

**Fifty-Third  
Annual Report  
of the  
Trustees and Officers  
of the  
BANGOR WATER DISTRICT  
Bangor, Maine  
for the year ending  
December 31, 2010**

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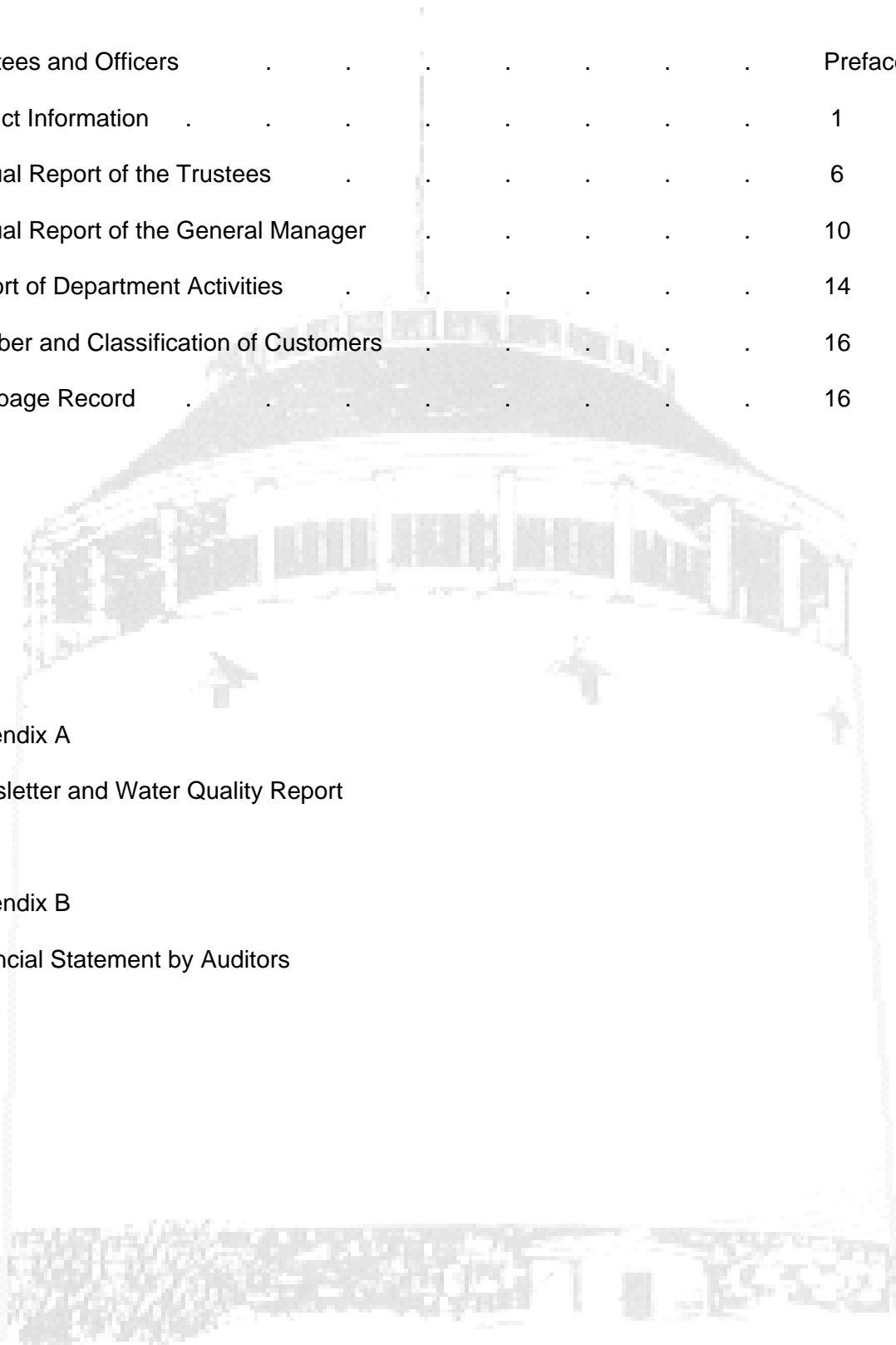
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Newsletter and Water Quality Report

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Financial Statement by Auditors



**TRUSTEES OF  
BANGOR WATER DISTRICT  
2010**

G. Richard Doll . . . . .	Term expires 2011
Ralph Foss, chair . . . . .	Term expires 2011
Laurel Grosjean, clerk . . . . .	Term expires 2011
Patricia Hamilton . . . . .	Term expires 2013
Stanley J. Miller, vice-chair . . . . .	Term expires 2012
James Rines . . . . .	Term expires 2012
Dan Wellington . . . . .	Term expires 2013

**OFFICERS OF  
BANGOR WATER DISTRICT  
2010**

Kathy Moriarty . . . . .	General Manager
Weston Haskell . . . . .	Assistant General Manager
Dana Smith . . . . .	Treasurer/ Accounting and Finance Manager

## **BANGOR WATER DISTRICT General Information**

Did you know that

- \* The District pumps and treats approximately 5,000,000 gallons of water each day.
- \* The water is delivered through 180 miles of pipeline ranging up to 30 inches in diameter.
- \* The District supplies more than 55,000 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 over 50 years ago.
- \* The District 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**

In 1875, Bangor officials contracted with the Holly Co. for the installation of 76,951 feet of water mains to be used for domestic, industrial and fire protection utilizing water from the Penobscot River. Many of these lines are still in service today.

Bangor had experienced typhoid epidemics nearly every year in the late part of the 1800's and early 1900's. The City government appointed a citizen committee to ascertain the cause of the problem, and during the investigation it was noted 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.

Orderly growth 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 district. In essence, the act authorized the District 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 the District. 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 to place it in a ready state for consumption.

In the ensuing decades, increasingly sophisticated equipment was added to the District's 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, the District 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 facility to control standpipe levels.

In 2002, at the invitation of the Town of Orrington, BWD expanded its existing service area. The Town completed a 3500-foot extension of BWD's line serving customers along Rt. 15, funded by the municipality. The new 12-inch pipe will provide water service to 70 or more potential 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 District is Floods Pond in Otis. The pond lies 15 miles east of Bangor in a rocky, rugged area which was scoured by the retreating glaciers. The pond supplies an excellent source of water that is clear, soft and palatable year-round. The 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. In order to protect the source of water, the District 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 which could impact on 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, chemical dosing was moved to the new Butler Ozone Treatment 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.

Both plants 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 District 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 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--which 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 the District's 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 which 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, replaced a steel tank constructed in 1958 holding 4,000,000 gallons. A second steel tank built in 1933 and holding 2,000,000 gallons is planned to be demolished in the near future.
- 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 which 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 the pump station and standpipes, chemical dosing, and monitoring equipment are supported by a System Control and Data Acquisition system (SCADA) computer. The computer is monitored from the engineering department on State Street in Bangor and at the ozone plant. This SCADA system helps operate all BWD transmission and distribution facilities, and is designed to continue operating in case of power loss. The SCADA system utilizes telephone telemetry to communicate with the 14 remote sites which it monitors and operates on a continuous basis. In the event that all communications are lost, there is a small computer at each pump station designed to allow continued operation. Many other functions such as intrusion alarms, temperature control, etc. are monitored by the SCADA system. The system is capable of monitoring up to 99 sites, thus giving the District expansion capabilities in the future.

## **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. A 5.5-mile private road runs over the transmission line to the intersection with Rt. 9, at which point the line then runs along Route 9. On the east bank of the Penobscot River, the transmission line splits into two 24-inch pre-stressed reinforced concrete mains which pass under the river.

On the west bank of the river in Veazie, the two lines rejoin and form a single 30-inch main which runs to a control valve facility, and on to Mount Hope Avenue and into the City.

## **Customer Service**

There are approximately 11,000 services (direct water connections) which 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 1110 public hydrants and 220 private hydrants.

The District 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. The District monitors the water quality for bacteriological contamination each working day in its own certified laboratory to ensure it meets all regulations.

**ANNUAL REPORT  
OF THE BOARD OF TRUSTEES  
BANGOR WATER DISTRICT  
2010**

On behalf of the Board of Trustees, I am pleased to present the 53rd annual report of the Bangor Water District.

At the Board's **annual meeting**, the following officers were chosen: Ralph Foss, chair; Stan Miller, vice-chair; and Laurel Grosjean, clerk. Kathy Moriarty was appointed as General Manager, and Dana J. Smith was appointed as Treasurer.

Departing Trustees Wellman and Fournier – both of whom had served two terms – were presented with plaques acknowledging their service. New Trustees Patricia Hamilton and Dan Wellington were welcomed to the Board.

One of the District's most visible accomplishments was completion of a **new 3.4 million gallon concrete standpipe** at Essex Street, replacing an aging four-million-gallon steel tank. (Concrete was chosen based on operating and maintenance costs, compared to a steel tank.) New 20-inch operational valves were installed by BWD at the site, which required two "line stops" or temporary insertion of 20-inch plugs to allow work to be completed. Additionally, a grant from Efficiency Maine helped fund a "passive" water mixing system inside the standpipe which will reduce electrical costs.

Several projects related to water pumping and treatment continued to be addressed by the Board in 2010, including

- Planning for federally mandated installation of **additional treatment methods** (such as ultra-violet disinfection) which must be in place at Butler Ozone Plant at Floods Pond by 2013. (The alternative to UV disinfection could be construction of a filter plant at a cost of \$40 million.)
- Planning for an **overhaul of Johnston Pump Station (JPS)**, virtually untouched since it was constructed in 1958.

Board members and staff reviewed information from the District's consulting engineers regarding many aspects of the project, including selection and location of the UV equipment, increasing reliability and energy efficiency at both locations, and projected operating and maintenance costs. After site visits by the engineers and modifications to the project, the Board voted to move forward with preliminary design work for both items.

A third component of the initial plan was to extend the water intake lines at Floods Pond to lower depths, and the District has been collecting water quality data at those depths for about a year. On staff recommendation, more evaluation is needed before any design work is undertaken.

Both the new Essex Street standpipe as well as the conceptual study for the Butler plant and Johnston pump station upgrades were paid for through \$2.1 million in ARRA funding, in the form of a 30 percent grant and a no-interest loan.

Based on engineering estimates for the JPS/Butler work as well as the flat/declining level of water sales, BWD is on track for **planned rate adjustments** in 2011 and 2013.

The Board also undertook a wage and salary study by an outside consultant to ensure the District's payroll is reasonable. The study is conducted approximately every five years. (District employees did not receive cost of living increases in 2010.)

The 2010 **timber harvest** involved 90 acres in the southern part of the watershed. The "release" harvest removed low-value trees to create improved reseeding and growing conditions for the remaining stock. A total of 893 cords were cut (compared to an anticipated 824 cords), well below the 980-cord safe yield amount.

The Board investigated options for **wind power** in the Floods Pond watershed, both through a developer who wished to access the District's power transmission line to convey wind power generated just outside the watershed – and the potential for BWD to site its own windmill within the watershed to help offset the utility's electrical costs.

Based on the capacity of the District's private power line and the potential for development of its own tower, the Board opted not to allow use of the line by the developer, and to continue to monitor wind power progress and collect information before proceeding with any design work for its own installation.

Progress was made on placing the **energy recovery turbine (ERT)** at the Veazie control valve site on line to generate "green" power. A contract with Bangor Hydro-Electric Co. was completed for purchase of the power, a UPS (uninterruptible power supply) was installed for use during power outages, operating procedures were refined, and the ERT was tested "running" for extended periods of time.

The District was awarded \$345,000 by the Maine Drinking Water Program to fund a multi-year project to design, purchase, and implement a system control and data acquisition **(SCADA) system**. The equipment functions as the treatment plant nerve center, allowing operators to monitor and control treatment and distribution procedures. The new system will replace one installed in 1987 which now has limited functionality and dwindling tech support. A new fiber-optic line is planned to be installed between JPS and Butler, and BWD's consulting engineers spent several days on-site in December to gather detailed information for design and planning phases.

Coincidentally, BWD was randomly chosen for a Dept. of Homeland Security assessment. Although unexpected and lengthy, the visit provided helpful information for use in designing the new SCADA system.

The District continues to support work done by the University of Maine on the **arctic charr population** in Floods Pond. UMaine monitors the population activity, including tagging of fish and observation of the spawning beds. Due to cutbacks in recent years, the District has assisted in funding the University's Floods Pond Student Fellowship. The recipient conducts research, reports on the research to the District and the Maine Department of Inland Fisheries and Wildlife, and participates in the District's annual Open House. This year's \$3,400 includes a \$1000 stipend for the grad student with the remainder for equipment, travel, and other expenses.

Word was received from the Department of Environmental Protection that BWD will not need a certificate of withdrawal to obtain water from Floods Pond. The “**instream flow rule**” attempts to balance supply drawdown needs with wildlife habitat. DEP officials toured Floods Pond over the summer, and received information on historic lake levels, data on the District’s commitment to protect the charr spawning beds, and on Tannery Brook (the pond’s outlet) stream flows.

The Board continues to meet quarterly with the **Bangor City Council**. The members have a standing invitation to visit our facilities and learn about our operations.

In closing, I wish to thank the Board members and the utility staff for their efforts on behalf of the District and its customers.

Respectfully submitted,  
**BANGOR WATER DISTRICT**

Ralph Foss, chair

**ANNUAL REPORT  
OF THE GENERAL MANAGER  
BANGOR WATER DISTRICT  
2010**

I am pleased to present my annual report as General Manager of the Bangor Water District. The last 12 months have kept our employees busy with a variety of projects.

Our Water Quality Department has monitored **lead and copper levels** since 1992 by obtaining required samples from customers' taps. There are no lead components in the District's system; the most common sources of lead are from the customer's internal plumbing. Since testing began, test results have been at low levels that required no action. Results in 2010, however, showed test results over the "action level." The District began a mandated public education program that included:

- Mailing of information brochures to all customers
- Notice of test results on customers' bills
- Information provided to the media
- Mailings to child care/educational facilities
- A meeting with and mailings to area pediatricians

All items were completed in advance of the required deadline. BWD will now be testing more frequently, and – depending on future test results – may need to modify its water treatment procedures.

Our Engineering/IT department continued to gather data for its **GIS system** (electronic mapping) with the assistance of two UMaine summer interns. Much information was logged on data points in Eddington in preparation for a Dept. of Transportation project on Route 9. Coordinates on approximately 90 percent of the valves and hydrants on the east side of Bangor have been captured as well.

The department also began an assessment of the 5,000,000-gallon Hammond Street standpipe (a steel tank more than 40 years old), following discovery of a minor leak at its base. Working with a local engineering firm, the District will weigh repair/replacement/relocation options as well as potential costs/funding sources.

Our Construction Department found the mild winter of 2009-2010 resulted in few water main leaks, reducing anticipated repair costs. Other in-house projects for the year included:

- **Mount Hope Avenue** – replacement of 1200 feet of eight-inch pipe between Forest Avenue and Birch Street, based on age and reliability of pipe
- **Bellevue Avenue** – replacement of 600 feet of six-inch pipe between State Street and Garland Street, based on age and reliability of pipe
- Installation of 700 feet of 20-inch main on **Sylvan Road** at Hogan Road, for relocation of the line away from a collapsing culvert. The culvert was bypassed as part of the Sylvan Road repositioning about a decade ago
- Installation of 200 feet of 12-inch main on outer **State Street** as part of Maine Dept. of Transportation stream culvert project. The line was installed for future use to avoid the cost of disturbing the pavement.
- Installation of **800 new radio-read meters** as part of an overall system conversion. To date, more than 4000 of our 11,000 meters can be read using a “drive-by” handheld receiver, a more efficient system than walking house to house.
- Replacement of **100 ozone diffusers** in the Butler plant disinfection basins. The annual cost is about \$15,000 but damaged or “lazy” diffusers use more chemicals and more electricity.
- Installation of a new **flow meter** at Johnston Pump Station, replacing a 52-year-old outdated meter that measure actual water pumpage.

Members of public continued to enjoy our quarterly **tours of Thomas Hill Standpipe**. Attendance this year was: 573 for the March winter tour, 170 for the spring tour, 761 for the summer tour, and 1191 for a busy fall tour on a perfect autumn day.

BWD also hosted its Open House for several hundred school children and chaperones at the Butler Plant and Johnston Pump Station as a part of National Drinking Water Week in May.

Other items of note:

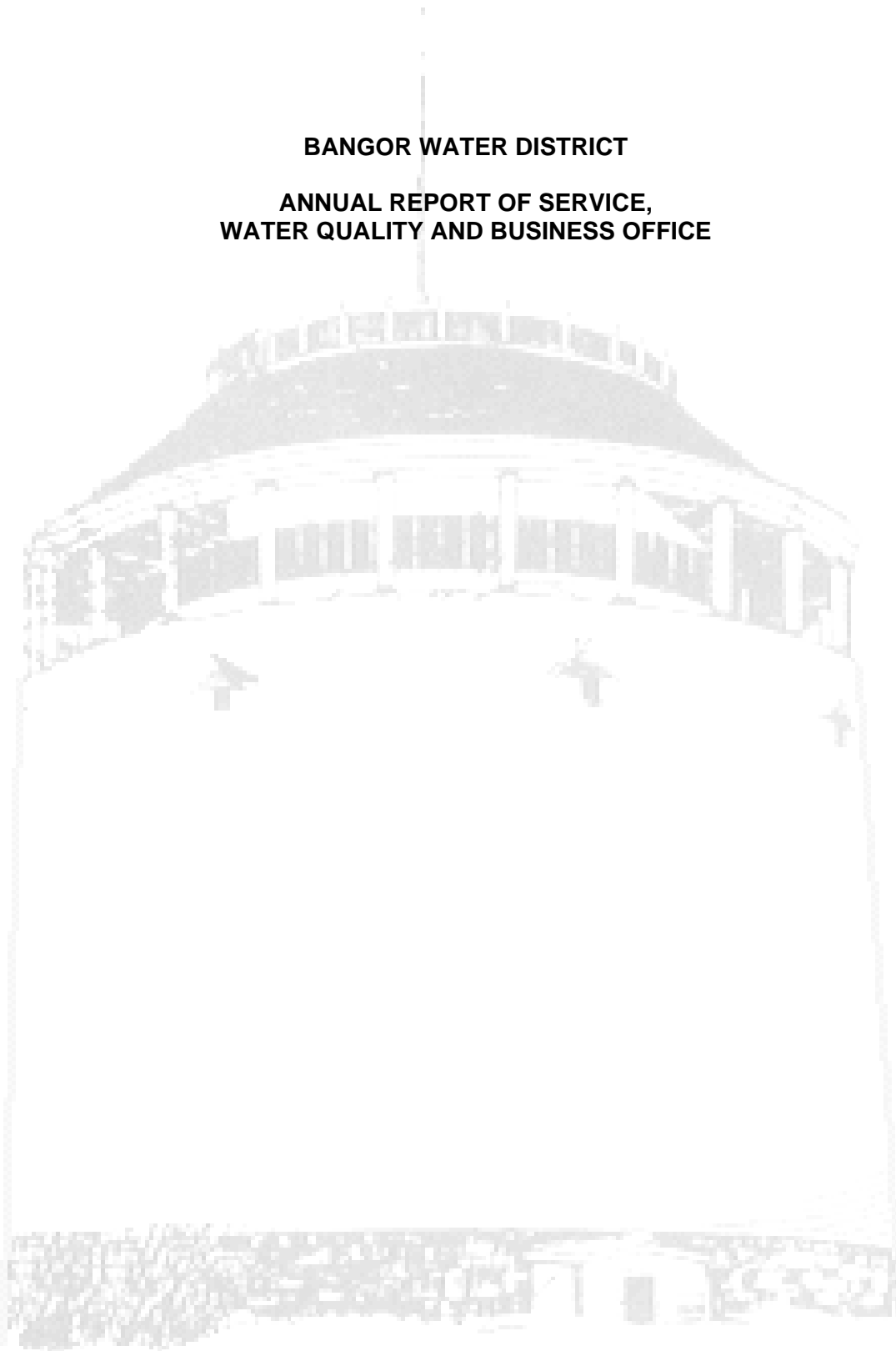
- Cal McKay, a member of the service department, and Office Manager Kim Marchegiani completed 25 years of service at BWD.
- District Engineer Wes Haskell left the District after four years for a sail 'across the seas'. His replacement, Rick Pershken, joins the staff in January.
- Kyle Killip joined the District as assistant engineer, resulting from a restructuring of the engineering and maintenance departments following the departure of the long-time maintenance supervisor.
- The annual newsletter and water quality report were mailed to all customers
- Staff attended the American Water Works Association, the Maine Rural Water Association, and the Maine Water Utilities Association conferences. General Manager Moriarty presented a seminar on ozone plant related items at an AWWA water quality conference.

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

Respectfully submitted,  
**BANGOR WATER DISTRICT**

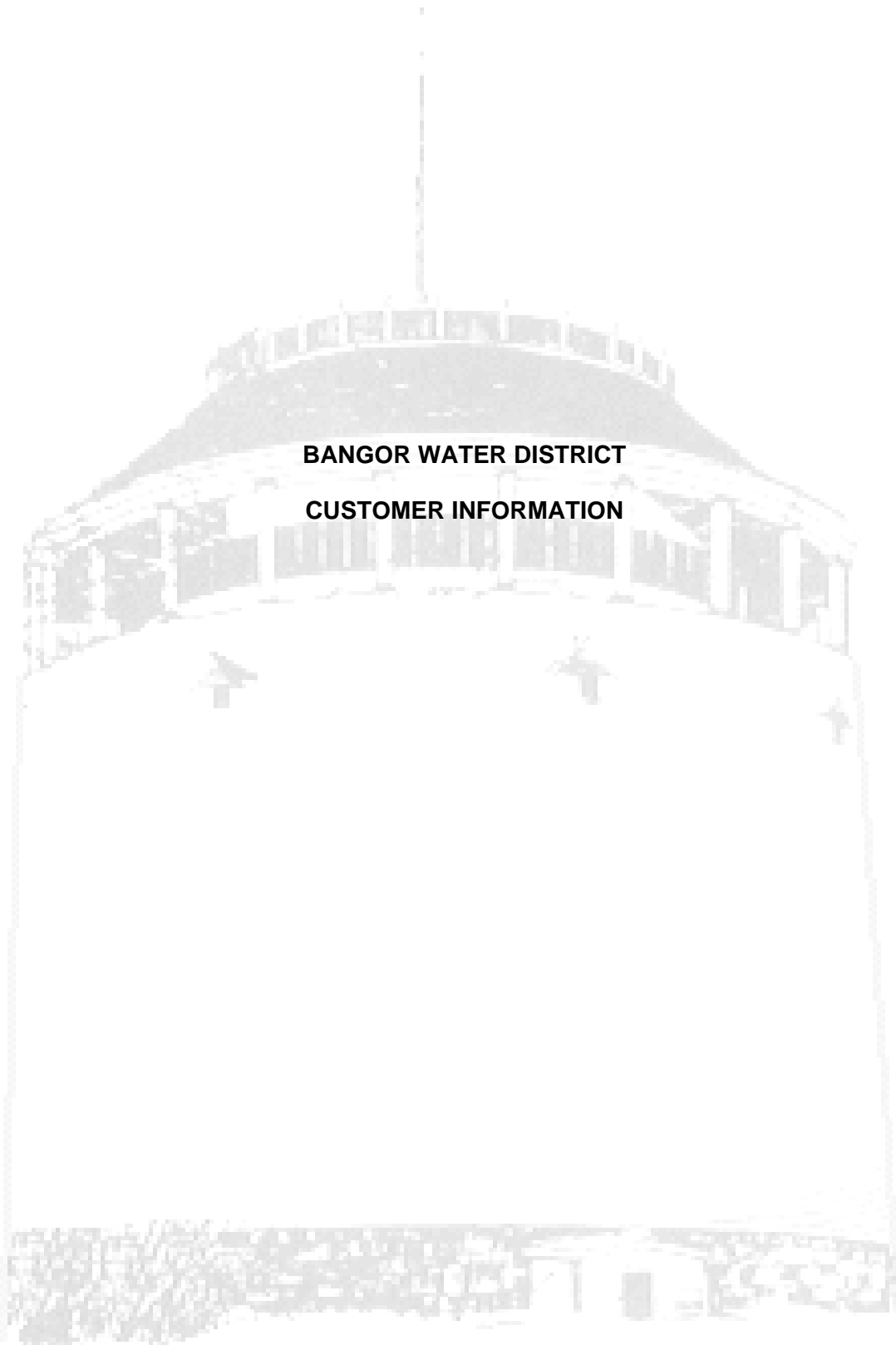
Kathy Moriarty, General Manager

**BANGOR WATER DISTRICT**  
**ANNUAL REPORT OF SERVICE,**  
**WATER QUALITY AND BUSINESS OFFICE**



## ACTIVITY SUMMARY

<u>Service Dept:</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Number of meter readings collected:	44,720	46,881	47,346	45,516	45,102
Number of meters tested:	708	420	113	92	244
Number of meters set/removed:	1,916	888	2,146	1,642	1,853
Number of service assignments completed:	5,400	5,094	5,741	5,267	5,488
 <b><u>Water Quality:</u></b>					
Total number of BWD samples:	2,939	2,539	3,158	3,156	2,956
Number of tests performed:	13,873	12,164	12,910	13,182	12,914
Total number of other utility samples:	665	894	723	726	848
Number of tests performed:	1,549	1,818	1,469	1,448	1,738
Water quality complaints investigated:	40	27	29	28	29
 <b><u>Business Office:</u></b>					
Number of service slips processed:	5,274	4,908	5,471	5,380	5,591
Number of bills issued:	40,597	40,390	44,737	42,781	42,996
Amount of BWD water payments processed:	\$3,933,334	\$4,202,788	\$4,338,581	\$4,554,800	\$5,120,467
Amount of water payments collected by City of Bangor sewer department	\$199,573	\$192,669	\$197,487	\$182,602	\$158,739
Amount of sewer payments collected by Bangor Water District	\$3,856,613	\$4,197,024	\$4,346,633	\$4,366,487	\$3,247,799
 <b><u>Collections</u></b>					
Number of bills issued:	40,597	40,390	44,737	42,781	42,996
Number of residential late notices mailed	3336	3812	3720	3585	3960
Average amount of overdue residential bill	\$45.25	\$44.86	\$49.00	\$50.00	\$58.00
Number of non-residential late notices mailed	382	415	383	370	532
Average amount of overdue non-residential bill	\$132.98	\$125.91	\$116.00	\$114.00	\$144.00
Number of accounts shut off for non-payment	62	73	75	88	82



**BANGOR WATER DISTRICT**

**CUSTOMER INFORMATION**

**BANGOR WATER DISTRICT****CUSTOMER INFORMATION**

<b>Number and Classification of Billed Accounts</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Residential	8,545	8,622	8,641	8,665	8,648
Commercial	1,454	1,457	1,473	1,509	1,466
Industrial	20	18	18	18	18
Governmental	451	456	456	486	452
Fire Protection	464	487	497	508	517
Hampden Water District	5	4	4	3	3
	10,939	11,044	11,089	11,189	11,104

**Pumpage (gallons)**

January	148,714,000	139,487,000	156,692,000	139,166,000	136,779,000
February	134,882,000	133,060,000	152,584,000	148,334,000	125,844,000
March	146,104,000	153,130,000	157,156,000	138,719,000	136,749,000
April	151,606,000	149,775,000	153,094,000	132,101,000	136,159,000
May	158,760,000	161,904,000	162,390,000	141,755,000	158,285,000
June	152,474,000	177,874,000	161,952,000	147,681,000	157,235,000
July	170,396,000	171,859,000	175,981,000	146,044,000	172,984,000
August	169,646,000	176,061,000	160,078,000	164,653,000	188,398,000
September	163,798,000	160,708,000	154,032,000	162,858,000	166,146,000
October	169,045,000	157,610,000	159,451,000	149,897,000	166,770,000
November	146,631,000	154,068,000	152,355,000	157,232,000	149,313,000
December	137,837,000	150,544,000	136,768,000	136,139,000	129,718,000
	1,849,893,000	1,886,080,000	1,882,533,000	1,764,579,000	1,824,380,000