Distributed June 2022

Drinking Water Quality Report 2021

To Our Customers,

2021 was yet another exciting year for the Salem and Beverly Water Supply Board (the Board). During 2021 not only did the Board produce exceptional high-quality drinking water for its customers, it also engaged various experts to assist in beginning work on its new capital sustainability program, safety program, computerized maintenance management system (CMMS), and best management practices program. It is our mission to deliver our customers with a high-quality, reliable, and resilient water supply, and it is our vision to be a world-class water utility driven by teamwork and operational excellence.

This report describes the Board's raw water sources, drinking water treatment process, and water quality data for the year 2021. As part of our ongoing commitment to increase public communication, awareness, and transparency, this report includes information beyond the minimum federal requirements related to your drinking water for the protection and sustainability of this most valuable resource.

It has been a great pleasure to serve you all in 2021.

Sincerely,

Alan F. Taubert, Jr., PE, CEM, Executive Director
Salem and Beverly Water Supply Board

Salem and Beverly Water Supply Board: PWS ID 3030001
Salem Water Department: PWS ID 3258000
Beverly Water Department: PWS ID 3030000

We're here to answer your questions.

Who do I contact with my water quality questions?
Brad Perron, Deputy Director for the Board
978-922-2600

Who do I contact in my City with water distribution questions?
Beverly Water Department: 978-921-6000, ext. 2358
Salem Water Department: 978-745-9595, ext. 5673

History of the Salem and Beverly Water Supply Board (SBWSB)

*To comply with the Department of Environmental Protection (DEP) revision of Turbidity Standards, 1991.

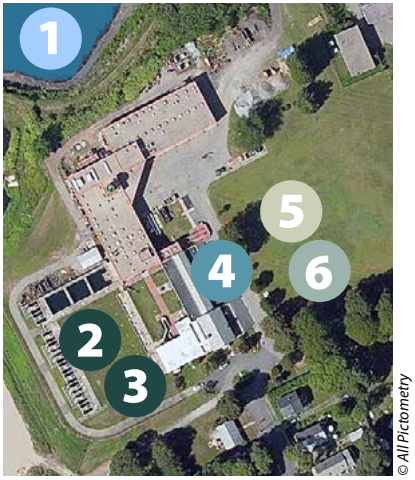
How Is Your Water Purified?

The source waters of the Board's reservoir system undergo extensive treatment at the water treatment plant on the shores of Wenham Lake Reservoir in Beverly before drinking water is delivered to your home or business. The water is treated to exceed all state and federal drinking water standards established by the United States Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP). The plant removes naturally occurring impurities from the source water as required by federal regulations and good public health practices.

1 **Source Water:** Raw water for the water treatment plant is drawn from Wenham Lake Reservoir.

2 & 3 **Pretreatment:** The first step in the treatment process combines preoxidation with potassium permanganate, adsorption with carbon and coagulation with alum and polymer, followed by gravity settling to remove manganese, natural color, taste and odor, and sediment and particles.

4 **Filtration:** The water passes through sand and anthracite media to remove organic compounds. Filtration also acts as a "polishing step" to remove additional particles, color, and bacteria.

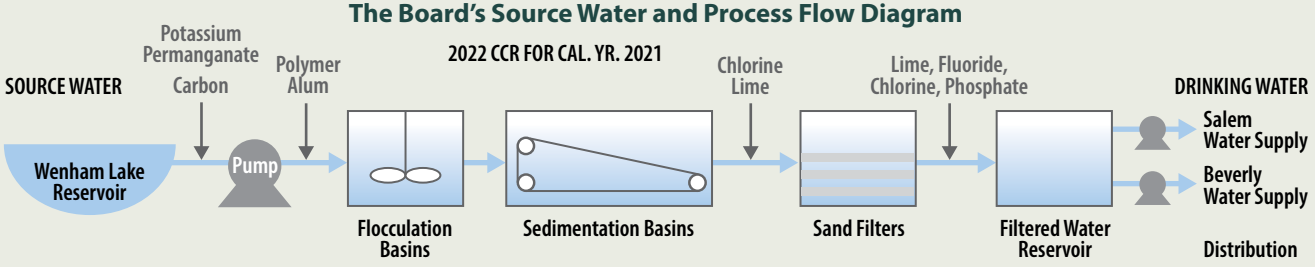


© All Pictometry

5 **Disinfection:** Sodium hypochlorite is used to provide disinfection of the filtered water to kill bacteria and viruses, and to maintain a protective residual throughout the distribution system.

6 **Post-Treatment:** Fluoride is added to prevent tooth decay/cavities. To maintain corrosion control in the distribution pipes, the Board adjusts the pH and uses a phosphate additive that is designed to optimize corrosion control throughout the distribution system and minimize dissolved lead in the pipes and household plumbing. To ensure the highest quality water, the Board continuously monitors the effectiveness of the treatment process and makes necessary adjustments to the treatment to maintain water quality.

The Board's Source Water and Process Flow Diagram

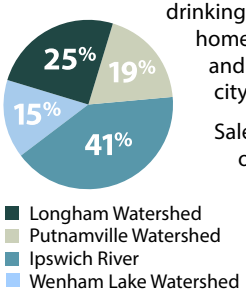


Where Does Your Water Come From?

Reservoirs

The Board provides potable water to the cities of Salem and Beverly for drinking, sanitation, and fire protection. The Board maintains the source waters, treats the water at the Arlington Avenue water treatment plant located in North Beverly, and delivers water to the individual Salem and Beverly pumping stations. These pumping stations deliver drinking water to your home in pipes owned and maintained by each city water department.

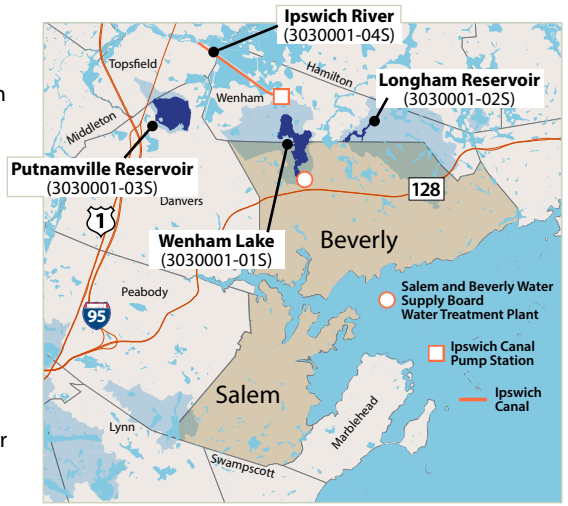
Salem and Beverly use over 3 billion gallons of drinking water each year.



This water is drawn from the Ipswich River and three reservoirs: Wenham Lake, Putnamville, and Longham Reservoirs.

Beverly's water mains have interconnections with Salem, Wenham, Danvers, and Manchester. Salem's water mains have interconnections with Beverly, Marblehead, and Peabody.

The Board recognizes the importance of storing high winter and spring flows of the Ipswich River for use in summer when river flows are naturally low. Between December 1 and May 31, when there is excess water in the river, water is pumped to the Putnamville Reservoir and/or Wenham Lake Reservoir for storage and use during summer and fall each year.



Water is not pumped from the Ipswich River from June 1 through November 30. Similarly, Longham Reservoir augments Wenham Lake Reservoir.

Important Information from EPA & MassDEP about Sources of Drinking Water and Drinking Water Contaminants

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria, may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, and farming.
- **Pesticides and herbicides** may come from a variety of sources, such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants** include synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
- **Radioactive contaminants** can be naturally occurring or the result of oil and gas production and mining activities.

To ensure tap water is safe to drink, MassDEP and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The FDA and the Massachusetts Department of Public Health regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contamination. The presence of contaminants does not necessarily indicate that water poses a health risk. For more information about contaminants and potential health effects »

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care providers. EPA/Centers for Disease Control and Prevention (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline: 800-426-4791.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Board is responsible for providing high-quality drinking water, but it cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at ***epa.gov/safewater/lead***.

Massachusetts Source Water Assessment and Protection Program (SWAP)

The Source Water Assessment and Protection (SWAP) Program assesses the susceptibility of public water supplies to contamination from land uses and activities within the recharge area of Salem and Beverly's water supply. The water supply for these cities consists of surface water from Wenham Lake (Source ID #3030001-01S), Longham Reservoir (Source ID #3030001-02S), Putnamville Reservoir (Source ID #3030001-03S), and the Ipswich River (Source ID #3030001-04S).

MassDEP assigned a susceptibility rating of "high" to this system using the information collected during their assessment. A high ranking is given to any water supply that has at least one high threat within the water supply protection area. Since there are 17 potential high-threat land uses within the protection area, the Salem and Beverly water supply must be assigned a high susceptibility ranking. The potential contaminant sources within the protection area are manure storage or spreading, pesticide storage or use, airports, body shops, gas stations, service stations/auto repair shops, bus and truck terminals, dry cleaners, photo processors, repair shops (engine, appliance, etc.), hazardous materials storage, machine/metalworking shops, hazardous waste facilities, large quantity hazardous waste generators, landfills and dumps, military facilities (past and present), former NIKE missile sites, and underground storage tanks.

This ranking does not imply that the cities have poor water quality or will have poor water quality in the future. It only draws attention to various activities within the watershed that may be potential sources of contamination.

The SWAP then assesses what the water supplier is doing to prevent contamination and recommends other measures that can be taken to further protect the sources. Some source protection measures the Board have already implemented include reviewing the development of plans in the City of Beverly and the Towns of Wenham and Topsfield; conducting stream monitoring throughout the watersheds; and managing geese on Wenham Lake.

For more information, the complete SWAP report is available at the Board and online at: ***www.mass.gov/doc/salem-beverly-water-supply-bd-swap-report/download.*** You can also call the Board at 978-922-2600.

Nonpoint Source Pollution

The EPA Phase II Stormwater regulations require all communities with populations under 100,000 to implement control measures aimed at reducing water pollution caused by stormwater runoff. Stormwater runoff is a major component of nonpoint source (NPS) pollution. According to the EPA, NPS pollution constitutes the nation's largest source of water quality problems. NPS pollution occurs when runoff (rainwater or snowmelt) moves over the land picking up sediments and contaminants and then depositing them into lakes, rivers, and coastal waters. Overland flow picks up pollutants from driveways, crops, industrial sites, or malfunctioning septic systems before discharging into the river or storm drain.

NPS pollution can lead to beach closures, fish kills, habitat destruction, and unsafe drinking water. Unlike point sources (e.g., discharge pipes from facilities), nonpoint sources are diffuse, which makes them difficult to trace and control. The Board provides robust watershed protection (including limiting access to the public) to control NPS pollution and the source of drinking water for their customers.

Household contributors to NPS pollution include improperly disposed pet waste, lawn fertilizer, paints, and motor oil. Automobiles, factories, and wood stoves emit airborne contaminants that return to the earth in the form of rain or snow. The amount of these contaminants that reach water sources is increased by impermeable surfaces, such as roofs and pavements, which keep the soils from naturally filtering stormwater.

The Cities of Salem and Beverly have implemented Stormwater Management Plans (SWMP) designed to reduce stormwater runoff pollution and protect your source and surface waters. Involving the public through education and participation are required control measures for the SWMP.

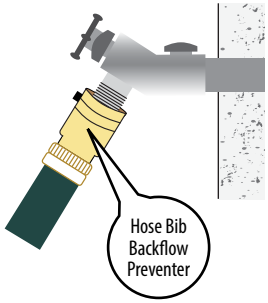
Protect Your Drinking Water at Home!

A "cross connection" is a connection between a drinking water pipe and a polluted source. The pollution can come from your own home. For instance, to spray fertilizer on your lawn, you hook your hose up to the sprayer that contains the fertilizer. If the water pressure drops (say, because of fire hydrant use in the City) when the hose is connected to the fertilizer, the fertilizer may be sucked back into the drinking water pipes through the hose. Over half of cross-connection incidents involve unprotected garden hoses.

For additional information on cross connections and the status of our program, please contact your City Water Department:

Salem: (978) 745-9595, ext. 5673

Beverly: (978) 921-6000, ext. 2358



	Compound	Highest Level Found	Range of Detections (low–high)	Highest Level Allowed (MCL or MRDL)	Ideal Goal (MCLG or MRDLG)	Possible Source
Regulated Compounds	Chlorine	0.57 ppm [1]	ND – 2.08 ppm [2]	4 ppm	4 ppm	Water disinfectant
	Copper [3, 4]	Both: 0.14 ppm Salem: 0.16 ppm Beverly: 0.09 ppm	0.011 – 0.24 ppm 0.016 – 0.24 ppm 0.011 – 0.16 ppm	AL = 1.3 ppm	1.3 ppm	Corrosion of household plumbing systems
	Fluoride	0.84 ppm	0.52 – 0.84 ppm	4 ppm [5]	4 ppm	Added to water to promote strong teeth
	Lead [3, 4]	Both: 2.5 ppb Salem: 2.1 ppb Beverly: 2.5 ppb	ND – 25.6 ppb ND – 25.6 ppb ND – 9.1 ppb	AL = 15 ppb	0 ppb	Corrosion of household plumbing systems
	Nitrate as Nitrogen	0.05 ppm	Single Sample	10 ppm	10 ppm	Naturally present in the environment
	Perchlorate	0.097 ppb	Single Sample	2 ppb	N/A	Rocket propellants, fireworks, munitions, flares, blasting agents
	PFAS6 [6]	8.5 ppt	2.4 – 8.5 ppt	20 ppt		Discharges and emissions from industrial and manufacturing sources associated with the production or use of these PFAS, including production of moisture- and oil-resistant coatings on fabrics and other materials. Additional sources include the use and disposal of products containing these PFAS, such as firefighting foams.
	Total Haloacetic Acids	39 ppb [1]	17 – 54 ppb [2]	60 ppb [7]	0 ppb	Byproduct of water disinfection
	Total Trihalomethanes	67 ppb [1]	24 – 87 ppb [2]	80 ppb [7]	0 ppb	Byproduct of water disinfection
	Turbidity [8]	0.24 NTU	0.03 – 0.24 NTU	TT = 0.3 NTU	N/A	Suspended matter from soil runoff

	Compound	Highest Level Found	Range of Detections (low–high)	Highest Guidance Level (SMCL or ORSG)	Ideal Goal (MCLG or MRDLG)	Possible Source
Secondary/Guideline Contaminants	Aluminum	35 ppb	Single Sample	200 ppb	–	Erosion of natural deposits
	Chloride	87.1 ppm	Single Sample	250 ppm	–	Erosion of natural deposits
	Chloroform	12.8 ppb	Single Sample	70 ppb	–	Byproduct of water disinfection
	Manganese [9]	4 ppb	Single Sample	50 ppb	–	Naturally occurring minerals
	Odor	1.4 TON	Single Sample	3 TON	–	Naturally occurring organic materials that form ions when in water
	Sodium [10]	42.7 ppm	Single Sample	20 ppm	–	Erosion of natural deposits
	Sulfate	24.9 ppm	Single Sample	250 ppm	–	Erosion of natural deposits
	Total Dissolved Solids	219 ppm	Single Sample	500 ppm	–	Naturally occurring minerals

Unregulated Contaminants	Compound	Average	Range of Detections (low–high)	ORSG Guideline
	PFHxA	2.6 ppt	2.0 – 3.6 ppt	None for this compound

Notes

1. Highest level detected is based on a running monthly or quarterly average of samples.
2. Highest value in range is based on individual samples, rather than averages.
3. The Action Level (AL) and the highest level found are based on the 90th percentile of the samples. The range represents all individual samples.
4. Data are from most recent sampling occurrence in 2020.
5. Fluoride also has an SMCL of 2.0 ppm.
6. PFAS6 comprises six compounds: perfluorooctane sulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluoroheptanoic acid (PFHpA), and perfluorodecanoic acid (PFDA).
7. Highest level allowed (MCL) for this substance is based on the average of four quarterly samples.
8. Treatment Technique (TT): Turbidity is a measure of treatment performance and is regulated as a treatment technique. 100% of samples met the TT requirement.
9. US EPA and MassDEP have established public health advisory levels for manganese to protect against concerns of potential neurological effects and a one-day and 10-day HA of 1,000 ppb for acute exposure.
10. The MassDEP Office of Research and Standards (ORS) has set a guideline concentration of 20 ppm for sodium. Sodium-sensitive individuals, such as those experiencing hypertension, kidney failure, or congestive heart disease, should be aware of the sodium levels if exposures are being carefully controlled.

Terms & Abbreviations

AL: Action Level – The concentration of a contaminant that, if exceeded, triggers treatment or other requirements, which a water system must follow.

MCL: Maximum Contaminant Level – The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG: Maximum Contaminant Level Goal – The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MRDL: Maximum Residual Disinfectant Level – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG: Maximum Residual Disinfectant Level Goal – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

N/A: Not Available – An ideal goal has not been established by EPA or MassDEP for this compound.

ND: Not Detected

NTU: Nephelometric Turbidity Unit – A measure of the turbidity (or clarity) of water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

ORSG: Office of Research and Standards Guideline – Guidance values developed by MassDEP ORS in absence of any other federal standards or guidance.

ppb: Parts per Billion or Micrograms per Liter – (µg/L)

ppm: Parts per Million or Milligrams per Liter – (mg/L)

ppt: Parts per Trillion or Nanograms per Liter – (ng/L)

SMCL: Secondary Maximum Contaminant Level – Concentration limit for a contaminant that may have aesthetic effects such as taste, odor, or staining.

TON: Threshold Odor Number

TT: Treatment Technique – A required process intended to reduce the level of a contaminant in drinking water. Turbidity is a measure of treatment performance and is regulated as a treatment technique. 95% of our turbidity readings each month must be below 0.3 NTU.

90th Percentile– Nine out of every 10 homes were at or below this level.

Salem and Beverly Water Supply Board
50 Arlington Avenue
Beverly, MA 01915

Outdoor Water Conservation

All residents can do their part to conserve our planet's precious resource of clean water by implementing easy outdoor water conservation measures. Incorporate some or all of these tips to conserve water:

- Let your grass grow longer – it is more drought-resistant, requiring less watering.
- Use a rain barrel to collect water for gardens and landscape watering.
- Water in the early morning or late afternoon.
- Use plants native to your area.
- Mulch around plantings to retain moisture.
- Fix broken or clogged sprinkler heads and leaks.
- Install an irrigation controller.
- Wash your car on your lawn.

For outdoor water use tips, visit:
www.epa.gov/watersense/outdoor

The Board is an active participate in the **North Shore Water Resilience Task Force**, collaborating for safe and reliable water supply, now and into the future, with the Cities of Beverly, Lynn, Peabody, and Salem, and the Towns of Andover, Boxford, Burlington, Danvers, and Hamilton. Outdoor water conservation can play a part in protecting our water supplies!

The Salem and Beverly Water Supply Board's Mission

To deliver a high-quality, reliable, and resilient water supply to our customers.

This report contains very important information about your drinking water. Please translate it, or speak with someone who understands it.

Este informe contiene información importante accrca de su agua potable. Haga que alguien lo traduzca para usted, o hable con alguien que lo entinenda.