deane Pump located in the old water works building on the Penobscot River gave way to electric turbine pumps at Johnston Pump Station at Floods Pond. Subsequently the old filter plant building on State Street was converted to work shops and storage space, and a new office building was constructed. The "new" water from Floods Pond was of such high quality that it did not require extensive treatment.

In the following decades, increasingly sophisticated equipment was added to our facilities, the Thomas Hill Standpipe became a National Historic landmark, and customers were changed from "flat rate" to "metered" service to provide more equitable distribution of charges and to encourage conservation.

In 1995, a new treatment plant was constructed on the access road to Floods Pond in response to changing federal regulations. The plant utilizes ozone--instead of chlorine--as the primary disinfectant, and chloramines (a combination of chlorine and ammonia) as a secondary disinfectant.

At the invitation of the Town of Hermon in 1999, Bangor Water expanded its service area with a 14,000-foot extension of 12-inch main on Odlin Road from Dowd Road in Bangor into Hermon and along Coldbrook Road. The expansion, funded by the Town of Hermon, also included more than a dozen new hydrants, and a new standpipe and control valve building.

In 2002, at the invitation of the Town of Orrington, Bangor Water again expanded its existing service area. The Town completed a 3500-foot water line extension to serve customers along Rt. 15, funded by the municipality. The 12-inch pipe provides water service to 90 or more customers, and interconnects with City of Brewer's water distribution system for emergency use.

Source of Supply

The source of supply for the Bangor Water is Floods Pond in Otis. The pond lies 15 miles east of Bangor in a rocky, rugged area that was scoured by the retreating glaciers. The pond supplies an excellent source of water that is clear, soft and palatable year-round. Due to the high quality water of Floods Pond, Bangor Water received an exemption from filtration from the Environment Protection Agency in 1991, thus avoiding the cost of nearly $30,000,000 for the construction of a filtration facility. Floods Pond watershed has an area of approximately 8.7 square miles.

The estimated dependable yield of Floods Pond is about 8.2 million gallons per day; we typically pump around four million gallons per day. In order to protect the source of water, Bangor Water originally acquired a strip of land 200 feet wide around the periphery of Floods Pond and Burnt Pond, and in recent years has purchased several thousand additional acres of land in the watershed area to control activities that could impact water quality.

Johnston Pump Station

Johnston Pump Station, located on the shore of Floods Pond, is named after Donald Johnston, a former District superintendent. The station has two 36-inch diameter intake pipes; one is in approximately 13.5 feet of water, and the second is in about 23 feet of water. Four vertical well-type electrically driven 150 hp pumps are on site, each capable of pumping five million gallons per day. From 1957 to 1995, raw water was treated at this pump station.

Butler Ozone Treatment Facility

Beginning in 1995, water treatment was moved to the new Butler Ozone Facility located about a mile from the original station. The water is treated with ozone and chloramines for disinfection, soda ash for pH adjustment, and fluoride for dental health. It is interesting to note that the pond has a natural fluoride content of about 0.20 ppm.

The Butler facility was named for Paul G. Butler of Bangor, who worked a total of 33 years for the City Water Department that then became the Bangor Water District. In addition to serving as chemist and assistant superintendent, Butler was responsible for much of the testing that resulted in Floods Pond being chosen as the source of supply.

Ultra-Violet Treatment Facility

In 2013, an ultra-violet (UV) treatment facility at Floods Pond in Otis was completed and put into service. The additional UV disinfection process is required by federal regulations relating to Cryptosporidium and provides another layer of disinfection protection ensuring safe drinking water.

All facilities have auxiliary generators to ensure lights, heat and pumping facilities during a power failure. The ozone facility is manned by operators 24 hours a day, seven days a week who control water pumpage and treatment, and monitor other Bangor Water storage and pump facilities through a computer network.

Pump Stations and Standpipes

Three pump stations in Bangor are used to control water flow. These are:

- Griffin Road, built in 1987
- Perry Road, built in 1988
- Bangor International Airport, built in 1943, which underwent extensive renovations in 1994. The station is named in honor of Harold Crane of Bangor, a retired 43-year employee and former service truck supervisor.

Water -- totaling 13,250,000 gallons — is stored in six standpipes for daily drawdown and for emergency purposes. These are:

- **Thomas Hill**: holds 1,750,000 gallons and is a riveted wrought iron tank with a wood jacket. It is located on Thomas Hill, rises 50 feet, and is 75 feet in diameter. The tank, built in 1897, is our oldest standpipe. It is a national historic landmark as designated by the Register of Historic Places and the Maine Historic Preservation Commission. It is also designated an American Water Landmark by the American Water Works Association, and a state historic civil engineering landmark by the Maine Chapter of the American Society of Civil Engineers. The lights that illuminate the top at night resemble a queen's crown, in keeping with Bangor being known as the "Queen City."
- **Bomarc**: a welded steel tank located at the former Bomarc base which holds 1,500,000 gallons. This standpipe was constructed in 1986

- **Essex Street:** a concrete tank built in 2010, holding 3,400,000 gallons of water. The new tank replaced a four-million-gallon steel tank constructed in 1958 as well as a two-million-gallon steel tank built in 1933, both of which were demolished.
- **Hammond Street**: a steel welded tank holding 5,000,000 gallons. It stands 74 feet high and is 110 feet in diameter. It was built in 1963.
- **Bangor International Airport**: a 1,000,000-gallon standpipe that stands 100 feet high. It was built in 1944, and is painted in an orange-and-white checkerboard fashion due to its proximity to runways.
- **Hermon**: built in 1999. Holding 600,000 gallons, the standpipe is located on the Coldbrook Road in Hermon and was constructed as part of the Hermon service area expansion.

SCADA System

Operation of pump stations and standpipes, chemical dosing, and monitoring equipment are managed by a System Control and Data Acquisition system (SCADA) computer. A new SCADA system was installed in 2012, to replace the original 1988 model that was no longer supported.

The computer is monitored from the engineering department on State Street in Bangor and at the Butler ozone plant. This SCADA system helps operate our transmission and distribution facilities, and is designed to continue operating in case of power loss. The SCADA system communicates with multiple remote sites that it monitors and operates on a continuous basis. Many other functions such as intrusion alarms, temperature control, etc. are monitored by the SCADA system.

Transmission Lines

Transmission facilities include a 30-inch reinforced pre-stressed concrete pipeline from Floods Pond to the Penobscot River (76,821 feet in length). The main runs along the side of Burnt, Little Burnt, and Snowshoe ponds, and then west to Eddington. At the Penobscot River, the transmission line splits into two 24-inch pre-stressed reinforced concrete mains that pass under the river.

On the west side of the river, the two lines rejoin and form a single 30-inch main which runs to a control valve facility, and on into Bangor.

Customer Service

There are approximately 11,000 service lines (direct water connections) to provide service to approximately 10,500 domestic accounts and 500 fire protection services. Domestic water customers are charged based on the amount of water use measured by a meter. Fire protection is provided through 1119 public hydrants and 220 private hydrants.

Bangor Water also provides water directly to customers in sections of Clifton, Eddington, Hermon, Orrington, Hampden, and Veazie, as well as to the Hampden Water District.

The water provided meets all of the maximum contaminant level requirements of the Safe Drinking Water Act. We monitor the water quality for bacteriological contamination each working day in our certified laboratory to ensure it meets all regulations.

BANGOR WATER DISTRICT
BOARD OF TRUSTEES ANNUAL REPORT

On behalf of the Board of Trustees, I am pleased to present the 63rd annual report of the Bangor Water District.

At the Board's **annual meeting**, the following officers were chosen: Gerry Palmer, chair; Ralph Foss, vice-chair; and Dan Wellington, clerk. Kathy Moriarty was appointed General Manager and Rachel Bailey was appointed Board Treasurer. Departing Trustee Laurel Grosjean was recognized for her years of service.

The most significant event of the year was the impact of COVID on all facets of District operations, including staffing, customer interaction, and finances. As examples

- The Board opted to delay a planned rate adjustment from July until October, and then postponed again until 2021.
- Facilities were closed to the public early in the pandemic, and then again at the holiday season to reduce the possibility of staff exposure.
- Meetings were held via Zoom or with limited people in attendance.
- Finances were impact by the imposed moratorium on shutting off customers for non-payment of bills
- Staffing was challenging as all "construction" companies vied for employees.
- Project schedules were delayed due to the unavailability of contractors and the shortage of various supplies.
- Our quarterly tours of Thomas Hill standpipe were cancelled as a precaution.

In some respects, the staffing issues were helpful because the vacant positions helped reduce expenses. In addition, the winter of 2019-2020 was mild, and fewer than average leaks occurred – further reducing expenses.

Funding for infrastructure renewal comes primarily from water rates, and the Board anticipates a rate adjustment in 2021 to move forward with projects. Currently, our minimum user pays 49 cents per day for water, while our average residential user pays 75 cents per day.

We did not make a great deal of progress toward our goal of replacing two miles of pipe each year, which ensures that the water system is renewed every 100 years. COVID-19 dealt a blow to schedules, personnel, and supplies – with planned projects delayed or postponed. However, work during 2020 included:

- Completion of a water line suspended under the Ohio Street I-95 overpass as part of MDOT's road work (the existing line is buried under the interstate).

- Transfer of service lines on Parker Street from an old line to a newer line. Although this was planned as an in-house job, we opted to use the contractor performing sewer line installation – due to staff vacancies.

- Upgrades to pump stations – new pumps were installed at Griffin Road for electrical efficiency and reliability, and a permanent generator was installed at Perry Road for increased reliability.

- Continued work on a multi-year project to upgrade the 25-year-old ozone treatment facility. Final design plans submitted by our consulting engineer were approved, but the bid and start dates were delayed due to contractor unavailability.

We are continuing to pursue installation of a solar array in the Floods Pond watershed to generate revenue. Review of submitted RFPs led us to choose a consultant to shepherd the project through the planning and permitting process, including analysis of lease/purchase options, negotiation with Versant Power, legal review, and required impact statements. Electricity costs at more than $250,000 a year continue to be one of our largest expenses.

Proposals received for watershed forestry management were received and reviewed. The selected firm works with Bangor Water to target harvest sites and manage the harvest sales with a primary focus on non-impact to water quality. The 2020 harvest included 75 acres in an area that had not been cut recently as well as drainage and road work upgrades. The yield of 3,030 tons resulted in $50,000 net income.

Bangor Water was pleased to be the recipient of the “Founding Fathers Preservation and Stewardship Award” from the Bangor Historical Society. The honor was based on stewardship of a significant Bangor property, namely the 123-year-old Thomas Hill Standpipe.

In closing, I wish to thank our customers, the Board members for their continued commitment to Bangor Water, as well as staff for its outstanding efforts during a most challenging year.

Respectfully submitted,
BANGOR WATER DISTRICT

Gerry Palmer, Chair

BANGOR WATER DISITRICT
GENERAL MANAGER'S ANNUAL REPORT

I am pleased to present my annual report as General Manager of the Bangor Water District for a year that saw many unusual challenges. The COVID pandemic forced us to find new ways to provide customer service and safeguard the integrity of the treatment and distribution system while maintaining employee safety and health. The use of remote technology for job functions, meetings, and customer service came into its own in 2020.

For a variety of reasons, we also experienced turn-over in a large number of positions which left us short-staffed for most of the year. Employees rose to the occasion, covering essential functions while performing their own work. Almost all of the positions are now filled which – in spite of a learning curve – will be helpful in 2021.

Bangor Water continued to make progress on a number of projects, including

- Initial data gathering for a Risk and Resiliency Assessment, required for federal funding assistance with utility infrastructure projects. Our consultant will assist us with reviewing our current systems and analyzing any weakness/improvements/issues. The RRA is due to be submitted to the EPA in June 2021.

- Joint planning with the City of Bangor for water line replacement on State Street in conjunction with municipal sewer and storm drain work. A new 16-inch line will be installed between Spruce and Howard streets, and we will also perform a "line stop" in front of Eastern Maine Medical Center to insert a valve. The additional valve will help ensure water feed to the hospital during the project. Some sewer work will be done during the winter; water line work is scheduled for summer 2021.

- Design work and coordination with the City on expansion of the BIA pressure zone. The project will include construction of a new pump station and standpipe, and decommissioning of the existing Crane pump station, BIA standpipe, and Hammond Street standpipe. A consulting engineer was selected to assist with hydraulic/flow considerations, regulatory items, and permitting. The project will involve a swap with or purchase from the City of land for the new facilities.

- Replacement of the District-owned original c. 1957 power line feeding the treatment and pump facility, with an eye toward Versant Power ultimately taking ownership. It has been difficult to find contractors with time or interest for the project.

- Reconfiguration of the water feed to Husson University due to growth and the need to retrofit buildings with sprinklers. The project involves changing the water feed for a Husson Avenue apartment complex, flow testing to check pressures, and design work based on campus needs.

Human resource items were at the forefront for much for 2020, including filling vacant positions – with both internal and external candidates. In 2018, 28 percent of the staff had been at Bangor Water for more than 25 years, compared to 15 percent by 2020. Additionally, 43 percent of the current staff have been on board for less than five years.

Most notably, Service Worker Merle Moore was recognized on his retirement for 51 years of service.

Cross-training has increased in light of staff departures and the threat of COVID absences, and much of the payroll process has been outsourced to a payroll company after soliciting proposals.

The groundwork has been laid for:

- A review of the Personnel Handbook, last updated comprehensively in 2013
- A wage and salary study which is typically conducted every five years
- A new provider for CDL license-holder drug and alcohol testing (Maine-based and less costly than the current provider)
- Exploration of adding professional HR expertise in some capacity

In closing, I wish to extend my thanks to the Board, our customers, and all of the employees for their continued support during the last 12 challenging months.

Respectfully submitted,
BANGOR WATER DISTRICT

Kathy Moriarty, General Manager

BANGOR WATER
ANNUAL DEPARTMENT REPORT

	2016	2017	2018	2019	2020
Water Distribution:					
Leaks repaired:	21	38	23	35	15
Service/valve boxes repaired:	299	203	178	221	142
Number of meter readings collected:	41,217	41,400	41,899	43,569	43,786
Water valve/nut repair/renew	61	168	128	188	104
Water Quality:					
Total number of BWD samples:	2,384	2,170	2,222	2,280	1,978
Number of tests performed:	11,454	10,770	10,522	10,505	8,876
Total number of other utility samples:	543	516	527	495	537
Number of tests performed:	1,084	1,041	1,065	982	1,074
Water quality concerns investigated:	45	26	37	24	11
Business Office:					
Number of bills issued:	43,327	43,755	43,387	43,368	43,056
Amount of water payments processed:	$6,191,987	$6,384,888	$6,527,425	$6,978,503	$7,072,494
Number of residential late notices mailed	2,813	2,704	2,489	2,708	824
Average amount of overdue residential bill	$69	$67	60	$71	$85
Number of non-residential late notices mailed	289	310	297	331	157
Average amount of overdue non-residential bill	$187	$125	167	$188	221
Number of accounts shut off for non-payment	154	128	105	91	41

BANGOR WATER
CUSTOMER AND PUMPAGE INFORMATION

Number and Classification of Billed Accounts	2016	2017	2018	2019	2020
Residential	8574	8740	8762	8808	8814
Commercial	1356	1492	1494	1489	1519
Governmental	478	498	497	501	483
Industrial	16	15	15	16	19
Fire Protection	556	563	575	570	570
Hampden Water District	3	3	3	4	4
	10,983	11,311	11,346	11,388	11,409

Pumpage (gallons)					
January	131,000,000	129,000,000	131,000,000	127,471,000	127,944,000
February	129,000,000	117,000,000	117,000,000	118,912,000	123,056,000
March	129,000,000	136,000,000	127,000,000	128,880,000	131,070,000
April	127,000,000	124,000,000	118,000,000	133,411,000	117,037,000
May	137,000,000	141,000,000	137,000,000	133,197,000	128,507,000
June	142,000,000	141,000,000	143,000,000	134,242,000	143,936,000
July	154,000,000	149,000,000	155,000,000	141,338,000	147,137,000
August	162,000,000	164,000,000	152,000,000	140,228,000	148,556,000
September	141,000,000	144,000,000	137,000,000	131,150,000	134,972,000
October	135,000,000	138,000,000	130,000,000	126,956,000	124,913,000
November	120,000,000	123,000,000	127,000,000	121,139,000	114,391,000
December	132,000,000	121,000,000	128,000,000	117,169,000	120,913,000
	1,639,000,000	1,627,000,000	1,602,000,000	1,554,093,000	1,562,432,000
Gals/day	4,490,411	4,457,534	4,389,041	4,246,156	4,268,940