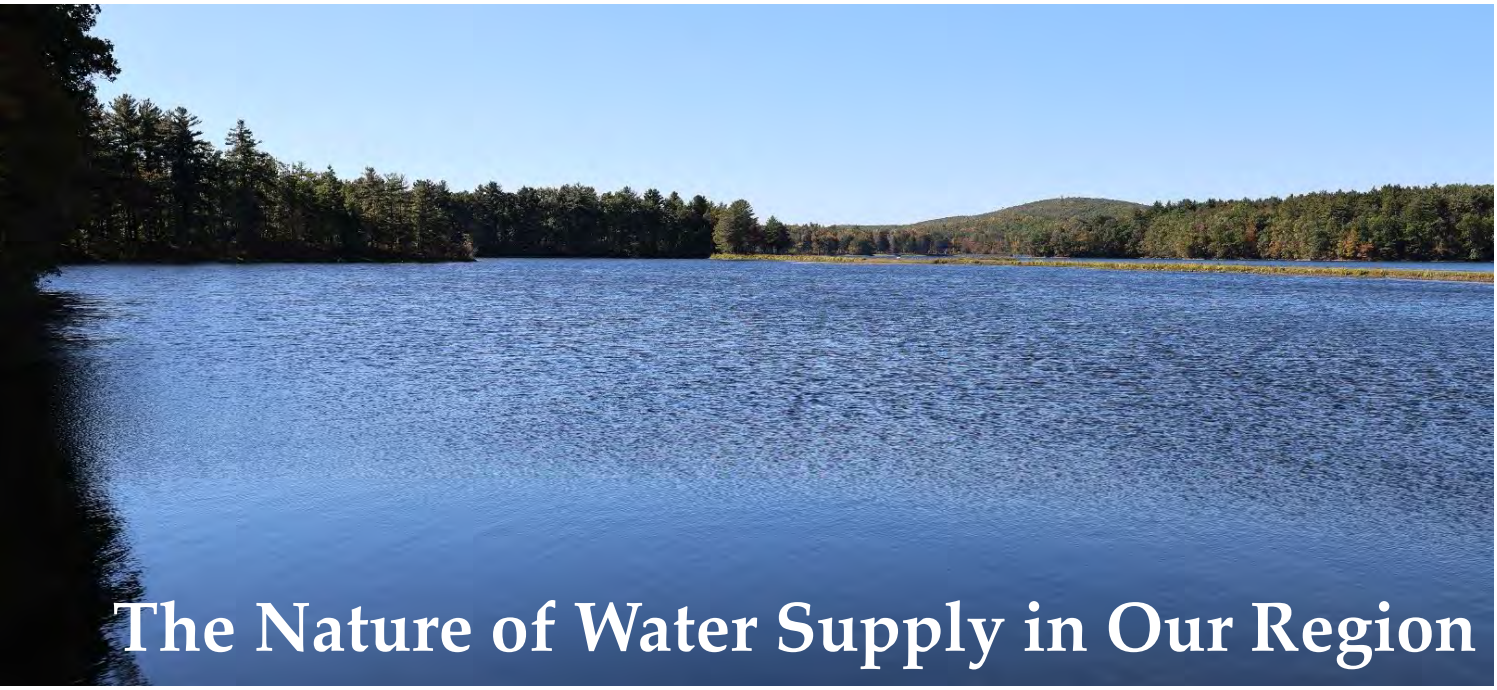


The Nature of Water Supply in Our Region

Types of suppliers

Residents in the Pioneer Valley obtain their drinking water through one of several different types of systems. The majority of households are served by municipally owned community water systems, but the region also has a significant number of households who use private wells, especially in rural areas. In addition, a small number of residents are served by privately-owned community water systems. Table 1 in the appendix includes a list of the 43 towns in the region, along with the estimated numbers of residents who are served by each type of water system.

Municipally owned community water systems

Within Hampden and Hampshire counties, there are a total of 34 municipally owned community water systems (CWS) that serve 30 of the 43 cities and towns in the region. Some municipalities have multiple systems, and some systems serve customers in more than one municipality. These include publicly owned water systems that are authorities, commissions, districts, and departments. Collectively, these systems serve an estimated 551,104 residents, about 87.7% of the region's total population. The extent of the service areas for these systems is discussed in greater detail in the "Populations Served" section below.

The administrative structure of community water systems varies by municipality. In many cities and towns, the water system is a division within the department of public works, while in others the water system is a standalone city or town department, district, or commission.

Municipal systems that source their own water

Of the 34 municipal community water systems in the region, 27 directly obtain water from their own sources. As discussed in the "Diversity of Water Sources" section, this water comes from either surface

water reservoirs, underground wells, or a combination of the two.[1] These systems own and maintain their reservoirs and/or wells, and they usually own land within the watershed and aquifer recharge areas for water supply protection. These systems also own and maintain their treatment, storage, and distribution infrastructure, and they sell water directly to their retail customers.

Some of these systems also sell wholesale water to other community water systems, whether on a regular basis or as needed for peak or emergency demand. Likewise, some of these systems will purchase water from other systems in order to meet peak or emergency demand.

Municipal systems that purchase water

Seven of the 34 municipal community water systems in the region do not have their own sources, and instead purchase wholesale water from other systems. Agawam, East Longmeadow, and Longmeadow all purchase water from the Springfield Water and Sewer Commission, while Chicopee, South Hadley Fire District #1, and Wilbraham all purchase water from the Massachusetts Water Resources Authority. In Palmer, the Thorndike Fire and Water District purchases its water from the other three water districts in the town.

These community water systems sell water to retail customers within their service area. They maintain their own distribution infrastructure, including water mains, pump stations, storage tanks, and in some instances their own water treatment facilities.

Private wells

Most residents who are not served by municipal community water systems obtain their drinking water from privately-owned wells on their property. Because these wells do not have the same associated regulatory oversight as public water supplies, there is limited data on the exact number of active wells, and the exact number of households and individuals who are served by private wells.

As of 2023, the number of residents with private wells in Hampden and Hampshire counties is estimated to be about 74,000, or about 11.8% of the total population of the region. This estimate is derived by subtracting the total population served by public water systems (as reported in the 2023 Annual Statistical Reports) from the total 2020 U.S. Census population of the city or town.

Based on these estimates, Belchertown has the highest number of residents who use private wells out of any community in the region, with about 11,500 people using private wells. This is followed by Ludlow (about 8,600), Wilbraham (about 5,600), Granby (about 5,400), Hampden (about 4,700), and Westfield (about 4,600). Together, these communities account for a little more than half of the total estimated number of residents using private wells in the region.

1 This figure of 27 includes both the Cummington and West Cummington Water Departments as separate water systems. Although both are owned by the town of Cummington and managed by the same people, they do not have any interconnections and are counted as two separate systems for statistical purposes. Note that in other chapters of this plan document the two are counted as one entity.

Privately-owned community water systems

A small number of residents are served by privately-owned community water systems. As explained in more detail in the "Varied Regulatory Landscape" section below, the Massachusetts Drinking Water Regulations (310 CMR 22.00) define community water system as one that has 15 service connections for year-round residents or serves at least 25 year-round residents. Aside from municipal systems, this definition also includes privately-owned systems, such as condominium complexes, retirement homes, or mobile home parks that share a common water source. As with municipal systems, these are subject to state regulations regarding source protection, testing, contamination thresholds, and similar requirements.

As of 2024, there were 23 such systems in the region with a combined total of 1,206 service connections. These systems provided water to an estimated 2,803 residents, or about 0.4% of the region's total population. Of these 23 systems, 22 obtain water from groundwater sources, and 1 obtains supply from a surface water source. Table 2 in the appendix includes a list of these private community water systems.

Diversity of water sources

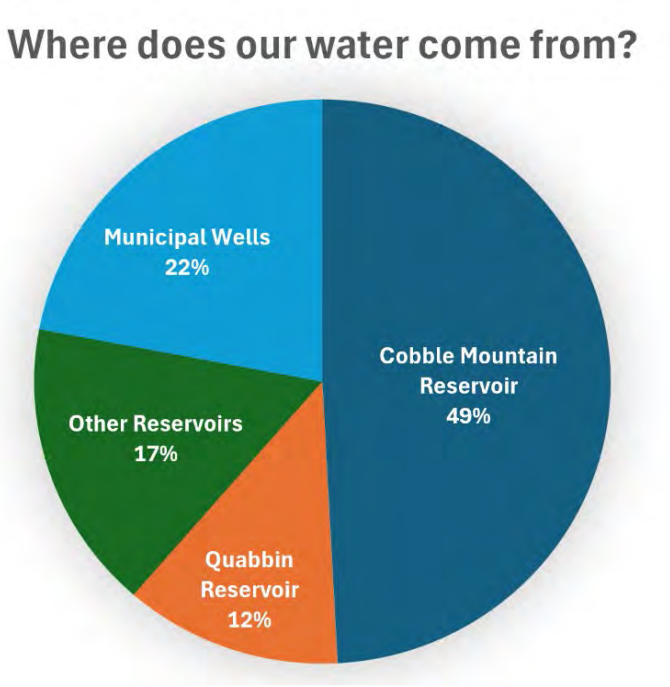
The 43 cities and towns of Hampden and Hampshire Counties have a wide variety of clean, reliable drinking water sources supplied by publicly-owned community water systems and also through privately-owned wells. This water is sourced from a combination of underground aquifers and also from surface water reservoirs.

Surface water and groundwater

Of the 34 municipally-owned community water systems in Hampden and Hampshire counties, 19 obtain their water entirely from groundwater sources, while 10 are supplied entirely from surface water reservoirs. The remaining 5 systems are supplied by both ground and surface water sources.

In terms of total volume, most of the region's water supply comes from surface water sources. In 2023, the 34 municipal community water systems in the region produced a total of 21,429 million gallons of finished water for distribution. Of this, 4,714 million gallons (22%) were from groundwater sources, and 16,715 million gallons (78%) were from surface water sources. A full list of all the municipal community water systems and the amount of water that was available for distribution in 2023 is found in Table 3 in the appendix.

Each type of source has its advantages and challenges. Reservoirs can store large quantities of water to meet demand, but they are also expensive to build and maintain, which makes them best suited for large community water systems that are able to leverage economies of scale. Surface water also requires extensive watershed protection areas, combined with filtration and chemical treatment of the water.[2]



Sources of finished water distributed by municipal community water systems in Hampden and Hampshire counties in 2023. Source: 2023 Annual Statistical Reports.

Groundwater wells tend to have lower operational costs when compared to surface water sources. However, they are limited in terms of the volume of water that can be withdrawn in order to prevent depletion of the aquifer. Because of this, groundwater is best suited to small and medium-sized public water systems. Unlike surface water, groundwater is naturally filtered through layers of soil, gravel, and rocks, and it often requires less treatment than surface water.[3] However, groundwater is still susceptible to water quality concerns, which can include both naturally occurring and human-made contaminants.[4]

Surface water sources

A total of 15 municipal community water systems use surface water reservoirs as part of their regular water supply. Of these, 9 systems maintain their own reservoirs, while 6 systems purchase surface water from other systems. In addition, several groundwater systems use surface water as a backup, whether through emergency reservoirs or through interconnections with surface water systems. Table 4 in the appendix has a full list of all surface water sources and the volume of water that was pumped in 2023. These sources are also shown on the map in Figure 1.

The surface water supply for the region includes a total of 25 reservoirs that are operated by 11 different suppliers. This total includes 17 reservoirs that are classified as active, 6 emergency reservoirs, and 2 inactive reservoirs. Most of the reservoirs are located within Hampden and Hampshire counties, although several are located just outside the region. To protect the water quality, these reservoirs are located away from developed areas, and most are located in the rural communities in the western and northeastern parts of the region.

[2] https://www.epa.gov/dwreginfo/surface-water-treatment-rules
3 https://iee.psu.edu/news/blog/groundwater-deep-need-deep-trouble
4 https://www.usgs.gov/faqs/if-ground-filters-water-groundwater-always-clean

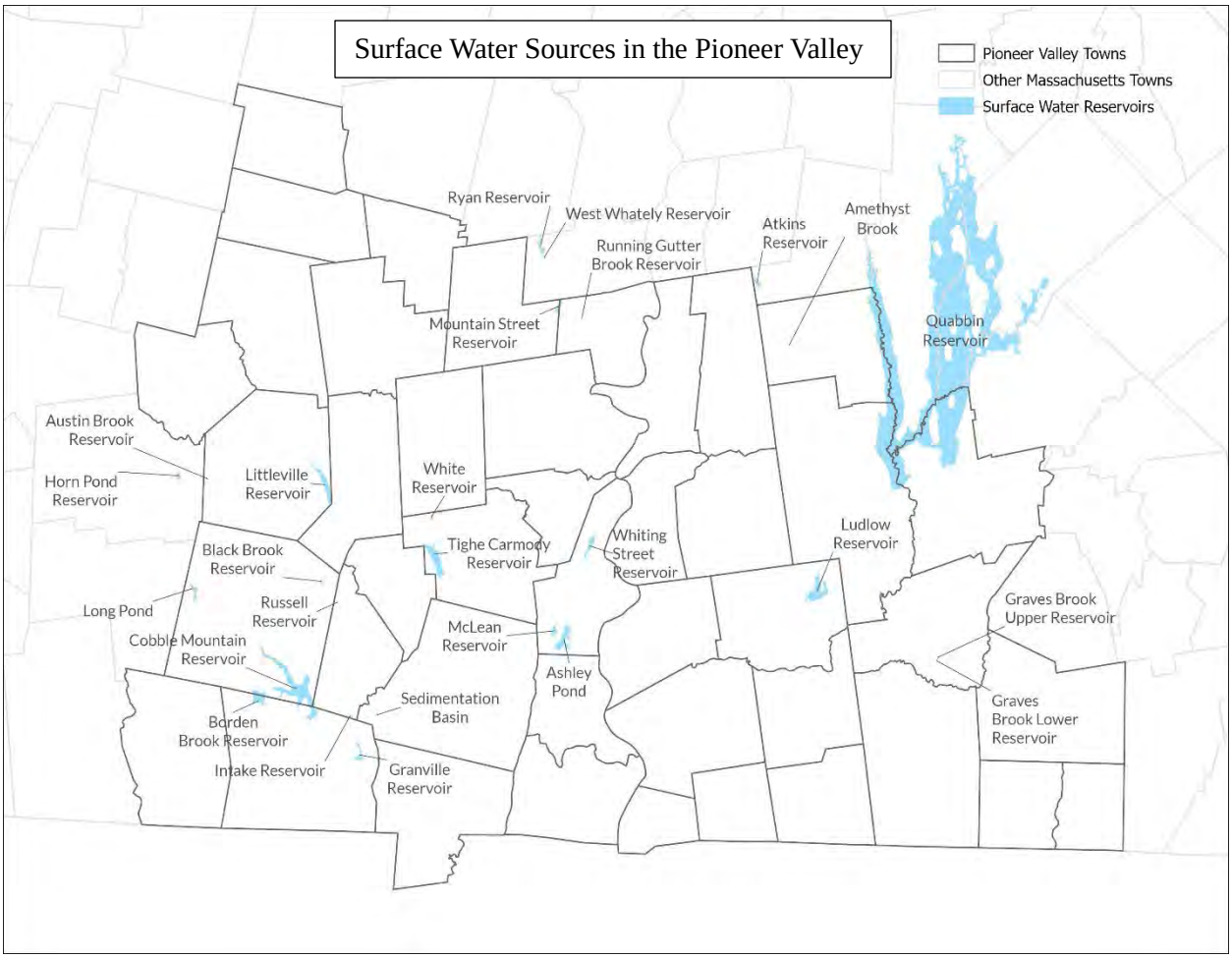


Figure 1: Surface water reservoirs in Hampden and Hampshire counties.
Source: MassGIS Data: Public Water Supplies.

Springfield Water and Sewer Commission

The single largest source of drinking water in the Pioneer Valley region is Cobble Mountain Reservoir. It has a capacity of 22.8 billion gallons, and it covers 1,134 acres in Blandford and in the neighboring towns of Granville and Russell. It is operated by the Springfield Water and Sewer Commission (SWSC), which provides retail service to customers in Springfield and Ludlow. SWSC also sells wholesale water to public water systems in Agawam, East Longmeadow, and Longmeadow, and it supplies water as needed for peak or emergency demand to Chicopee, Southwick, Westfield, West Springfield, and Wilbraham. In 2023, these municipalities distributed 10,519 million gallons of finished water from Cobble Mountain Reservoir, which accounts for about 49% of the total amount of finished water that was produced by all of the municipal community water systems in the region in 2023.

In addition to the Cobble Mountain Reservoir, SWSC also maintains the Borden Brook Reservoir, with a capacity of 2,500 million gallons. Like Cobble Mountain, Borden Brook is located within the Little River watershed in Blandford and Granville. It is listed as an active reservoir, but no water was withdrawn from

it in 2023. SWSC also has two emergency reservoirs: Littleville Reservoir (10,560 million gallons) in Huntington and Chester, and the Ludlow Reservoir (1,710 million gallons) in Ludlow.

Massachusetts Water Resources Authority

Another source of surface water in the region is the Quabbin Reservoir, which covers 39 square miles in western and central Massachusetts and has a capacity of 412 billion gallons. It is operated by the Massachusetts Water Resources Authority (MWRA), which primarily serves Boston and other communities in eastern Massachusetts. However, three western Massachusetts community water systems purchase water from the MWRA: Chicopee, South Hadley Fire District #1, and Wilbraham. In total, these three public water systems distributed 2,629 million gallons of finished water from the Quabbin Reservoir in 2023, which accounts for 12% of the total amount of finished water that was supplied by all municipal community water systems in the region in 2023.

Given the Quabbin's location in Western Massachusetts there has been conversation around how the MWRA might better serve communities in the region. The MWRA has completed one study to look at possible connections to its system and another analysis by PVPC and FRCOG is currently under way.

Other surface water suppliers

Aside from SWSC and MWRA, there are nine other municipal community water systems in the region with surface water reservoirs:

- Amherst DPW Water Division: The Atkins Reservoir in Shutesbury (capacity of 200 million gallons) supplies nearly half of Amherst's drinking water, with the remainder coming from town-owned wells. Amherst also has a second surface water source, located on Amethyst Brook in Pelham, although this is currently inactive.
- Blandford Water Department: The Long Pond Reservoir in northwestern Blandford has a capacity of 300,000 gallons. It is the sole source of Blandford's municipal community water system.
- Chester Water Department: The Horn Pond Reservoir in Becket (capacity of 41 million gallons) is the primary source of municipal drinking water for Chester. The water department also owns Austin Brook Rerservoir in Chester (capacity 1.1 million gallons), which is currently inactive.
- Hatfield Water Department: The Running Gutter Brook Reservoir in Hatfield (capacity 1.7 million gallons) is the primary source of the town's municipal drinking water. A small portion of the town's municipal water supply is groundwater, from two town-owned wells.
- Holyoke Water Works: Holyoke's primary water source is the Tighe-Carmody Reservoir in Southampton (capacity of 4,825 million gallons). The system also includes the McLean Reservoir in Holyoke (capacity of 365 million gallon), which supplements the Tighe-Carmody Reservoir during periods of high demand, such as the summer months. In addition, the Holyoke Water Works has two emergency reservoirs in Holyoke: Ashley Reservoir (capacity of 795 million gallons) and Whiting Street Reservoir (capacity of 479 million gallons).
- Northampton Water Division: The two primary reservoirs for Northampton are the Ryan Reservoir (capacity of 895.1 million gallons) in Whately and the Mountain Street Reservoir (capacity of 166.5 million gallons) in Williamsburg, Hatfield, and Whately. The system also includes the West Whately Reservoir (capacity of 17.6 million gallons) in Whately.

- Palmer Water District No. 1: The Upper Graves Brook Reservoir in Palmer (capacity of 19 million gallons) supplies nearly half of the drinking water for District No. 1, with the remainder coming from the water district's wells. The water district also owns the Lower Graves Brook Reservoir in Palmer (capacity of 5 million gallons).
- Russell Water Department: The town's primary municipal water supply is groundwater from a well, but the water department owns two reservoirs: the Black Brook Reservoir in Blandford (capacity of 30 million gallons) and the Russell Reservoir in Russell (capacity of 1 million gallons), both of which are for emergency use.
- Westfield DPW Water Division: The majority of Westfield's municipal water supply is from groundwater wells, but it also includes surface water from the Granville Reservoir in Granville (540 million gallon capacity).

Groundwater sources

The groundwater sources in the Pioneer Valley region are more numerous and more widely dispersed than the surface water sources. Groundwater wells are used by many municipal systems, and they are also used by most privately-owned community water systems. In addition, most households that are not served by community water systems instead obtain water from private wells on their property.

Within the region, 23 municipal community water systems operate their own wells, with a combined total of 82 wells. Of these, 73 wells are classified as active, 4 are emergency wells, and 5 are inactive wells. Not all of the active wells are necessarily used at any given time. In 2023, only 56 wells were pumped over the course of the year. The remaining wells are typically used for peak demand or backup, and are not in use on a regular basis. Table 5 in the appendix has a full list of the number of wells operated by each water system. The locations of these wells are shown in Figure 2, along with the locations of high-, medium-, and low-yield aquifers in the region.

The number of wells varies from one system to another. Two systems only have a single well, and ten systems have two wells. Six systems have either three or four wells, and five systems have six or more wells. In many instances, multiple wells are located within the same wellfield, while other systems have wells that are widely dispersed across the community. The numbers and locations of wells operated by each municipal community water system are listed below:

- Amherst DPW Water Division: 5 active and 2 inactive wells, located in southeastern Amherst and northwestern Belchertown.
- Belchertown Water District: 5 active and 1 emergency well, located along Jabish Brook in central Belchertown and along Hop Brook in northwestern Belchertown.
- Bondsville Fire and Water District (Palmer): 3 active and 1 inactive well, located along Jabish Brook in southern Belchertown.
- Cummington Water Department: 1 active and 1 emergency well, and 1 emergency spring. The wells are located along the Westfield River in the town center, and the spring is located on the hillside southwest of the town center.
- Easthampton Water Department: 5 active and 1 emergency well, located along Broad Brook in southern Easthampton and the Manhan River in northern Easthampton.

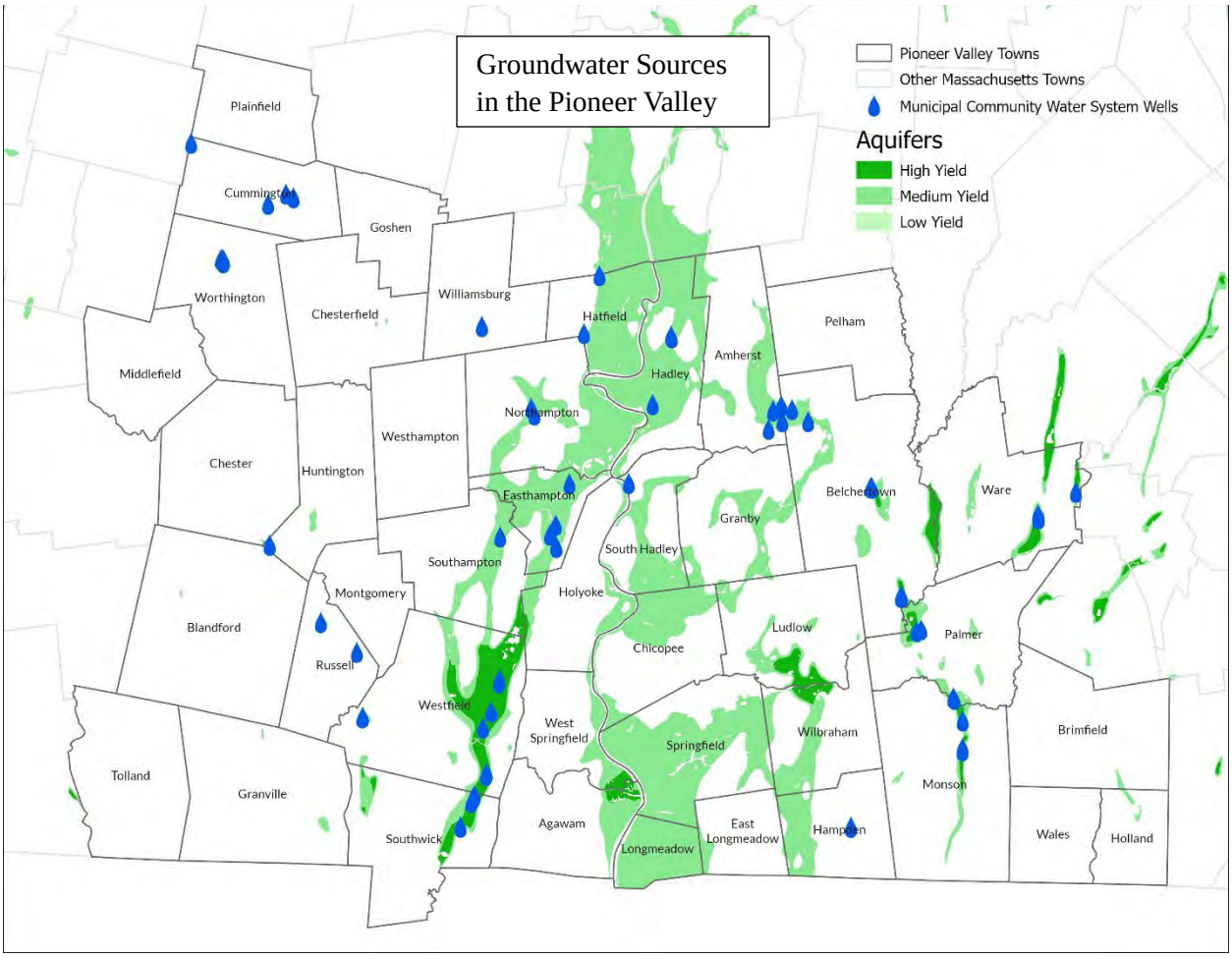


Figure 2: Groundwater sources in Hampden and Hampshire counties.
Source: MassGIS Data: Aquifers; MassGIS Data: Public Water Supplies

- Hadley DPW Water Division: 3 active and 1 inactive well, located near the Fort River to the south of the town center, and near Mount Warner in the northern part of Hadley.
- Hatfield Water Department: 2 active wells, located along Running Gutter in southern Hatfield and along the Mill River in northern Hatfield.
- Huntington Water Department: 2 active wells, located near the Westfield River in the southwestern corner of town.
- Monson Water and Sewer Department: 4 active wells located in two different areas along Chicopee Brook in north-central Monson.
- Northampton Water Division: 2 active wells located just south of the village of Florence.
- Palmer Water District No. 1: 2 active wells along the Quaboag River in southern Palmer.
- Russell Water Department: 1 active and 1 inactive well. The active well is located to the northwest of the town center, and the inactive well is located near the Westfield River to the north of the village of Woronoco.
- Scantic Valley Water District (Hampden): 2 active wells at the Laughing Brook Wildlife Sanctuary just to the east of the town center.

- South Hadley Fire District #2: 2 active wells located along Dry Brook in the northwestern corner of the town.
- Southampton Water Department: 1 active well located near the Manhan River in the northern part of the town.
- Southwick Water Department: 2 active wells located near Great Brook in the eastern part of the town.
- Three Rivers Fire District (Palmer): 2 active wells along the Ware River to the north of the Three Rivers village.
- Ware Water Department: 4 active wells located along Muddy Brook near the town center, and along the Ware River on the eastern edge of the town.
- West Cummington Water Department: 1 active well located along the Westfield River in the northwestern corner of the town.
- West Springfield DPW Water Division: 4 active wells located along Great Brook in the northeastern corner of Southwick.
- Westfield DPW Water Division: 8 active wells located throughout the city. Four are located along Pond Brook in the northeastern part of the city, 2 are located along Great Brook in the southeastern part of the city, and 2 are located along the Little River in the southwestern part of the city.
- Williamsburg Water Department: 2 active wells located along Unquomonk Brook in the southern part of the town.
- Worthington Fire District: 10 active wells located along Ridge Road in the northern part of the town.

In terms of volume, the largest groundwater systems in the region are West Springfield and Westfield, which pumped 1,164 million gallons and 1,031 million gallons of groundwater in 2023, respectively. Together, these two systems account for nearly half of all the groundwater pumped by municipal systems in the region in 2023. The next largest systems, in decreasing order of volume pumped, are Amherst (640 million gallons), Easthampton (487 million gallons), Southwick (258 million gallons), and Hadley (214 million gallons). Together with West Springfield and Westfield, these six systems account for about 80% of municipal groundwater.

Varied regulatory landscape

Types of public water systems

As defined by the Massachusetts Drinking Water Regulations (310 CMR 22.00), a “public water system” is a system that provides piped drinking water and has at least 15 service connections or serves an average of at least 25 individuals daily for at least 60 days of the year. Such systems can be either publicly or privately owned, and they include both community and non-community water systems. Within public water systems, there are:

- Community water systems have at least 15 service connections for year-round residents or serve at least 25 year-round residents. This includes large municipal systems, but it also includes residential communities such as condominiums, apartment complexes, and mobile home parks, if those communities have their own water source.

- Non-community water systems include non-transient non-community (NTNC) systems, as well as transient non-community systems (TNC).
    - NTNC systems serve at least 25 of the same people for four or more days per week, more than 6 months or 180 days per year. NTNC systems include those that serve large workplaces or schools.
    - TNC systems serve at least 25 different people at least 60 days per year, and can include restaurants, hotels, campgrounds, and similar facilities.

All water systems in Massachusetts that are designated as public water systems are regulated by 310 CMR 22.00.[5] This includes adhering to state guidelines for design approvals, source development, water treatment, pumping and storage facilities, distribution systems, testing, emergency response planning, and reporting.

Some of these requirements vary depending on the type of system. In general, the regulations for community water systems and NTNC systems are more stringent than for TNC systems, because they are used by the same people on a regular basis.

Water Management Act

The Massachusetts Water Management Act (M.G.L. c. 21G) regulates large-volume withdrawals from surface and groundwater sources. It went into effect in March 1986, and is intended to ensure that Massachusetts has adequate supplies of water for current and future needs.[6]
Water users are subject to the WMA if they withdraw an annual average of 100,000 gallons per day, or if they withdraw 9 million gallons in any three-month period. This includes community water systems, and it also includes large-volume commercial, industrial, and agricultural water uses that withdraw water directly from a surface or groundwater source. Table 6 in the appendix includes a list of all municipal community water systems in the region that are subject to the WMA.

When the WMA went into effect, existing water users had the ability to register their withdrawals based on the average volume of water that they withdrew during the period between 1981 and 1985. These registrations, which had to be submitted by January 1988, allow water users to continue their existing withdrawals without needing a Water Management Act permit.

Water users who do not have a registered volume must apply for a permit to withdraw more than 100,000 gallons per day, or more than 9 million gallons in a three-month period. Water suppliers and other users who have a registration must apply for a permit if they wish to exceed their registered volume. They must also apply for a permit if they wish to add a new source, regardless of whether the total volume of the withdrawals exceeds the registered volume.

Permits are issued by the Massachusetts Department of Environmental Protection (MassDEP) for a term of no more than 20 years. The permits may include conditions such as conservation, source protection,

[5] https://www.mass.gov/regulations/310-CMR-22-the-massachusetts-drinking-water-regulations
[6] https://www.mass.gov/info-details/fact-sheet-water-management-act-registration-and-permitting

and fisheries protection measures, minimization and mitigation measures, along with withdrawal reductions and outdoor water use restrictions during certain periods.

Based on their average daily withdrawals, 21 of the 34 municipal community water systems in Hampden and Hampshire counties are subject to the WMA. Most of these public water systems operate under a registered volume, which is based on their 1981–1985 usage. A total of 10 systems operate entirely under a registration, 10 have both a registration and a permit, and 1 system has only a permit. Of the 10 systems with both a registration and a permit, 5 do not currently have any additional volume authorized by the permit.

The remaining 13 municipal community water systems in the region are not subject to the WMA. Of these, 7 systems purchase their water from other systems that have registered or permitted volumes, and 6 systems have low withdrawals that do not exceed the 100,000 gallons per day threshold.

Source protection

The Massachusetts Drinking Water Regulations (310 CMR 22.00) protects public water sources, including by establishing restrictions on the allowable land uses within surface water watersheds and within the aquifer recharge areas of groundwater wells.

Surface water protection

The land within a surface water supply watershed is classified into three zones:

- Zone A: The area between the surface water source and the upper boundary of the bank; the land area within a 400 foot lateral distance from the upper boundary of the bank of a Class A water source, as defined in 314 CMR 4.05(3)(a); and the land area within a 200 foot lateral distance from the upper boundary of the bank of a tributary or associated surface water body.
- Zone B: The land area within one-half mile of the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a), or edge of watershed, whichever is less. Zone B always includes the land area within a 400 ft lateral distance from the upper boundary of the bank of a Class A surface water source.
- Zone C: The land area not designated as Zone A or B within the watershed of a Class A surface water source, as defined in 314 CMR 4.05(3)(a).

The Massachusetts Drinking Water Regulations regulate or prohibit certain types of land uses within these zones. These include regulations that address potential contamination sources such as storage tanks, sewage systems, domestic animals and livestock, burials, and swimming or boating. Zone A has the most stringent protections, with prohibitions on new land uses that could contaminate the water supply. These include, but are not limited to, uses such as underground storage tanks, sand and gravel excavation, vehicle repair, junkyards, car washes, cemeteries, and uncovered or uncontained storage of materials such as fertilizer, manure, and de-icing/sanding materials.

Under 310 CMR 22.20B, public water suppliers are responsible for conducting regular and thorough inspections of Zones A, B, and C in order to ensure compliance with the law. Each year, water suppliers must document these inspections on the Annual Statistical Reports, including the nature and outcome of

any violations. In 2023, three municipal community water suppliers reported a total of four violations. This included two instances of livestock within 100 feet of a Zone A tributary, and two instances of individuals fishing at reservoirs.

Within Hampden and Hampshire counties, about 57 square miles is classified as a Zone A surface water supply protection areas, amounting to about 5% of the total area of the region. These areas are shown on the map in Figure 3. Because the surface water reservoirs are primarily located in the upland areas in the eastern and western parts of the region, most of the Zone A land is located in those areas as well. This includes large portions of the towns of Blandford, Granville, and Pelham, along with parts of Amherst, Belchertown, Chester, Hatfield, Holyoke, Huntington, Middlefield, Montgomery, Palmer, Russell, Ware, Westfield, Williamsburg, and Worthington.[7] About30 square miles, or about 53% of this Zone A land is considered to be permanently protected under Article 97.[8]

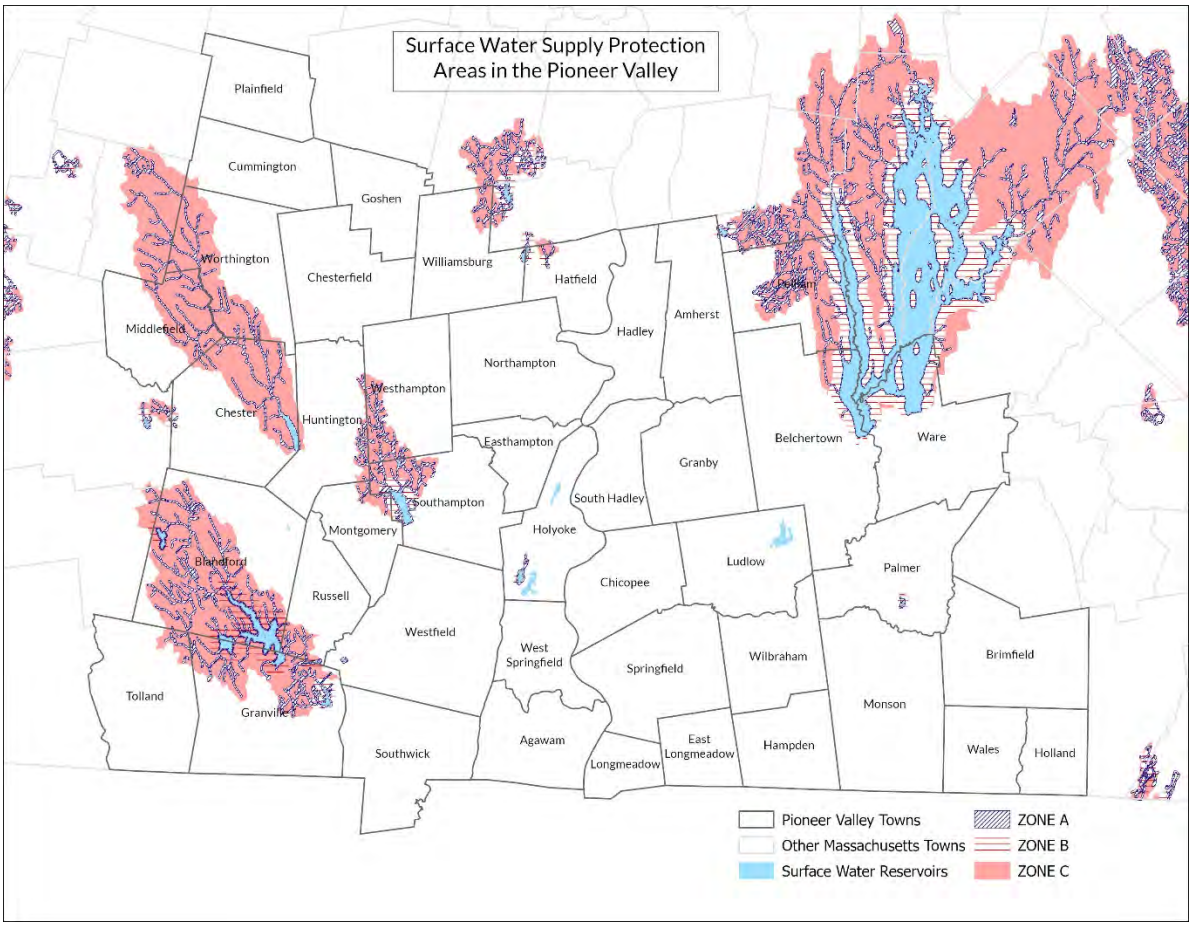


Figure 3: Surface Water Supply Protection Areas in Hampden and Hampshire counties.
Source: MassGIS Data: Surface Water Supply Protection Areas (ZONE A, B, C)

[7] https://www.mass.gov/info-details/massgis-data-surface-water-supply-protection-areas-zone-a-b-c
[8] https://www.mass.gov/info-details/massgis-data-protected-and-recreational-openspace

Groundwater protection

Groundwater sources are protected through MassDEP Wellhead Protection Areas, which include two zones and one interim classification:

- Zone I: A protective radius around the well or wellfield, ranging from 100 to 400 feet based on the approved yields. Public water system wells with approved yields of 100,000 gallons per day or greater have a protective radius of 400 feet.
- Zone II: As defined by 310 CMR 22.02, a Zone II Wellhead Protection Area is: "That area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation). It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone IIs shall extend up gradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock , or a recharge boundary)."
- Interim Wellhead Protection Areas (IWPA): For wells that do not yet have an approved Zone II, an IWPA serves as the primary protected recharge area for the wells. The radius of the IWPA is determined based on pumping rate, and can range from a minimum of 400 feet to a maximum of 2,640 feet (1/2 mile).

The Massachusetts Drinking Water Regulations (310 CMR 22) require that a public water supplier have ownership or control of enough land around a well or other groundwater source to protect it from contamination. This generally involves controlling the land within the Zone I area. The regulations also place restrictions on the types of land uses that are allowable within the Zone II areas. This includes restrictions on landfills, junkyards, and the storage of materials such as petroleum products, road salt, hazardous waste, fertilizers, manure, and other substances that could potentially contaminate the groundwater.[9]

Within Hampden and Hampshire counties, about 71.5 square miles is classified as a Zone II wellhead protection area, as shown in Figure 4. This amounts to about 6% of the total area of the region. The single largest Zone II area is the Barnes Aquifer, which underlies most of Easthampton and parts of Northampton, Southampton, Holyoke, and Westfield. Other Zone II areas are located in portions of Amherst, Belchertown, Chester, Hadley, Huntington, Granby, Granville, Monson, Palmer, Pelham, South Hadley, Ware, Westfield, Williamsburg, and Worthington.[10]

[9] https://www.mass.gov/doc/310-cmr-2200-the-massachusetts-drinking-water-regulations
[10] https://www.mass.gov/info-details/massgis-data-massdep-wellhead-protection-areas-zone-ii-zone-i-iwpa

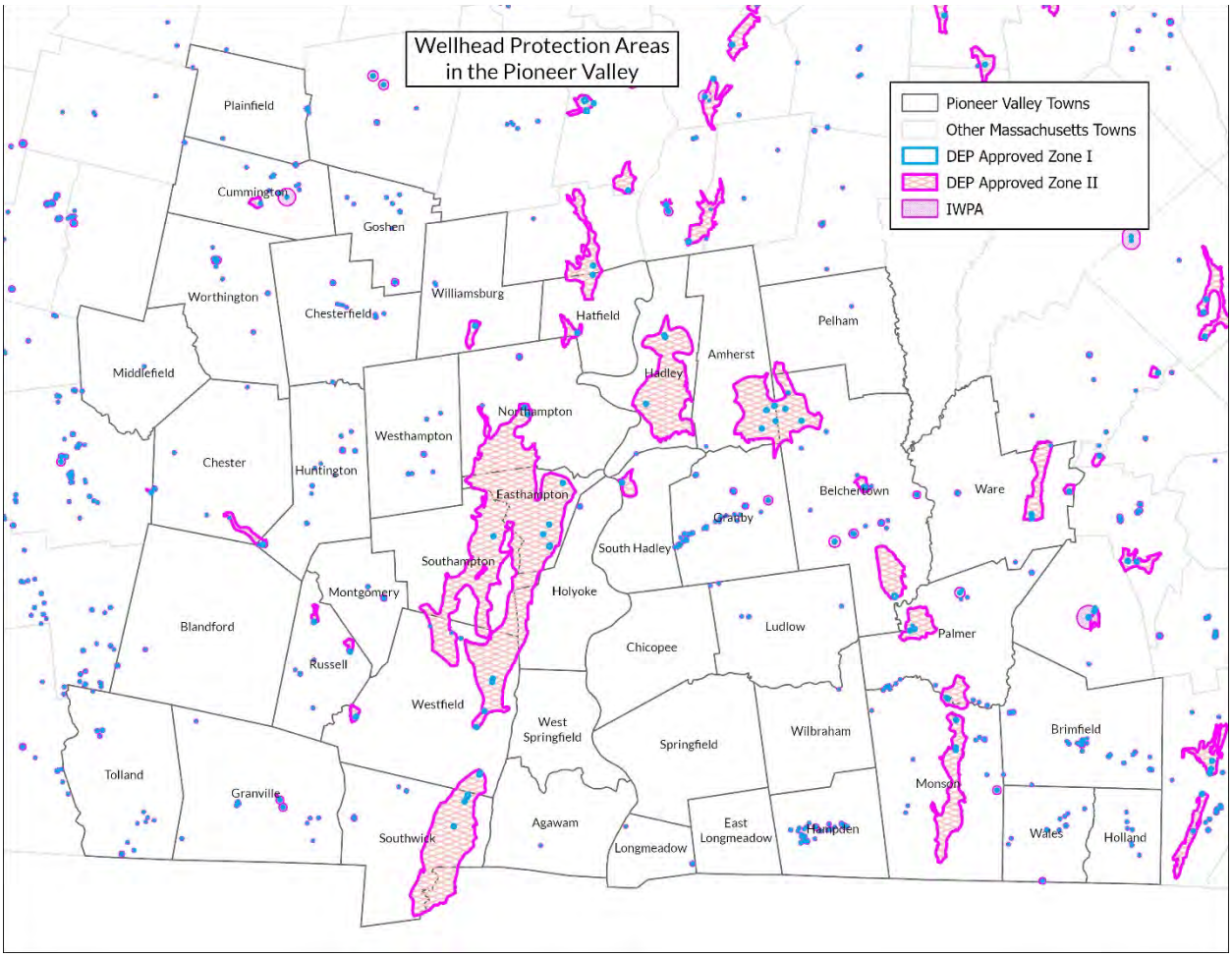


Figure 4: Wellhead Protection Areas in Hampden and Hampshire counties.
Source: MassGIS Data: MassDEP Wellhead Protection Areas (Zone II, Zone I, IWPA)

Regulation of private wells

Drinking water sources that do not meet the threshold for being a public water system are not regulated by MassDEP. These are classified as private wells and typically provide drinking water for single family residences.[11] Private wells are regulated by local boards of health, which issue permits for drilling new wells. Massachusetts General Laws Chapter 111, Section 31 allows boards of health to "make reasonable health regulations," including those that are more stringent than Title V. These can include locally appropriate private well regulations which take into consideration local geology, land uses, and zoning regulations, such as setback distances; construction, alteration, and maintenance standards; well decommissioning standards; and periodic water quality testing.[12]

Because private wells are regulated at the local level, oversight of private wells varies between communities. Several communities have adopted the state model bylaws[13] for private wells, but others

[11] https://www.mass.gov/private-wells
[12] https://www.mass.gov/doc/private-well-guidelines/download
[13] https://www.mass.gov/doc/model-board-of-health-regulations-for-private-wells/download

have not adopted any additional regulations, and many do not exercise any oversight of private wells beyond issuing permits for drilling new wells and decommissioning abandoned wells.[14]

As of 2026, MassDEP is exploring options for developing a statewide private well program. A March 2026 report[15] examines several potential approaches. Unlike public water supplies, which undergo regular testing, private wells are not necessarily tested on a regular basis. As such, they can be susceptible to contaminants from sources such as landfill leachate, malfunctioning septic systems, underground fuel tanks, fertilizers/pesticides, stormwater runoff, road salt, naturally-occurring metals and radiologicals, oil/hazardous material spills, animal waste, and industrial facilities.

The report does not make specific recommendations, but it identifies four potential scenarios for a statewide private well program. These scenarios are ordered from least to most intensive in terms of the level of effort required on the part of state and local governments and private well owners:

- Scenario 1: Expand Guidelines and Outreach: Enhances current MassDEP technical guidance and educational efforts with dedicated staff, funding, and resources.
- Scenario 2: Create Funding Program: Establishes financial assistance for private well owners to test and remediate contamination, modeled after MassDEP's Community Septic Management Program.
- Scenario 3: Local BOH Implementation: Develops enforceable statewide regulations that are administered and enforced locally by BOHs, similar to Massachusetts's Title 5 septic system program.
- Scenario 4A/4B: State-Run Program: Creates a comprehensive, centralized program fully operated by the state, including testing and remediation requirements. The primary difference between Scenarios 4A and 4B is that Scenario 4A only includes water quality testing and remediation requirements; whereas, Scenario 4B includes additional requirements from MassDEP's Model Board of Health Regulations for Private Wells, such as well construction and minimum well yield requirements.

[14] Survey of boards of health in Hampden and Hampshire counties, February 2025
[15] https://www.mass.gov/doc/massdep-private-well-program-report-considerations-related-to-establishing-a-statewide-private-well-program-march-2026/download

Populations served

Population characteristics

The city of Springfield is the economic hub of the region. Historically, the city was a major manufacturing center, but its economy is now primarily service-based, including education, healthcare, financial and business services, retail, and hospitality. The city itself has a population of 155,929, but the surrounding communities also have large populations, including Chicopee, Holyoke, West Springfield, Agawam, Ludlow, East Longmeadow, Longmeadow, and Wilbraham. Collectively, these municipalities have a population of 375,152, which accounts for nearly 60% of the total population of Hampden and Hampshire counties.

In the northern part of the region in Hampshire County, Northampton and Amherst are also important population centers and economic hubs. This is in large part due to the colleges and universities in Hampshire County, which include Amherst College, Mount Holyoke College, Smith College, and UMass Amherst. As a result, Hampshire County has a high student population, and the colleges are a major source of employment and economic activity for the region.

Hampden and Hampshire counties are collectively comprised of 43 cities and towns. These communities range from major cities with over 150,000 residents, to small rural towns with fewer than 500 residents. The most densely populated municipalities are all located in the Springfield area and include Springfield (4,897 inhabitants per square mile), Chicopee (2,428), Holyoke (1,822), Longmeadow (1,743), and West Springfield (1,724). The least densely populated municipalities are in the western part of the region and include Tolland (15 inhabitants per square mile), Middlefield (16), Blandford (24), Plainfield (30), and Chester (34). Table 7 in the appendix includes a list of all municipalities in the region, along with their 2020 population, land area, and population density. Figure 5 below shows the population density of the census block groups in the region.

As of 2020, the racial composition of Hampden and Hampshire counties is 68.9% White, 7.4% Black, 0.4% Native American, 3.7% Asian, 0.1% Native Hawaiian/Pacific Islander, 10.1% of another race, and 9.5% of two or more races. Hispanic or Latino residents of any race comprise 21.2% of the population. Of the two counties, Hampden County has a population that is much larger and also more diverse than Hampshire County. This due to the location of larger cities, such as Springfield, Chicopee, and Holyoke, in Hampden County, which tend to have a high number of nonwhite and Hispanic residents. By contrast, the suburban and rural communities in both counties tend to be predominantly white and non-Hispanic.[16] Table 8 in the appendix includes more detailed racial demographic data for the two counties and the region.

[16] https://data.census.gov/table

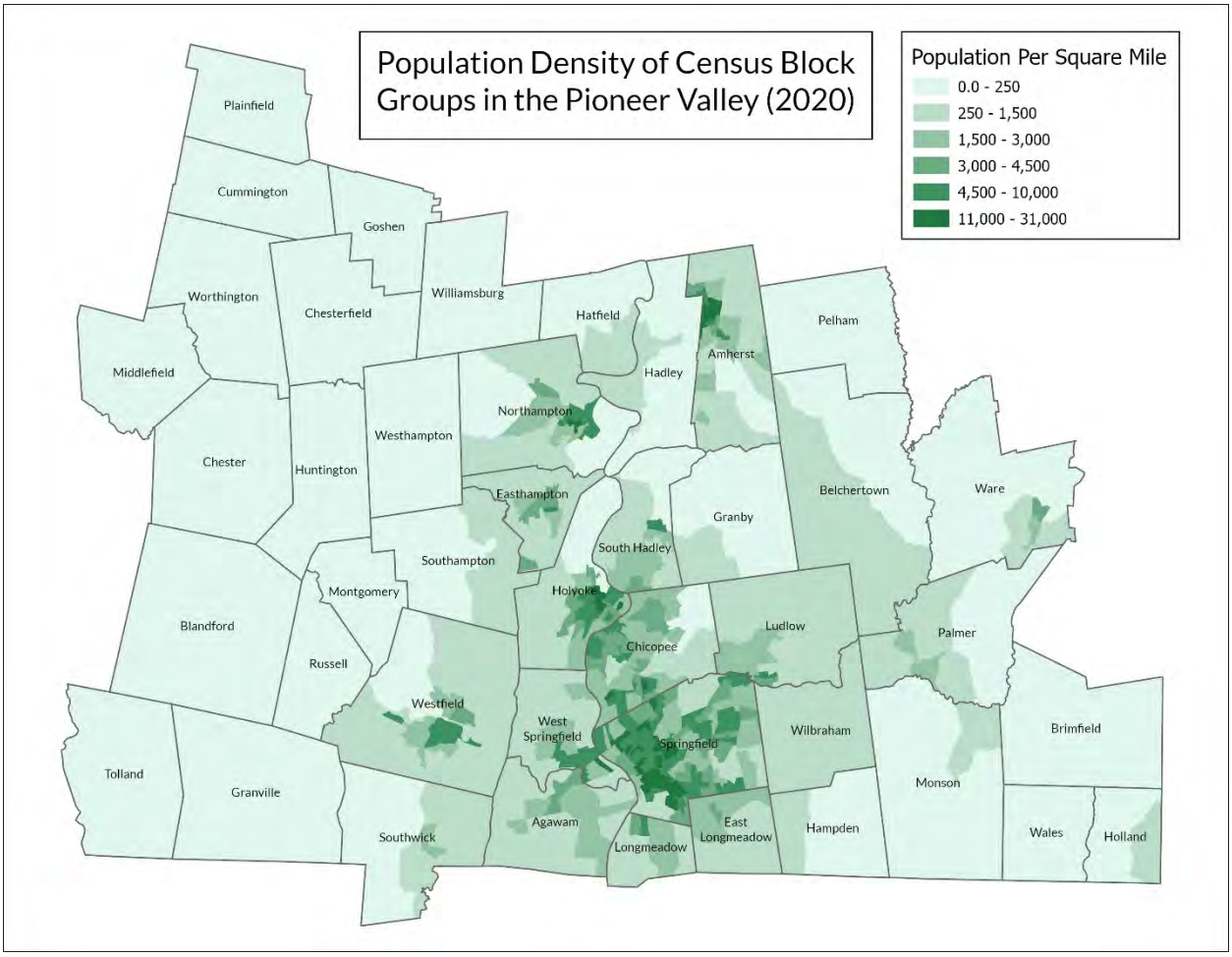


Figure 5: Population Density of Hampden and Hampshire counties, 2020.
MassGIS Data: 2020 U.S. Census

Community water system service areas

The service areas of municipal community water systems vary by city and town. Some systems cover nearly the entire community, while others only serve the more densely populated parts of the community. Municipal community water systems service areas are typically located within a single city or town, although there are some instances where residents near the border of their municipality will receive water service from the community water systems of a neighboring municipality. The Springfield Water and Sewer Commission is the only community water systems that serves a large number of residents in multiple communities.

Three towns in the region have multiple municipal community water systems. Cummington and South Hadley each have two systems, and Palmer has four. Within Palmer, each of these four systems serves one of the four villages in the town. The systems are interconnected, and they have the ability to purchase water from each other as needed. In South Hadley, the two systems obtain water from different sources. District #1 purchases water wholesale from the MWRA, while District #2 pumps water from its own

wells. In Cummington, each of the town's two villages has its own community water system. Due to the distance between the villages, there is no direct connection between these two systems.

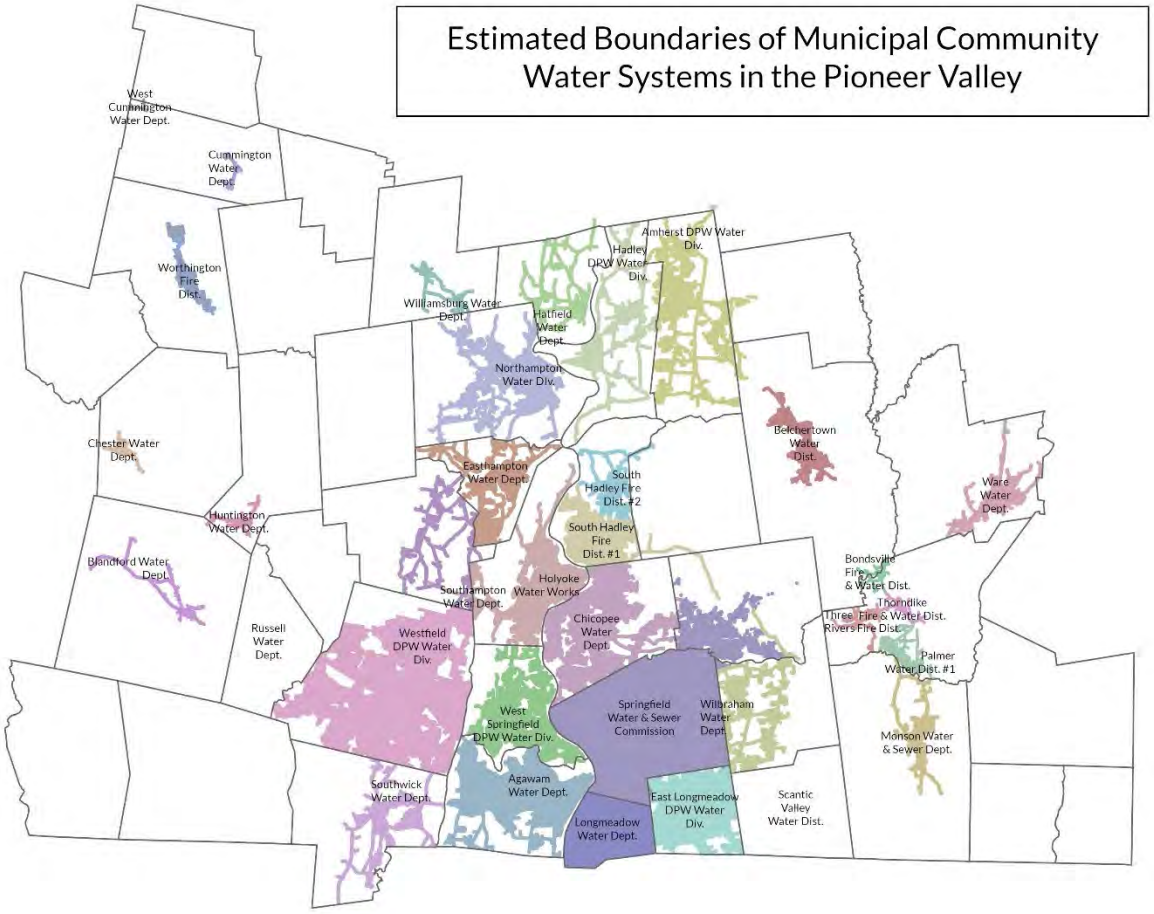


Figure 6: Cities and towns in Hampden and Hampshire counties by percentage of population served by a municipal community water system.

Sources: 2023 Annual Statistical Reports; MassGIS Data: Municipalities.

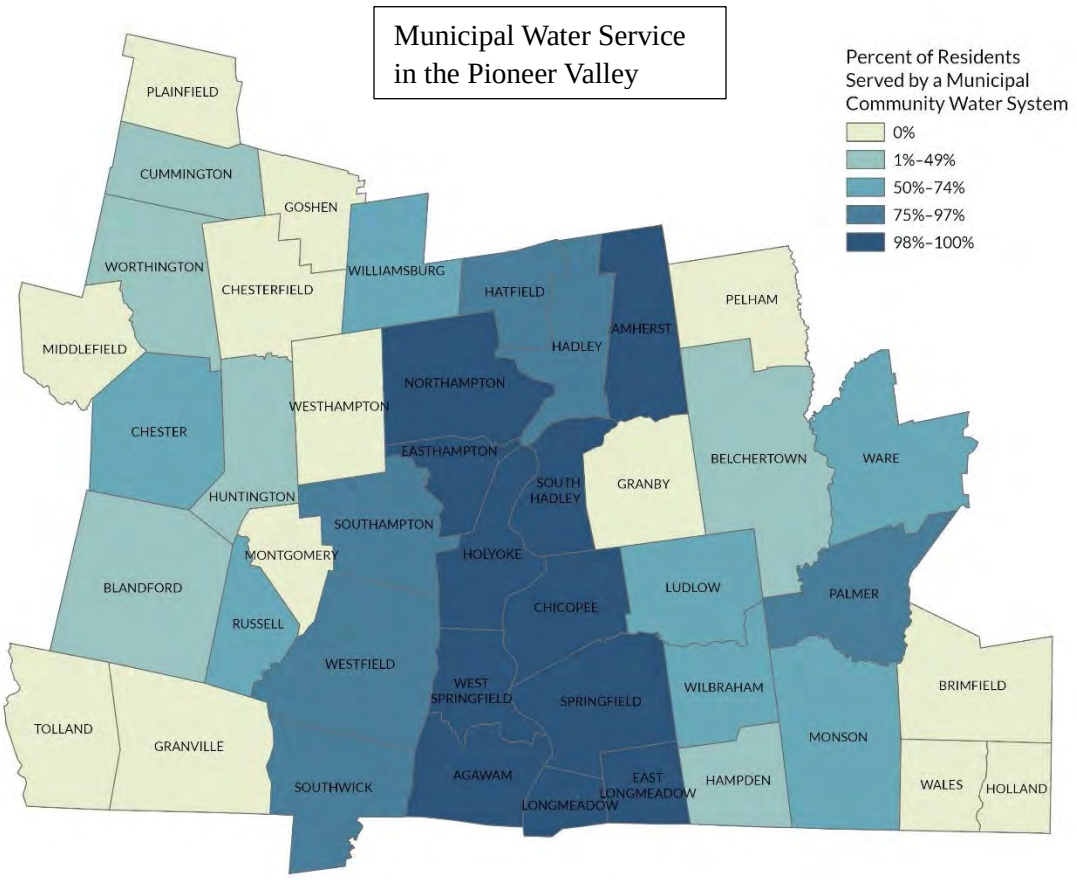


Figure 7: Cities and towns in Hampden and Hampshire counties by percentage of population served by a municipal community water system.

Sources: 2023 Annual Statistical Reports; MassGIS Data: Municipalities.

Of the 43 cities and towns in Hampden and Hampshire counties, 11 are served entirely or almost entirely (>98% of the population) by a municipal community water systems. These communities are primarily urban and suburban, with relatively high population densities. They are listed below, along with the estimated percentage of residents who are served by a municipal community water systems.

- Agawam (100%)
- Amherst (100%)
- Chicopee (100%)
- Easthampton (100%)
- Holyoke (100%)
- Longmeadow (100%)
- South Hadley (100%)
- Springfield (100%)
- West Springfield (100%)
- Longmeadow (99%)
- Northampton (98%)

In 6 cities and towns, fewer than 98% but greater than 75% of residents are supplied by a municipal CWS. These communities are primarily suburban, but have portions of outlying rural areas where residents use private wells. They include:

- Hatfield (91%)
- Palmer (91%)
- Hadley (90%)
- Westfield (88%)

- Southwick (83%)
- Southampton (76%)

In 7 towns, more than half but fewer than 75% of residents are supplied by a municipal CWS. Some of these towns are suburban, while others are rural towns that have a CWS serving the more densely-populated villages. They include:

- Ware (73%)
- Russell (65%)
- Wilbraham (62%)
- Williamsburg (62%)
- Chester (61%)
- Ludlow (59%)
- Monson (52%)

In 6 towns, fewer than half of residents are supplied by a municipal CWS. Several of these towns are suburban, but most are rural. They include:

- Cummington (49%)
- Worthington (47%)
- Huntington (38%)
- Blandford (36%)
- Belchertown (20%)
- Hampden (2%)

The remaining 13 towns in the region do not have a municipal CWS, although the towns of Granby and Pelham both have a small numbers of residents who are served by a CWS from a neighboring municipality. In most cases the residents of these towns use private wells, although some towns have privately-owned community water systems for condominium complexes, mobile home parks, and retirement communities.

Environmental justice communities

Hampden and Hampshire counties have a combined total of 444 census block groups. Of these, 256 block groups are environmental justice communities as defined by the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) According to the EEA, a block group is an environmental justice community if it meets at least one of the four following criteria:

- The annual median household income is not more than 65% of the statewide median
- Minorities comprise 40 percent or more of the population
- 25 percent or more of households lack English language proficiency
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

Within the region, 111 block groups meet the criteria based on both minority population and income, 80 meet the criteria based on minority population, 40 meet the criteria based on minority population, income, and English proficiency, 23 meet the criteria based on income, 1 meets the criteria based on minority population and English proficiency, and 1 meets the criteria based on income and English proficiency.

Of the 43 cities and towns in Hampden and Hampshire counties, 14 have one or more census block group that is defined as an environmental justice population. The entire city of Springfield is comprised of environmental justice populations, and the cities of Chicopee, Holyoke, and West Springfield also have high numbers of people living in environmental justice census block groups. The town of Amherst also has a high percentage of residents living in environmental justice census block groups, although this is likely due to the high percentage of college students who live in the town. Overall, 331,809 people live in environmental justice block groups in the region as of 2020, which amounts to 53% of the region's total

population.[17] Table 9 in the appendix includes a full list of the cities and towns that have environmental justice communities.

Based on the MassEnviroScreen data of the region's 444 block groups, nearly 60% or 263 are burdened and another 30% or 135 that are not burdened are adjacent to burdened block groups. Of the burdened block groups, fully 88% are located in the eight Hampden and Hampshire-county municipalities with populations exceeding 25,000. These communities fall at the bottom of the region when ranked by median household income, with all 8 (Springfield, Holyoke, West Springfield, Northampton, Amherst, Chicopee, Agawam, Westfield) falling within the bottom 13 communities (out of 43 total).

Research published in *Communications: earth and environment* calculates a "climate vulnerability index" by combining financial information about community drinking water utilities with information about the financial well-being of residents, the age of infrastructure (median housing age), and drinking water non-compliance scores.[18] The calculated vulnerability scores for the three Hampden County communities in their database were 0.363 for Springfield, 0.318 for Chicopee, and 0.244 for Westfield, placing those communities at the 92nd, 79th, and 52nd percentiles, respectively within the Commonwealth of Massachusetts. This aligns with certain correlations in the MassEnviroScreen between cumulative burden scores and drinking water non-compliance scores.

Together, these sources suggest that when residents of a community are struggling with low household incomes, low educational attainment, language barriers, and high rates of poverty, the community itself struggles as well, as does the infrastructure – including water systems, dependent on the well-being of the community.

Supply and demand

Types of water use

Within Hampden and Hampshire counties, a majority of the water that is distributed by municipal community water systems is used for residential purposes. According to the 2023 Annual Statistical Reports, 60.6% of the distributed water was used for residential purposes, along with 2.6% that is classified as having been used by residential institutions. Commercial/business use accounts for 18.0%, followed by 13.5% for industrial and 4.0% for municipal or institutional use. Agricultural use accounts for just 0.4% of distributed water, and another 0.9% is used for other purposes. Table 10 in the appendix shows the percentage of water use by category for each municipal community water system.

Residential use per capita

The residential gallons per capita per day (RGPCD) is the number of gallons of water used, on average, each day by a resident for purposes such as washing clothes, flushing toilets, showering and lawn watering. The Massachusetts performance standard for RGPCD is 65.

[17] https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts
[18] Zia J. Lyle, Jeanne M. VanBriesen, and Constantine Samaras, "Climate change risk index and municipal bond disclosures of United States drinking water utilities", Volume 7:68, 2026. https://www.nature.com/articles/s43247-025-03044-z

According to MassDEP, higher RGPCD values may indicate that residents of the system use substantial water for outdoor use, notably lawn watering. Lower RGPCD values may indicate that a community controls outdoor water use or that the community is densely settled with small lawn areas (for example, cities).

In 2023, RGPCD varied considerably between the communities in the region, as shown in Table 11 in the appendix. More than 80% of public water systems in the region had RGPCD values that were lower than the state performance standard, and the average for the region was 53 gallons per capita per day. The RGPCD was highest in communities that are predominantly suburban, including Longmeadow (87 RGPCD), Southwick (78 RGPCD), Wilbraham (77 RGPCD), and East Longmeadow (73 RGPCD). This is likely due to the prevalence of lawns and irrigation systems in these communities.

Authorized withdrawal limitations

Of the 34 municipal community water systems in Hampden and Hampshire counties, 21 are subject to the Water Management Act (WMA) based on the volume of their withdrawals. The WMA regulates the amount of water that each system may withdraw from its respective river basin(s). The 2023 Annual Statistical Reports indicate, based on that year's usage, that the water supplies are adequate to meet the current needs for most public water systems.

Collectively, the 21 systems subject to the WMA have a total registered volume of 76.93 million gallons per day and a permitted volume of 3.43 million gallons, for a total authorized withdrawal of 80.4 million gallons per day. In 2023, the combined daily average water use was 53.65 million gallons per day, with 15 of the 21 systems withdrawing less than 70% of their authorized volumes. However, several systems came close to reaching their authorized volumes in 2023, including Southampton and Southwick, both of which have seen considerable population growth and new development in recent years.

Uncertainties

Demand

The future demand for drinking water in the region will be influenced by many factors, including changes to water usage patterns, increased water conservation measures, new development, and population shifts. These changes can be difficult to project in the long term, but recent development and population trends can give some insight into current and future water demand.

The Pioneer Valley region experienced rapid growth in the post-World War II period, increasing in population from 404,568 in 1940 to 583,031 in 1970, for an increase of 44% in 30 years. Since then, however, this rate of growth has slowed considerably, with the region increasing in population by less than 8% between 1970 and 2020. The region's population in the most recent federal census in 2020 was 628,133, which is a 1.1% increase from 2010. By comparison, Massachusetts as a whole saw a population increase of 7.4% during that same period. Table 12 in the appendix shows the population changes in Hampden and Hampshire counties from 1850 through 2020.

At the municipal level, some communities have seen significant growth in recent years, while others have seen a decrease in population. The town of Southampton had the largest rate of growth, increasing by 7.5% from 2010 to 2020. Other communities with high growth rates included Holland (4.9%), Belchertown (4.8%), East Longmeadow (4.5%), Amherst (3.8%), South Hadley (3.6%), and Northampton (3.6%).

Another measure of potential changes in water demand is the number of new residential building permits. New residential construction often correlates with population growth, but this is not necessarily always the case. For example, adult children moving out of their parents' house will increase the demand for housing, even if the total population numbers do not change. Between 2000 and 2024, a total of 20,607 new housing units were constructed in Hampden and Hampshire counties. More than half of this development occurred between 2000 and 2007, when new housing construction averaged more than 1,300 units per year. The Great Recession slowed new housing development, and the region averaged 538 units per year from 2008 through 2017. This growth rate has increased somewhat since 2018, with an average of 681 new units per year between 2018 and 2024, but these numbers remain well below the rate of development in the early 2000s.

In terms of total numbers, the city of Springfield saw the greatest amount of new residential construction, with 2,222 new units constructed between 2000 and 2024. This was followed by Belchertown (1,350), Amherst (1,344), Westfield (1,168), East Longmeadow (1,167), Ludlow (1,089), and Northampton (1,003). New residential construction can also be evaluated in terms of the percentage increase in housing units. For example, because Springfield is a large city, an increase in 2,222 units reflected just a 4% change when compared to the number of existing housing units in the city in 2000. The communities that saw the greatest increase in new residential construction, when compared to the number of housing units in 2000, were Southampton (33%), Montgomery (31%), Belchertown (27%), Brimfield (26%), Westhampton (25%), Ware (23%), Granville (22%), East Longmeadow (22%), Chesterfield (21%), Plainfield (21%), and Middlefield (21%). A full list of the number of new units in each community is found in Table 13 in the appendix.

These changes in population and new developments carry potential implications for future drinking water demands. For example, of the 16 communities with the highest percentage of new permits relative to the housing stock in 2000, 10 do not have any municipal community water systems, and 2 have systems that only supply a small portion of the towns. Only one of these 16 communities (East Longmeadow) has near universal coverage with its water system. Many of these communities are relatively small and rural, and short-term development is unlikely to have a significant impact on its water resources. However, in some communities the population growth and development pressures may have a considerable impact on the demand for drinking water.

One such example is Southampton, which experienced the greatest population growth in the region from 2010 to 2020, and also the highest percentage of new residential permits from 2000 through 2024. The town had been unable to register its water withdrawals in the 1980s because the total volume withdrawn from the Glendale Well did not meet the WMA threshold. However, subsequent development increased the demand for water, and in 2003 the Southampton Water Department received a permit with an authorized annual average withdrawal rate of 0.36 million gallons per day. In recent years, Southampton

has consistently approached this limit, requiring the water department to purchase water from Easthampton during periods of high demand.

Another town that has seen considerable population growth and new development is Belchertown. The Belchertown Water District operates under both a registration and a permit, which allow a total of 0.40 million gallons per day. In 2023, the town was safely under this limit, with a daily average water use of 0.24 million gallons. However, the water district has a relatively small service area, covering the town center area and portions of Routes 9 and 202 north of the town center. Overall, only about 20% of town residents are served by the water district. A small number of households are served by the Amherst DPW Water Division and by the Bondsville Fire and Water District, and there are also four privately-owned community water systems in the town, but the remainder of town residents use private wells for their drinking water. Overall, more than 11,000 residents use private wells, which is by far the highest number of wells in any community in Hampden or Hampshire counties. As population and development increases in the town, this may pose increased risk of contamination and/or changes in groundwater levels.

In the long term, it is difficult to project future development patterns in the region. As housing demand and costs of living increase in other parts of the state and planned East-West rail infrastructure gets built the Pioneer Valley could experience an increase in development pressure. Another potential long-term factor is climate migration. Increases in coastal flooding, extreme urban summer temperatures, droughts, and other climate hazards in other parts of the state and country could result in population shifts that would affect the Pioneer Valley. These population changes would, in turn, have an impact on the demand for water in the region.

Climate

Other areas of uncertainty include the effects of climate change on drinking water supplies, including both groundwater and surface water. Climate projections for Western Massachusetts show an increase in periods of extended drought, and also an increase in rainfall, especially an increase in the intensity of the strongest rainstorms. One particular challenge is the impact of flash droughts, which can affect drinking water supplies through rapid depletion of groundwater. These can develop in a matter of weeks or even days, and can impact the amount and quality of water in both municipal and private wells.

According to the 2022 Massachusetts Climate Change Assessment, the Connecticut River Valley will experience an increase in drought indicators between 2030 and 2090.[19] This includes an increase in the average number of dry-day events per year, and also an increase in the annual number of days without rain. Likewise, the ResilientMass Climate Change Projections Dashboard highlights the projected changes in rainfall. Compared to the baseline, precipitation totals in the Connecticut River Valley are expected to increase by 6.2% by 2030, 8.2% by 2050, 9.9% by 2070, and 12.3% by 2090. Over this same period, the intensity of the 99th percentile storms is expected to increase at an even higher rate, increasing by 6.7% by 2030, 10.4% by 16% by 2070, and 19.5% by 2090.[20]

[19] https://www.mass.gov/info-details/massachusetts-climate-change-assessment
[20] https://resilientma-mapcenter-mass-eoeea.hub.arcgis.com/#ClimateDashboard

This pattern of extended drought, followed by periods of intense rainfall, can place a strain on drinking water supplies, including public systems and private wells. During drought, reservoir levels, streamflows, and groundwater recharge typically decline, reducing the amount of water available and potentially causing shallow wells to run dry. The low water levels also result in a greater concentration of salts, nutrients, and other pollutants in the remaining source waters.

When heavy rain finally arrives, the dry and often hardened ground is unable to absorb enough to adequately recharge groundwater. Instead, the water runs off the surface and into rivers, lakes, and reservoirs, which can impair surface water sources. Runoff can carry sediment, nutrients, pathogens, agricultural waste, and other contaminants into source waters, causing sudden increases in turbidity and water-quality problems. Heavy rainfall can also stir up material that accumulated during the dry period, overwhelm drainage and wastewater systems, and increase the risk of microbial contamination. As a result, water suppliers may face both reduced supply reliability and more challenging treatment conditions, including higher chemical use, operational disruptions, and temporary declines in source-water quality.

Water quality

The uncertainties surrounding the future quality of drinking water include the risks posed by climate change, but there are also other factors involved. This has included a greater understanding of different types of contaminants and the risks associated with them.

Testing Requirements

The Massachusetts Drinking Water Regulations (310 CMR 22) establish testing requirements for public water systems, along with maximum contaminant levels (MCLs) and Maximum Residual Disinfectant Levels (MRDLs). These are based on the standards that have been established by the U.S. Environmental Protection Agency, along with additional standards that have been established by MassDEP. These regulations only apply to water sources that are designated as public water supplies. Private wells do not have any state-mandated testing requirements, but MassDEP recommends that all homeowners periodically test the quality of their well.[21]

Public water systems are required to test for a wide range of potential contaminants, including both naturally-occurring and human-made substances. Contaminants with EPA-established MCLs and MRDLs include:

- Inorganic compounds (arsenic, asbestos, cadmium, lead, copper, mercury, nitrate, etc.)
- Volatile organic compounds (benzene, trichloroethylene, vinyl chloride, etc.)
- Synthetic organic compounds (atrazine, glyphosate, lindane, methoxychlor, PBCs, etc.)
- Turbidity (suspended particles in the water)
- Disinfectants/disinfection byproducts (chlorine, bromate, haloacetic acids, etc.)
- Bacteria (E.coli, fecal coliform bacteria)
- Radionuclides (radium, uranium, etc.)

[21] https://www.mass.gov/info-details/protect-your-family-a-guide-to-water-quality-testing-for-private-wells

In addition, Massachusetts establishes guidelines for other contaminants that do not have MCLs or MRDLs. MassDEP may require systems to monitor one or more of these on a case-by-case basis. These include substances such as acetone, bromomethane, ethylene glycol, nickel, radon-222, sodium, and many other potential contaminants.[22]

The monitoring requirements vary based on factors such as the type of contaminant, the type and size of the public water system, and the type of water source. For example, the number of samples required for monitoring coliform bacteria ranges from 1 sample per month for systems serving 1,000 people or fewer, to 480 samples per month for systems serving more than 3,960,000 people. Monitoring frequency for most other contaminants varies based on the MassDEP-approved sampling plan for each individual public water system.

In the event that a sample exceeds the MCL or MRDL, the public water supplier is required to notify the public. There are three tiers of violations, depending on the potential impact to human health. Each tier has its own reporting requirements, including the timeframe for notifying the public:

- Tier 1: violations with potential to have serious adverse effects on human health from short-term exposure, including contaminants such as fecal coliforms or E. coli. Tier 1 violations require public notice within 24 hours.
- Tier 2: violations with potential to have serious, but not immediate, adverse effects on human health. This includes most MCL or MRDL violations that are not Tier 1. These violations require public notice within 30 days.
- Tier 3: all other violations or situations not included in Tier 1 or Tier 2. Public notice is required within 12 months, and it may be issued as part of the public water system's annual report.

PFAS Contamination

In recent years, one of the major areas of concern for drinking water in Massachusetts and the region is contamination from per- and poly-fluoroalkyl substances (PFAS).[23] These chemicals have been used since the mid-20th century for a variety of products and industrial processes, and they are often found in water-resistant materials and in some types of firefighting foam. Often called "forever chemicals," PFAS break down very slowly, causing them to accumulate in soil, water, and human bodies. There are many ways in which people can be exposed to PFAS, including through drinking water, food and food packaging, household products and dust, and workplace exposure in industries that use or produce PFAS.[24]

Many of the long-term health and environmental effects of PFAS are not yet fully known, but research indicates that exposure to PFAS may affect human health. This includes effects on the liver, kidneys, immune system, and thyroid gland, and PFAS are considered to be likely carcinogenic. PFAS exposure is also associated with increased risk of high blood pressure of pre-eclampsia in pregnant women, increased cholesterol levels, decreased infant birth weights, decreased antibody response to vaccines in children, and increased liver enzymes. The health effects are likely influenced by many factors, including the

[22] https://www.mass.gov/doc/testing-requirements-for-public-water-systems-summary-0
[23] https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas-in-drinking-water
[24] https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas

amount and duration of the exposure and personal factors such as age, sex, diet, lifestyle, and current health status.[25]

Conclusion

The drinking water supply system in Hampden and Hampshire counties is broad, varied, and generally well positioned to meet the region's current needs. Most residents are served by municipally owned community water systems, while a smaller but significant share rely on private wells, particularly in rural and faster-growing outlying communities. The region benefits from a diverse mix of surface water reservoirs and groundwater wells, including major regional sources such as Cobble Mountain Reservoir and the Quabbin Reservoir, as well as numerous smaller municipal and privately owned systems. This diversity provides resilience, but it also creates a complex landscape of ownership, infrastructure, regulation, and source protection responsibilities.

Looking ahead, climate change and water quality concerns are likely to place additional stress on both public and private drinking water sources. More frequent drought conditions, flash droughts, and intense rainfall events may affect reservoir storage, groundwater recharge, runoff, turbidity, and contaminant transport. Emerging contaminants such as PFAS further underscore the need for continued monitoring, source protection, infrastructure investment, and coordinated planning across municipal boundaries.

Overall, the Pioneer Valley's drinking water resources remain a major regional asset, but their long-term reliability will depend on proactive management. Protecting watersheds and aquifers, supporting local boards of health, improving data on private wells, strengthening conservation measures, and planning for climate-related uncertainty will be critical. When completed, the regional drinking water plan for the Pioneer Valley will be an important tool in charting a pathway forward to ensuring clean, reliable drinking water for current and future generations.

[25] https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas-in-tap-water

Appendix to

The Nature of Water Supply

Page left blank intentionally.

Table 1: Drinking Water Supply Type by Municipality, 2023

City/Town	2020 Population	Municipal CWS Population	Other CWS Population	Estimated Private Wells Population[1]	Percent Served by Municipal CWS
Agawam	28,692	28,692	0	0	**100%**
Amherst	39,263	39,263	0	0	**100%**
Belchertown	15,350	3,073	762	11,515	20%
Blandford	1,215	442	0	773	36%
Brimfield	3,694	0	197	3,497	0%
Chester	1,228	750	0	478	61%
Chesterfield	1,186	0	0	1,186	0%
Chicopee	55,560	55,560	0	0	**100%**
Cummington	829	404	0	425	49%
East Longmeadow	16,430	16,224	0	206	**99%**
Easthampton	16,211	16,211	0	0	**100%**
Goshen	960	0	25	935	0%
Granby	6,110	0[2]	727	5,383	0%
Granville	1,538	0	70	1,468	0%
Hadley	5,325	4,779	0	546	90%
Hampden	4,966	100	184	4,682	2%
Hatfield	3,352	3,065	0	287	91%
Holland	2,603	0	0	2,603	0%
Holyoke	38,238	38,238	0	0	**100%**
Huntington	2,094	806	0	1,288	38%
Longmeadow	15,853	15,853	0	0	**100%**
Ludlow	21,002	12,417	0	8,585	59%
Middlefield	385	0	0	385	0%
Monson	8,150	4,202	0	3,948	52%
Montgomery	819	0	0	819	0%
Northampton	29,571	29,103	120	348	98%
Palmer	12,448	11,358	48	1,042	91%
Pelham	1,280	0[3]	0	1,280	0%
Plainfield	633	0	0	633	0%
Russell	1,643	1,075	0	568	65%
South Hadley	18,150	18,150	0	0	100%
Southampton	6,224	4,731	0	1,493	76%
Southwick	9,232	7,633	0	1,599	83%

[1] The estimates in this column are derived by subtracting the total population served by public water systems (as reported in the 2023 Annual Statistical Reports) from the total 2020 U.S. Census population of the city or town. In some instances, communities with widespread public water service may have a small but unrecorded number of residents who still use private wells.

[2] A small number of Granby residents are served by South Hadley Fire District #1

[3] A small number of Pelham residents are served by the Amherst DPW Water Division

City/Town	2020 Population	Municipal CWS Population	Other CWS Population	Estimated Private Wells Population[1]	Percent Served by Municipal CWS
Springfield	155,929	155,929	0	0	100%
Tolland	471	0	0	471	0%
Wales	1,832	0	105	1,727	0%
Ware	10,066	7,376	65	2,625	73%
West Springfield	28,835	28,835	0	0	100%
Westfield	40,834	35,732	500	4,602	88%
Westhampton	1,622	0	0	1,622	0%
Wilbraham	14,613	8,998	0	5,615	62%
Williamsburg	2,504	1,540	0	964	62%
Worthington	1,193	565	0	628	47%
TOTAL	**628,133**	**551,104**	**2,803**	**74,226**	**87.7%**

Source: Massachusetts DEP, Public Water System Annual Statistical Reports, 2023

Table 2: Other Community Water Systems in Hampden and Hampshire Counties

City/Town	Public Water System	Service Connections	Population Served	2024 Volume (millions of gallons/year)
Belchertown	Cedarwood Apartments	2	25	0.417
	Pine Valley Plantation	391	600	27.392
	Sports Haven Mobile Home Park	51	107	7.866
	Washington Acres	12	30	0.407
Brimfield	Brimfield Housing Authority	4	60	0.774
	Meadowbrook Acres Mobile Home Park	96	137	2.156
Goshen	Wildwood Condominium	6	25	0.377
Granby	Bachelor Knolls	31	101	1.371
	Crescent Valley Condos	26	78	0.915
	Granby Heights Condominiums	76	152	2.415
	Granby Housing Authority	5	61	0.955
	Hillside Heights of Granby	30	30	0.558
	The MacDuffie School	2	305	3.879
Granville	Granville Centre Water Co.	30	70	2.285
Hampden	Hampden Housing Authority	57	59	1.09
	Vantage at Hampden	1	100	1.286
	White Birch Garden Apartments	2	25	0.413
Northampton	Linda Manor Nursing Home	1	120	6.116

City/Town	Public Water System	Service Connections	Population Served	2024 Volume (millions of gallons/year)
Palmer	Breton Estates	2	48	0.678
Wales	Brookside Village	65	80	3.333
	Silver Meadow	1	25	0.285
Ware	Quabbin Sunrise Cooperative Inc.	65	65	4.481
Westfield	Liberty Manor Inc.	250	500	8.739
	TOTAL	**1,206**	**2,803**	**78.188**

Source: MassGIS Data: MassDEP Estimated Public Drinking Water System Service Area Boundaries, 2025

Table 3: Total Finished Water Available for Distribution by Source, 2023 (in millions of gallons)

City/Town	Public Water System	Own Ground Water	Own Surface Water	Purchased Ground Water	Purchased Surface Water	Total Finished Water
Agawam	Agawam Water Department	0.0	0.0	0.0	1,058.8	1,058.8
Amherst	Amherst DPW Water Division	492.2	411.2	0.0	0.0	903.4
Belchertown	Belchertown Water District	86.4	0.0	0.0	0.0	86.4
Blandford	Blandford Water Department	0.0	31.3	0.0	0.0	31.3
Chester	Chester Water Department	0.0	15.8	0.0	0.0	15.8
Chicopee	Chicopee Water Department	0.0	0.0	0.0	1,861.3	1,861.3
Cummington	Cummington Water Department	5.1	0.0	0.0	0.0	5.1
Cummington	West Cummington Water Department	2.2	0.0	0.0	0.0	2.2
East Longmeadow	East Longmeadow DPW Water Dept	0.0	0.0	0.0	638.8	638.8
Easthampton	Easthampton Water Department	449.8	0.0	0.0	0.0	449.8
Hadley	Hadley Public Works Water Division	206.0	0.0	0.0	0.0	206.0
Hampden	Scantic Valley Water District	0.7	0.0	0.0	0.0	0.7
Hatfield	Hatfield Water Department	14.6	86.8	0.0	0.0	101.3

City/Town	Public Water System	Own Ground Water	Own Surface Water	Purchased Ground Water	Purchased Surface Water	Total Finished Water
Holyoke	Holyoke Water Works	0.0	1,540.9	0.0	0.0	1,540.9
Huntington	Huntington Water Department	18.5	0.0	0.0	0.0	18.5
Longmeadow	Longmeadow Water Department	0.0	0.0	0.0	644.5	644.5
Monson	Monson Water and Sewer Department	117.6	0.0	0.0	0.0	117.6
Northampton	Northampton Water Division	10.9	892.7	0.0	0.0	903.7
Palmer	Palmer Water District No. 1	96.5	76.5	0.0	0.0	173.0
Palmer	Bondsville Fire and Water District	47.7	0.0	6.2	0.0	54.0
Palmer	Thorndike Fire and Water District	0.0	0.0	24.4	2.0	26.4
Palmer	Three Rivers Fire District	80.0	0.0	0.0	0.0	80.0
Russell	Russell Water Department	45.1	0.0	0.0	0.0	45.1
South Hadley	South Hadley Fire District #1	0.0	0.0	0.0	360.0	360.0
South Hadley	South Hadley Fire District #2	122.8	0.0	0.0	0.0	122.8
Southampton	Southampton Water Department	188.8	0.0	0.6	0.0	189.4
Southwick	Southwick Water Department	257.8	0.0	0.0	25.1	282.9
Springfield	Springfield Water & Sewer Commission	0.0	8,149.9	0.0	0.0	8,149.9
Ware	Ware Water Department	173.9	0.0	0.0	0.0	173.9
West Springfield	West Springfield DPW Water Division	1,196.6	0.0	0.0	2.0	1,198.6
Westfield	Westfield Water Department	1,017.8	509.5	0.0	0.0	1,527.3
Wilbraham	Wilbraham Water Department	0.0	0.0	0.0	407.7	407.7
Williamsburg	Williamsburg Water Department	44.1	0.0	0.0	0.0	44.1
Worthington	Worthington Fire District	7.9	0.0	0.0	0.0	7.9
	TOTAL	**4,683**	**11,715**	**31**	**5,000**	**21,429**

Source: Massachusetts DEP, Public Water System Annual Statistical Reports, 2023

Table 4: Surface Water Sources Pumped in 2023, in Millions of Gallons (MG)

Surface Water Source	Public Water System	Total Volume Pumped (MG)[4]	Days Pumped in 2023	Safe Yield (MG/day)	Maximum Single Day Pumped (MG/day)	Storage Capacity (MG)
Cobble Mountain Reservoir	SWSC	11,213.3	365	46.5	47.7	22,800
Quabbin Reservoir	MWRA	2,707.8[5]	365	--	--	--
Tighe-Carmody Reservoir	Holyoke Water Works	1,504.5	365	14.0	5.5	4,825
Ryan Reservoir	Northampton Water Division	895.1	312	2.6	4.2	718
Atkins Reservoir	Amherst DPW Water Division	534.6	279	1.3	1.1	200
Granville Reservoir	Westfield DPW Water Division	516.4	365	1.8	1.8	540
Mt. Street Reservoir	Northampton Water Division	166.5	71	0.6	3.4	334.3
Running Gutter Brook Reservoir	Hatfield Water Department	86.8	337	0.5	0.5	1.7
Graves Brook, Upper	Palmer Water District No. 1	83.1	208	0.4	0.9	19
Long Pond Reservoir	Blandford Water Department	62.8	365	--	0.2	0.3
McLean Reservoir	Holyoke Water Works	36.4	23	0.5	4.8	365
Horn Pond Reservoir	Chester Water Department	14.7	346	0.2	0.5	41.0
Ludlow Reservoir	SWSC	1.1	5	8.1	0.4	1,710.0
Austin Brook Reservoir	Chester Water Department	1.0	19	0.1	0.5	1.1

Source: Massachusetts DEP, Public Water System Annual Statistical Reports, 2023

[4] The total volume pumped is typically measured in terms of raw (untreated) water, not in terms of finished water that was available for distribution. This volume includes water that was sold to other public water systems.

[5] This figure reflects the total volume pumped by the Chicopee Water Department, South Hadley Fire District #1, and the Wilbraham Water Department

Table 5: Number of Wells Per Municipally Owned Community Water System

Town	Public Water System	Active Wells	Emergency Wells	Inactive Wells	Total Wells	Wells Pumped in 2023	Volume Pumped in 2023 (millions of gallons)
Amherst	Amherst DPW Water Division	5	0	2	7	5	639.826
Belchertown	Belchertown Water District	5	1	0	6	2	86.394
Cummington	Cummington Water Department	1	2	0	3	1	5.148
Cummington	West Cummington Water Department	1	0	0	1	1	2.221
Easthampton	Easthampton Water Department	5	1	0	6	4	486.847
Hadley	Hadley DPW Water Division	3	0	1	4	3	213.678
Hampden	Scantic Valley Water District	2	0	0	2	2	0.697
Hatfield	Hatfield Water Department	2	0	0	2	2	14.559
Huntington	Huntington Water Department	2	0	0	2	2	18.514
Monson	Monson Water and Sewer Department	4	0	0	4	4	117.575
Northampton	Northampton Water Division	2	0	0	2	2	10.948
Palmer	Palmer Water District No. 1	2	0	0	2	1	104.824
Palmer	Bondsville Fire and Water District	3	0	1	4	3	48.123
Palmer	Three Rivers Fire District	2	0	0	2	2	93.596
Russell	Russell Water Department	1	0	1	2	1	44.9
South Hadley	South Hadley Fire District #2	2	0	0	2	2	122.805
Southampton	Southampton Water Department	1	0	0	1	1	118.771
Southwick	Southwick Water Department	2	0	0	2	2	257.796
Ware	Ware Water Department	4	0	0	4	4	173.816
West Springfield	West Springfield DPW Water Division	4	0	0	4	4	1,164.106
Westfield	Westfield DPW Water Division	8	0	0	8	6	1,031.451

Town	Public Water System	Active Wells	Emergency Wells	Inactive Wells	Total Wells	Wells Pumped in 2023	Volume Pumped in 2023 (millions of gallons)
Williamsburg	Williamsburg Water Department	2	0	0	2	1	41.183
Worthington	Worthington Fire District	10	0	0	10	1	7.913
Total		**73**	**4**	**5**	**82**	**56**	**4,805.69**

Source: Massachusetts DEP, Public Water System Annual Statistical Reports, 2023

Table 6: Water Management Act (WMA) Registered and Permitted Volume Withdrawals in 2023, in millions of gallons (MG) per day

Community Water System	River Basin	Registered Volume (MG/day)	Permitted Volume (MG/day)	WMA Auth. Volume (MG/day)	Daily Avg. Water Use (MG/day)	Difference (MG/day)
Amherst DPW Water Division	Connecticut	3.34	1.21	4.55	2.56	1.99
Belchertown Water District	Connecticut	0.00	0.21	0.21	0.14	0.07
	Chicopee	0.19	0.00	0.19	0.10	0.09
Easthampton Water Dept.	Connecticut	3.31	0.00	3.31	1.24	2.07
Hadley Public Works Water Div.	Connecticut	0.79	0.13	0.92	0.59	0.33
Hatfield Water Department	Connecticut	0.35	0.00	0.35	0.28	0.07
Holyoke Water Works	Westfield	1.01	0.00	1.01	0.10	0.91
	Connecticut	8.04	0.00	8.04	4.12	3.92
Huntington Water Dept.	Westfield	0.12	0.00	0.12	0.05	0.07
Monson Water and Sewer Dept.	Chicopee	0.92	0.00	0.92	0.32	0.60
Northampton Water Division	Connecticut	3.96	0.84	4.80	2.94	1.86
Palmer Water District No. 1	Chicopee	0.65	0.00	0.65	0.48	0.17
Bondsville Fire and Water Dist.	Chicopee	0.36	0.00	0.36	0.13	0.23

Community Water System	River Basin	Registered Volume (MG/day)	Permitted Volume (MG/day)	WMA Auth. Volume (MG/day)	Daily Avg. Water Use (MG/day)	Difference (MG/day)
Three Rivers Fire District	Chicopee	0.40	0.00	0.40	0.26	0.14
Russell Water Department	Westfield	0.29	0.00	0.29	0.12	0.17
South Hadley Fire District #2	Connecticut	0.68	0.00	0.68	0.34	0.34
Southampton Water Dept.	Connecticut	0.00	0.36	0.36	0.33	0.03
Southwick Water Department	Westfield	0.45	0.28	0.73	0.71	0.02
Springfield Water & Sewer Commission	Westfield	39.10	0.00	39.10	30.72	8.38
	Chicopee	1.82	0.00	1.82	0.00	1.82
Ware Water Department	Chicopee	0.95	0.00	0.95	0.48	0.91
West Springfield DPW Water Div.	Westfield	3.89	0.00	3.89	3.28	0.61
Westfield Water Department	Westfield	6.11	0.00	6.11	4.24	1.87
Williamsburg Water Dept.	Connecticut	0.20	0.00	0.20	0.12	0.08
	TOTAL	**76.93**	**3.43**	**80.40**	**53.65**	**26.75**

Source: Massachusetts DEP, Public Water System Annual Statistical Reports, 2023

Table 7: Population and Density of Cities and Towns in Hampden and Hampshire Counties, 2020

City/Town	County	2020 Population	Land Area (Sq. Mi.)	Density (pop/ sq. mi.)
Agawam	Hampden	28,692	23.3	1,232
Amherst	Hampshire	39,263	27.6	1,422
Belchertown	Hampshire	15,350	52.5	292
Blandford	Hampden	1,215	51.5	24
Brimfield	Hampden	3,694	34.7	106
Chester	Hampden	1,228	36.6	34
Chesterfield	Hampshire	1,186	30.9	38
Chicopee	Hampden	55,560	22.9	2,428
Cummington	Hampshire	829	22.9	36
East Longmeadow	Hampden	16,430	12.9	1,270
Easthampton	Hampshire	16,211	13.3	1,216

City/Town	County	2020 Population	Land Area (Sq. Mi.)	Density (pop/ sq. mi.)
Goshen	Hampshire	960	17.3	56
Granby	Hampshire	6,110	27.8	220
Granville	Hampden	1,538	42.3	36
Hadley	Hampshire	5,325	23.1	230
Hampden	Hampden	4,966	19.6	253
Hatfield	Hampshire	3,352	15.9	211
Holland	Hampden	2,603	12.3	212
Holyoke	Hampden	38,238	21.0	1,822
Huntington	Hampshire	2,094	26.3	80
Longmeadow	Hampden	15,853	9.1	1,743
Ludlow	Hampden	21,002	27.2	772
Middlefield	Hampshire	385	24.1	16
Monson	Hampden	8,150	44.5	183
Montgomery	Hampden	819	15.0	55
Northampton	Hampshire	29,571	34.3	863
Palmer	Hampden	12,448	31.3	398
Pelham	Hampshire	1,280	25.1	51
Plainfield	Hampshire	633	21.1	30
Russell	Hampden	1,643	17.5	94
South Hadley	Hampshire	18,150	17.7	1,024
Southampton	Hampshire	6,224	28.2	221
Southwick	Hampden	9,232	30.8	300
Springfield	Hampden	155,929	31.8	4,897
Tolland	Hampden	471	31.4	15
Wales	Hampden	1,832	15.7	116
Ware	Hampshire	10,066	34.0	296
West Springfield	Hampden	28,835	16.7	1,724
Westfield	Hampden	40,834	46.3	883
Westhampton	Hampshire	1,622	27.2	60
Wilbraham	Hampden	14,613	22.0	664
Williamsburg	Hampshire	2,504	25.5	98
Worthington	Hampshire	1,193	32.0	37
Hampden County Total		**465,825**	**616.5**	**756**
Hampshire County Total		**162,308**	**527.0**	**308**
Regional Total		**628,133**	**1,143.5**	**549**

Source: United States Census Bureau, 2020 Decennial Census

Table 8: Racial and Ethnic Composition of Hampden & Hampshire Counties, 2020

	Hampden County Total	Hampden County Percent	Hampshire County Total	Hampshire County Percent	Total Number	Total Percent
Total Population	465,825	100.0%	162,308	100.0%	628,133	100.0%
White	302,357	64.9%	130,161	80.2%	432,518	68.9%
Black/ African American	41,556	8.9%	4,706	2.9%	46,262	7.4%
American Indian/ Native American	2,338	0.5%	426	0.3%	2,764	0.4%
Asian	12,344	2.6%	10,796	6.7%	23,140	3.7%
Native Hawaiian/ Pacific Islander	286	0.1%	58	0.0%	344	0.1%
Some Other Race	59,013	12.7%	4,215	2.6%	63,228	10.1%
Two or More Races	47,931	10.3%	11,946	7.4%	59,877	9.5%
Hispanic or Latino (of any race)	121,319	26.0%	11,622	7.2%	132,941	21.2%
Not Hispanic or Latino	344,506	74.0%	150,686	92.8%	495,192	78.8%

Source: United States Census Bureau, 2020 Decennial Census

Table 9: Environmental Justice (EJ) Population by Municipality, 2020

City/Town	EJ Block Groups	EJ Block Group Population	Total Population	Percent EJ Population
Agawam	2	2,484	28,692	9%
Amherst	19	35,670	39,263	91%
Chicopee	34	42,789	55,560	77%
Easthampton	4	4,150	16,211	26%
Holyoke	29	29,853	38,238	78%
Ludlow	4	6,314	21,002	30%
Monson	1	1,136	8,150	14%
Northampton	7	10,076	29,571	34%
Palmer	2	1,947	12,448	16%
South Hadley	2	3,796	18,150	21%
Springfield	122	155,929	155,929	100%
Ware	3	4,043	10,066	40%
West Springfield	15	18,508	28,835	64%
Westfield	12	15,114	40,834	37%
Total	**256**	**331,809**	**628,133**	**53%**

Source: MassGIS Data: 2020 Environmental Justice Populations

Table 10: Water use by Category, 2023

City/Town	Public Water System	Residential	Residential Institutions	Commercial/ Business	Agriculture	Industrial	Municipal/ Institutional / Non-	Other
Agawam	Agawam Water Department	68.9%	0.0%	17.8%	0.0%	10.3%	3.0%	0.0%
Amherst	Amherst DPW Water Division	46.6%	45.1%	6.6%	0.3%	0.0%	1.4%	0.0%
Belchertown	Belchertown Water District	80.1%	0.0%	12.9%	0.0%	0.0%	6.5%	0.5%
Chicopee	Chicopee Water Department	69.1%	0.0%	12.1%	0.0%	7.0%	8.0%	3.8%
East Longmeadow	East Longmeadow DPW Water Dept.	78.2%	0.0%	10.4%	0.5%	5.3%	4.7%	0.9%
Easthampton	Easthampton Water Dept.	82.8%	0.7%	8.7%	0.1%	0.7%	6.9%	0.1%
Hadley	Hadley Public Works Water Div.	47.7%	0.0%	34.6%	16.2%	0.0%	1.5%	0.0%

City/Town	Public Water System	Residential	Residential Institutions	Commercial/ Business	Agriculture	Industrial	Municipal/ Institutional / Non-	Other
Hatfield	Hatfield Water Department	80.3%	0.9%	9.4%	8.5%	0.2%	0.8%	0.0%
Holyoke	Holyoke Water Works	35.1%	0.0%	53.2%	0.0%	7.0%	0.0%	4.6%
Huntington	Huntington Water Dept.	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Longmeadow	Longmeadow Water Dept.	94.3%	0.9%	2.0%	0.0%	0.0%	2.8%	0.0%
Monson	Monson Water and Sewer Dept.	74.3%	0.0%	7.4%	0.0%	3.3%	9.1%	5.8%
Northampton	Northampton Water Division	61.8%	0.0%	38.2%	0.0%	0.0%	0.0%	0.0%
Palmer	Palmer Water District No. 1	43.3%	29.2%	21.1%	0.0%	4.8%	1.6%	0.0%
	Bondsville Fire and Water Dist.	48.0%	0.0%	4.6%	0.0%	8.6%	6.4%	32.4%
	Thorndike Fire and Water Dist.	76.1%	0.0%	5.7%	7.8%	0.2%	10.2%	0.0%
	Three Rivers Fire District	90.8%	0.0%	4.9%	0.0%	0.5%	3.8%	0.0%
Russell	Russell Water Department	89.8%	0.0%	7.4%	0.0%	0.0%	2.9%	0.0%
South Hadley	South Hadley Fire District #1	79.3%	1.9%	6.2%	6.2%	2.6%	3.7%	0.0%
	South Hadley Fire District #2	63.2%	25.0%	6.0%	0.2%	0.0%	1.2%	4.4%
Southampton	Southampton Water Dept.	91.7%	0.0%	5.8%	1.1%	0.5%	0.8%	0.2%
Southwick	Southwick Water Department	88.9%	0.0%	6.3%	1.5%	1.2%	2.1%	0.0%
Springfield	Springfield Water & Sewer Comm.	52.5%	0.0%	14.9%	0.0%	27.1%	5.4%	0.0%
Ware	Ware Water Department	64.1%	0.1%	7.0%	0.4%	18.7%	9.5%	0.2%
West Springfield	West Springfield DPW Water Div.	56.2%	0.2%	18.3%	0.0%	19.8%	3.4%	2.1%
Westfield	Westfield Water Department	74.3%	0.0%	23.8%	0.0%	0.0%	1.9%	0.0%
Wilbraham	Wilbraham Water Department	68.7%	0.0%	31.3%	0.0%	0.0%	0.0%	0.0%
Williamsburg	Williamsburg Water Dept.	77.1%	11.1%	10.1%	0.9%	0.0%	0.8%	0.0%
	TOTAL	**60.6%**	**2.6%**	**18.0%**	**0.4%**	**13.5%**	**4.0%**	**0.9%**

Source: Massachusetts DEP, Public Water System Annual Statistical Reports, 2023

Table 11: Residential Gallons Per Capita Per Day (RGPCD), 2023

City/Town	Public Water System	Total Residential Volume (millions of gallons)	RGPCD (gallons per capita per day)
Longmeadow	Longmeadow Water Department	501	87
Southwick	Southwick Water Department	216	78
Wilbraham	Wilbraham Water Department	252	77
East Longmeadow	East Longmeadow DPW Water Department	431	73
Westfield	Westfield Water Department	890	68
Agawam	Agawam Water Department	668	64
Hatfield	Hatfield Water Department	71	64
Williamsburg	Williamsburg Water Department	34	60
Belchertown	Belchertown Water District	66	59
Southampton	Southampton Water Department	99	57
Springfield	Springfield Water & Sewer Commission	3,500	57
West Springfield	West Springfield DPW Water Division	604	57
Chicopee	Chicopee Water Department	1,075	53
Palmer	Three Rivers Fire District	63	53
Easthampton	Easthampton Water Department	309	52
Hadley	Hadley Public Works Water Division	86	49
South Hadley	South Hadley Fire District #1	271	49
South Hadley	South Hadley Fire District #2	72	49
Monson	Monson Water and Sewer Department	71	46
Northampton	Northampton Water Division	485	46
Huntington	Huntington Water Department	13	45
Russell	Russell Water Department	17	44
Palmer	Thorndike Fire and Water District	19	36
Ware	Ware Water Department	92	34
Palmer	Bondsville Fire and Water District	21	31
Amherst	Amherst DPW Water Division	388	27
Holyoke	Holyoke Water Works	401	27
Palmer	Palmer Water District No. 1	40	23
	Hampden & Hampshire County Totals	**10,755**	**53**

Source: Massachusetts DEP, Public Water System Annual Statistical Reports, 2023

Table 12: Hampden and Hampshire County Population, 1850–2020

Year	Hampden County Population	Hampshire County Population	Regional Total Population	Hampden County Percent Change	Hampshire County Percent Change	Regional Percent Change
1850	51,283	35,732	87,015			
1860	57,366	37,823	95,189	11.9%	5.9%	9.4%
1870	78,409	44,388	122,797	36.7%	17.4%	29.0%
1880	104,142	47,232	151,374	32.8%	6.4%	23.3%
1890	136,905	51,859	188,764	31.5%	9.8%	24.7%
1900	175,603	58,820	234,423	28.3%	13.4%	24.2%
1910	231,369	63,327	294,696	31.8%	7.7%	25.7%
1920	300,305	69,599	369,904	29.8%	9.9%	25.5%
1930	335,536	72,101	407,637	11.7%	3.6%	10.2%
1940	332,107	72,461	404,568	-1.0%	0.5%	-0.8%
1950	367,971	87,594	455,565	10.8%	20.9%	12.6%
1960	429,353	103,229	532,582	16.7%	17.8%	16.9%
1970	459,050	123,981	583,031	6.9%	20.1%	9.5%
1980	443,018	138,813	581,831	-3.5%	12.0%	-0.2%
1990	456,310	146,568	602,878	3.0%	5.6%	3.6%
2000	456,228	152,251	608,479	0.0%	3.9%	0.9%
2010	463,490	158,080	621,570	1.6%	3.8%	2.2%
2020	465,825	162,308	628,133	0.5%	2.7%	1.1%

Source: U.S. Census Bureau, Decennial Censuses 1850–2020

Table 13: New Residential Building Permits in Hampden and Hampshire counties, 2000–2024

City/Town	2000 Total Housing Units	New Residential Units Permitted 2000–2024	Percent Increase
Agawam	11,659	943	8%
Amherst	9,427	1,344	14%
Belchertown	5,050	1,350	27%
Blandford	526	83	16%
Brimfield	1,396	362	26%
Chester	580	53	9%
Chesterfield	524	112	21%
Chicopee	24,424	874	4%
Cummington	452	59	13%
East Longmeadow	5,363	1,167	22%
Easthampton	7,083	712	10%
Goshen	536	78	15%
Granby	2,295	362	16%
Granville	595	132	22%

City/Town	2000 Total Housing Units	New Residential Units Permitted 2000–2024	Percent Increase
Hadley	1,953	276	14%
Hampden	1,846	197	11%
Hatfield	1,431	196	14%
Holland	1,317	135	10%
Holyoke	16,210	498	3%
Huntington	935	103	11%
Longmeadow	5,879	93	2%
Ludlow	7,841	1,089	14%
Middlefield	263	55	21%
Monson	3,213	497	15%
Montgomery	257	80	31%
Northampton	12,405	1,003	8%
Palmer	5,402	451	8%
Pelham	556	79	14%
Plainfield	311	66	21%
Russell	641	74	12%
South Hadley	6,784	523	8%
Southampton	2,025	661	33%
Southwick	3,533	630	18%
Springfield	61,172	2,222	4%
Tolland	478	85	18%
Wales	796	131	16%
Ware	4,336	988	23%
West Springfield	12,259	559	5%
Westfield	15,441	1,168	8%
Westhampton	623	157	25%
Wilbraham	5,048	736	15%
Williamsburg	1,073	138	13%
Worthington	582	86	15%
Hampden County	185,876	12,259	7%
Hampshire County	58,644	8,348	14%
Regional Total	244,520	20,607	8%

Source: United States Census Bureau, 2000 Decennial Census; Metropolitan Area Planning Council, Building Permits by Type and Year (Municipal)