

Drinking Water Supply Protection

Overview & findings

Overview

Maintaining the integrity of drinking water supply depends on several interacting factors. Some are fixed — geography, geology, and the relative abundance of surface or groundwater — and these often explain why particular sites were chosen as sources in the first place. Others are shifting and include land use and land protection, and forest health. Layered on top of these are deeper uncertainties, particularly around climate — including the whiplash between the greater frequencies of drought and downpours, and water storage (occurring more at the surface of the land than deep below).

Against this backdrop of shifting pressures, protecting drinking water supply in the region requires navigating a complex web of regulatory, land use, environmental, and infrastructure challenges. While frameworks exist at the state and local level to safeguard water resources, significant gaps remain in how these tools are applied, enforced, and coordinated across municipal boundaries. The issues identified here span public water systems and private wells alike, and collectively point to the need for more proactive, coordinated, and adaptive approaches to drinking water supply protection.

Local regulatory tools — zoning bylaws, land use controls, and board of health regulations — are often outdated, inconsistently applied, or difficult to enforce given limited municipal capacity. Most communities rely on model bylaws that set standards for impervious cover and artificial recharge, but there is little ability to verify compliance. Cross-jurisdictional gaps compound the problem, as water resource areas frequently extend beyond the boundaries of the supplying municipality. Emerging land use pressures, including the siting of Battery Energy Storage Systems in water resource areas and the statewide push for increased housing development over recharge zones, are adding new layers of regulatory complexity.

Land use patterns pose direct and ongoing risks to water quality and supply. Transportation corridors carrying unknown quantities of hazardous materials pass through some water resource areas without adequate emergency response planning. Agricultural, recreational, and residential uses contribute fertilizers, pesticides, and road salt to both surface and groundwater sources. Meanwhile, ongoing land conservation for drinking water supply and land protection opportunities, such as Chapter 61 right-of-first-refusal, remain underdeveloped in most communities.

Climate change is intensifying many of these vulnerabilities. The increasing frequency of both drought and heavy rainfall is disrupting natural recharge cycles: parched soils during dry periods tend to shed rather than absorb intense precipitation, accelerating erosion, increasing sedimentation, and flushing organics into surface supplies that can generate harmful disinfection byproducts. The decline of winter snowpack — historically a slow and reliable source of groundwater recharge — is further stressing supplies as winter precipitation increasingly falls as rain and runs off frozen ground. Forests that buffer water sources are themselves under mounting threat from disease, pests, and wildfire risk. And for a couple of suppliers in the region, higher river flows threaten access to pump houses and wells.

Private wells present their own set of concerns, affecting an estimated 11.8 percent of the region's population, some 74,000 people. Regulatory oversight varies widely from one municipality to the next, with most boards of health collecting only limited data and many having not adopted local private well bylaws. Private wells are vulnerable to drought, extended power outages, and contamination — most notably from septic systems and PFAS — yet the support for monitoring and safeguarding supply and even providing for emergency backup remains inconsistent and, in many cases, inadequate.

The actions in this chapter respond to the findings summarized below. They represent initial steps toward stronger drinking water supply protection — a foundation that will evolve over time as understanding grows about which approaches most effectively reduce vulnerabilities and close gaps in protecting this critical regional resource.

Chapter content draws primarily from one-on-one interviews with the 26 public drinking water operators in the region who source their own supply. It also integrates responses to a Board of Health survey, conversations with three municipalities about drinking water regulatory updates, 6 community learning and listening sessions (Belchertown, Chester, Chicopee, Holyoke, Ware, and West Springfield), 8 community of practice roundtables with drinking water operators, interviews with several businesses, and more than a decade of PVPC work on drinking water issues in the region, from facilitating the Barnes Aquifer Protection Advisory Committee to assisting with Water Management Act permitting.

Findings

Regulatory

- Controls on development in drinking water resource areas provide a key approach to safeguarding supply for the long term. Local land use controls for drinking water supply protection, however, are often outdated and missing important restrictions or standards. At the same time, updates or standards in other parts of the code are not consistent with drinking water supply protection provisions, creating potential for conflict and legal challenge. (*Action 1*)
- Many zoning bylaws pull from the MassDEP 2011 model bylaw based on 310 CMR 22, which prohibits the siting of land uses that result in the rendering impervious of more than 15% or 2,500 square feet of any lot or parcel, whichever is greater, unless a system for "artificial recharge" of precipitation is provided that will not result in the degradation of groundwater quality. It is unclear whether these thresholds for impervious had a scientific basis and whether they actually work to protect drinking water supply. (*Action 1*)[1]
- For projects that are allowed to exceed these impervious thresholds, it is unclear whether municipalities have the capacity to ensure that developers properly construct the "artificial recharge" facilities and then maintain them over time to provide long-term performance. This is based on a complaint from a municipal building inspector in the region, who indicated he is seeing many residential properties where there is no evidence of on-site artificial recharge though the properties exceed impervious thresholds. (*Action 1*)
- Contamination sources noted by water suppliers tied to land use include fertilizer and pesticide use with residential, recreation, and agricultural uses. (*Action 1*)
- Because water supplies and especially resource areas for drinking water supply (Zone IIs, and Zone A and Bs in particular) often extend beyond municipal boundaries, neighboring communities ought to include protections for resource areas within their local bylaws or ordinances.[2] Most water suppliers, however, were uncertain as to whether these cross-jurisdictional provisions are in place in neighboring communities. (*Action 1*)
- Many communities are concerned about how best to respond to state clean energy requirements and especially siting of Battery Energy Storage Systems (BESS) when proposed in drinking water resource areas. Specific questions for drinking water areas relate to risk of battery fires and containment of contaminated runoff to reduce threat to drinking water supply. (*Action 2*)

Land use

- Roadways and rail lines pass through numerous water resource areas in the region and it is unclear what hazardous materials may be traveling along these transportation corridors. One municipal official reported surveying passing rail cars for the four digit UN/NA codes that identify hazardous materials and reported a range of hazards, including radioactive material. (*Action 3*)

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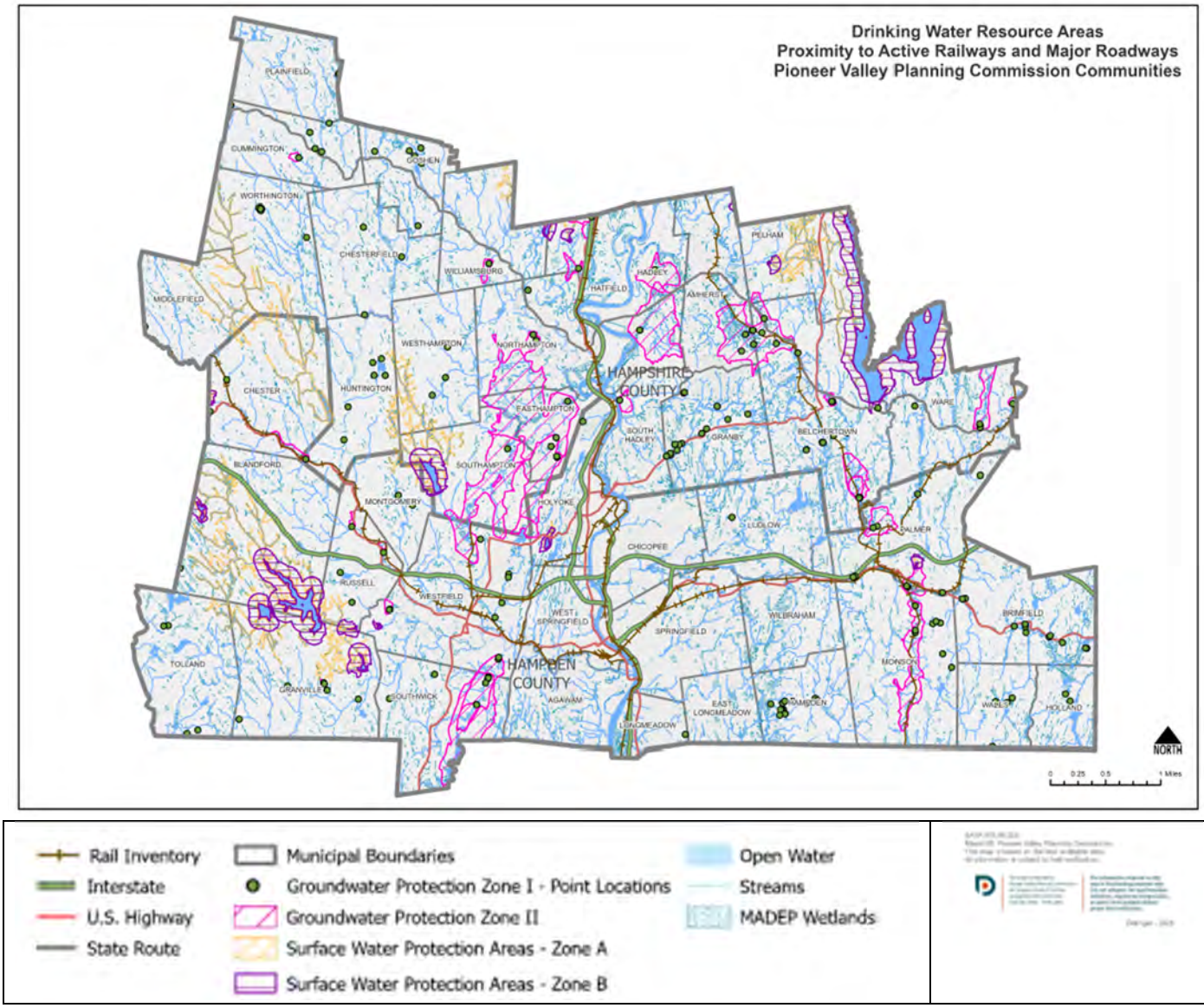
[1] Metropolitan Area Planning Commission's Martin Pillsbury, who served on a DEP working group in the 19080s that drafted the model bylaw, indicates that there were not any hydrologic studies to calibrate an exact number. Some were instead using a figure of no more than 10% impervious cover to protect groundwater sources while also allowing for development. (Correspondence 7-21-26)

[2] Based on 310 CMR 22.21 for groundwater sources, where withdrawal is 100,000 gallons per day or more; and 310 CMR 22.20C for Class A surface water sources.

- At the same time, emergency response plan exercises have not been performed to prepare for the possibility of a spill that threatens drinking water supply. (*Action 3*)
- Contamination sources noted by water suppliers tied to land use include salt from roads.
- The push to respond to the housing shortage is creating pressures to accommodate more housing over Zone II areas. It is not clear what the risks might be in terms of changed water chemistry and reduced recharge. (*Action 4*)
- At the same time, several water suppliers indicate they feel caught in a bind with limits on authorized withdrawals from MassDEP and the push for increased development, and especially the state-wide push on housing. (*Action 4*)



Roadways and rail lines pass through numerous water resources areas in the region and it is unclear what hazardous materials may be traveling along these transportation corridors.

Intermunicipal collaboration

- Several water suppliers indicated concern with development that poses potential risk to supply occurring in their water resource areas across municipal boundaries. They noted the lack of any consultation during the development proposal stage. (*Action 5*)
- Some communities have inter-municipal agreements that allow one water supplier to purchase water from another supplier on a regular basis or for back up during an emergency. However:
  - Many communities do not have any emergency back-up/interconnection plan in place.
  - Some communities with intermunicipal agreements have not tested the interconnection for whether it is operational (mixing issues, pipe pressure, etc.). (*Action 6*)

Land protection

- Critical areas of drinking water supply protection (Zone 1 for groundwater and Zone A for surface water sources) are not always under control of the supplier and in some cases existing land uses are incompatible (chemical applications for agriculture). (*Action 7*)
- In most places, water suppliers are uncertain whether protected lands carry Article 97 status though at least one community has been working to research this status. (*Action 7*)
- While surface water supplies typically have large expanses of conserved surrounding lands, groundwater supplies are not protected with the same attention. (*Action 7*)



This photo shows part of a Zone II primary recharge area in the region. Groundwater supplies are generally not protected with the same attention as surface water supplies. While surface water is often surrounded by large expanses of protected forest, groundwater sources lie beneath land used for a variety of purposes, including residential and commercial development.

- Most municipal drinking water suppliers in the region lack an active land conservation program. (*Action 7*)
- Some communities have indicated interest in exploring ways to update Agricultural Preservation Restrictions (APR) easements to better manage fertilizer use in water supply resource areas. (*Action 7*)
- Few municipalities have established processes in place to respond to Chapter 61 Right of First Refusal opportunities. This includes processes with neighboring communities where such opportunities may arise to better protect drinking water supply. (*Action 8*)

Climate change impacts

- Extremes between drought conditions and downpours means soils get parched. Rainfall comes in volumes that makes recharge difficult and more water is flowing off the land at higher velocities and volumes into rivers and streams. (*Action 9*)
  - This exacerbates erosion and sedimentation.
  - Washes more organics into surface water supplies. In several cases where chlorination of supply is needed, these organics produce disinfection byproducts that require additional treatment (as they are potential human carcinogens).
  - At the same time, these dynamics are leading to more water storage at the surface (within first 30 feet or so) and less recharge to deep groundwater sources from which we typically draw drinking water supply (though many report not seeing this dynamic yet in their wells).
- Further complicating this picture is the shift away from snow and accumulated winter snowpack on the ground, which had provided some good groundwater recharge in springtime with a slow gradual ground thaw and snow melt. With more winter precipitation coming as rain, runoff moves quickly over frozen ground into rivers and streams with little chance of recharge along its journey. (*Action 9*)
- Forests that offer protection for drinking water sources are also highly impacted by new diseases, insects, and wildfire risk due to rising temperatures. (*Action 9*)
- For two water suppliers, occasional high flood flows in the Westfield River basin are preventing physical access to the pump houses and wells. While this has been a problem for some time, the increased frequency, intensity, and duration of storms are reportedly exacerbating these vulnerabilities to infrastructure. (*Action 9*)

Private wells

- Based on the board of health survey responses:
  - Several municipalities have adopted the state's model board of health regulations that address these aspects of private wells, but nearly two-thirds of responding boards of health have not adopted any additional regulations in these areas.
  - The amount of oversight that boards of health exercise over private wells varies significantly from one municipality to the next. With the exception of one municipality that no longer allows any permits for new private wells, all of the responding boards of health issue permits for construction of new private wells.[3]

[3] After a well is drilled, the Massachusetts Well Drillers program collects information from drillers per 310 CMR 46.00 on: well location; well owner name and address; municipal board of health permit; well use; well completion date; casing type, size, length, and depth into bedrock; protective well seal; well depth; depth to bedrock and water bearing zones; well screen and setting; static water level; well yield from productive wells, including drawdown,

  - Most also issue permits for decommissioning abandoned wells, but only about half issue permits for plumbing permits of new potable sources or alterations to private wells.
  - Most boards of health collect only a limited amount of data on private wells. This generally consists of records relating to applications, well drilling permits, and completion reports, but most of the responding boards of health do not collect any additional information after a well is installed.
  - Some boards of health identified gaps in records, including records of older wells, along with inconsistent well completion reports. Depending on the municipality, some of these records are in digital format, others are in paper format only, and some have both types of records. A few municipalities are in the process of digitizing paper records or are exploring the possibility of doing so. (*Action 10*)
- Private wells are susceptible to drought. Of the 91 municipalities surveyed by MassDCR following the 2016 drought, half indicated that there were problems with 1 or more (up to 20) wells in their jurisdictions, including going dry, silting in, poor water quality, needing to drill new well, etc.[4] Specific numbers for the Pioneer Valley were not available. (*Action 10*)
- Extended power outages can pose a challenge for residents who rely on wells for their domestic drinking water supply. However, only about half of the responding municipalities have specific resources in place that would enable residents to obtain water from an alternate source in the event of an emergency. For most of the municipalities that do, this involves allowing residents to fill their own containers with potable water at an emergency shelter or similar town facility. (*Action 10*)
- When asked to identify areas of concern that could affect the water quality of private wells, the greatest area of concern involved contamination from septic systems, with 38% of respondents identifying this as a high concern and another 38% as a medium concern. The second-highest area of concern involved contamination from per- and polyfluoroalkyl substances (PFAS), with 29% identifying this as a high priority and 43% as a medium priority. By contrast, contamination issues related to road salt and metals such as copper and lead were rated as a relatively low area of concern, with 50% and 54% of respondents selecting these as being of low concern, respectively. (*Action 10*)

recovery, and testing method used; drilling log describing materials penetrated; hydrofracturing; well abandonment; and well driller business. They maintain a state-wide data base at: https://eeaonline.eea.state.ma.us/portal#!/search/welldrilling

[4] MassDCR correspondence, 12-5-18

Security technology

Several smaller drinking water suppliers are actively seeking — or have recently secured — funding to transition from fully manual operations to SCADA (Supervisory Control and Data Acquisition) systems. These systems enable real-time monitoring and control of water infrastructure, including well and pump operations, storage tank levels, and chemical feeds and ratios. Some communities view remote access as a practical solution to staffing and efficiency challenges. Without it, they face ongoing logistical burdens: staff must physically travel to storage tanks and other infrastructure for visual inspections and adjustments.

At the same time, many water suppliers express concern about cybersecurity, pointing to high-profile hacks of water systems elsewhere in the country. These suppliers are prioritizing security over the convenience of remote operational control, often invoking the concept of "air gaps"— ensuring no connection to the internet and, by extension, no pathway for intrusion. One supplier notes that manual control is itself a form of air gap.

For medium and large water suppliers serving more than 3,300 people, EPA regulations require a risk and resiliency assessment that must include a cybersecurity evaluation. One supplier described completing work under a MassDEP cybersecurity grant, which also enrolled him in an ongoing monitoring program — though he was caught off guard by the resulting $700 monthly service fee.

Regulatory requirements add further complexity. Suppliers must certify completion of both risk and resiliency assessments and emergency response plans, with recertification required every five years. EPA's Vulnerability Self-Assessment Tool program offers a streamlined checklist for smaller systems that may struggle with more demanding assessment frameworks. For systems already using SCADA, DEP sanitary surveys now include a cybersecurity component — an area that appears to be an increasing regulatory focus.

Taken together, these demands are drawing resources from water suppliers of all sizes. The landscape is constantly evolving, raising a pressing question: how can smaller systems, operating with limited staff and budgets, realistically keep pace?

III. Actions

The following pages describe 10 actions that are responsive to the issues surfaced in the findings. These lay important groundwork for strengthening drinking water protections across both public and private sources. For all actions described within these pages, planning and implementation partners include local officials, regional planning agency staff, state agencies, particularly DEP and DCR, local land trusts, and watershed organizations. The mix of recommended partners – regional, local, state – is denoted with icons at the top of each action.

Action 1: Review local drinking water regulations to provide recommended updates



Existing conditions

Local drinking water regulations typically appear in zoning bylaws/ordinances or board of health regulations.[5] While based on the minimum protections established in state law, local provisions can include stricter requirements to reduce the risk of contamination.

State law includes the following:

- On surface water supply protection, the Massachusetts Drinking Water Regulations and specifically 310 CMR 22.20B and C, requires municipal sources to have in place zoning or non-zoning controls that prohibit certain land uses within Zone A areas, including outside of municipal boundaries where a Zone A extends into another jurisdiction.[6] These prohibitions are spelled out in 310 CMR22.20C(2) and include: 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.
- On groundwater supply protection, the Massachusetts Drinking Water Regulations and specifically 310 CMR 22.21 require that a public water supplier have ownership or control of the Zone 1 land around a wellhead or spring. The regulations also place restrictions on the types of land uses that are allowed within the Zone II area.[7] 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 ground water.

[5] MassDEP staff note that some communities include these provisions in general bylaws/ordinances instead of zoning.

[6] Zone A: The area between the surface water source and 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.

[7] Zone I: The protective radius required around a public water supply well or Wellfield. For Public Water System wells with approved yields of 100,000 gpd or greater, the protective radius is 400 feet. Zone II: That area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). For more information, see: 310 CMR 22.00.

- For private well protection, there are a number of state laws aimed at protecting such sources.[8],[9] M.G.L. c.111, §31 grants local boards of health broad authority to "make reasonable health regulations." Boards of health are encouraged to adopt locally appropriate private well regulations which take into consideration local geology, land uses, and zoning regulations. It is the duty of local boards of health to monitor local conditions and create necessary regulations which address those conditions in order to protect public health. The following are examples of reasonable private well regulations that local boards of health may adopt under M.G.L. c.111, §31:
    - setback distances
    - well construction, alteration, and maintenance standards
    - well decommissioning standards
    - periodic water quality testing[10]

To promote local regulatory updates that align with these provisions, MassDEP re-issued in 2011 several model regulations, including a Groundwater Protection Board of Health Regulation (updated from an original model developed in 1996) and a Groundwater Protection District Bylaw (updated from an original model developed in 1991).[11] In the four communities where PVPC has to date provided review and recommendations for drinking water regulatory updates (related to groundwater sources), none appears to have worked with these updated 2011 models. And nearly two thirds of boards of health in the region indicated through their 2025 survey responses that they do not have local private well regulations in place.

In this work, PVPC has noted that local land use controls for drinking water supply protection are often outdated and missing important definitions, restrictions or standards. At the same time, updates or standards in other parts of the code are not consistent with drinking water supply protection provisions, creating potential for conflict and legal challenge. For example, one community changed the table of uses several years ago to allow for accessory dwelling units in their Aquifer Protection District, while the language of the bylaw allows only single-family residential development. Another community had widely ranging earth removal provisions in various parts of its code, from 4 and 5 feet to 10 feet to within depth of groundwater table and even confused terms between “historical high groundwater table” and “seasonal high-water table.”

[8] This includes control of underground injection or disposal of hazardous wastes, and fluids having the potential to contaminate groundwater (310 CMR 27.00); and standard requirements for siting and constructing of on-site sewage treatment and disposal systems, including set back distances from nearby private wells (310 CMR 15.000, Title 5). For more information, see: https://www.mass.gov/info-details/private-well-guidelines

[9] A private water supply provides water for human consumption and consists of a system that has less than 15 service connections and either (1) serves less than 25 individuals or (2) serves an average of 25 or more individuals daily for less than 60 days of the year.

[10] https://www.mass.gov/info-details/private-well-guidelines

[11] Massachusetts Association of Health Boards has also been recommended as a source for guidance on strengthening local regulations around private wells.

How action will help resolve problems

This action will help align drinking water provisions across municipal code, ensure that state standards are integrated, and also provide important opportunity for conversations about risks to water supply and best ways to address through local regulations. Review of local drinking water regulations also offers opportunities to further explore important questions and concerns that have emerged in PVPC's recent work:

- Many zoning bylaws—pulling from 310 CMR 22.21—prohibit the siting of land uses that result in the rendering impervious of more than 15% or 2,500 square feet of any lot or parcel, whichever is greater, unless a system for artificial recharge of precipitation is provided that will not result in the degradation of groundwater quality.[12] For projects that are allowed to exceed these impervious thresholds, it is unclear whether municipalities have the capacity to ensure that projects install and provide long-term performance of "artificial recharge" facilities, especially on residential properties. What then is the cumulative impact of this lost recharge?
- How can municipal code control for some of the contamination sources of concern for water suppliers, particularly fertilizer and pesticide use with residential, recreation, and agricultural uses? There are at least two elements in state law that limit local control:
  - Based on the Massachusetts Pesticide Control Act (M.G.L. c. 132B), municipalities cannot regulate pesticide use by private homeowners or by landscape professionals on private land, nor can they restrict pesticide use through zoning bylaws.[13]
  - Municipal authority to regulate commercial agricultural uses is restricted by state statute, specifically Massachusetts General Laws (MGL) Chapter 40A, Section 3. This law prevents municipalities from outright prohibiting or unreasonably regulating commercial agriculture, aquaculture, silviculture, horticulture, floriculture or viticulture.
- Water supplies and especially resource areas for drinking water supply (Zone IIs, and Zone A and Bs in particular) often extend beyond municipal boundaries, but it is not clear whether neighboring communities include these cross-jurisdictional protections for resource areas within their local laws.[14] MassDEP staff note that public water suppliers must request these communities provide protection per DEP's *Best Effort Requirement* regulation 310 CMR 22.21(1)(d) and (e). This requirement is triggered for new sources, existing sources increasing withdrawals >100k gpd, and permit renewals. According to MassDEP staff, the uncertainty around cross-border protections has mostly to do with Zone A and B areas since most surface water sources were in operation prior to DEP regulations and therefore not typically subject to the *Best Effort Requirement.*[15]

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[12] "15% or 2500 sq ft, whichever is greater" is a dual-threshold test designed to be fair to both small and large lot owners. You must calculate both and apply the higher number. Scenario A (Small Lot): If you have a 10,000 sq ft lot, 15% is 1,500 sq ft. Because 2,500 sq ft is greater than 1,500, the 2,500 sq ft limit applies. Scenario B (Large Lot): If you have a 40,000 sq ft (roughly 1 acre) lot, 15% is 6,000 sq ft. Because 6,000 sq ft is greater than 2,500, the 15% limit (6,000 sq ft) applies. The rule of thumb: If the 15% calculation is tiny, you get a 2,500 sq ft "allowance." If 15% is large, that percentage is your limit.

[13] Wellesley, MA, has been advocating for a change in this state law based on human health impacts and drinking water supply, with their representatives introducing house and senate bills in recent legislative sessions.

[14] Based on 310 CMR 22.21 for groundwater sources, where withdrawal is 100,000 gallons per day or more; and 310 CMR 22.20C for Class A surface water sources.

[15] Where public water suppliers are uncertain about a neighboring town protecting their recharge area, a request for an update on protection status can be made at program.director-dwp@mass.gov.

- What minimum required vertical separation to groundwater provides adequate protection for drinking water supply? Some municipal regulations seem to reflect the distance required in Title V for soil absorption systems (leaching facilities) with 4 feet separation required where soils have a percolation rate greater than 2 minutes per inch; and 5 feet separation required where there are highly porous soils with a percolation rate of 2 minutes or less per inch. Others, however, are more protective using greater separation, such as 10 feet. And to ensure protection of private supplies in a community, does this separation make sense across a geography, not only in the Zone II area for example?
- And perhaps most importantly, how can municipalities control for *emerging uses* that pose risk to drinking water supply? Most recently this has included Battery Energy Storage (addressed below in Action 2), but also materials such as artificial turf fields, the crumb rubber of which may include volatile organic compounds (VOCs), semi-VOCs (SVOCs) such as polycyclic aromatic hydrocarbons (PAHs), and metals such as lead. Per- and polyfluoroalkyl substances (PFAS).[16] The recent boom in data centers, driven by AI, also presents risk based on the quantities of water required for operation. Highlights on data centers identified by the bipartisan Environmental and Energy Study Institute in a 2025 article are as follows:
  - Data center developers are increasingly tapping into freshwater resources, putting nearby communities at risk.
  - Large data centers can consume up to 5 million gallons *per day*, equivalent to the water use of a town populated by 10,000 to 50,000 people.
  - With larger and new AI-focused data centers, water consumption is increasing alongside energy usage and carbon emissions.
  - Novel technologies like direct-to-chip cooling and immersion cooling can reduce water and energy usage by data centers.[17]

First do no harm

The principle of "First do no Harm" offers an important lens to ensure that land uses do not put drinking water sources at risk. Allowing uses that then result in contamination of surface or groundwater sources leads to additional future public cost to locate and manage a new source or build and maintain a facility that can treat contamination.

This principle – borrowed from medical ethics -- serves to reframe land use decisions near drinking water sources as risk management decisions with asymmetric consequences: the upside of allowing a risky use can be modest and local; the downside can be regional, expensive (in terms of both costs and human health), and sometimes permanent.

The challenge is ensuring that state and local authorities treat the precautionary principle not as an obstacle to development, but as a long-term investment in one of the most irreplaceable public assets within a community.

[16] https://www.mass.gov/info-details/artificial-turf-fields
[17] https://www.eesi.org/articles/view/data-centers-and-water-consumption

What action entails

Working with communities drawing municipal supply from groundwater sources, PVPC has developed a robust checklist for regulatory review. This checklist draws from the MassDEP drinking water regulations, 2011 model bylaws, but also includes suggested adjustments and additional considerations for discussion. Currently, this checklist is most fully developed for zoning bylaw review of groundwater drinking water supply protection districts, but PVPC is in process of developing checklists for surface water sources and for board of health regulations that relate to both municipal supply and private wells.

This action involves engaging with interested communities to update drinking water regulations to ensure that municipal groundwater, surface water, and private well sources are not exposed to greater risk with new or redevelopment projects and remain safe over the long term.



One of Belchertown's wellfields.

Other considerations

During a conversation with drinking water suppliers around the new "by right" allowances for accessory dwelling units (ADUs) required by the state, one supplier raised concern about the approach to service connections.[18] In West Springfield, for example, the policy has been one structure, one service line to ensure clear ownership of the service line and proper billing. With ADUs there is concern that the progress made will regress as the current laws for ADU's do not allow the Town to enforce this policy. Customers are allowed to split the service line or connect the ADU through the primary house.

While currently property owners are not allowed to split off a lot that only has an ADU, the concern is that this could change in the future. The West Springfield Deputy Director of Water notes he has already heard about Massachusetts developers who are trying to get approval for ADU size or 'tiny house' only subdivisions. "If those are approved," he observes, "it could pave the way for ADU only lot splits. Then we would be stuck with more adjoining lots with shared service lines."

This lack of clarity in ownership of drinking water service lines has presented several problems in the past:

- If one customer fails to pay their bill on a shared service line the only way to enforce is to shut off all the homes connected to that service line.
- If there is a leak on a shared service line then identifying the responsible party for repair becomes next to impossible. (Most property deeds have no mention of these shared service lines.)
- Service lines that are "daisy chained" together typically have their meters located in each house. This leaves long sections of internal plumbing prior to the meter that can be easily tapped into (which West Springfield reports has occurred before).
- And if all of the meters are located in the first building, then a municipal water supplier has to request access to the primary building for issues with the other customer's meter. If the owner of the primary building is uncooperative, then it can cause issues with billing for the other customers.

He suggests that a possible solution would involve strong policies for lot splitting that require any shared utilities to be separated prior to approval of the lot split.

[18] Under the Massachusetts' Affordable Homes Act, ADUs up to 900 square feet (or 50% of the primary home's size, whichever is smaller) are allowed by-right in all single-family zoning districts.

Action 2: Update Board of Health regulations for municipalities interested in controlling siting of large battery energy storage systems in drinking water resource areas



Existing conditions

A clean energy and climate law enacted in November 2024 — *An Act Promoting a Clean Energy Grid, Advancing Equity, and Protecting Ratepayers*, St. 2024, c. 239 (the "2024 Climate Act") — set in motion the establishment of new statewide siting and permitting processes for clean energy infrastructure in Massachusetts.

- Clean energy generation projects greater than 25 megawatts and clean energy storage projects *greater* than 100 megawatt hours are permitted by the Massachusetts Energy Facilities Siting Board (EFSB), pursuant to the revised provisions of G.L. c. 164, §§ 69G–69W, as amended by St. 2024, c. 239. The EFSB is responsible for siting and permitting clean energy generation projects over 25 megawatts (e.g., solar, wind), clean energy storage projects over 100 megawatt hours, and certain transmission and distribution projects.
- Clean energy generation projects (e.g., solar and wind) under 25 megawatts; clean energy storage projects *under* 100 megawatt hours; and certain transmission and distribution projects must be permitted under new local/municipal consolidated siting and permitting processes governed by 225 CMR 29.00 (promulgated by the Department of Energy Resources under G.L. c. 25A, §§ 2, 6, and 21), beginning October 1, 2026, by which date local governments must begin accepting consolidated applications for these small clean energy infrastructure facilities.

Though the state is providing for certain scoring of projects based on site suitability--with projects proposed for previously developed locations scored as having very low impacts and projects proposed for open space locations scored as having high impact—there is no outright restriction of projects in drinking water resource areas.

While acknowledging the critical importance of clean energy initiatives, several communities have raised concerns about potential impacts to drinking water supply should a battery energy storage system (BESS) facility catch fire or be impacted similarly by lightning strike, or vandalism. Aside from air quality concerns to neighboring residents, these communities speak to the runoff of contaminated firefighting waters that could reach wellheads. Though BESS fires are not common, the risk to drinking water supplies is a serious concern given the potential consequences.

- In Westfield, a proposed 200-megawatt BESS project drew so much opposition and concern about drinking water supply within the Barnes Aquifer that the City Councils in Westfield, Easthampton, and Holyoke all passed resolutions opposing the project. The Town of Southampton Select Board and Planning Board also weighed in with concerns.[19] Jupiter Power, the developer, withdrew its project proposal shortly thereafter.

[19] See: "Easthampton and Holyoke join push against siting lithium energy storage system over Barnes Aquifer in Westfield," Daily Hampshire Gazette, April 22, 2025.



Westfield, Holyoke, and Easthampton City Councils all passed resolutions opposed to the siting of a lithium battery energy storage system over the Barnes Aquifer in Westfield. Dan Allie, a city councilor in Westfield, (shown above) was a vocal opponent of the plan. Photo source: Gazette

- In Hadley, the history of perchlorate contamination of municipal wells on Mt. Warner was a major factor in the Town's decision to reduce risks and prohibit large capacity energy storage systems in their Aquifer Protection District Overlay Zones. These are defined as (any energy storage system with an aggregate capacity of 150 kWh or larger).[20]
- The Town of Orange fought a legal challenge from a solar developer seeking to site an 8-megawatt BESS facility within its drinking water resource area. The dispute began when the planning board denied the developer a special permit, citing serious risks to the Town's aquifer, drinking water supply, and emergency fire suppression capabilities. The developer appealed that decision in court but ultimately withdrew after the Town's Board of Health adopted regulations prohibiting commercial and industrial BESS installations within the zoned Water Resource District that includes Zone I and II wellhead protection areas. The Board of Health was prompted to act by hydrogeological and chemical analyses conducted for the Town's case, which demonstrated that chemicals released during a fire at the proposed lithium BESS facility could contaminate the municipal drinking water supply.

[20] See Hadley Zoning Bylaw, Section XXVIII, 28.5.3, which was approved by the Massachusetts Attorney General's Office.

> "If a fire should occur at the proposed facility, the disparity in concentrations that could be found in firefighting water runoff versus levels that may present a risk to human health suggests the need for abundant caution, and siting such a facility within the recharge zone could contaminate the Town's drinking water supply, and in our opinion is inadvisable."
>
> Sanborn, Head & Associates, Inc. in December 2025 letter to attorneys for Town of Orange

How action will help resolve problems

This action is aimed at protecting drinking water resources from risks to public health associated with commercial and industrial scale BESS facilities. The recommended approach here recognizes the statutory protections for clean energy within the Dover Amendment under M.G.L. c. 40A, §3, paragraph 9, that expressly bars municipalities from prohibiting or unreasonably regulating solar energy systems (including both solar arrays and energy storage systems) unless a municipality establishes a valid public health, safety, or welfare basis for doing so.[21]

Given the constituents in runoff from firefighting waters that present risk to drinking water in resource areas, it seems a public health angle provides the best approach. A 2024 European study that evaluated composition of runoff waters resulting from lithium-ion battery firefighting operations notes, that such waters "…are susceptible to containing many metals, including Ni, Mn, Co, Li, and Al, mixed with other carbonaceous species (soot, tarballs) and sometimes undecomposed solvents used in the electrolyte."[22]

What action entails

This action involves two parts:

- Convene a roundtable of boards of health in the region, working with the Western Massachusetts Public Health Association, to share the approach in Orange and discuss concerns and questions.
- Provide technical assistance to interested Boards of Health in the region in collaboration with municipal water suppliers to update and adopt groundwater protection regulations (or develop where none exist) to protect drinking water as indicated in Action 1, but also with provisions to protect from risk of fire from commercial and industrial BESS facilities. The regulations in Orange could provide a useful basis for such updates.[23] Note that these regulations include a provision that the Board of Health shall review the regulation every two years. Where there is a preponderance of private wells, it may also be worth exploring whether there are appropriate setback distances for commercial and industrial BESS facilities from such sources.

21 https://foleyhoag.com/news-and-insights/blogs/energy-and-climate-counsel/2025/july/ma-appeals-court-sets-new-precedent-protecting-solar-development-in-local-permitting/

22 Bordes, A.; Papin, A.; Marlair, G.; Claude, T.; El-Masri, A.; Durussel, T.; Bertrand, J.-P.; Truchot, B.; Lecocq, A. Assessment of Run-Off Waters Resulting from Lithium-Ion Battery Fire-Fighting Operations. Batteries 2024, 10, 118. https://doi.org/10.3390/batteries10040118

23 See: https://townoforange.org/DocumentCenter/View/1158/FINAL-GROUNDWATER-PROTECTION-REGULATION-

Other considerations

Orange Board of Health Chair Jane Peirce has noted that in addition to the risk of contamination to drinking water associated with a BESS fire, there were also concerns about the amount of water that would be required to fight a fire, and its impact on the Town's water supply. The Town estimated that extinguishing a fire at the proposed BESS facility would require 1.3 million gallons of water, exceeding capacities of municipal supply. This raised concerns about the impacts on the local aquifer and water supply infrastructure if the well were to be so severely drawn down. Such a firefighting response would also be expensive, requiring water tankers and mutual aid from neighboring towns.

Action 3: Work with MEMA to conduct emergency response exercises in communities where there is proximity to rail lines and/or major roadways in drinking water resource areas



Existing conditions

Municipal water supply areas in the region are criss-crossed by major transportation corridors, including rail lines and roadways. This includes the Massachusetts Turnpike/I-90, which has a high point at the top of the watershed for a major reservoir and often carries icy condition warnings in winter, as well as Route 91, which passes within 250 feet of a municipal wellhead. These corridors also include other state-numbered highways and railway lines that pass close to groundwater sources in numerous communities across the region.

The interviews with 26 municipal water suppliers in the region reveal that there is little understanding of what hazardous materials may be transported along these corridors though one fire and water district chief reported surveying passing rail cars for the four-digit UN/NA codes. Through this survey, his staff identified a range of hazards, including radioactive material. In that community, the rail line passes within 1,300 feet of the wellhead.

Emergency spill response falls to local fire departments, who will call as needed on the Massachusetts Hazardous Materials Emergency Response Division. This division operates regional HazMat teams that are strategically located to be able to respond in less than 1 hour to industrial or transportation incidents like a tanker truck rollover or a manufacturing incident involving chemicals. These teams support local fire departments with technical information, expertise, and specialized equipment. The team for the Pioneer Valley is dispatched through Chicopee Fire.

Municipal water suppliers that have sources close to such transportation corridors say they have not been involved in any emergency response planning exercises.

How action will help resolve problems

Emergency response exercises are essential in preparing for the possibility of a spill that threatens drinking water supply. While derailments and major highway accidents involving hazardous material spills rarely occur, the magnitude of some of these events is impressive.

- Consider the train derailment in February 2023 of a Norfolk Southern freight train in East Palestine, Ohio, where 20 of the affected cars contained hazardous materials, including vinyl chloride, ethylene glycol, ethylhexyl acrylate, butyl acrylate and isobutylene. Some cars caught fire. Some cars spilled their loads into an adjacent creek that feeds into the Ohio River, a primary drinking water source for numerous downstream municipalities.[24]
- Closer to home on the Massachusetts Turnpike in Charlton, Massachusetts, a tractor-trailer in the breakdown lane leaked roughly 80 gallons of sulfuric acid from a 330-gallon container in 2024. And in

[24] https://www.openaccessgovernment.org/article/train-derailment-in-east-palestine-ohio-the-toxic-risks-of-transporting-hazardous-chemicals/166985/

Billerica, a rollover crash on Route 3 involving a fuel tanker spilled 1,500 gallons of diesel fuel and 9,300 gallons of gasoline in 2023.[25],[26]



Massachusetts Hazardous Materials Emergency Response Division operates regional HazMat teams that are strategically located to be able to respond in less than 1 hour to industrial or transportation incidents like a tanker truck rollover or a manufacturing incident involving chemicals.
Photo source: https://www.mass.gov/info-details/hazardous-materials-emergency-response-division-hazmat

Coordinated training exercises that identify the location of drinking water supply resource areas and key vulnerabilities along transportation corridors, will provide an important advantage in hazardous material spill response. The *After Action Report and Improvement Plan* following the Ohio train derailment found the recurring failure points were not technical; they were coordination gaps between public agencies and the railroad, and between jurisdictions that had not planned jointly for a derailment-plus-hazmat-spill scenario before it happened.[27] From the lessons learned, the report notes:

> Recommendations for improvement include additional joint planning, training and exercises, and enhancements to coordinated messaging across jurisdictions and with state and federal agencies. Leveraging environmental protection expertise for handling major spills, air and water monitoring during chemical incidents, and responding beyond local capabilities is crucial for responder and resident safety.[28]

[25] https://www.telegram.com/story/news/traffic/2024/05/20/hazardous-materials-incident-impacts-traffic-on-mass-pike-in-charlton/73775127007/
[26] https://www.nbcboston.com/news/local/billerica-fuel-spill-cleanup-continues/3206696/
[27] https://epohio.org/wp-content/uploads/East-PalestineOH_Train-Derailment-AAR-IP-Report_09AUG2024_Final.pdf
[28] Ibid.

What action entails

This action involves several preliminary steps before running exercises, including:

- Create topographical mapping that shows extent of drinking water resource areas and transportation corridors. This is important to the exercises but could also be invaluable to informing response should a spill occur.
- Investigating what information may be available on hazardous materials being transported in the region. This will provide a sense of what classes of chemicals should be considered for the spill scenarios within the response exercises.
- Work with MEMA and others to identify important collaborators and support needed to design, organize and run emergency response exercises.
- Host several coordinating meetings with all partners prior to running exercises and then run exercises.

Integral to this action is determining frequency of such exercises going forward given staff turnover and the retirements occurring in both first responder and drinking water supply teams. Can such exercises become part of ongoing programming?

Other considerations

Impacts on drinking water wells due to road salting for snow and ice management has been an ongoing issue in the region, with some impacts going back several decades. The Town of Goshen, for example, has a public well at Town Hall (adjacent to Route 9), but signs over the sinks indicate the water is not safe to drink. Records show that this issue dates to the 1980s.

Along Route 10 in Southampton and Westfield, research by Smith College from 2004 through 2009 showed numerous private wells with elevated sodium and chloride concentrations along both Route 10 and Route 202. At that time, there were explorations into extending municipal drinking water service lines in Southampton and Westfield, but as of 2016, it was not clear whether any upgrades had been possible. Revisiting this issue and finding workable solutions for salt impacted wells is an action that is long overdue.[29]

MassDOT has acknowledged that during winter maintenance operations, the use of salt may impact drinking water supplies in the form of elevated sodium and chloride concentrations. MassDOT has developed a program to address these issues, which includes the Water Supply Salt Complaint Policy for the investigation and remediation of these matters. [30]

The work of addressing salt contaminated wells could start through conversations with local boards of health to develop an updated understanding of where there may be such impacted homes and conducting outreach to homeowners on testing and resolution processes through MassDOT. Because the testing and paperwork may be daunting to some, technical assistance could be an important element to addressing issues. MassDOT requires the following be submitted with salt contamination complaints for private wells: Private Well Data Form; Water Sample Quality Results; Notarized Right of Entry Form;

[29] For better snow and ice management practices, MassDCR has some good resources at: https://www.mass.gov/info-details/dcr-watershed-system-salt-reduction

[30] https://www.mass.gov/massdot-highway-salt-remediation-program

Physician’s Documentation Form for Bottled Water Request (if applicable); and Resident’s Certification Form for Bottled Water Request (if applicable).



The water flowing through the tap at this sink at Goshen Town Hall has been salt impacted for decades due to snow and ice management on nearby Route 9.

Action 4: Examine implications of impervious cover on drinking water supply



Existing conditions

Impervious cover includes the roads, driveways, parking lots, and rooftops that come with development. These are surfaces that block rainfall and snowmelt from soaking into soils.[31] In our developed landscapes, runoff is typically directed to drains and then pipes that carry storm flows to discharge directly into nearby streams, rivers, lakes and ponds. Limiting impervious cover in drinking water recharge areas is critical to maintaining groundwater replenishment and preventing contamination. At the same time, it is important to provide stormwater management through adequately sized infiltration control measures designed to achieve predevelopment recharge volumes.

Recent analysis shows that 1 acre of impervious cover can lead to the runoff and annual loss of 440,000 to 650,000 gallons in recharge volume as compared to predevelopment conditions. This loss is equivalent to the annual water supply demand for 9 to 12 typical housing units in Massachusetts.[32] When accounting for the many acres of impervious cover in an entire Zone II groundwater protection area, the quantity of lost recharge can be daunting.

Controls on runoff from impervious cover and loss of recharge are governed in a couple of ways.

- For Zone II groundwater protection areas, 310 CMR 22, prohibits the siting of land uses that would render more than 15% or 2,500 square feet of any lot or parcel impervious — whichever is greater — unless an artificial recharge system is provided to capture and infiltrate precipitation without degrading groundwater quality. Such systems may include dry wells, rain gardens, and similar facilities designed to absorb rainfall and snowmelt on-site.

  The table below shows the amount of impervious allowed for given lot sizes based on 310 CMR 22. On a one-acre lot, up to 6,534 square feet could be impervious before a system of artificial recharge would be required while on an eighth of an acre lot up to 2,500 square feet or 46% of the lot can be impervious. As noted in Action 1 above, this dual threshold of “15% or 2500 sq ft, whichever is greater" is designed to be fair to both small and large lot owners. Note that with an increase in smaller lot sizes at one-quarter and eighth of an acre lot sizes, there is a net increase of impervious cover at 23% and 46% of the given lot size. Consider the comparison too of the impervious threshold when 1 acre is divided into smaller lot sizes: The 6,534 sf of impervious with one acre turns into 10,000 sf of

[31] The Draft Massachusetts Stormwater Handbook, page 6-83, included the following: “For purposes of stormwater management, Impervious Surfaces are defined by 310 CMR 10.04 to include any surface that prevents or significantly impedes the infiltration of water into the underlying soil, including, but not limited to: Artificial turf and compacted gravel or soil; Roads, building rooftops, solar arrays, parking lots, shared use paths, bicycle paths, and sidewalks paved with concrete or asphalt, or similar materials; and Buildings or structures created using non-porous material.”

[32] The calculations in preceding two sentences are based on the EPA’s Flow Duration Curve studies of the Taunton Watershed and further elaborated by Mark Voorhees with the University of New Hampshire Stormwater Center and Rob Roseen of Waterstone Engineering in a presentation entitled, “The Watershed Protection Standard.”

impervious where one acre is subdivided into quarter acre lots and 20,000 sf of impervious where one acre is subdivided into eighth of an acre lots.

Thresholds for impervious before triggering requirement for artificial recharge – within 310 CMR 22

Lot size	Square feet equivalent	15% of lot size (in square feet)	Allowed impervious in square feet	% impervious
1 acre	43,560	6,534	6,534	15%
.5 acre (half)	21,780	3,267	3,267	15%
.25 acre (quarter)	10,890	1,634	2,500	23%
0.125 acre (eighth)	5,445	816.75	2,500	46%

- The other control on impervious cover creation occurs through stormwater regulations in communities that are subject to the state and federal MS4 stormwater permit. Local regulations require stormwater control on sites disturbing 1 acre or more during and after construction. And projects must meet Standard 3 of the Massachusetts Stormwater Handbook, which requires that any loss of annual recharge to groundwater must be eliminated or minimized. Post-development annual recharge must approximate pre-development conditions, customized by soil type.

  It has been estimated, however, that projects undergoing local review under MS4 permit requirements accounts for as little as 30% of impervious that is created since many projects creating impervious disturb less than 1 acre.[33] The cumulative impact of impervious cover from many small projects will likely be significant as shown by analysis projected over time in the Taunton Watershed and for the Great Bay watershed in New Hampshire and Maine.[34] At the same time, ensuring long-term performance of facilities that infiltrate and recharge stormwater on private property will be a challenge, especially for capacity limited municipalities.

In the foreground of these impervious cover considerations related to water supply are the critically important responses to the housing shortage. As part of Massachusetts' first comprehensive statewide housing plan, Governor Healey has set a goal of building or rehabilitating 222,000 housing units statewide by 2035.[35] In Western Massachusetts, the region is projected to need more than 16,700 new housing units by 2035.[36] To accommodate these pressing needs, Easthampton's Housing Advisory Group is proposing a reduction of lot sizes in the City's Zone II drinking water supply recharge area from 80,000 to 40,000 square feet in the current R80 zone and from 40,000 to 15,000 in the R40 zone with the possibility of even

[33] https://snepnetwork.org/2026/02/11/the-watershed-protection-standard-for-clean-water-cool-communities-smarter-growth/ see slide 7. Presented by James Houle UNH Stormwater Center.
[34] Mark Voorhees correspondence 6-23-26.
[35] https://www.mass.gov/news/healey-driscoll-administration-releases-states-first-ever-comprehensive-housing-plan
[36] https://donahue.umass.edu/documents/Way_Finders_Final_Report_-_Building_Homes_Building_Futures_2025.pdf

smaller lot sizes with multifamily (10,000square feet per unit) and with multifamily dwellings with at last 15% affordable 5,000 square feet per unit.[37] This proposal could lead to significant increases in the amount of impervious cover and it is not clear what the risks to water supply might be in terms of both reduced recharge and even water chemistry.

How action will help resolve problems

With the mounting pressures for housing development that could impact primary recharge areas for drinking water, key questions emerge: What level of impervious cover is safe? And at what level does it begin to pose risk to the quantity and quality of drinking water supply? Alternatively, should we be asking how do we manage new impervious cover so that we can retain predevelopment recharge levels?

In a 1990 report for Easthampton, UMass - Amherst Hydrogeologist Ward Motts had two key recommendations related to controlling impervious cover and preserving recharge for the Town's groundwater wells:

- Limit the Zone 3 area (till and bedrock) to 80,000 square foot lots and limit the Zone 2 area (stratified drift) to 40,000 square foot lots
- Reduce impervious cover by allowing only 10 percent on each lot, though an increase from 10 to 20 percent could be allowable with special permission for small lots.[38]

It is not clear what the scientific basis was for Motts recommended impervious limits nor the state's thresholds for requiring artificial recharge of "15% or 2500 sq ft, whichever is greater." It may be that such limits were influenced by emerging related research coming out of stormwater work in that era. Around that time, Thomas Schueler of the Center for Watershed Protection began drawing together a large set of studies to develop the impervious cover model, a framework (initially rolled out by Schueler in a 1994 publication) that correlates stream health to degree of imperviousness in a watershed with the following[39]:

- From 0 to 10% imperviousness – streams typically maintain predevelopment water quality, stable channels, and diverse aquatic life, though sensitive fish and macroinvertebrate populations begin to show minor impacts.
- From 11% - 25% imperviousness – clear signs of degradation appear with stream channels becoming unstable, water temperatures rising, and biodiversity dropping as pollutants wash off the land into the waterbody.
- With more than 25% imperviousness – there is severe degradation with biological diversity typically very poor, water quality is low, and channels are highly eroded.

An additional impact here involves the hydrology of the streams. As impervious surface increases, the streams become flashier with higher peak flows and lower baseflows. This is a direct result of decreasing groundwater recharge.

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[37] Easthampton's recharge area is part of an EPA designated sole source aquifer known as the Barnes Aquifer. The wells in the Barnes Aquifer are the only source of drinking water supply for Easthampton, as well as Southampton.

[38] Aquifer Protection Study of Barnes Aquifer for Easthampton, Massachusetts, January 1990, Ward S. Mott, Hydrogeologist, Amherst, MA.

[39] Schueler's article is entitled, "The Importance of Imperviousness," published in Volume 1, Issue 3 of the CWP's journal, *Watershed Protection Techniques.*

Although the Impervious Cover Model as developed applies specifically to streams that are 3rd order or less, the model is frequently generalized to apply to larger watersheds.

What action entails

This action will assess how zoning changes—particularly increased housing density within critical Zone II recharge areas—may affect groundwater resources in Easthampton. At the center of the project is a groundwater flow model coupled with long-term climatic data, developed by the Boutt Geology Lab at UMass Amherst, that will function as a decision-support tool enabling the City to evaluate potential limits on impervious cover tied to proposed housing density over the drinking water supply's Zone II area.

The model will allow the community to examine how land-use changes could affect groundwater recharge, water-table elevations, municipal well stress, and surface water/groundwater interactions, including impacts on nearby streams and wetlands. Through scenario testing, it will clarify how increased impervious cover influences groundwater replenishment and chemistry, and specifically how the proposed zoning change could affect recharge in this northern portion of the Barnes Aquifer.



Bob Newton, Smith College Geosciences Professor Emeritus and a member of the Easthampton Aquifer Protection Committee, talks about aquifer considerations related to reducing lot size and increasing housing density at a joint meeting with the Easthampton Housing Advisory Committee.

Beyond its immediate use in Easthampton, the model supports climate-resilient housing development, water-resource protection, and municipal planning more broadly. By integrating hydrologic science with local planning needs, the project will offer guidance on growth strategies that help balance housing demand

without increasing risk to drinking water supply. The resulting datasets and analyses will be made publicly accessible, creating a transferable framework that other Massachusetts public water suppliers facing similar groundwater pressures can apply in their own communities.

Other considerations

With the push for more housing across the state and several development proposals already in the works locally, a few drinking water suppliers say they are coming up against drinking water withdrawal authorizations from MassDEP that do not match the growing need in their communities. One of the region's fastest growing rural communities also says it had to reallocate $14,000 (funds intended for exploring a new water source) to engineering fees associated with keeping its existing withdrawal authorization.

MassDCR develops the demand projections used by MassDEP that drive withdrawal authorization amounts. While DCR and DEP are evaluating options to integrate the potential new demands of housing into DCRs Water Needs Forecasts, MassDEP notes that if a public water supplier can demonstrate the demand for additional withdrawals, there is the possibility of permitting increased withdrawals. Permitting increased withdrawals may require mitigation where feasible and may require evaluation of alternatives but the possibility for more water exists.[40] To help with planning assistance, demand management, and withdrawal impact mitigation projects around Water Management Act permits or registrations, MassDEP administers the Water Management Act Grant program.[41]

A bright idea – A new standard to help reduce imperviousness

Through their work with southeastern Massachusetts communities, Mark Voorhees with the University of New Hampshire Stormwater Center and Rob Roseen of Waterstone Engineering are advancing an idea whereby projects permitted by building inspectors in local communities would require capture and infiltration of all roof runoff, using set design specifications and sizing requirements adopted by the community.

Since typical stormwater permitting has been estimated to only address 30% of new impervious cover, this would provide a standard to help ensure that at a minimum this runoff is captured and infiltrated from rooftops for every project. Roof runoff, where roofs are not galvanized, is relatively clean compared to roadway or parking lot runoff and can be infiltrated/recharged to the ground at low cost.

[40] Correspondence with Duane LeVangie, Program Chief Water Management Program, MassDEP Bureau of Resource Protection's Drinking Water Program, June 22, 2026.

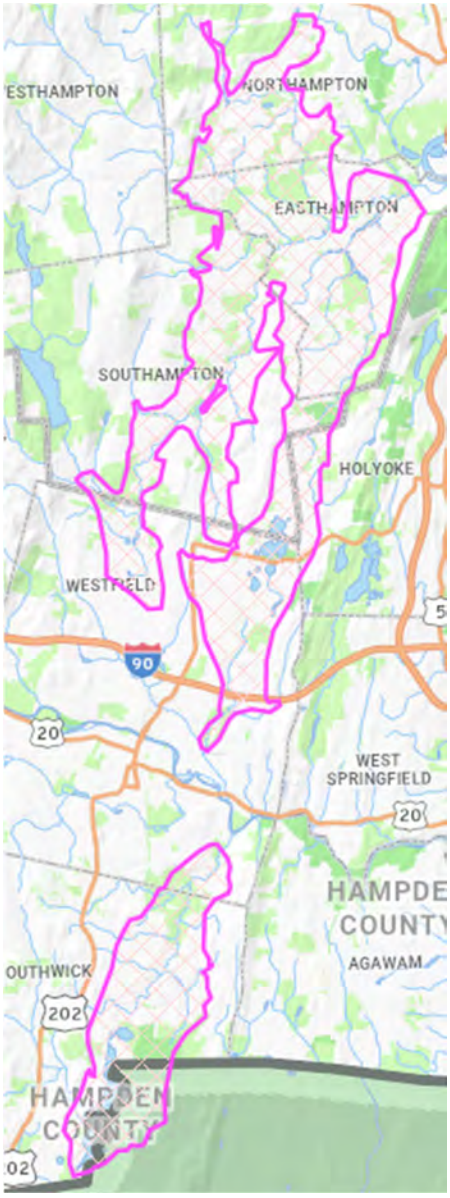
[41] For more information about this and other related grant programs, see: https://www.mass.gov/info-details/water-management-act-grant-programs-for-public-water-suppliers

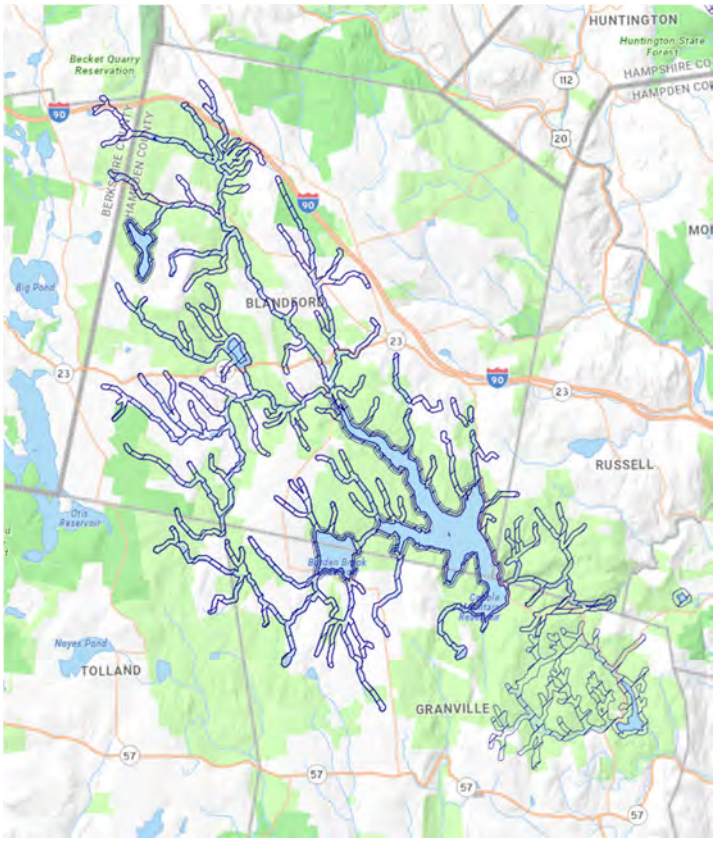
Action 5: Work with interested communities in cooperative agreements to allow for input on development projects that could have cross-border drinking water supply impacts



Existing conditions

Drinking water resource areas typically do not align with municipal boundaries. Examples of this in the region include the Great Brook and Barnes Aquifer where Zone II recharge areas for Southwick, West Springfield, and Westfield overlap one another's municipal boundaries in the south and recharge areas for Westfield, Southampton, Easthampton, and Northampton overlap municipal boundaries in the north. Cobble Mountain Reservoir where Zone A areas extend from Granville, and Blandford into Tolland, Russell, and Otis.





These maps -- pulled from MassMapper -- show at left how primary groundwater recharge areas (Zone IIs in pink) in the Barnes and Great Brook Aquifer extend across municipal boundaries and show above how critical reservoir watershed areas (Zone As in blue) for Cobble Mountain extend across municipal boundaries.

Primary groundwater recharge areas (Zone IIs) and critical reservoir watershed areas (Zone As) often extend beyond municipal boundaries, creating challenges for protection: those responsible for safeguarding these resources typically have no opportunity for input on development projects across the border. Several water suppliers raised concerns about potentially risky development occurring within their water resource areas in neighboring municipalities, noting that they are not consulted during the proposal stages. Some cross-border coordination does appear to occur for high-profile proposals, however, such as the recent Battery Energy Storage facility proposed for Westfield, described in Action 2.

One mechanism municipalities in the region have used to collaborate on cross-border drinking water protection is through intermunicipal agreements. The Barnes Aquifer Protection Advisory Committee, which was active from 1989 to 2015, involved four municipalities in collaborative review and issuance of advisory comments on "developments of regional impact" (projects located in resources areas that extended into another municipality). Organized through a Memorandum of Agreement (with a term of 25 years), the group reviewed some 6 to 10 projects each year and provided advisory recommendations to local permit granting authorities. In the course of its work, the group developed important guidelines on drinking water supply protection to help inform permitting across the aquifer region. This included recommended standards for geothermal wells, transformers at solar fields, and stormwater flows from more intensive land uses such as parking lots (pretreatment prior to infiltration/recharge). Unfortunately, with the challenges of PFAS contamination at several Westfield wells, this group did not continue to meet.

How action will help resolve problems

Where water suppliers and municipal officials are concerned about how developments in neighboring municipality will impact their drinking water resource areas, this action could set up a process that enables cross-border review and advisory comment relative to drinking water supply protections.

What action entails

As a first step, it may be most helpful to understand the location of all cross-border drinking water resource areas throughout the region. Such mapping should already be included in local zoning maps and regulated as drinking water resource areas, which could be verified through the work in Action 1.

Next steps would involve the following:

- Survey municipalities where there are cross-border drinking water resources to understand what communications they may have had with neighboring municipalities about development proposals.
- Explore what interest there may be in better communicating, perhaps through an informal or more formal arrangement. In either case, it will be important to set up processes so that local boards are prompted to seek consultation from a neighboring community on a given development proposal over a drinking water supply resource area.
- Another possibility is to establish a drinking water circuit rider position that both builds capacities in local permitting boards through trainings and facilitates the development of advisory comments from a neighboring community.



Signs like this are helpful to build awareness of drinking water resource areas.

Action 6: Create a more connected and resilient network for emergency backup of drinking water supply



Existing conditions

Some municipal drinking water suppliers in the region have intermunicipal agreements that allow for one water supplier to purchase water from another supplier during peak demand or in the event of an emergency. Springfield Water & Sewer Commission, for example, has such agreements in place with Chicopee, Southwick, Westfield, West Springfield, and Wilbraham. The SWSC itself has two emergency sources: the Ludlow Reservoir in Ludlow, and the Littleville Reservoir in Chester and Huntington.

Other existing emergency interconnections include those between Amherst and Hadley; Easthampton and Northampton; Easthampton and Southampton; Hadley and Sunderland; Hatfield and Northampton; Hatfield and Whately; Holyoke and West Springfield; and South Hadley Fire District #1 and Fire District #2. In addition, each of Palmer's four water districts has an interconnection with at least one other district, and Palmer Water District #1 also has the capability to create an emergency interconnection with Monson.

Smaller and more rural community water systems typically do not have any interconnections due to their distance from other water systems. Instead, these systems have backup plans that involve bringing water into town by truck. With the recent boil water orders in Chester, for example, the Town brought in water tanks on trailers.

These back up sources are part of the planning required under Massachusetts Drinking Water Regulations to ensure the continuation of service in the event of an emergency.[42] Each water supplier must prepare an Emergency Response Plan that enables a system to be responsive to emergencies, including routine operating emergencies such as pipe breaks, pump malfunctions, coliform contamination, and power outages, as well as more serious non-routine emergencies.

In conversations with municipal suppliers, however, there is uncertainty around a few interconnection agreements and also whether connections had ever been tested. Without testing there is the possibility of differing pipe pressures causing surges or backflows, and the mixing of supplies with different chemistries, triggering water quality issues.

How action will help resolve problems

This action seeks to create a more connected network through emergency interconnection agreements that will ensure that even during an emergency, access to clean water is possible. Where emergency interconnection can be made, agreements allow suppliers to share resources and redistribute drinking water during crises. These agreements are vital because they provide system redundancy, prevent prolonged outages during infrastructure failures, droughts, or contamination events, and establish clear rules and responsibilities.

[42] 310 CMR 22.04

What action entails

First and foremost, this action involves developing a more complete understanding of the existing network of emergency interconnections. Where are there interconnections that are fully functional? Where are there interconnections in place (physically and with agreements) but not tested? And where are there gaps where emergency interconnection is critical to greater system resilience?

Next step strategies could include:

- Building an understanding of where interconnections have worked well and how those have been supported through good agreements[43]
- Enabling more conversation among water suppliers to address gaps in emergency interconnections
- Targeted assistance to develop agreements and to test connections.
- Advance understanding about the Massachusetts WARN (Water/Wastewater Agency Response Network), which allows public water and wastewater systems to receive rapid mutual aid and assistance from other public systems to restore services damaged by natural or man-made incidents.[44]

[43] PVPC has a model agreement that has been used by Easthampton and Southampton

[44] For more information, see: https://www.mawarn.org/

Action 7: Advance land conservation for improved protection of drinking water supply



Existing conditions

The value of land conservation in protecting drinking water supply is rooted in the recognition that preventing contamination is far more cost-effective than building treatment facilities. This understanding is most evident today in the large tracts of protected watershed forests surrounding reservoir sources like the Quabbin, Cobble Mountain, and Tighe Carmody that trap sediments, and filter and recharge storm flows. This is also evident in the protected lands over and around wellhead areas, and setback distance requirements for groundwater recharge areas.

While land conservation remains among the most effective approaches to protecting drinking water supply, municipal operators note several vulnerabilities.

- Certain critical areas are not under control of the municipality or water supplier and in some cases existing land uses are incompatible (reportedly with chemical applications for agriculture). These include Zone I and Interim Wellhead Protection Areas (for groundwater wells) and Zone A (for surface water sources), which are critical because they define the areas of land closest to a water source where contamination would have the most immediate and severe impact on water quality.[45] MassDEP requires public water suppliers to either own or control lands within Zone 1 and Zone A areas. Control can be achieved through conservation restrictions, deeds, or agreements and land use within these zones must be strictly managed to protect water quality.
- Most municipal water suppliers are uncertain whether conserved lands in drinking water resource areas, including Zone II (for groundwater wells) and Zone B (for surface water sources), carry permanent protection as offered under Article 97 of the Amendments to the Massachusetts Constitution.[46] Staff at MassDCR have indicated that there is a mosaic of possibilities that can depend on language in both town meeting votes and deeds during the time of acquisition and conservation.[47] This can leave the future of these lands in question.[48]

[45] Interim Wellhead Protection Areas, denote well areas that do not yet have an approved Zone II, and define the primary protected recharge area. The radius of the IWPA is determined based on pumping rate and can range from a minimum of 400 fee to a maximum of 2,640 feet (1/2 mile). Zone I is the protective radius immediately surrounding a public water supply well — typically 400 feet — within which land use is most strictly regulated because any contamination here has little distance or time to be naturally filtered or diluted before reaching the water supply. Similarly, Zone A encompasses the land within 400 feet of a surface water source (such as a reservoir, pond, or the bank of a river that serves as a public water supply) and extending 200 feet from the edge of tributaries flowing into it; this zone is vital because pollutants, sediments, or pathogens entering the water here have minimal opportunity to settle out or break down before affecting the supply.

[46] Article 97 declares the conservation of natural resources a public purpose and provides that land or easements subject to Article 97 shall not be used for other purposes or disposed of without a two-thirds roll call vote of the Legislature.

[47] March 19, 2025 correspondence between DCR's Nick Rossi and Kestrel Land Trusts' Lee Halasz.

[48] In any case, water suppliers must receive prior consent and approval from MassDEP before they acquire or release (sell, transfer, or abandon) any land designated for water supply purposes. See: MGL, Chapter 40, Sections 4, 15B, 38, 39B, 41.

- While customary farming practices are permitted under Agricultural Preservation Restrictions (APRs), all agricultural land must comply with the strict plant nutrient management regulations established by the Massachusetts Department of Agricultural Resources under 330 CMR 31.00 (enacted via the *Act Relative to the Regulation of Plant Nutrients*). These include 100-foot setbacks from surface waters used for public water supplies, and prohibitions from Zone I areas of a public water supply well. A few communities that have Agricultural Preservation Restrictions (APR) easements in water supply areas are concerned about fertilizer use and interested as to whether there can be both more guidance for farmers and exploration of how APRs might be better written so as to better control the use of fertilizers in water supply resource areas.
- The vast tracts of protected forestland surrounding reservoirs provide a stark contrast to the far more limited land protections around groundwater sources, where residential and commercial development is spread across important recharge areas. Conversations between water suppliers and geoscientists have begun to inform strategy around where land protection investments would be most valuable—particularly in Zone IIs, where soil transmissivity is highest and groundwater recharge rates are greatest. Where these connections are more direct—between surface and groundwater—risks to drinking water supply are higher.



Large tracts of conserved forestlands around Tighe Carmody Reservoir serve to protect the integrity of drinking water supply.

Image courtesy Holyoke Water

At the same time, most municipal drinking water suppliers in the region have limited budgets and staff time for land protection. While most lack any active land protection programs for drinking water supply, some suppliers with greater capacity and stronger partnerships, have been able to pursue MassDEP Drinking Water Supply Protection grants. Through one-on-one interviews with water suppliers, this project brought regional and local land trusts (Kestrel Land Trust, Franklin Land Trust, Hilltown Land Trust, and Opacum Land Trust) to the table to begin or continue building relationships around land protection as a key approach to drinking water supply protection.

How action will help resolve problems

There are several problems to resolve here, all targeting different layers of drinking water protection. Together, the four activities that comprise this action will close gaps in how drinking water source areas are protected on the ground at different scales and time horizons, including: immediate, high-risk parcels in Zone A and Zone I areas; legal durability of protections already in place for drinking water supply lands; strategic positioning for opportunistic acquisition of lands in sensitive Zone II areas; and strengthening an existing agricultural program (APRs) to deliver greater drinking water protection value.

What action entails

Advancing a regional land conservation strategy for improved protection of drinking water supply involves four interrelated activities:

- Ensure that the inventory of Zone I and Zone A areas in the region where existing land uses are incompatible with drinking water supply protection is complete. This involves identifying parcels where current land use conflicts with the high level of protection these zones are supposed to have. Because resolving these issues will likely require local relationship building, the next step will likely involve local officials and/or land trusts sitting down with landowners to discuss options (easements, land swaps, voluntary best management practices, or eventual acquisition), possibly with MassDEP or and MassDAR if farming practices are involved.
- Research protected drinking water supply lands in the region to identify where Article 97 protection is lacking. It will be important to review deeds and original local votes and warrant articles from when land was acquired, and sometimes Conservation Commission or Select Board records, to determine the intent of protections so that land is not vulnerable to future development pressure or repurposing for other uses.
- Enable continued conversations with water suppliers and geoscientists to identify and prioritize areas of Zone II recharge areas where risks to drinking water supply are highest. Through this process, develop a list of priorities, that also flags priority parcels that are currently enrolled in Chapter 61. Keep town officials informed of these priorities (especially conservation commissions) so that when opportunities arise, they may be able to act.
- Review with MADAR specific cases in the region where agricultural uses are incompatible with drinking water supply protection and explore how might better manage fertilizer use in water supply resource areas, where there are APRs in place.

Massachusetts land conservation funding suited to drinking water supply protection

The Drinking Water Supply Protection grant program - Provides financial assistance to public water systems and municipal water departments for the purchase of land or interests in land for the following purposes: 1) protection of existing MassDEP-approved public drinking water supplies; 2) protection of planned future public drinking water supplies; or 3) groundwater recharge. This MassDEP reimbursement program provides maximum awards of $350,000, with a 40% match requirement.[49]

The Conservation Partnership Grant Program - Can help IRS 501(c)(3) organizations acquire interest in land for conservation or recreation purposes. Potential projects fall into one of two categories: acquisition of the fee interest in land or a conservation restriction; or due diligence costs for donations of land or CRs. For selected projects, a conservation restriction must be held by a municipal or state agency or another land trust. Appropriate public access must also be provided.[50]

Landscape Partnership Grant – Promotes large-scale, landscape-level conservation projects that protect at least 500 contiguous acres (though there have been 250-acre projects). This MassEEA reimbursement program provides maximum awards of $1,250,000 with a 50% match requirement.[51]

LAND Grants (Local Acquisitions for Natural Diversity) - Are for municipal conservation commissions looking to protect conservation land. Eligible projects include acquisition of land or conservation restrictions for conservation and passive recreation. This MassEEA reimbursement program provides maximum awards of $425,000 with a 52 to 70% match requirement.[52]

Community Preservation Act (CPA) – More than 200 communities in Massachusetts have adopted the Community Preservation Act (M.G.L. c. 44B), which allows municipalities to establish a dedicated fund for open space preservation, historic preservation, affordable housing, and outdoor recreation. CPA is funded locally via a property tax surcharge (up to 3%) and state matching funds, and applications for funding typically go to a local Community Preservation Act Committee. Such funds are often a key component for providing match commitment to state grants.

[49] https://www.mass.gov/info-details/drinking-water-supply-protection-grant-program
[50] https://www.mass.gov/info-details/conservation-partnership-grant-program
[51] https://www.mass.gov/how-to/apply-for-a-landscape-partnership-grant
[52] https://www.mass.gov/info-details/local-acquisitions-for-natural-diversity-land-grant-program

Action 8: Formalize Chapter 61 right of first refusal processes so that municipalities can effectively respond to drinking water supply protection opportunities



Existing conditions

Parcels enrolled in the property tax abatement programs offer reduced local property taxes in return for maintaining land in productive forestry, agricultural, or open space or passive recreational use. Chapter 61 applies to forestland, Chapter 61A applies to agricultural and horticultural land (which may also include forestland), and Chapter 61B applies to land used for general open space (which may also include forestland).

One important feature of the Chapter 61 program is that it offers municipalities the opportunity to protect land permanently if land that has been enrolled in the programs is being sold or converted to another use. A municipality can choose to preserve the parcel permanently within a 120-day waiting period during which it can exercise or assign its "right of first refusal" to purchase the property at fair market value or meet the conversion price offer.

Few municipalities involved in the drinking water conversations of this project, however, indicate that they are prepared to respond in such a short timeframe to such opportunities. Few have processes in place to enable considered decision making on worthwhile land conservation, particularly as such action relates to drinking water supply protection.

How action will help resolve problems

This action will set up a clear process for municipal staff, boards, and residents by providing a clear and consistent process to address right of first refusal opportunities when landowners propose to sell or convert all or part of their Chapter 61, 61A, or 61B land. It is important to couple this action with a prioritization of lands for conservation as recommended in Action 7.

What action entails

With input from Kestrel Land Trust, PVPC has prepared a "Model Procedure for Exercising Right of First Refusal on Chapter 61, 61A, and 61B Lands" - a guidance document to help municipalities establish a Chapter 61 right of first refusal process. An interested municipality, perhaps with support from PVPC or a local land trust, can adapt and adopt this process for its own use. Doing so will clarify the point of contact for Chapter 61 notifications, establish clear lines of communication about who to involve in the conversation, and create better pathways to identifying available support and assistance, particularly when an opportunity aligns with drinking water supply protection priorities.[53]

[53] See state law governing this process at MGL Chapter 61, Section 8, Chapter 61A, Section 14, and Chapter 61B, Section 9 (each a "Chapter Statute"), as well as Municipal Counsel.

Action 9: Promote development of forest stewardship plans to help mitigate impacts of extremes between drought and downpour and associated risk to water supply



Existing conditions

Forest cover provides tremendous protection for drinking water supplies. Forests can function like natural sponges: their canopies intercept rainfall, their litter layer absorbs water, and their soils allow it to infiltrate and recharge groundwater. These characteristics can also help to mitigate the impacts of extremes in climate and whiplash between drought and downpours as forests maximize water storage in soils and slow runoff.

Yet these protective functions depend on the forest's resilience — and that resiliency is increasingly under threat. With the increasing risks of extreme heat and drought together with invasive pests and plants, promoting forest health and resilience through assessment, planning, monitoring, and active management—where appropriate—seems more important than ever.[54]

Forest stewardship plans have been an important tool in Massachusetts water supply protection dating to 1907.[55],[56] Innovations in managing for invasive pests and pathogens, and swings from drought to downpours, however, are relatively new. Modern forest stewardship plans may address:

- Drinking-water and source-water protection objectives
- Detailed assessment of soils, slopes, wetlands, streams, riparian areas, and recharge areas
- Roads, trails, stream crossings, drainage systems, erosion risks, and sedimentation concerns
- Invasive plants, insects, pathogens, deer browse, storm impacts, drought, and wildfire risk
- Climate vulnerability and options for improving adaptive capacity
- Areas suitable for active management, restoration, monitoring, or reserve treatment
- Monitoring priorities, implementation responsibilities, and schedules for review and updates [57]

Several water suppliers in the region have active forest stewardship plans that are responsive to these emerging risks.

- Springfield Water & Sewer Commission's reports that its latest forest management plan will provide recommendations for stands in keeping with their climate resiliency goal and will include strategies to

[54] The term "resilient forests" emphasizes forests that can endure and adapt to stresses, especially climate impacts, wildfires, and pests.

[55] Outreach Coordinator for DCR's Service Forestry & Forest Stewardship Programs Mike Downey notes that one of the earliest forest management plans was prepared for Brockton Water Commission land, according to State Forester Annual Reports.

[56] Downey also recommends moving away from use of Forest Management Plans to Forest Stewardship Plan or Watershed Forest Stewardship Plan. Such plans provide a broader framework for long-term stewardship as they evaluate water resources, soils, climate, wildlife, recreation, forest conditions, and landowner objectives. Correspondence 6/22/26.

[57] List provided by DCR's Service Forestry & Forest Stewardship Programs Mike Downey.

diversify forest stands so that the forest is more biologically diverse (i.e. numerous species), structurally diverse (i.e. wide range of tree ages), and able to naturally regenerate itself.[58]

- West Springfield, Holyoke, and Westfield have an ongoing obligation to certify that their forests are sustainably managed, a requirement tied to their participation in the Tri-City Carbon Sequestration Program. Established in 2014, the partnership pools 15,000 acres of forest land across the three cities to trade carbon credits on the American Carbon Registry (ACR), with active trading underway since 2019. The certification ensures that carbon sequestration levels remain above the required baseline.[59]
- In Hatfield, forest health around Running Gutter Brook Reservoir is in decline due to invasive species and disease. The Red and White Pine so prevalent in the area were also not planted for long term health. The Town has worked to turn this around by actively working with Baystate Forestry to manage forest composition and promote forest diversity for greater resilience to climate change and invasive pest events.[60]

For other forested water-supply lands in the region, the availability and status of forest stewardship plans are not well documented. This planning gap may be particularly common on lands associated with groundwater sources, where forest stewardship planning has received less attention despite the important role that heathy forest covers and soils can play in protecting water supply quality, supporting infiltration, and sustaining groundwater recharge.

Two points of view - Active management and minimal intervention

It should be noted that there is an ongoing tension in forest ecology and policy, with thoughtful viewpoints on both sides. While this tension is greatest in the Western U.S., it does carry some charge here even in the Pioneer Valley region. It seems worth laying out the two viewpoints.[61]

- On the one hand, the case for active management rests on the observation that many forests today are not in a "natural" state to begin with. Decades of fire suppression, past logging, and a warming climate have left many stands overstocked and vulnerable to high-severity fires and insect and disease outbreaks. Active management makes forests more resilient to these unprecedented stresses.
- On the other hand, the case for minimal intervention emphasizes that mature forests have complex, self-regulating ecological processes— soil fungal networks, wildlife habitat, carbon storage, genetic diversity — that can be disrupted or degraded by even well-intentioned intervention. Nature has its own disturbance regimes that are part of a functioning system we do not fully understand and should not override. Mature forests also provide the greatest carbon and biodiversity benefits.[62]

Taken together, there may be the possibility of consensus, where forest health is significantly degraded and presenting risks to water supply.

[58] https://waterandsewer.org/wp-content/uploads/2020/08/Ludlow-Forest-FMP-10282018.pdf

[59] For more information on forests and carbon trading, see: https://masswoods.org/sites/default/files/2025-09/forest_carbon_2022-ua.pdf and file:///C:/Users/Staff/Downloads/CarbonOffset_MunicipalGuide_Final.pdf

[60] October 16, 2025 meeting with the Town of Hatfield and including Baystate Forestry.

[61] This recent story aptly describes the tension albeit related to issues in the Western U.S.: https://news.mongabay.com/2025/08/fixing-forests-or-fueling-fires-scientists-split-over-active-management/

[62] For example, see Woodwell Climate Research Center study at: https://www.sciencedirect.com/science/article/pii/S000632072500151X



An ecologically important forest tree in the northeast, Eastern white pine (Pinus strobus) has exhibited symptoms of decline that include: yellowing/browning needles, premature needle shedding, thinning canopies, undersized shoots and needles, resinosis, branch dieback and death. UMass reports that multiple fungal pathogens, an insect pest and a changing climate are responsible. While the issues facing eastern white pine will continue, management options exist to help improve the health and vigor of stressed white pines.
Source: https://www.umass.edu/agriculture-food-environment/landscape/fact-sheets/dieback-of-eastern-white-pine

How action will help resolve problems

Forest stewardship plans identify site-specific strategies to maintain healthy, resilient forest conditions and protect drinking-water resources. Depending on the forest conditions, water-supply objectives, and identified risks, these strategies may include:

- Protecting water retention and infiltration by maintaining forest cover and healthy soils; retaining coarse woody debris where appropriate to slow localized runoff, trap sediment, retain moisture, and contribute organic matter; using contour felling selectively on disturbed or erosion-prone slopes; and minimizing soil compaction and disturbance by matching equipment to site conditions, operating during suitable ground conditions, and applying forestry best management practices. These measures help

preserve soil structure, reduce erosion and overland flow, and support infiltration, groundwater recharge, and overall watershed resilience.

- Promoting regeneration and species diversity through targeted silvicultural practices, including canopy management to alter light levels on the forest floor, site preparation to create ideal seedbeds, planting native and climate-adapted species where appropriate or when natural regeneration has been demonstrated to be inadequate, and measures such as slash walls, fencing, or other methods to protect young trees from excessive deer browse.
- Reducing wildfire risk by thinning to remove smaller, over dense trees and brush; implementing carefully controlled fires to clear out accumulated dry debris, needles, and deadwood on the forest floor; and restoring riparian areas to ensure that if a fire occurs, it remains low-intensity and prevents downstream ash or sediment from contaminating drinking water sources.

What action entails

The end goal of this action is to ensure that water supply lands with forest cover, have forest stewardship plans in place.[63] First steps should include:

- Complete an inventory of forested water-supply lands and survey water suppliers to identify where current plans are in place and where planning gaps remain. As part of this inventory, document forest stewardship activities conducted during the previous 10 years and evaluate whether their outcomes are consistent with drinking-water protection, forest health, climate resilience, and other established management objectives.
- Convene a roundtable and field day for water suppliers that do not currently have forest stewardship plans to build understanding of their value and practical application. Water suppliers with established plans could share their experiences, lessons learned, and examples of how planning has informed on-the-ground management and drinking-water protection. Invited forestry, watershed, and source-water protection professionals could provide additional technical perspectives and participate in a facilitated discussion of planning needs, available resources, and next steps.
- Establish a peer-learning and technical-assistance network to help interested water suppliers develop, update, and implement forest stewardship plans. The network could designate a regional coordinating organization or primary point of contact to connect suppliers with experienced peers, qualified forestry and watershed professionals, and appropriate state or federal programs. Water suppliers with established plans could serve as peer mentors by sharing examples, lessons learned, procurement approaches, and management outcomes. Periodic roundtables, field visits, and technical workshops could sustain these relationships and help suppliers move from initial assessment through planning, funding, implementation, and monitoring.[64]

[63] The MA Clean Energy and Climate Plan recognizes the value of forests. See: https://www.mass.gov/doc/2050-clean-energy-and-climate-plan/download

[64] Potential sources of assistance may include the MA DCR Service Forestry Program for technical guidance and Forest Stewardship Plan cost-share opportunities; the Municipal Vulnerability Preparedness Program for eligible climate-resilience planning and implementation projects; the Drinking Water Supply Protection Grant Program for qualifying land-protection projects; MA DCR Urban and Community Forestry Program for grant opportunities; and USDA Natural Resources Conservation Service programs where ownership and eligibility requirements are met (municipally-owned lands are ineligible).

Technical assistance and grant programs for forest stewardship

The following are potential sources for funding and technical assistance for planning and implementation of forest stewardship activities:

- DCR Service Forestry technical assistance and Forest Stewardship Planning cost-share opportunities.
  - Cost-Share Opportunities for Private Forestland Owners | Mass.gov
  - Forest Stewardship Program | Mass.gov
  - Home Page | MassWoods
- DCR forestry implementation and cost-share programs, when eligible and available.
  - Urban and Community Forestry Challenge Grants | Mass.gov
- USDA Natural Resources Conservation Service (NRCS) assistance where eligibility and ownership conditions allow.
  - NRCS assistance programs
- MassWildlife habitat management grants and related programs.
  - MassWildlife Habitat Management Grant Program | Mass.gov

Other considerations

Higher river flows—driven by the increasing frequency, duration, and intensity of downpours—present another key consideration for water suppliers. As noted in the findings section above, at least two water suppliers in the Westfield River basin reported that when high flood flows occur, physical access to their pump houses and wells are effectively blocked. Identifying assistance options for these suppliers should be a priority. More broadly, the region would benefit from a systematic analysis to map critical drinking water infrastructure against current—and, where data is available, projected—flood flows. Such an analysis would help identify vulnerable sites, strengthening long-term resilience for the region's drinking water supply.

Action 10: Explore best approaches to increasing Board of Health capacities in providing oversight on private wells



Existing conditions

Under Massachusetts General Law (MGL Ch.111 s.31), local boards of health have primary jurisdiction over the regulation of private wells. The local board is empowered to adopt a Private Well Regulation that establishes criteria for private well siting, testing, and construction and takes 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.

Local boards of health, however, face significant constraints in their capacity to oversee private wells. According to health officials responding to PVPC's survey, most issue permits for new well construction, yet nearly two-thirds have not adopted the MassDEP model regulations. The survey also revealed several additional gaps in safeguarding private wells: inconsistent data collection and record keeping, limited ability to guide and advance water quality testing, and insufficient support for private well owners during extreme conditions such as drought and power outages.

These gaps are not new — they have been a driving factor behind two recent initiatives aimed at better serving residents who rely on private wells. These include bills filed in the current legislative session (HB 900 and SB 585) that seek to institute state-wide standards and easier access to remediation funds.[65] It also includes a MassDEP analysis that examines several potential approaches.[66] The 2026 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

[65] At the Chester learning and listening sessions, private well owners raised four main concerns about the legislation:
It puts requirements on private wells for testing when owners feel they are caring for their water source well enough.
What happens if testing shows that private well water is not safe to drink? Does a home then become condemned because it has no viable source of drinking water?
What happens to home values in an area where water testing is showing problematic results? How would the state ensure enough money to help private well owners manage issues?
One suggestion was to revise the bills so that it leads with creating a funding source to help private well owners while making testing optional.

[66] https://www.mass.gov/doc/massdep-private-well-program-report-considerations-related-to-establishing-a-statewide-private-well-program-march-2026/download

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.

How action will help resolve problems

With approximately 74,000 residents — roughly 11.8% of the region's population — dependent on private wells for their drinking water, strengthening Board of Health (BOH) capacity is critically important.

Through structured regional conversations and targeted local engagement, this action will explore concrete pathways to addressing deficiencies in oversight, record keeping, water quality testing, and support systems during periods of drought and power outages — challenges that have grown more pressing as climate-related extremes become more frequent.

It should be noted that Actions 1 and 2 will help advance the development and adoption of local BOH regulations governing private wells, providing a complementary regulatory foundation for the capacity-building work described here. Additionally, Action 8 in the Community Engagement chapter focuses on developing accessible outreach materials for Board of Health use with private well owners, ensuring that improved capacity translates into meaningful communication and support at the household level.

What action entails

This action operates at two complementary scales — regional and local — recognizing that effective change requires both system-wide coordination and community-level understanding.

At the local level, the immediate priority is developing a more complete and detailed inventory of BOH resources and existing capacity as they relate to private well oversight. This inventory will build on findings from PVPC's health officials survey, but will go deeper, seeking greater specificity around day-to-day operations, staffing, data management practices, and the procedures boards currently use — or lack — when engaging with private well owners. Direct attendance at local Board of Health meetings is expected to be among the most productive methods for gathering this granular information, allowing for candid dialogue and a clearer picture of where gaps are most acute.

At the regional level, the action begins with a series of coordinated meetings focused on building BOH capacity with respect to private wells. These conversations would likely be conducted in partnership with the Western Massachusetts Public Health Association and would include the Franklin Regional Council of Governments as a key collaborator. These meetings would serve as a forum for identifying common challenges across municipalities and exploring collective strategies — such as shared staffing models, standardized protocols, or regional data systems — that individual towns may lack the resources to develop on their own. It may be consultation with the Massachusetts Association of Health Boards could also be helpful.