MASSACHUSETTS CLIMATE CHANGE PROJECTIONS

Researchers from the Northeast Climate Science Center at the University of Massachusetts Amherst developed downscaled projections for changes in temperature, precipitation, and sea level rise for the Commonwealth of Massachusetts. The Executive Office of Energy and Environmental Affairs has provided support for these projections to enable municipalities, industry, organizations, state government and others to utilize a standard, peer-reviewed set of climate change projections that show how the climate is likely to change in Massachusetts through the end of this century.

Temperature and Precipitation Projections

The temperature and precipitation climate change projections are based on simulations from the latest generation of climate models[1] from the International Panel on Climate Change and scenarios of future greenhouse gas emissions.[2] The models were carefully selected from a larger ensemble of climate models based on their ability to provide reliable climate information for the Northeast U.S., while maintaining diversity in future projections that capture some of the inherent uncertainty in modeling climate variables like precipitation. The medium (RCP 4.5) and high (RCP 8.5) emission scenarios were chosen for possible pathways of future greenhouse gas emissions. A moderate scenario of future greenhouse gas emissions assumes a peak around mid-century, which then declines rapidly over the second half of the century, while the highest scenario assumes the continuance of the current emissions trajectory. These scenarios represent different pathways that society may or may not follow, to reduce emissions through climate change mitigation measures.

Fourteen climate models have been run with 2 emission scenarios each, which lead to 28 projections. The values cited in the tables below are based on the 10-90th percentiles across the 28 projections, so they bracket the *most likely* scenarios. For simplicity, we use the terms "…expected to…," and "…will be…," but recognize that these are estimates based on model scenarios and are *not predictive forecasts*. The statewide projections comprising county- and basin-level information are derived by statistically downscaling, or localizing, the climate model results.[3] They represent the best estimates that we can currently provide for a range of

[1] These latest generation of climate models are included in the Coupled Model Intercomparison Project Phase 5 (CMIP5), which formed the basis of projections summarized in the IPCC Fifth Assessment Report (2013).

[2] Future greenhouse gas emissions scenarios are typically expressed as "Representative Concentration Pathways" (RCPs). They indicate emissions trajectories, or storylines, that would lead to certain levels of radiative forcing by 2100, relative to the pre-industrial state of the atmosphere; RCP4.5 equates to +4.5W m^{-2}, and RCP 8.5 would be +8.5W m^{-2}. USGCRP, 2017: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp., doi: 10.7930/J0J964J6.

[3] The Local Constructed Analogs (LOCA) method (Pierce et al., 2014) was used for the statistical downscaling of the statewide projections.

anticipated changes in greenhouse gases. Note that precipitation projections are generally more uncertain than temperature.

The downscaled temperature and precipitation projections for the Commonwealth are provided at three geographic scales (Table 1) for annual and seasonal temporal scales (Table 2), and can be accessed through the Massachusetts Climate Change Clearinghouse website (www.resilientma.org).

These climate projections are provided to help municipal officials, state agency staff, land managers, and others to identify future hazards related to, or exacerbated by changing climatic conditions. For the Municipal Vulnerability Preparedness (MVP) program participants, we recommend using climate projections downscaled to the major drainage basin scale (Table 1) as there are regional differences across several climate indicators (Table 3). These projections can help MVP communities to think through how future hazards in their community may change, given projected changes in temperature and precipitation.

Regardless of geographic scale, rising temperatures, changing precipitation, and extreme weather will continue to affect the people and resources of the Commonwealth throughout the 21st century. A first step in becoming more climate-resilient is to identify the climate changes your community will be exposed to, the impacts and risks to critical assets, functions, vulnerable populations arising from these changes, the underlying sensitivities to these types of changes, and the background stressors that may exacerbate overall vulnerability.

Table 1: Geographic scales available for use for Massachusetts temperature and precipitation projections

Geographic Scale	Definition
Statewide	Massachusetts
County	Barnstable, Berkshire, Bristol, Dukes, Essex, Franklin, Hampden, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, Worcester
Major drainage basins[4]	Blackstone, Boston Harbor, Buzzards Bay, Cape Cod, Charles, Chicopee, Connecticut, Deerfield, Farmington, French, Housatonic, Hudson, Ipswich, Merrimack, Millers, Narragansett Bay & Mt. Hope Bay, Nashua, North Coastal, Parker, Quinebaug, Shawsheen, South Coastal, Sudbury-Assabet-Concord (SuAsCo), Taunton, Ten Mile, Westfield, and Islands (presented here as Martha's Vineyard basin and Nantucket basin)

Table 2: Definition of seasons as applied to temporal scales used for temperature and precipitation projections

Season	Definition
Winter	December-February
Spring	March-May
Summer	June-August
Fall	September-November

[4] The 27 major drainage basins of Massachusetts are defined by the U.S. Geological Survey Water Resources Division and the MA Water Resources Commission. The projections for the Islands basin are presented for Martha's Vineyard and Nantucket. Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

Table 3: List and definitions of projected temperature indicators

Climate Variable	Climate Indicator	Definition
Temperature	Average temperature	Average annual or seasonal temperature expressed in degrees Fahrenheit (^{o}F).
	Maximum temperature	Maximum annual or seasonal temperature expressed in degrees Fahrenheit (^{o}F).
	Minimum temperature	Minimum annual or seasonal temperature expressed in degrees Fahrenheit (^{o}F).
	Days with Tmax > 90 ^{o}F	Number of days when daily maximum temperature exceeds 90°F.
	Days with Tmax > 95 ^{o}F	Number of days when daily maximum temperature exceeds 95°F.
	Days with Tmax > 100 ^{o}F	Number of days when daily maximum temperature exceeds 100°F.
	Days with Tmin < 32 ^{o}F	Number of days when daily minimum temperature is below 32 ^{o}F.
	Days with Tmin < 0 ^{o}F	Number of days when daily minimum temperature is below 0 ^{o}F.
	Heating degree-days (base 65 ^{o}F)	Heating degree-days (HDD) are a measure of how much and for how long outside air temperature was lower than a specific base temperature. HDD are the difference between the average daily temperature and 65°F. For example, if the mean temperature is 30°F, we subtract the mean from 65 and the result is 30 heating degree-days for that day. HDD serves as a proxy that captures energy consumption required to heat buildings, and is used in utility planning and building design.[5]
	Cooling degree-days (base 65 ^{o}F)	Cooling degree days (CDD) are a measure of how much and for how long outside air temperature was higher than a specific base temperature. CDD are the difference between the average daily temperature and 65°F. For example, if the temperature mean is 90°F, we subtract 65 from the mean and the result is 25 cooling degree-days for that day. CDD serves as a proxy that captures energy consumption required to cool buildings, and is used in utility planning and building design. [6]
	Growing degree-days (base 50 ^{o}F)	Growing degree days (GDD) are a measure of heat accumulation that can be correlated to express crop maturity (plant development). GDD is computed by subtracting a base temperature of 50°F from the average of the maximum and minimum temperatures for the day. Minimum temperatures less than 50°F are set to 50, and maximum temperatures greater than 86°F are set to 86. These substitutions indicate that no appreciable growth is detected with temperatures lower than 50° or greater than 86°.[7]

[5] For seasonal or annual projections, HDD are summed for the period of interest. For example, for winter HDD, one would sum the HDD for December 1 through February 28. Degree-days are not the equivalent of calendar days and thus why it is possible to have more than 365 degree-days.

[6] For seasonal or annual projections, CDD are summed for the period of interest. For example, for summer CDD, one would sum the CDD for June 1 through August 31. Degree-days are not the equivalent of calendar days and thus why it is possible to have more than 365 degree-days.

[7] Definition adapted from National Weather Service. Degree-days are not the equivalent of calendar days and thus why it is possible to have more than 365 degree-days.

Table 4: List and definitions of projected precipitation indicators

Climate Variable	Climate Indicator	Definition
Precipitation	Total precipitation	Total annual or seasonal precipitation expressed in inches.
	Days with precipitation >1 inch	Extreme precipitation events measured in days with precipitation eclipsing one inch.
	Days with precipitation > 2 inch	Extreme precipitation events measured in days with precipitation eclipsing two inches.
	Days with precipitation > 4 inch	Extreme precipitation events measured in days with precipitation eclipsing four inches.
	Consecutive dry days	For a given period, the largest number of consecutive days with precipitation less than 1 mm (0.039 inches).

Impacts from Increasing Temperatures

Warmer temperatures and extended heat waves could have very significant impacts on public health in our state, as well as the health of plants, animals and ecosystems like forests and wetlands. Rising temperatures will also affect important economic sectors like agriculture and tourism, and infrastructure like the electrical grid.

Annual air temperatures in the Northeast have been warming at an average rate of 0.5°F (nearly 0.26°C) per decade since 1970. Winter temperatures have been rising at a faster rate of 0.9°F[8] per decade on average. Even what seems like a very small rise in average temperatures can cause major changes in other factors, such as the relative proportion of precipitation that falls as rain or snow.

In Massachusetts, temperatures are projected to increase significantly over the next century. Winter average temperatures are likely to increase more than those in summer, with major impacts on everything from winter recreation to increased pests and challenges to harvesting for the forestry industry.

Beyond this general warming trend, Massachusetts will experience an increasing number of days with extreme heat in the future (Table 3). Generally, extreme heat is considered to be over 90 °F, because at temperatures above that threshold, heat-related illnesses and mortality show a marked increase.

Extreme heat can be especially damaging in urban areas, where there is often a concentration of vulnerable populations, and where more impervious surfaces such as streets and parking lots

[8] NOAA National Centers for Environmental information, Climate at a Glance: U.S. Time Series, Average Temperature, published December 2017, retrieved on December 21, 2017 from http://www.ncdc.noaa.gov/cag/

and less vegetation cause a “heat island” effect that makes them hotter compared to neighboring rural areas.

Urban residents in Massachusetts – especially those who are very young, ill, or elderly, and those who live in older buildings without air conditioning – will face greater risks of serious heat-related illnesses when extreme heat becomes more common. Extreme heat and dry conditions or drought could also be detrimental to crop production, harvest and livestock.

While warmer winters may reduce burdens on energy systems, more heat in the summer may put larger demands on aging systems, creating the potential for power outages. The number of cooling degree days is expected to increase significantly by the end of the century adding to this strain. In addition, heat can directly stress transmission lines, substations, train tracks, roads and bridges, and other critical infrastructure.

Impacts from Changing Precipitation Conditions

Rainfall is expected to increase in spring and winter months in particular in Massachusetts, with increasing consecutive dry days in summer and fall. More total rainfall can have an impact on the frequency of minor but disruptive flooding events, especially in areas where storm water infrastructure has not been adequately sized to accommodate higher levels. Increased total rainfall will also affect agriculture, forestry and natural ecosystems.

More intense downpours often lead to inland flooding as soils become saturated and stop absorbing more water, river flows rise, and the capacity of urban storm water systems is exceeded. Flooding may occur as a result of heavy rainfall, snowmelt, or coastal flooding associated with high wind and wave action, but precipitation is the strongest driver of flooding in Massachusetts. Winter flooding is also common in the state, particularly when the ground is frozen. The Commonwealth experienced 22 flood-related disaster declarations from 1954 to 2017 with many of these falling in winter or early spring, or during recent hurricanes.

The climate projections suggest that the frequency of high-intensity rainfall events will trend upward. Overall, it is anticipated that the severity of flood-inducing weather events and storms will increase, with events that produce sufficient precipitation to present a risk of flooding likely increasing. A single intense downpour can cause flooding and widespread damage to property and critical infrastructure. The coast will experience the greatest increase in high-intensity rainfall days, but some level of increase will occur in every area of Massachusetts.

Intense rainfall in urbanized areas can cause pollutants on roads and parking lots to get washed into nearby rivers and lakes, reducing habitat quality. As rainfall and snowfall patterns change, certain habitats and species that have specific physiological requirements may be affected.

Climate projections for Massachusetts indicate that in future decades, winter precipitation could increase, but by the end of the century most of this precipitation is likely to fall as rain instead of snow due to warmer winters. There are many human and environmental impacts that could result from this change including reduced snow cover for winter recreation and tourism, less spring snow melt to replenish aquifers, higher levels of winter runoff, and lower spring river flows for aquatic ecosystems.

A small projected decrease in average summer precipitation in Massachusetts could combine with higher temperatures to increase the frequency of episodic droughts, like the one experienced across the Commonwealth in the summer of 2016.

Droughts will create challenges for local water supply by reducing surface water storage and the recharge of groundwater supplies, including private wells. More frequent droughts could also exacerbate the impacts of flood events by damaging vegetation that could otherwise help mitigate flooding impacts. Droughts may also weaken tree root systems, making them more susceptible to toppling during high wind events.

Table 5: Statewide projected changes of temperature and precipitation variables by mid- and end of the century. Projected changes for each climate indicator are given as a 30-year mean relative to the 1971-2000 baseline, centered on the 2050s (2040-2069) and the 2090s (2080-2099).[9] These projections were derived from 14 climate models that were run with the medium and high pathways of future greenhouse gas emissions (i.e., each model was run with two emission scenarios each to produce 28 projections per climate indicator). The values cited below are the range of the most likely scenarios (10-90th percentile) across the projections for each climate indicator. The values are rounded off for clarity and are not known precisely to one decimal point.

Climate Indicator		Observed Value 1971-2000 Average	Mid-Century Projected and Percent Change in 2050s (2040-2069)	End of Century Projected and Percent Change in 2090s (2080-2099)
Average Temperature	Annual	47.6 °F	Increase by 2.8 to 6.2 °F Increase by 6 to 13 %	Increase by 3.8 to 10.8 °F Increase by 8 to 23 %
	Winter	26.6 °F	Increase by 2.9 to 7.4 °F Increase by 11 to 28 %	Increase by 4.1 to 10.6 °F Increase by 15 to 40 %
	Spring	45.4 °F	Increase by 2.5 to 5.5 °F Increase by 6 to 12 %	Increase by 3.2 to 9.3 °F Increase by 7 to 20 %
	Summer	67.9 °F	Increase by 2.8 to 6.7 °F Increase by 4 to 10 %	Increase by 3.7 to 12.2 °F Increase by 6 to 18 %
	Fall	50 °F	Increase by 3.6 to 6.6 °F Increase by 7 to 13 %	Increase by 3.9 to 11.5 °F Increase by 8 to 23 %
Maximum Temperature	Annual	58.0 °F	Increase by 2.6 to 6.1 °F Increase by 4 to 11 %	Increase by 3.4 to 10.7 °F Increase by 6 to 18 %
	Winter	36.2 °F	Increase by 2.5 to 6.8 °F Increase by 7 to 19 %	Increase by 3.5 to 9.6 °F Increase by 10 to 27 %
	Spring	56.1 °F	Increase by 2.3 to 5.4 °F Increase by 4 to 10 %	Increase by 3.1 to 9.4 °F Increase by 6 to 17 %
	Summer	78.9 °F	Increase by 2.6 to 6.7 °F Increase by 3 to 8 %	Increase by 3.6 to 12.5 °F Increase by 4 to 16 %
	Fall	60.6 °F	Increase by 3.4 to 6.8 °F Increase by 6 to 11 %	Increase by 3.8 to 11.9 °F Increase by 6 to 20 %
Minimum Temperature	Annual	37.1 °F	Increase 3.2 to 6.4 °F Increase by 9 to 17 %	Increase by 4.1 to 10.9°F Increase by 11 to 29 %
	Winter	17.1 °F	Increase by 3.3 to 8.0 °F Increase by 19 to 47 %	Increase by 4.6 to 11.4 °F Increase by 27 to 66 %
	Spring	34.6 °F	Increase by 2.6 to 5.9 °F Increase by 8 to 17 %	Increase by 3.3 to 9.2 °F Increase by 9 to 26 %
	Summer	56.8 °F	Increase by 3 to 6.9 °F Increase by 5 to 12 %	Increase by 3.9 to 12 °F Increase by 7 to 21 %
	Fall	39.4 °F	Increase by 3.5 to 6.5 °F Increase by 9 to 16 %	Increase by 4.0 to 11.4 °F Increase by 10 to 29 %

[9] A 20-yr mean is used for the 2090s because the climate models end at 2100.

Table 5 Continued

Climate Indicator		Observed Value 1971-2000 Average	Mid-Century Projected and Percent Change in 2050s (2040-2069)	End of Century Projected and Percent Change in 2090s (2080-2099)
Days with Tmax > 90°F	Annual	5 days	Increase by 7 to 26 days	Increase by 11 to 64 days
	Winter	0 days	No change	No change
	Spring	< 1 day[10]	Increase by 0 to 1 days	Increase by 0 to 4 days
	Summer	4 days	Increase by 6 to 22 days	Increase by 9 to 52 days
	Fall	< 1 day[10]	Increase by 0 to 3 days	Increase by 1 to 9 days
Days with Tmax > 95°F	Annual	< 1 day[10]	Increase by 2 to 11 days	Increase by 3 to 35 days
	Winter	0 days	No change	No change
	Spring	< 1 day[10]	No change	Increase by 0 to 1 days Increase by
	Summer	< 1 day[10]	Increase by 2 to 10 days	Increase by 3 to 32 days
	Fall	< 1 day[10]	Increase by 0 to 1 day	Increase by 0 to 3 days
Days with Tmax > 100°F	Annual	< 1 day[10]	Increase by 0 to 3 days	Increase by 0 to 13 days
	Winter	0 days	No change	No change
	Spring	0 days	No change	No change
	Summer	< 1 day[10]	Increase by 0 to 3 days	Increase by 0 to 12 days
	Fall	0 days	No change	Increase by 0 to 1 day
Days with Tmin < 32°F	Annual	146 days	Decrease by 19 to 40 days	Decrease by 24 to 64 days
	Winter	82 days	Decrease by 4 to 12 days	Decrease by 6 to 25 days
	Spring	37 days	Decrease by 6 to 15 days	Decrease by 9 to 20 days
	Summer	< 1 day[10]	No change	No change
	Fall	27 days	Decrease by 8 to 13 days	Decrease by 8 to 20 days
Days with Tmin < 0°F	Annual	8 days	Decrease by 4 to 6 days	Decrease by 4 to 7 days
	Winter	8 days	Decrease by 3 to 6 days	Decrease by 4 to 6 days
	Spring	< 1 day[10]	No change	No change
	Summer	0 days	No change	No change
	Fall	< 1 day[10]	No change	No change

[10] Over the observed period, there were some years with at least 1 day with seasonal Tmax over (or Tmin under) a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

Table 5 Continued

Climate Indicator		Observed Value 1971-2000 Average	Mid-Century Projected and Percent Change in 2050s (2040-2069)	End of Century Projected and Percent Change in 2090s (2080-2099)
Heating Degree-Days (Base 65°F)	Annual	6839 degree-days	Decrease by 773 to 1627 degree-days Decrease by 11 to 24 %	Decrease by 1033 to 2533 degree-days Decrease by 15 to 37 %
	Winter	3475 degree-days	Decrease by 259 to 681 degree-days Decrease by 7 to 20 %	Decrease by 376 to 973 degree-days Decrease by 11 to 28 %
	Spring	1822 degree-days	Decrease by 213 to 468 degree-days Decrease by 12 to 26 %	Decreases by 283 to 727 degree-days Decrease by 16 to 40 %
	Summer	134 degree-days	Decrease by 63 to 101 degree-days Decrease by 47 to 76 %	Decrease by 76 to 120 degree-days Decrease by 65 to 89 %
	Fall	1407 degree-days	Decrease by 282 to 469 degree-days Decrease by 20 to 33 %	Decrease by 289 to 752 degree-days Decrease by 21 to 53 %
Cooling Degree-Days (Base 65°F)	Annual	457 degree-days	Increase by 261 to 689 degree-days Increase by 57 to 151 %	Increase by 356 to 1417 degree-days Increase by 78 to 310 %
	Winter	0 degree-days	Increase by 0 to 5 degree-days	Increase by 0 to 5 degree-days
	Spring	17 degree-days	Increase by 15 to 48 degree-days Increase by 88 to 277 %	Increase by 18 to 110 degree-days Increase by 103 to 636 %
	Summer	397 degree-days	Increase by 182 to 519 degree-days Increase by 46 to 131 %	Increase by 260 to 1006 degree-days Increase by 65 to 253 %
	Fall	40 degree-days	Increase by 40 to 139 degree-days Increase by 100 to 350 %	Increase by 69 to 297 degree-days Increase by 175 to 750 %
Growing Degree-Days (Base 50°F)	Annual	2344 degree-days	Increase by 531 to 1210 degree-days Increase by 23 to 52 %	Increase by 702 to 2347 degree-days Increase by 30 to 100 %
	Winter	5 degree-days	Increase by 1 to 13 degree-days Increase by 21 to 260 %	Increase by 4 to 27 degree-days Increase by 74 to 563 %
	Spring	259 degree-days	Increase by 88 to 226 degree-days Increase by 34 to 87 %	Increase by 104 to 450 degree-days Increase by 40 to 174 %
	Summer	1644 degree-days	Increase by 253 to 618 degree-days Increase by 15 to 38 %	Increase by 342 to 1124 degree-days Increase by 21 to 68 %
	Fall	429 degree-days	Increase by 172 to 394 degree-days Increase by 40 to 92 %	Increase by 216 to 745 degree-days Increase by 50 to 174 %

Table 5 Continued

Climate Indicator		Observed Value 1971-2000 Average	Mid-Century Projected and Percent Change in 2050s (2040-2069)	End of Century Projected and Percent Change in 2090s (2080-2099)
Days with Precipitation Over 1"	Annual	7 days	Increase by 1 to 3 days	Increase by 1 to 4 days
	Winter	2 days	Increase by 0 to 1 days	Increase by 0 to 2 days
	Spring	2 days	Increase by 0 to 1 days	Increase by 0 to 1 days
	Summer	2 days	Increase by 0 to 1 days	Increase by 0 to 1 days
	Fall	2 days	Increase by 0 to 1 days	Increase by 0 to 1 days
Days with Precipitation Over 2"	Annual	1 day	Increase by 0 to 1 days	Increase by 0 to 1 days
	Winter	< 1 day[11]	Increase by < 1 day[11]	Increase by < 1 day[11]
	Spring	< 1 day[11]	Increase by < 1 day[11]	Increase by < 1 day[11]
	Summer	< 1 day[11]	Increase by < 1 day[11]	Increase by < 1 day[11]
	Fall	< 1 day[11]	Increase by < 1 day[11]	Increase by < 1 day[11]
Days with Precipitation Over 4"	Annual	< 1 day[11]	Increase by < 1 day[11]	Increase by < 1 day[11]
	Winter	0 days	No change	Increase by < 1 day[11]
	Spring	0 days	Increase by < 1 day[11]	Increase by < 1 day[11]
	Summer	< 1 day[11]	Increase by < 1 day[11]	Increase by < 1 day[11]
	Fall	< 1 day[11]	Increase by < 1 day[11]	Increase by < 1 day[11]
Total Precipitation	Annual	47 inches	Increase by 1 to 6 inches Increase by 2 to 13 %	Increase by 1.2 to 7.3 inches Increase by 3 to 16 %
	Winter	11.2 inches	Increase by 0.1 to 2.4 inches Increase by 1 to 21 %	Increase by 0.4 to 3.9 inches Increase by 4 to 35 %
	Spring	12 inches	Increase by 0.1 to 2 inches Increase by 1 to 17 %	Increase by 0.4 to 2.7 inches Increase by 3 to 22 %
	Summer	11.5 inches	Decrease by 0.4 to Increase by 2 inches Decrease by 3 % to Increase by 17 %	Decrease by 1.5 to Increase by 1.9 inches Decrease by 13% to Increase by 16 %
	Fall	12.2 inches	Decrease by 1.1 to Increase by 1.4 inches Decrease by 9 to Increase by 12 %	Decrease by 1.7 to Increase by 1.4 inches Decrease by 14 to Increase by 11 %
Consecutive Dry Days	Annual	17 days	Increase by 0 to 2 days	Increase by 0 to 3 days
	Winter	11 days	Decrease by 1 to Increase by 1 days	Decrease by 1 to Increase by 2 days
	Spring	11 days	Decrease by 1 to Increase by 1 day	Decrease by 1 to Increase by 1 day
	Summer	12 days	Decrease by 1 to Increase by 2 days	Decrease by 1 to Increase by 3 days
	Fall	12 days	Increase by 0 to 3 days	Increase by 0 to 3 days

[11] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

Sea Level Rise Projections

Future sea level projections are provided for the Massachusetts coastline at established tide gauge stations with long-term records at Boston Harbor, MA, Nantucket, MA, Woods Hole, MA, and Newport, RI. The projections are adjusted to each station's mean sea level and converted to the North American Vertical Datum of 1988 (NAVD88). The sea level projections are based on a methodology which provides complete probability distributions for different greenhouse gas concentration trajectories (referred to as representative concentration pathways, or RCPs).[12] Consistent with the Intergovernmental Panel on Climate Change (IPCC), these RCPs are numbered according to changes in radiative forcing in 2100 relative to preindustrial conditions. RCP8.5 implies a future with continued high emissions growth, whereas the other RCPs represent different pathways of mitigating emissions. This approach was utilized for the recent City of Boston's sea level rise projections in 2016[13] and similar analyses for the states of California (2017)[14] and New Jersey (2016).[15]

The analysis for Massachusetts (DeConto and Kopp, 2017)[16] consisted of a probabilistic assessment of future relative sea level rise at each tide gauge location given two future atmospheric greenhouse gas concentration pathways, medium (RCP4.5) and high (RCP8.5)[17], and for two methods of accounting for Antarctic ice sheet contributions to sea level rise: one based on expert elicitation (Kopp, 2014[1]) and one where Antarctic ice sheet projections are driven by new, process-based numerical ice sheet model simulations (DeConto and Pollard, 2016[18]; Kopp, 2017[19]). Relative sea level is the local difference in elevation between the sea

[12] Kopp, R. E., R. M. Horton, C. M. Little, J. X. Mitrovica, M. Oppenheimer, D. J. Rasmussen,B. H. Strauss, and C. Tebaldi (2014), Probabilistic 21st and 22nd century sea level projections at a global network of tide gauge sites, Earth's Future, 2, 383–406.

[13] Douglas, E., P. Kirshen, R. Hannigan, R. Herst, A. Palardy, R. DeConto, D. FitzGerald, C. Hay, Z. Hughes, A. Kemp, R. Kopp, B. Anderson, Z. Kuang, S. Ravela, J. Woodruff, M. Barlow, M. Collins, A. DeGaetano, C. A. Schlosser, A. Ganguly, E. Kodra, and M. Ruth (2016), Climate Change and Sea Level Rise Projections for Boston: the Boston Research Advisory Group Report, 54 pp. pp., Climate Ready Boston, Boston, MA.

[14] Griggs, G., Arvai, J., Cayan, D., DeConto, R., Fox, J., Fricker, H. A., Kopp, R. E., Tebaldi, C., Whiteman, E.A. and the California Ocean Protection Council Science Advisory Team Working Group (2017), Rising Seas in California: An Update on Sea-Level Rise Science. California, Ocean Science Trust, April 2017.

[15] Kopp, R.E., A. Broccoli, B. Horton, D. Kreeger, R. Leichenko, J.A. Miller, J.K. Miller, P. Orton, A. Parris, D. Robinson, C.P.Weaver, M. Campo, M. Kaplan, M. Buchanan, J. Herb, L. Auermuller and C. Andrews. 2016. Assessing New Jersey's Exposure to Sea-Level Rise and Coastal Storms: Report of the New Jersey Climate Adaptation Alliance Science and Technical Advisory Panel. Prepared for the New Jersey Climate Adaptation Alliance. New Brunswick, New Jersey.

[16] DeConto, R. M. and R.E. Kopp. (2017). Massachusetts Sea Level Assessment and Projections. Technical memorandum.

[17] Van Vuuren, D. P., Edmonds, J., Kainuma, M., Riahi, K., Thomson, A., Hibbard, K.,Lamarque, J.-F. (2011), The representative concentration pathways: an overview. *Climatic Change*, 109, 5-31.

[18] DeConto, R. M., and Pollard, D. (2016). Contribution of Antarctica to past and future sea-level rise. Nature, 531(7596), 591–597.

surface and land surface. A multi-year reference time period for relative sea level was used to minimize biases caused by tidal, seasonal, and inter-annual climate variability, following the accepted practice of using a 19-year tidal datum epoch[20] centered on the year 2000 as the 'zero' reference for changes in relative sea level rise. To account for the 'zero' reference point utilized for the models and to provide elevations on a common geodetic datum, sea level rise model projection values at each tidal station were adjusted to the station's mean sea level as computed for the 19 year tidal datum epoch of 1999-2017 and converted to NAVD88.

Following the approach in the 2017 National Climate Assessment (NCA)[21] and the Global and Regional Sea Level Rise Scenarios for The United States[22], conditional probability distributions for sea level rise projections can be integrated into different scenarios to support planning and decision-making, given uncertainty and future risks. This approach allows for the many different probabilistic projections (i.e., two models each using two greenhouse gas concentration pathways for multiple time series and several probabilities groups) to be filtered into four scenarios. Under this approach, each of the scenarios—Intermediate, Intermediate-High, High, and Extreme—is cross-walked with two or three probabilistic model outputs (Table 6). These values are consistent with the 2017 NCA global mean sea level values.

Collectively, these sea level rise projections (Tables 7-10, Figures 1-4) provide the background sea level estimates that can be used for detailed, site specific hydrodynamic modeling [23] to map storm surge impacts and influences of localized processes along the coast. On their own, while they are not site-specific projections of mean higher high water levels, these projections provide insight to overall trends in rising sea levels along the Commonwealth coastline, to help coastal municipal officials and workshop participants identify future hazards exacerbated by rising seas.

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[19] Kopp, R. E., DeConto, R. M., Bader, D. A., Hay, C. C., Horton, R. M., Kulp, S., Oppenheimer, M., Pollard, D., and Strauss, B. H. (2017). Evolving Understanding of Antarctic Ice-Sheet Physics and Ambiguity in Probabilistic Sea-Level Projections, Earth's Future, 5.

[20] A tidal datum epoch is a 19-year period over which tidal height observations are taken and reduced to obtain mean values in order to establish the various datums (e.g., mean higher high water, etc.)(NOAA Tides and Currents).

[21] Sweet, W.V., R. Horton, R.E. Kopp, A.N. LeGrande, and A. Romanou, 2017: Sea level rise. In: Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 333-363.

[22] Sweet, W.V., R.E. Kopp, C.P. Weaver, J. Obeysekera, R.M. Horton, E.R. Thieler, and C. Zervas, 2017: Global and Regional Sea Level Rise Scenarios for the United States. NOAA Technical Report NOS CO-OPS 083. NOAA/NOS Center for Operational Oceanographic Products and Services.

[23] e.g., Bosma, K., E. Douglas, P. Kirshen, K. McArthur, S. Miller, S., and C. Watson (2015), Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery. MassDOT, Boston MA.

Impacts from Rising Sea Levels

The impact of rising sea levels depends on local factors and geographies. The local impacts from sea level rise along our coast will be shaped by regional ocean currents, wind patterns, upland and shoreline elevations, geomorphic processes such as subsidence and accretion rates (sinking and accumulation of sediment), and tidal zones.

For low elevation coastal areas, even a rise of a foot can produce new risks for development and infrastructure such as electrical, stormwater and wastewater systems.

Sea level rise driven by climate change will exacerbate many other existing coastal hazards, like severe storms and storm surge, tidal inundation and salt water intrusion, which could produce billions of dollars of impacts for Massachusetts.

With rising sea levels, more regular flooding of developed and natural low-lying coastal areas is expected to occur due to more frequent tidal inundation. There will be increased erosion of existing coastal landforms (e.g., beaches and dunes). Damage to coastal engineering structures (e.g, seawalls) and more frequent flooding of coastal properties and neighborhoods may occur as tidal range and wave energy increases.

As water levels rise, coastal storm surge events will cause inundation of larger areas, and will occur more frequently. Storm surges can damage or destroy coastal engineering structures, critical infrastructure such as waste water treatment plants or transportation systems, and private property. Massachusetts has highways, subway systems and rail lines located close to the coast that would be impacted by storm surge. Storm surge can also create serious risks for public safety during severe or sudden storm events.

Salt-water intrusion, or the increased penetration of salt-water into estuarine habitats, such as salt marshes and freshwater wetlands. It could alter the composition of the plant species and affect the wildlife that depend on these ecosystems. Water resources (such as drinking water) could also be impacted by salt-water intrusion and by the corrosion of important infrastructure.

Table 6: Definitions of relative (or local) mean sea level projections based on four National Climate Assessment global scenarios with associated probabilistic model outputs from the Northeast Climate Science Center. Each of the scenarios—Intermediate, Intermediate-High, High, and Extreme—is cross-walked with two to three probabilistic model outputs. The shaded probabilistic output for each scenario (e.g., Unlikely to exceed [83% probability] given a high emissions pathway [RCP 8.5] for the Intermediate scenario) is reflected in the subsequent tables and plots for mean sea level projections at each tide station (Tables 7-10 and Figures 1-4), and are referenced to the North American Vertical Datum of 1988 (NAVD88).

Relative mean sea level (feet NAVD88)	
Scenario	Cross-walked probabilistic projections
Intermediate	Unlikely to exceed (83% probability) given a high emissions pathway (RCP 8.5)
	• Extremely unlikely to exceed (95% probability) given a medium emissions pathway (RCP 4.5) • Unlikely to exceed (83% probability) given a medium emissions pathway (RCP 4.5) • About as likely as not to exceed (50% probability) given a medium emissions pathway (RCP 4.5) when accounting for possible higher ice sheet contributions to sea level rise
Intermediate - High	Extremely unlikely to exceed (95% probability) given a high emissions pathway (RCP 8.5)
	• Unlikely to exceed (83% probability) given a medium emissions pathway (RCP 4.5) when accounting for possible higher ice sheet contributions to sea level rise • About as likely as not to exceed (50% probability) given a high emissions pathway (RCP 8.5) when accounting for higher possible ice sheet contributions to sea level rise
High	Extremely unlikely to exceed (99.5% probability) given a high emissions pathway (RCP 8.5)
	• Unlikely to exceed (83% probability) given a high emissions pathway (RCP 8.5) when accounting for possible higher ice sheet contributions to sea level rise • Extremely unlikely to exceed (95% probability) given a medium emissions pathway (RCP 4.5) when accounting for possible higher ice sheet contributions to sea level rise
Extreme (Maximum physically plausible)	Exceptionally unlikely to exceed (99.9% probability) given a high emissions pathway (RCP 8.5)
	• Extremely unlikely to exceed (95% probability) given a high emissions pathway (RCP8.5) when accounting for possible higher ice sheet contributions to sea level rise

Table 7, Figure 1: Relative (or local) mean sea level projections for the Boston, MA tide station based on four National Climate Assessment global scenarios with associated probabilistic model outputs from the Northeast Climate Science Center. Each of the scenarios—Intermediate, Intermediate-High, High, and Extreme—is cross-walked with two to three probabilistic model outputs. Modeling considered two future concentrations of greenhouse gas emissions (referred to as representative concentration pathways [RCP]) and two methods of accounting for Antarctic ice sheet contributions to sea level rise. A 19-year reference time period for sea level (tidal epoch) centered on the year 2000 was used to minimize biases caused by tidal, seasonal, and inter-annual climate variability. Sea level projections for the Boston tide station are referenced to the North American Vertical Datum of 1988 (NAVD88).

Relative mean sea level (feet NAVD88) for Boston, MA					
Scenario	**Probabilistic projections**	**2030**	**2050**	**2070**	**2100**
Intermediate	Unlikely to exceed (83% probability) given a high emissions pathway (RCP 8.5)	0.7	1.4	2.3	4.0
Intermediate- High	Extremely unlikely to exceed (95% probability) given a high emissions pathway (RCP 8.5)	0.8	1.7	2.9	5.0
High	Extremely unlikely to exceed (99.5% probability) given a high emissions pathway (RCP 8.5)	1.2	2.4	4.2	7.6
Extreme (Maximum physically plausible)	Exceptionally unlikely to exceed (99.9% probability) given a high emissions pathway (RCP 8.5)	1.4	3.1	5.4	10.2

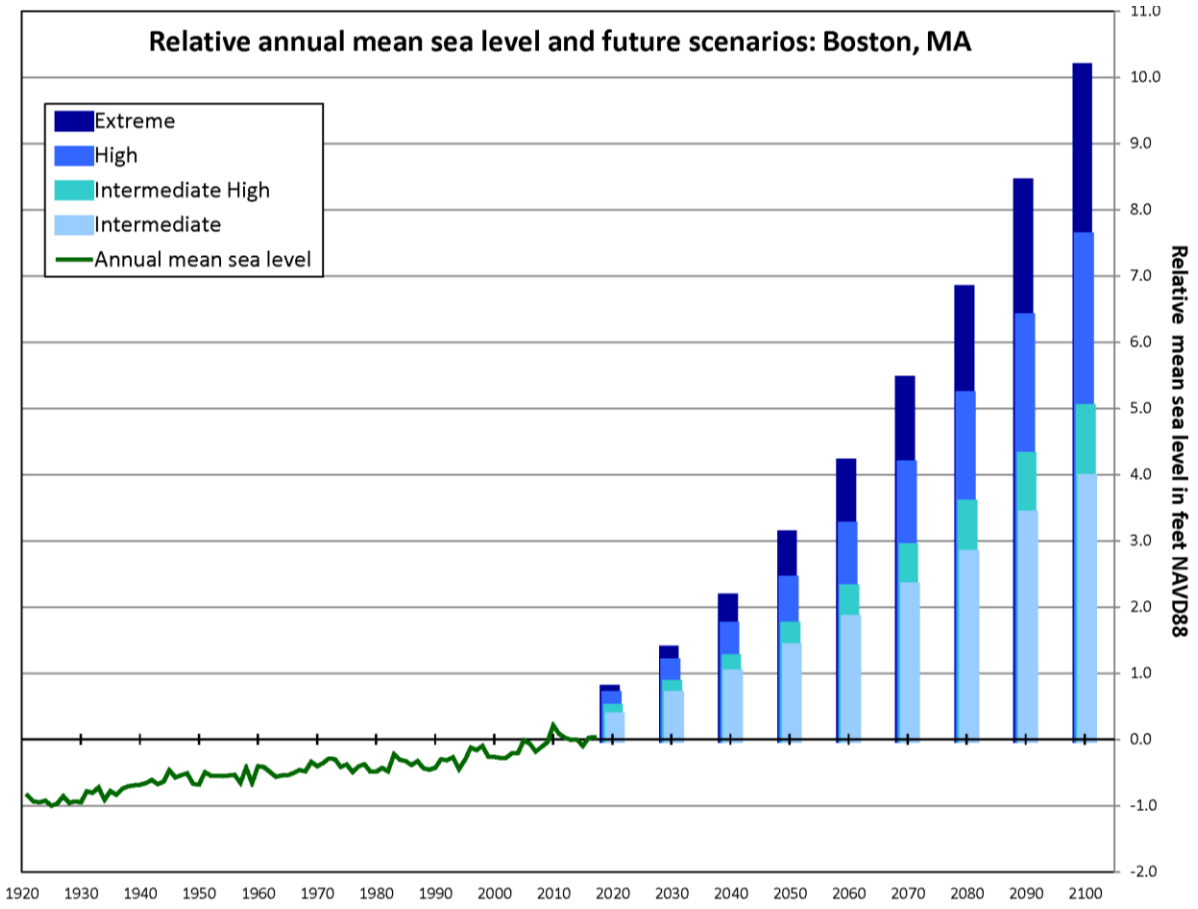


Table 8, Figure 2: Relative (or local) mean sea level projections for the Woods Hole, MA tide station based on four National Climate Assessment global scenarios with associated probabilistic model outputs from the Northeast Climate Science Center. Each of the scenarios—Intermediate, Intermediate-High, High, and Extreme—is cross-walked with two to three probabilistic model outputs. Modeling considered two future concentrations of greenhouse gas emissions (referred to as representative concentration pathways [RCP]) and two methods of accounting for Antarctic ice sheet contributions to sea level rise. A 19-year reference time period for sea level (tidal epoch) centered on the year 2000 was used to minimize biases caused by tidal, seasonal, and inter-annual climate variability. Sea level projections for the Woods Hole tide station are referenced to the North American Vertical Datum of 1988 (NAVD88).

Relative mean sea level (feet NAVD88) for Woods Hole, MA					
Scenario	**Probabilistic projections**	**2030**	**2050**	**2070**	**2100**
Intermediate	Unlikely to exceed (83% probability) given a high emissions pathway (RCP 8.5)	0.6	1.3	2.3	4.0
Intermediate- High	Extremely unlikely to exceed (95% probability) given a high emissions pathway (RCP 8.5)	0.8	1.7	2.9	5.1
High	Extremely unlikely to exceed (99.5% probability) given a high emissions pathway (RCP 8.5)	1.1	2.4	4.2	7.7
Extreme (Maximum physically plausible)	Exceptionally unlikely to exceed (99.9% probability) given a high emissions pathway (RCP 8.5)	1.3	3.1	5.4	10.3

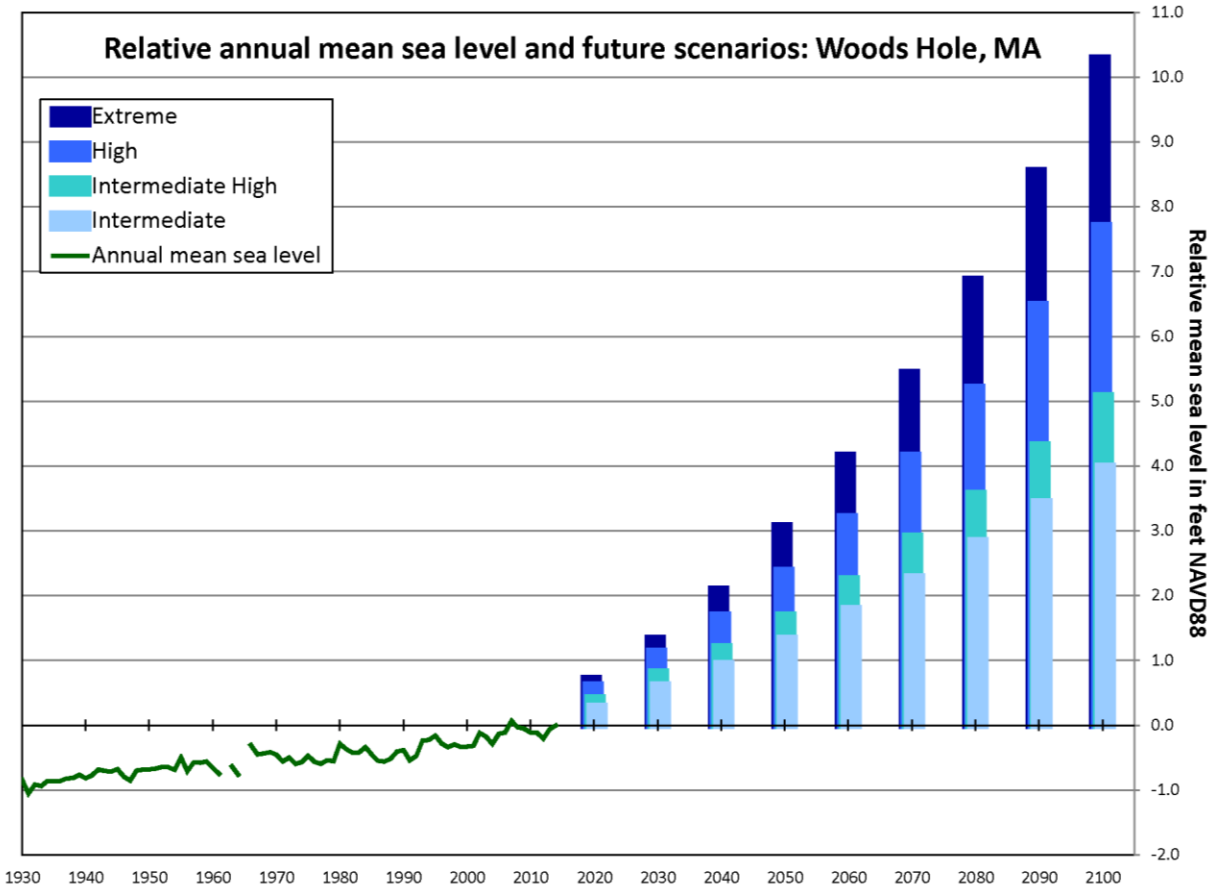


Table 9, Figure 3: Relative (or local) mean sea level projections for the Nantucket, MA tide station based on four National Climate Assessment global scenarios with associated probabilistic model outputs from the Northeast Climate Science Center. Each of the scenarios—Intermediate, Intermediate-High, High, and Extreme—is cross-walked with two to three probabilistic model outputs. Modeling considered two future concentrations of greenhouse gas emissions (referred to as representative concentration pathways [RCP]) and two methods of accounting for Antarctic ice sheet contributions to sea level rise. A 19-year reference time period for sea level (tidal epoch) centered on the year 2000 was used to minimize biases caused by tidal, seasonal, and inter-annual climate variability. Sea level projections for the Nantucket tide station are referenced to the North American Vertical Datum of 1988 (NAVD88).

Relative mean sea level (feet NAVD88) for Nantucket, MA					
Scenario	**Probabilistic projections**	**2030**	**2050**	**2070**	**2100**
Intermediate	Unlikely to exceed (83% probability) given a high emissions pathway (RCP 8.5)	0.7	1.5	2.4	4.2
Intermediate- High	Extremely unlikely to exceed (95% probability) given a high emissions pathway (RCP 8.5)	0.9	1.8	3.0	5.2
High	Extremely unlikely to exceed (99.5% probability) given a high emissions pathway (RCP 8.5)	1.2	2.5	4.3	7.9
Extreme (Maximum physically plausible)	Exceptionally unlikely to exceed (99.9% probability) given a high emissions pathway (RCP 8.5)	1.4	3.1	5.5	10.5

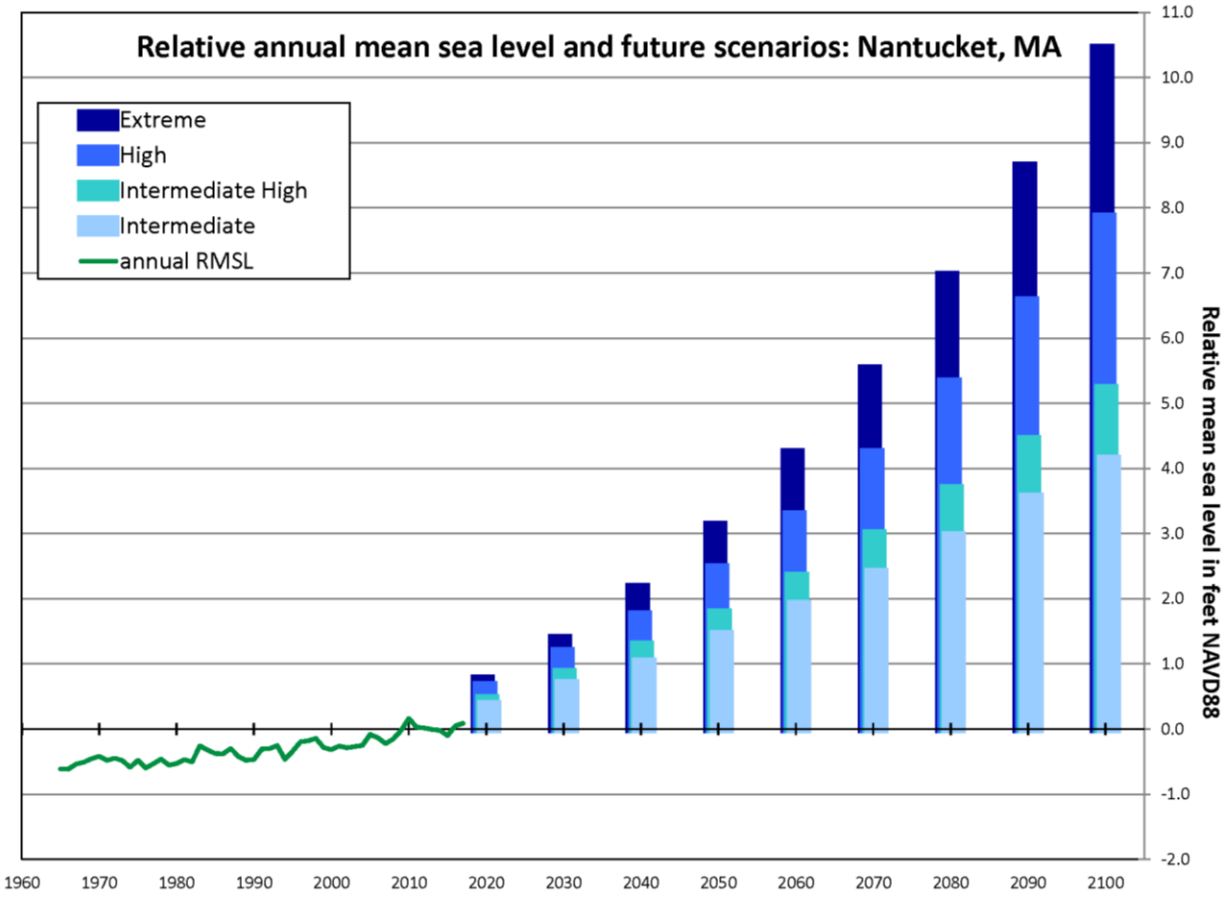
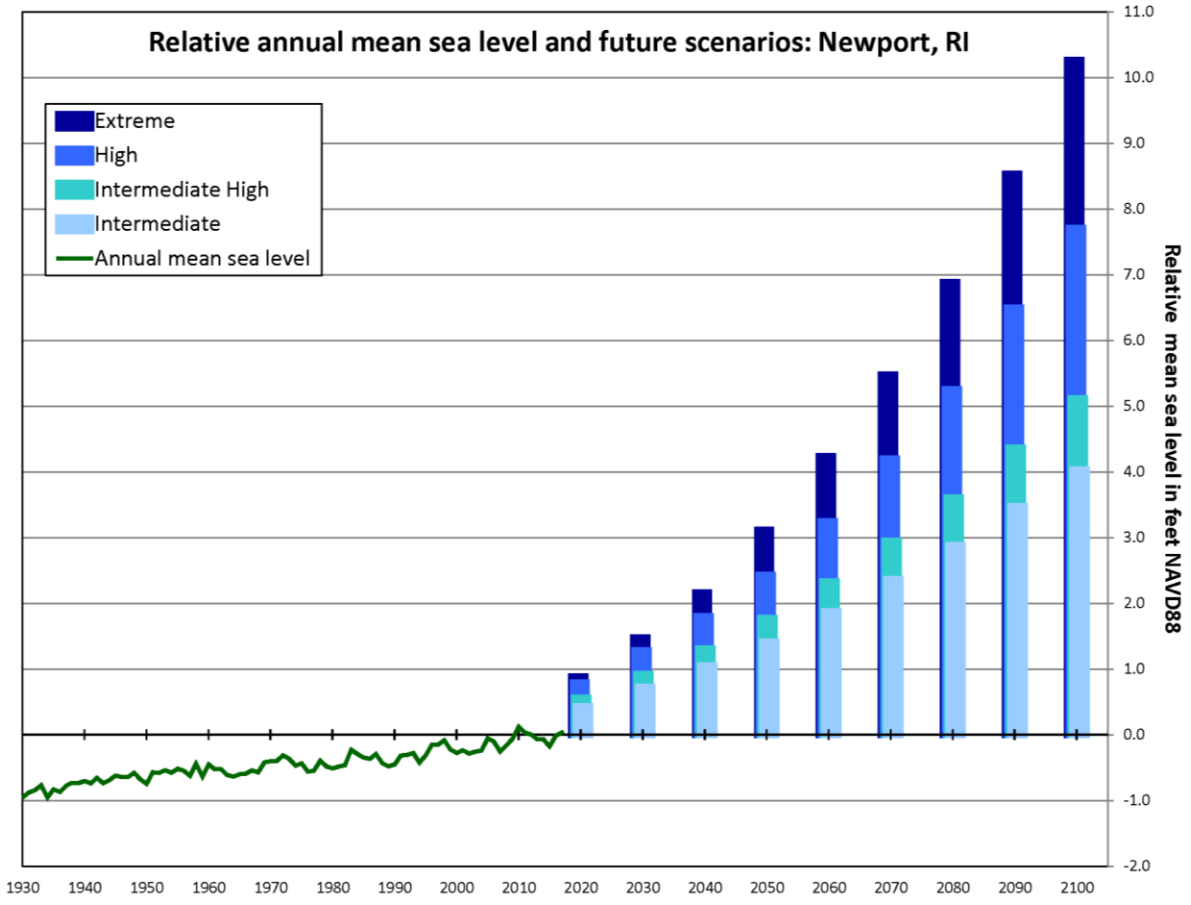
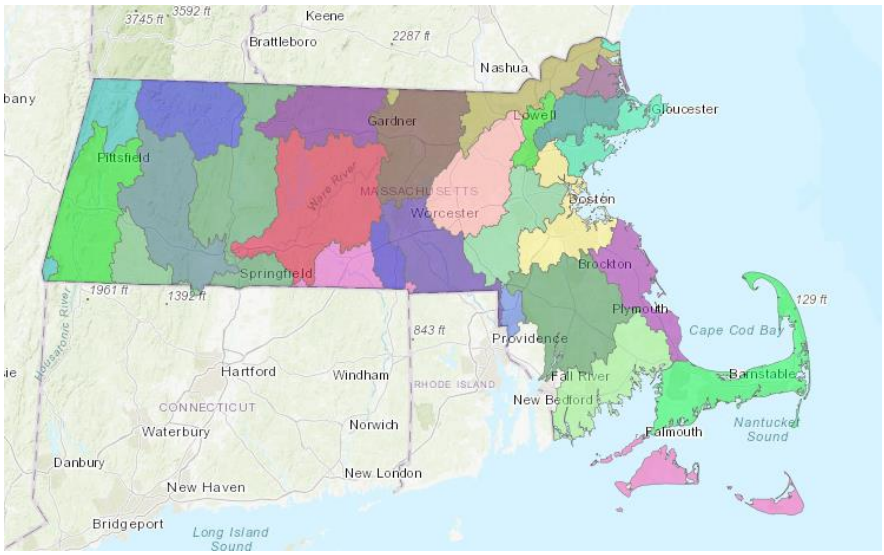


Table 10, Figure 4: Relative (or local) mean sea level projections for the Newport, RI tide station based on four National Climate Assessment global scenarios with associated probabilistic model outputs from the Northeast Climate Science Center. Each of the scenarios—Intermediate, Intermediate-High, High, and Extreme—is cross-walked with two to three probabilistic model outputs. Modeling considered two future concentrations of greenhouse gas emissions (referred to as representative concentration pathways [RCP]) and two methods of accounting for Antarctic ice sheet contributions to sea level rise. A 19-year reference time period for sea level (tidal epoch) centered on the year 2000 was used to minimize biases caused by tidal, seasonal, and inter-annual climate variability. Sea level projections for the Newport tide station are referenced to the North American Vertical Datum of 1988 (NAVD88).

Relative mean sea level (feet NAVD88) for Newport, RI					
Scenario	**Probabilistic projections**	**2030**	**2050**	**2070**	**2100**
Intermediate	Unlikely to exceed (83% probability) given a high emissions pathway (RCP 8.5)	0.7	1.4	2.4	4.0
Intermediate- High	Extremely unlikely to exceed (95% probability) given a high emissions pathway (RCP 8.5)	0.9	1.8	3.0	5.1
High	Extremely unlikely to exceed (99.5% probability) given a high emissions pathway (RCP 8.5)	1.3	2.4	4.2	7.7
Extreme (Maximum physically plausible)	Exceptionally unlikely to exceed (99.9% probability) given a high emissions pathway (RCP 8.5)	1.5	3.1	5.5	10.3



Temperature and Precipitation Climate Summaries for Massachusetts Major Drainage Basins



The following section provides temperature and precipitation projections for each major drainage basin through the end of the century. Projected changes for each climate indicator are given as a 30-year mean relative to the 1971-2000 baseline, centered on the 2050s (2040-2069) and the 2090s (2080-2099).[24] These projections were derived from 14 climate models that were run with the medium and high pathways of future greenhouse gas emissions (i.e., each model was run with two emission scenarios each to produce 28 projections per climate indicator). The values cited in the subsequent tables are the range of the most likely scenarios (10-90th percentile) across the projections for each climate indicator. The values are rounded off for clarity and are not known precisely to one decimal point.

The 27 major drainage basins of Massachusetts are defined by the U.S. Geological Survey Water Resources Division and the MA Water Resources Commission and were produced as a statewide digital datalayer by MassGIS:

> Blackstone, Boston Harbor, Buzzards Bay, Cape Cod, Charles, Chicopee, Connecticut, Deerfield, Farmington, French, Housatonic, Hudson, Ipswich, Merrimack, Millers, Narragansett Bay & Mt. Hope Bay, Nashua, North Coastal, Parker, Quinebaug, Shawsheen, South Coastal, Sudbury-Assabet-Concord (SuAsCo), Taunton, Ten Mile, Westfield, and Islands[25]

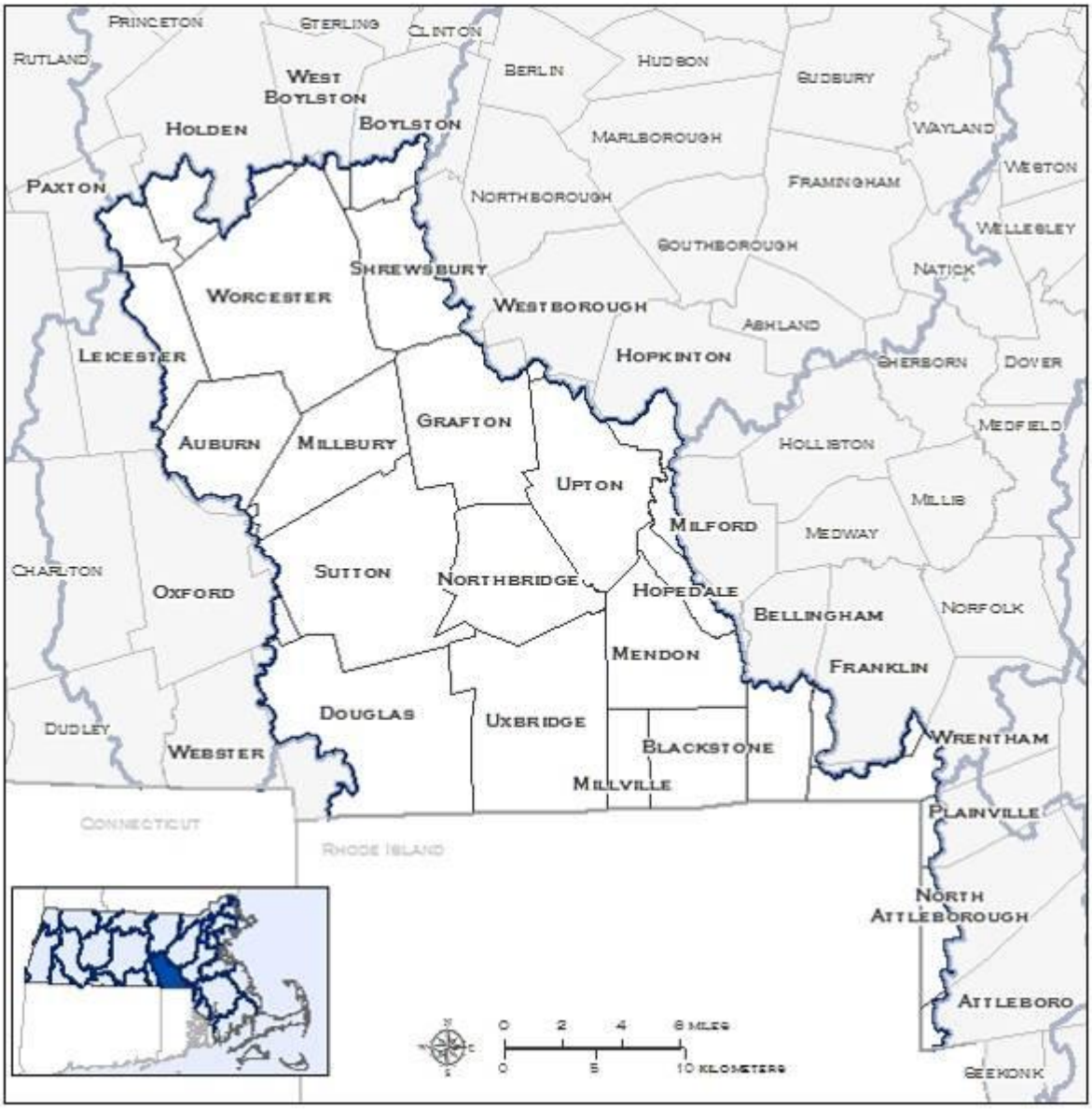
A map and a list of municipalities falling within each basin are provided for each basin, followed by the temperature and precipitation projections for that basin. Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

[24] A 20-yr mean is used for the 2090s because the climate models end at 2100.
[25] Projections for the Islands basin are presented separately for Martha's Vineyard and Nantucket.

BLACKSTONE BASIN

MUNICIPALITIES WITHIN BLACKSTONE BASIN:

Attleboro, Auburn, Bellingham, Blackstone, Boylston, Douglas, Franklin, Grafton, Holden, Hopedale, Hopkinton, Leicester, Mendon, Milford, Millbury, Millville, North Attleborough, Northbridge, Oxford, Paxton, Plainville, Shrewsbury, Sutton, Upton, Uxbridge, Westborough, West Boylston, Worcester, and Wrentham



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

BLACKSTONE BASIN

Blackstone Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	48.2	+2.2 to +4.2	+2.9 to +6.3	+3.5 to +9.1	+3.8 to +11.1
	Winter	27.1	+2.2 to +4.7	+2.8 to +7.2	+3.5 to +9.0	+3.9 to +10.4
	Spring	46.2	+1.6 to +3.4	+2.4 to +5.6	+2.6 to +8.0	+3.1 to +9.7
	Summer	68.6	+2.2 to +4.3	+2.8 to +6.9	+3.3 to +10.2	+3.9 to +12.6
	Fall	50.5	+2.3 to +5.2	+4.0 to +6.9	+3.8 to +9.8	+4.3 to +12.1
Maximum Temperature	Annual	58.7	+2.1 to +4.1	+2.7 to +6.2	+3.2 to +9.1	+3.5 to +11.0
	Winter	36.8	+1.8 to +4.3	+2.4 to +6.7	+2.9 to +8.2	+3.4 to +9.6
	Spring	57	+1.5 to +3.4	+2.1 to +5.6	+2.5 to +8.1	+3.0 to +9.7
	Summer	79.5	+2.0 to +4.3	+2.7 to +6.9	+3.2 to +10.5	+3.7 to +12.8
	Fall	61.1	+2.4 to +5.0	+3.7 to +7.1	+3.7 to +9.9	+4.1 to +12.4
Minimum Temperature	Annual	37.7	+2.3 to +4.5	+3.1 to +6.5	+3.8 to +9.0	+4.1 to +11.1
	Winter	17.5	+2.5 to +5.2	+3.2 to +7.7	+4.2 to +9.7	+4.4 to +11.2
	Spring	35.4	+1.7 to +3.6	+2.6 to +6.0	+2.7 to +7.8	+3.2 to +9.6
	Summer	57.7	+2.3 to +4.4	+3.0 to +7.0	+3.4 to +10.0	+4.1 to +12.4
	Fall	39.8	+2.2 to +5.4	+3.9 to +6.8	+3.9 to +9.6	+4.4 to +12.0

- The Blackstone basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.7 °F to 6.9 °F (3-12% increase); end of century increase of 3.7 °F to 12.8 °F (5-16% increase).
    - Fall mid-century increase of 3.7 °F to 7.1°F (6-17% increase); end of century increase by and 4.1 °F to 12.4 °F (7-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Winter mid-century increase of 3.2 °F to 7.7 °F (18-44% increase); end of century increase by 4.4 °F to 11.2 °F (25-64% increase).
    - Fall mid-century of 3.9 °F to 6.8 °F (10-17% increase); end of century increase of 4.4 °F to 12 °F (11-30% increase).

BLACKSTONE BASIN

Blackstone Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	5	+5 to +16	+8 to +29	+10 to +51	+12 to +70
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[26]	+<1[26] to +1	+<1[26] to +1	+<1[26] to +2	+<1[26] to +4
	Summer	4	+5 to +14	+7 to +25	+9 to +42	+11 to +56
	Fall	<1[26]	+<1[26] to +2	+1 to +4	+1 to +8	+1 to +11
Days with Maximum Temperature Over 95°F	Annual	<1[26]	+1 to +5	+2 to +11	+3 to +25	+4 to +40
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[26]	+<1[26] to +<1[26]	+<1[26] to +1	+<1[26] to +1
	Summer	<1[26]	+1 to +5	+2 to +10	+2 to +23	+4 to +35
	Fall	0	+<1[26] to +<1[26]	+<1[26] to +1	+<1[26] to +3	+<1[26] to +4
Days with Maximum Temperature Over 100°F	Annual	<1[26]	+<1[26] to +1	+<1[26] to +3	+<1[26] to +7	+<1[26] to +14
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[26]	+0 to +<1[26]	+0 to +<1[26]	+0 to +<1[26]
	Summer	<1[26]	+<1[26] to +1	+<1[26] to +3	+<1[26] to +6	+<1[26] to +13
	Fall	0	+0 to +<1[26]	+0 to +<1[26]	+0 to +<1[26]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Blackstone basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Blackstone basin is expected to see days with daily maximum temperatures over 90 °F increase by 8 to 29 more days by mid-century, and 12 to 70 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 7 to 25 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Blackstone basin is expected to have 11 to 56 more days.

[26] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BLACKSTONE BASIN

Blackstone Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	6	-2 to -4	-2 to -4	-3 to -5	-3 to -5
	Winter	6	-2 to -4	-2 to -4	-3 to -5	-3 to -5
	Spring	<1[27]	-0 to +<1	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[27]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	143	-10 to -27	-18 to -39	-1 to -54	-23 to -66
	Winter	83	-2 to -7	-3 to -11	-4 to -20	-6 to -26
	Spring	35	-3 to -11	-6 to -15	-7 to -20	-8 to -21
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	25	-5 to -11	-8 to -13	-8 to -17	-8 to -19

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Blackstone basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 3 to 11 fewer days by mid-century, and 6 to 26 fewer days by end of century.
    - Spring is expected to have 6 to 15 fewer days by mid-century, and 8 to 21 fewer days by end of century.
    - Fall is expected to have 8 to 13 fewer days by mid-century, and 8 to 19 fewer days by end of century.

[27] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BLACKSTONE BASIN

Blackstone Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6651	-539 to -1133	-745 to -1599	-876 to -2128	-991 to -2515
	Winter	3429	-186 to -441	-245 to -663	-310 to -815	-363 to -956
	Spring	1748	-128 to -292	-201 to -470	-219 to -632	-274 to -747
	Summer	104	-38 to -64	-50 to -84	-57 to -93	-59 to -99
	Fall	1365	-169 to -390	-293 to -473	-273 to -654	-296 to -747
Cooling Degree-Days (Base 65°F)	Annual	499	+226 to +444	+295 to +758	+346 to +1188	+398 to +1548
	Winter	0	+1 to +1	+1 to +2	+0 to +2	+0 to +5
	Spring	20	+11 to +29	+19 to +57	+24 to +95	+20 to +132
	Summer	435	+161 to +337	+200 to +558	+241 to +852	+286 to +1061
	Fall	40	+36 to +97	+51 to +165	+60 to +260	+86 to +347
Growing Degree-Days (Base 50°F)	Annual	2451	+427 to +817	+582 to +1287	+664 to +1992	+749 to +2492
	Winter	6	-2 to +10	+0 to +13	+3 to +22	+2 to +28
	Spring	285	+67 to +141	+91 to +246	+105 to +381	+111 to +496
	Summer	1712	+204 to +397	+260 to +638	+304 to +941	+357 to +1154
	Fall	442	+125 to +313	+200 to +435	+193 to +639	+242 to +810

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Blackstone basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 245 to 663 degree-days by mid-century (a decrease of 7-19%), and a decrease of 363 to 956 degree-days by the end of century (a decrease of 11-28%).
    - The spring season is expected to decrease in heating degree-days by 11-27% (201-470 degree-days) by mid-century, and by 16-43% (274-747 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-35% (293-473 degree-days) by mid-century, and by and 22-55% (296-747 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 46-128% (200-558 degree-days) by mid-century, and by 66-244% (286-1061 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 15-37% (260-638 degree-days) by mid-century, and by 21-67% (357-1154 degree-days) by end of century.
    - Spring is expected to increase by 32-86% (91-246 degree-days) by mid-century, and 39-174% (111-496 degree-days) by end of century.
    - Fall is expected to increase by 45-98% (200-435 degree-days) by mid-century and 55-183% (242-810 degree-days) by end of century.

BLACKSTONE BASIN

Blackstone Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[28] to +2	+1 to +3	+1 to +4	+1 to +5
	Winter	2	+0 to +1	+ <1[28] to +1	+ <1[28] to +2	+ <1[28] to +2
	Spring	2	+0 to +1	+ <1[28] to +1	+ <1[28] to +1	+ <1[28] to +2
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	3	+0 to +1	+0 to +1	+0 to +1	-1 to +1
Days with Precipitation Over 2"	Annual	1	+<1[28] to +1	+ <1[28] to +1	+ <1[28] to +1	+ <1[28] to +1
	Winter	<1[28]	+0 to +<1[28]	+0 to + <1[28]	+0 to + <1[28]	+0 to + <1[28]
	Spring	<1[28]	+0 to +<1[28]	+ <1[28] to + <1[28]	+ <1[28] to + <1[28]	+ <1[28] to + <1[28]
	Summer	<1[28]	+0 to +<1[28]	+0 to + <1[28]	+0 to + <1[28]	+0 to + <1[28]
	Fall	<1[28]	+0 to +<1[28]	+0 to + <1[28]	+0 to + <1[28]	+0 to + <1[28]
Days with Precipitation Over 4"	Annual	<1[28]	+0 to +<1[28]	+0 to + <1[28]	+0 to + <1[28]	+0 to + <1[28]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[28]	+0 to + <1[28]	+0 to + <1[28]	+0 to + <1[28]
	Summer	<1[28]	+0 to +<1[28]	+0 to + <1[28]	+0 to + <1[28]	+0 to + <1[28]
	Fall	0	+0 to +<1[28]	+0 to + <1[28]	+0 to + <1[28]	+0 to + <1[28]

- The projections for expected number of days receiving precipitation over one inch are variable for the Blackstone basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch 0-1 days by mid-century, and by 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-2 days by the end of century.

[28] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BLACKSTONE BASIN

Blackstone Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	47.1	+0.3 to +5.5	+1.4 to +6.8	+2.5 to +8.7	+1.6 to +8.7
	Winter	11.4	-0.4 to +2.1	+0.3 to +2.8	+0.4 to +3.5	+0.4 to +4.5
	Spring	12.0	-0.1 to +2.2	+0.1 to +2.3	+0.5 to +2.8	+0.3 to +2.8
	Summer	11.3	-0.1 to +1.7	-0.4 to +2.3	-0.8 to +2.7	-1.6 to +2.6
	Fall	12.4	-1.2 to +1.4	-1.3 to +2.1	-1.6 to +1.9	-1.8 to +1.7

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Blackstone basin.
    - The winter season is expected to experience the greatest change (increase of 3-25% by mid-century and 4-39% by end of century).
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Blackstone basin could see a decrease of 0.4 to an increase of 2.3 inches by mid-century (decrease of 3% to increase of 20%), and a decrease of 1.6 to an increase of 2.6 inches by the end of the century (decrease of 14% to increase of 23%).
        - The fall season projections for the Blackstone basin could see a decrease of 0.3 to an increase of 2.1 inches by mid-century (decrease of 11% to increase of 17%), and a decrease of 1.8 to an increase of 1.7 inches by the end of the century (decrease of 14% to increase of 14%).

Blackstone Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	+0 to +1	+0 to +2	-1 to +2	-1 to +3
	Winter	12	-1 to +1	-1 to +2	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	12	-1 to +1	-1 to +2	-1 to +3	-1 to +3
	Fall	13	-0 to +2	+0 to +3	+0 to +3	+0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Blackstone basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

BOSTON HARBOR BASIN

MUNICIPALITIES WITHIN BOSTON HARBOR BASIN:

Abington, Arlington, Avon, Belmont, Boston, Braintree, Brockton, Burlington, Cambridge, Canton, Chelsea, Cohasset, Dedham, Dover, Everett, Foxborough, Hingham, Holbrook, Hull, Lexington, Malden, Melrose, Medfield, Medford, Milton, Norwell, Norwood, Quincy, Randolph, Reading, Revere, Rockland, Sharon, Somerville, Stoneham, Stoughton, Wakefield, Walpole, Watertown, Westwood, Weymouth, Wilmington, Winchester, Winthrop, and Woburn

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

BOSTON HARBOR BASIN

Boston Harbor Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	50.1	+2.1 to +4.0	+2.7 to +6.1	+3.2 to +8.9	+3.5 to +10.8
	Winter	29.8	+2.2 to +4.6	+2.9 to +6.9	+3.5 to +8.9	+3.9 to +10.3
	Spring	47.7	+1.7 to +3.4	+2.3 to +5.4	+2.6 to +8.0	+3.1 to +9.8
	Summer	70.1	+1.8 to +4.0	+2.3 to +6.5	+2.8 to +9.8	+3.4 to +12.1
	Fall	52.6	+2.0 to +4.7	+3.5 to +6.5	+3.3 to +9.3	+3.8 to +11.6
Maximum Temperature	Annual	59.6	+1.9 to +3.9	+2.6 to +6.0	+2.9 to +8.9	+3.2 to +10.7
	Winter	38.4	+1.9 to +4.3	+2.5 to +6.4	+3.0 to +8.3	+3.4 to +9.6
	Spring	57.5	+1.5 to +3.4	+2.0 to +5.4	+2.6 to +8.2	+3.1 to +9.7
	Summer	80.0	+1.7 to +4.0	+2.2 to +6.4	+2.7 to +9.9	+3.2 to +12.2
	Fall	61.9	+2.1 to +4.5	+3.3 to +6.7	+3.2 to +9.4	+3.6 to +11.8
Minimum Temperature	Annual	40.7	+2.2 to +4.2	+2.9 to +6.2	+3.5 to +8.9	+3.8 to +11.0
	Winter	21.3	+2.5 to +5.0	+3.2 to +7.3	+4.0 to +9.5	+4.3 to +10.9
	Spring	37.8	+1.8 to +3.5	+2.6 to +5.7	+2.6 to +7.8	+3.3 to +9.8
	Summer	60.1	+1.9 to +3.9	+2.4 to +6.8	+2.9 to +9.6	+3.6 to +12.0
	Fall	43.2	+2.0 to +4.8	+3.5 to +6.5	+3.4 to +9.3	+3.9 to +11.4

- The Boston Harbor basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.2 °F to 6.4 °F (3-8% increase); end of century increase of 3.2 °F to 12.2 °F (4-15% increase).
    - Fall mid-century increase of 3.3 °F to 6.7°F (5-11% increase); end of century increase by and 3.6 °F to 11.8 °F (6-19% increase).
- Seasonally, minimum winter and fall temperatures are expected to increase throughout the 21st century.
    - Winter mid-century increase of 3.2 °F to 7.3 °F (15-34% increase); end of century increase by 4.3 °F to 10.9 °F (20-51% increase).
    - Fall mid-century of 3.5 °F to 6.5 °F (8-15% increase); end of century increase of 3.9 °F to 11.4 °F (9-26% increase).

BOSTON HARBOR BASIN

Boston Harbor Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	8	+6 to +16	+8 to +29	+9 to +49	+12 to +67
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	1	+<1[29] to +1	+<1[29] to +1	+<1[29] to +2	+<1[29] to +4
	Summer	7	+5 to +13	+6 to +24	+8 to +40	+10 to +52
	Fall	<1[29]	+1 to +2	+1 to +5	+1 to +8	+1 to +11
Days with Maximum Temperature Over 95°F	Annual	1	+2 to +7	+2 to +13	+3 to +26	+5 to +41
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[29]	+<1[29] to +<1[29]	+<1[29] to +<1[29]	+0 to +1	+<1[29] to +2
	Summer	1	+2 to +6	+2 to +11	+3 to +23	+4 to +36
	Fall	<1[29]	+<1[29] to +1	+<1[29] to +2	+<1[29] to +4	+<1[29] to +5
Days with Maximum Temperature Over 100°F	Annual	<1[29]	+<1[29] to +1	+<1[29] to +4	+<1[29] to +9	+1 to +16
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[29]	+0 to +<1[29]	+0 to +<1[29]	+0 to +<1[29]
	Summer	<1[29]	+<1[29] to +1	+<1[29] to +4	+<1[29] to +8	+1 to +14
	Fall	0	+0 to +<1[29]	+0 to +<1[29]	+0 to +1	+<1[29] to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Boston Harbor basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Boston Harbor basin is expected to see days with daily maximum temperatures over 90 °F increase by 8 to 29 more days by mid-century, and 12 to 67 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 6 to 24 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Boston Harbor basin is expected to have 10 to 52 more days.

[29] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BOSTON HARBOR BASIN

Boston Harbor Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	3	-1 to -2	-1 to -2	-1 to -2	-1 to -2
	Winter	3	-1 to -2	-1 to -2	-1 to -2	-1 to -2
	Spring	<1[30]	-0 to +<1[30]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	119	-12 to -27	-17 to -42	-21 to -55	-23 to -66
	Winter	76	-4 to -10	-5 to -17	-8 to -26	-9 to -34
	Spring	27	-3 to -10	-6 to -14	-7 to -18	-8 to -20
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	16	-4 to -8	-6 to -10	-7 to -13	-6 to -14

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Boston Harbor basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 5 to 17 fewer days by mid-century, and 9 to 34 fewer by end of century.
    - Spring is expected to have 6 to 14 fewer days by mid-century, and 8 to 20 fewer by end of century.
    - Fall is expected to have 6 to 10 fewer days by mid-century, and 6 to 14 fewer days by end of century.

[30] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BOSTON HARBOR BASIN

Boston Harbor Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6079	-501 to -1035	-672 to -1473	-798 to -1956	-899 to -2343
	Winter	3182	-191 to -421	-251 to -634	-312 to -806	-359 to -949
	Spring	1623	-132 to -285	-190 to -447	-216 to -630	-278 to -742
	Summer	78	-29 to -49	-34 to -62	-40 to -72	-44 to -75
	Fall	1191	-143 to -331	-248 to -418	-232 to -591	-254 to -669
Cooling Degree-Days (Base 65°F)	Annual	636	+217 to +443	+281 to +764	+327 to +1206	+381 to +1559
	Winter	0	+0. to +4	+0 to +5	-1 to +3	+0 to +5
	Spring	27	+13 to +33	+23 to +64	+26 to +103	+24 to +143
	Summer	544	+136 to +321	+175 to +541	+213 to +828	+261 to +1041
	Fall	60	+37 to +102	+57 to +191	+67 to +289	+94 to +376
Growing Degree-Days (Base 50°F)	Annual	2733	+393 to +798	+538 to +1251	+606 to +1996	+692 to +2508
	Winter	7	+1 to +17	+3 to +20	+7 to +37	+7 to +47
	Spring	327	+77 to +152	+101 to +262	+106 to +408	+122 to +527
	Summer	1847	+164 to +363	+215 to +600	+255 to +899	+312 to +1114
	Fall	547	+109 to +299	+198 to +441	+186 to +655	+236 to +818

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Boston Harbor basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 251 to 634 degree-days by mid-century (a decrease of 8-20%), and a decrease of 359 to 949 degree-days by the end of century (a decrease of 11-30%).
    - The spring season is expected to decrease in heating degree-days by 12-28% (190-447 degree-days) by mid-century, and by 17-46% (278-742 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-35% (248-718 degree-days) by mid-century, and by and 21-56% (254-669 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 32-99% (175-541 degree-days) by mid-century, and by 48-191% (261-1041 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 12-32% (215-600 degree-days) by mid-century, and by 17-60% (312-1114 degree-days) by end of century.
    - Spring is expected to increase by 31-80% (101-262 degree-days) by mid-century and 37-161% (122.-527 degree-days) by end of century.
    - Fall is expected to increase by 36-81% (198-441 degree-days) by mid-century and 43-149% (236-818 degree-days) by end of century.

BOSTON HARBOR BASIN

Boston Harbor Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	9	+<1[31] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+0 to +1	+<1[31] to +1	+<1[31] to +2	+<1[31] to +2
	Spring	2	+0 to +1	+0 to +1	+<1[31] to +1	+<1[31] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	3	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+<1[31] to +1	+<1[31] to +1	+<1[31] to +1	+<1[31] to +1
	Winter	<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]	+<1[31] to +<1[31]
	Spring	<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]	+<1[31] to +<1[31]
	Summer	<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]
	Fall	<1[31]	+0 to +<1[31]	+0 to +<1[31]	+<1[31] to +<1[31]	+0 to +<1[31]
Days with Precipitation Over 4"	Annual	<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]
	Summer	<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]
	Fall	<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]	+0 to +<1[31]

- The projections for expected number of days receiving precipitation over one inch are variable for the Boston Harbor basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-2.days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days) by mid-century, and by 0-1 days) by the end of century.

[31] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BOSTON HARBOR BASIN

Boston Harbor Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	46.1	+0.0 to +4.7	+0.3 to +6.2	+1.2 to +7.7	+1.1 to +9.0
	Winter	11.8	-0.4 to +1.9	-0.0 to +2.4	+0.4 to +3.0	+0.4 to +4.1
	Spring	11.6	-0.1 to +2.2	+0.0 to +2.2	+0.1 to +2.7	+0.3 to +2.8
	Summer	10.5	-0.5 to +1.6	-0.4 to +1.9	-1.0 to +2.8	-1.7 to +2.2
	Fall	12.2	-0.9 to +1.2	-1.0 to +1.6	-1.7 to +2.1	-1.6 to +1.8

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Boston Harbor basin.
  - The winter season is expected to experience the greatest change with an increase of 0-20% by mid-century, and 3-34% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Boston Harbor basin could see a decrease of 0.4 to an increase of 1.9 inches by mid-century (decrease of 4% to increase of 18%), and a decrease of 1.7 to an increase of 2.2 inches by the end of the century (decrease of 16% to increase of 21%).
    - The fall season projections for the Boston Harbor basin could see a decrease of 1.0 to an increase of 1.6 inches by mid-century (decrease of 8% to increase of 13%), and a decrease of 1.6 to an increase of 1.8 inches by the end of the century (decrease of 13% to increase of 15%).

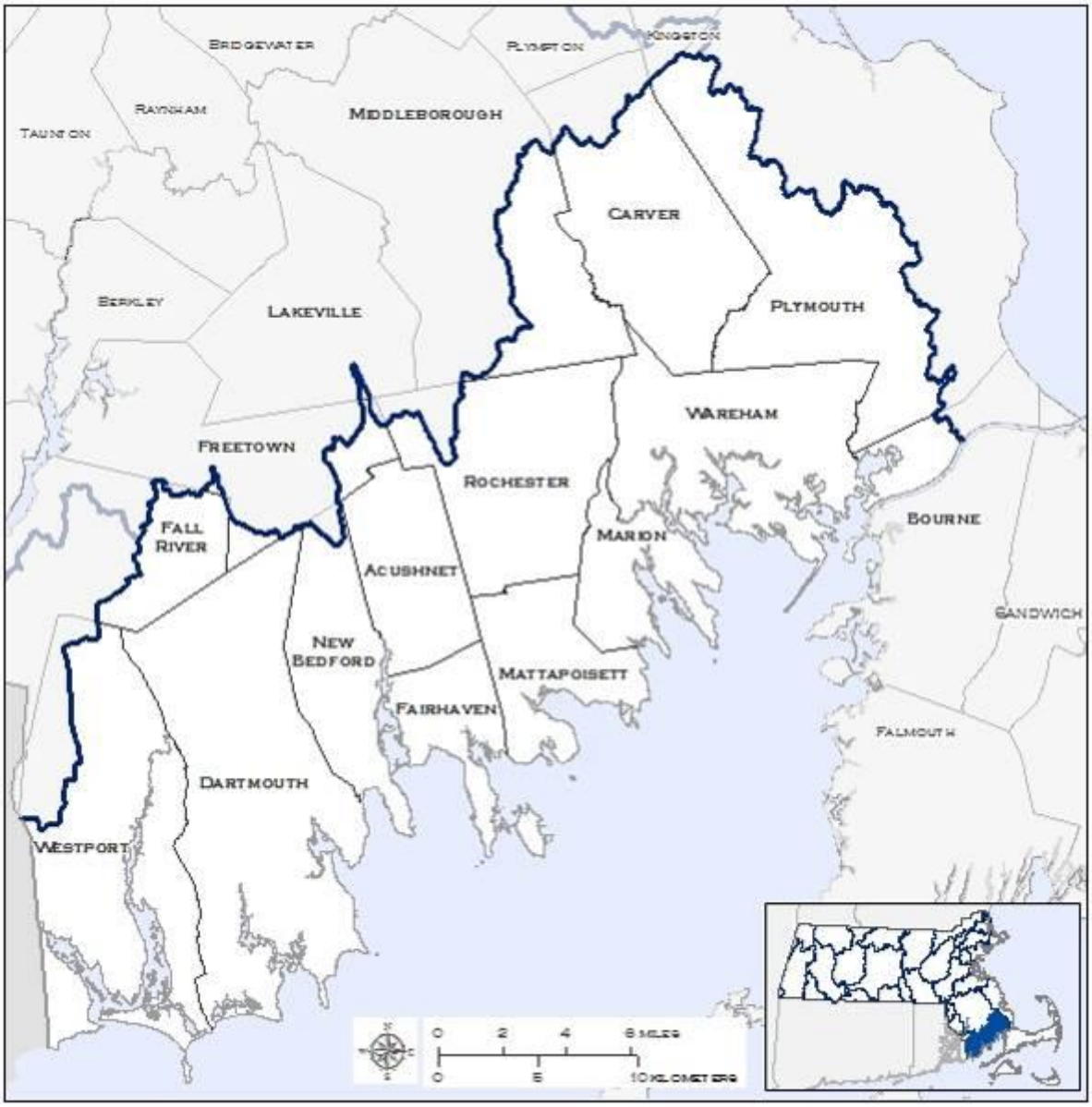
Boston Harbor Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-0 to +1	-0 to +2	-1 to +3	-1 to +4
	Winter	11	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	13	-1 to +1	-1 to +2	-1 to +3	-1 to +2
	Fall	13	-0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Boston Harbor basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

BUZZARDS BAY BASIN

MUNICIPALITIES WITHIN BUZZARDS BAY BASIN:

Acushnet, Bourne, Carver, Dartmouth, Fairhaven, Fall River, Freetown, Lakeville, Marion, Mattapoisett, Middleborough, New Bedford, Plymouth, Rochester, Wareham, Westport



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

BUZZARDS BAY BASIN

Buzzards Bay Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	50.7	+1.9 to +3.6	+2.6 to +5.9	+3.0 to +8.5	+3.3 to +10.3
	Winter	31.3	+2.1 to +4.2	+2.8 to +6.4	+3.3 to +8.5	+3.6 to +9.8
	Spring	47.3	+1.9 to +3.6	+2.6 to +5.7	+2.8 to +7.6	+3.3 to +9.2
	Summer	70.1	+1.6 to +3.7	+2.1 to +6.1	+2.6 to +9.4	+3.1 to +11.2
	Fall	53.6	+2.0 to +4.1	+3.2 to +6.1	+3.0 to +8.7	+3.5 to +10.7
Maximum Temperature	Annual	59.5	+1.8 to +3.6	+2.4 to +5.8	+2.7 to +8.5	+3.0 to +10.2
	Winter	39.7	+1.8 to +4.0	+2.4 to +5.9	+2.9 to +7.8	+3.3 to +9.1
	Spring	56.3	+1.8 to +3.5	+2.2 to +5.4	+2.7 to +7.6	+3.2 to +9.1
	Summer	79.2	+1.5 to +3.6	+1.9 to +6.1	+2.5 to +9.3	+2.9 to +11.2
	Fall	62.6	+1.9 to +4.1	+3.0 to +6.2	+2.9 to +8.6	+3.3 to +10.9
Minimum Temperature	Annual	41.8	+2.0 to +3.7	+2.8 to +6.0	+3.2 to +8.5	+3.6 to +10.4
	Winter	22.8	+2.4 to +4.4	+3.1 to +6.9	+3.7 to +9.1	+4.0 to +10.5
	Spring	38.4	+1.9 to +3.7	+2.9 to +5.9	+2.8 to +7.8	+3.4 to +9.2
	Summer	61.1	+1.7 to +3.8	+2.2 to +6.2	+2.7 to +9.3	+3.4 to +11.3
	Fall	44.7	+2.0 to +4.3	+3.3 to +6.1	+3.1 to +8.8	+3.7 to +10.7

- The Buzzards Bay basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 1.9 °F to 6.1 °F (2-8% increase); end of century increase of 2.9 °F to 11.2 °F (4-14% increase).
    - Fall mid-century increase of 3.0 °F to 6.2°F (5-10% increase); end of century increase by and 3.3 °F to 10.9 °F (5-17% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.1 °F to 6.9 °F (14-30% increase); end of century increase by 4.0 °F to 10.5 °F (18-46% increase).
    - Fall mid-century of 3.3 °F to 6.1 °F (7-14% increase); end of century increase of 3.7 °F to 10.7 °F (8-24% increase).

BUZZARDS BAY BASIN

Buzzards Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	4	+3 to +9	+4 to +21	+6 to +40	+8 to +55
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[32]	+0 to +<1[32]	+<1[32] to +3	+<1[32] to +1	+<1[32] to +1
	Summer	4	+3 to +8	+4 to +19	+6 to +35	+7 to +48
	Fall	<1[32]	+<1[32] to +1	+<1[32] to +2	+<1[32] to +4	+1 to +6
Days with Maximum Temperature Over 95°F	Annual	1	+1 to +3	+1 to +6	+1 to +15	+2 to +25
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[32]	+0 to +<1[32]	+0 to +<1[32]	+<1[32] to +<1[32]	+<1[32] to +<1[32]
	Summer	1	+1 to +2	+1 to +6	+1 to +14	+2 to +24
	Fall	0	+0 to +<1[32]	+<1[32] to +<1[32]	+<1[32] to +1	+<1[32] to +1
Days with Maximum Temperature Over 100°F	Annual	<1[32]	+<1[32] to +<1[32]	+<1[32] to +1	+<1[32] to +3	+<1[32] to +7
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[32]	+0 to +<1[32]	+0 to +<1[32]	+0 to +<1[32]
	Summer	<1[32]	+<1[32] to +<1[32]	+<1[32] to +1	+<1[32] to +3	+<1[32] to +7
	Fall	0	+0 to +<1[32]	+0 to +<1[32]	+0 to +<1[32]	+0 to +<1[32]

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Buzzards Bay basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Buzzards Bay basin is expected to see days with daily maximum temperatures over 90 °F increase by 4 to 21 more days by mid-century, and 8 to 55 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 4 to 19 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Buzzards Bay basin is expected to have 7 to 48 more days.

[32] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BUZZARDS BAY BASIN

Buzzards Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	2	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Winter	2	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Spring	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	111	-14 to -28	-20 to -44	-23 to -55	-24 to -67
	Winter	73	-5 to -12	-7 to -20	-9 to -29	-10 to -37
	Spring	25	-5 to -11	-7 to -15	-8 to -18	-9 to -19
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	13	-0 to -7	-0 to -9	-0 to -11	-0 to -12

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Buzzards Bay basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 7 to 20 fewer days by mid-century, and 10 to 37 fewer by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 19 fewer by end of century.
    - Fall is expected to have 5 to 9 fewer days by mid-century, and 6 to 12 fewer days by end of century.

BUZZARDS BAY BASIN

Buzzards Bay Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	5866	-502 to -972	-707 to -1455	-812 to -1927	-879 to -2283
	Winter	3056	-190 to -383	-247 to -590	-294 to -765	-327 to -905
	Spring	1639	-161 to -308	-217 to -480	-241 to -625	-297 to -728
	Summer	67	-23 to -44	-33 to -54	-34 to -63	-39 to -66
	Fall	1101	-133 to -291	-234 to -400	-223 to -564	-241 to -638
Cooling Degree-Days (Base 65°F)	Annual	622	+191 to +404	+242 to +683	+284 to +1120	+348 to +1423
	Winter	0	+0 to +4	+0 to +4	-1 to +4	+1 to +5
	Spring	16	+9 to +25	+13 to +48	+15 to +78	+16 to +104
	Summer	537	+120 to +303	+153 to +512	+200 to +795	+246 to +972
	Fall	67	+31 to +87	+47 to +160	+54 to +251	+81 to +330
Growing Degree-Days (Base 50°F)	Annual	2734	+363 to +753	+486 to +1199	+558 to +1890	+655 to +2361
	Winter	7	+1 to +14	+2 to +22	+6 to +38	+7 to +54
	Spring	280	+73 to +144	+96 to +246	+102 to +369	+110 to +479
	Summer	1850	+143 to +342	+188 to +564	+235 to +860	+287 to +1034
	Fall	593	+99 to +263	+179 to +411	+170 to +603	+219 to +765

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Buzzards Bay basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 247 to 590 degree-days by mid-century (a decrease of 8-19%), and a decrease of 327 to 905 degree-days by the end of century (a decrease of 11-30%).
    - The spring season is expected to decrease in heating degree-days by 13-29% (217-480 degree-days) by mid-century, and by 18-44% (297-728 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-36% (234-400 degree-days) by mid-century, and by and 22-58% (241-638 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 28-95% (153-512 degree-days) by mid-century, and by 46-181% (246-972 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 10-30% (188-564 degree-days) by mid-century, and by 16-56% (287-1034 degree-days) by end of century.
    - Spring is expected to see an increase by 34-88% (96-246 degree-days) by mid-century and 39-171% (110-479 degree-days) by end of century.
    - Fall is expected to see an increase by 30-69% (179-411 degree-days) by mid-century and 37-129% (219-765 degree-days) by end of century.

BUZZARDS BAY BASIN

Buzzards Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[34] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+<1[34] to +1	+<1[34] to +1	+<1[34] to +1	+<1[34] to +2
	Spring	2	+<1[34] to +1	+<1[34] to +1	+<1[34] to +1	+<1[34] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+<1[34] to +1	+<1[34] to +1	+<1[34] to +1	+<1[34] to +1
	Winter	<1[33]	+0 to +<1[34]	+<1[34] to +<1[34]	+0 to +<1[34]	+<1[34] to +<1[34]
	Spring	<1[34]	+0 to +<1[34]	+0 to +<1[34]	+<1[34] to +<1[34]	+<1[34] to +<1[34]
	Summer	<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]
	Fall	<1[34]	+0 to +<1[34]	+<1[34] to +<1[34]	+0 to +<1[34]	+0 to +<1[34]
Days with Precipitation Over 4"	Annual	<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]
	Winter	0	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]
	Spring	0	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]
	Summer	<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]
	Fall	<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]	+0 to +<1[34]

- The projections for expected number of days receiving precipitation over one inch are variable for the Buzzards Bay basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-1 days by the end of century.

[33] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

BUZZARDS BAY BASIN

Buzzards Bay Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	47.8	-0.7 to +3.9	+0.3 to +5.4	+0.7 to +6.1	+0.3 to +6.8
	Winter	12.6	-0.3 to +1.6	-0.0 to +1.9	+0.2 to +2.6	+0.1 to +3.9
	Spring	12.2	-0.1 to +1.9	-0.1 to +2.2	+0.1 to +2.4	+0.1 to +2.7
	Summer	11.0	-1.0 to +1.1	-0.9 to +1.5	-1.0 to +1.9	-2.3 to +1.8
	Fall	12.1	-0.7 to +0.8	-1.0 to +1.5	-1.6 to +1.7	-1.7 to +1.2

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Buzzards Bay basin.
  - The winter season is expected to experience the greatest change with an increase of 0-15% by mid-century, and 1-31% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Buzzards Bay or basin could see a decrease of 0.9 to an increase of 1.5 inches by mid-century (decrease of 8% to increase of 14%), and a decrease of 2.3 to an increase of 1.8 inches by the end of the century (decrease of 21% to increase of 17%).
    - The fall season projections for the Buzzards Bay basin could see a decrease of 1.0 to an increase of 1.5 inches by mid-century (decrease of 8% to increase of 13%), and a decrease of 1.7 to an increase of 1.2 inches by the end of the century (decrease of 14% to increase of 10%).

Buzzards Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	+0 to +2	+0 to +2	-1 to +3	+0 to +4
	Winter	10	-1 to +2	-1 to +1	+0 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	14	-1 to +2	-1 to +2	-1 to +3	+0 to +3
	Fall	13	+0 to +2	+0 to +3	+0 to +3	+0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Buzzards Bay basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The summer season is expected to experience an increase of 0-4 days in consecutive dry days by the end of the century.

CAPE COD BASIN

MUNICIPALITIES WITHIN CAPE COD BASIN:

Barnstable, Bourne, Brewster, Chatham, Dennis, Eastham, Falmouth, Harwich, Mashpee, Orleans, Provincetown, Sandwich, Truro, Wellfleet, Yarmouth

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

CAPE COD BASIN

Cape Cod Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.9	+1.8 to +3.4	+2.4 to +5.4	+2.7 to +7.8	+3.1 to +9.5
	Winter	31.9	+1.8 to +3.7	+2.5 to +5.7	+3.1 to +7.7	+3.4 to +9.2
	Spring	46.0	+1.7 to +3.2	+2.2 to +5.0	+2.6 to +6.7	+2.9 to +7.7
	Summer	68.2	+1.5 to +3.6	+2.1 to +5.7	+2.5 to +8.6	+3.0 to +10.4
	Fall	53.3	+1.9 to +3.8	+3.0 to +5.9	+2.9 to +8.3	+3.4 to +10.1
Maximum Temperature	Annual	57.7	+1.6 to +3.4	+2.2 to +5.2	+2.4 to +7.7	+2.8 to +9.3
	Winter	39.8	+1.5 to +3.6	+2.1 to +5.3	+2.6 to +7.3	+3.0 to +8.7
	Spring	53.7	+1.4 to +3.1	+1.9 to +4.8	+2.3 to +6.5	+2.6 to +7.6
	Summer	76.0	+1.4 to +3.5	+2.0 to +5.6	+2.3 to +8.5	+2.7 to +10.3
	Fall	61.2	+1.8 to +3.8	+2.8 to +5.8	+2.8 to +8.0	+3.1 to +10.0
Minimum Temperature	Annual	42.1	+1.9 to +3.5	+2.7 to +5.5	+3.1 to +7.8	+3.4 to +9.7
	Winter	24.1	+2.1 to +4.0	+2.9 to +6.2	+3.5 to +8.3	+3.8 to +9.9
	Spring	38.2	+1.7 to +3.5	+2.5 to +5.3	+2.7 to +6.9	+3.2 to +7.8
	Summer	60.4	+1.7 to +3.8	+2.2 to +5.7	+2.6 to +8.7	+3.3 to +10.6
	Fall	45.4	+1.9 to +4.0	+3.1 to +5.9	+3.0 to +8.5	+3.6 to +10.3

- The Cape Cod basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2 °F to 5.6 °F (3-7% increase); end of century increase of 2.7 °F to 10.3 °F (4-14% increase).
    - Fall mid-century increase of 2.8°F to 5.8°F (5-10% increase); end of century increase by and 2.8 °F to 5.8 °F (5-16% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 2.9 °F to 6.2 °F (12-26% increase); end of century increase by 3.8 °F to 9.9 °F (16-41% increase).
    - Fall mid-century of 3.1 °F to 5.9 °F (7-13% increase); end of century increase of 3.6 °F to 10.3 °F (8-23% increase).

CAPE COD BASIN

Cape Cod Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	1	+1 to +4	+2 to +9	+2 to +21	+3 to +34
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[34]	+0[35] to +<1[35]	+0[35] to +<1[35]	+0 to +<1[35]	+0 to +<1[35]
	Summer	1	+1 to +4	+2 to +9	+2 to +20	+3 to +32
	Fall	<1[35]	+<1[35] to +<1[35]	+<1[35] to +1	+<1[35] to +1	+<1[35] to +2
Days with Maximum Temperature Over 95°F	Annual	<1[35]	+<1[35] to +1	+<1[35] to +2	+<1[35] to +5	+<1[35] to +9
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[35]	+0 to +<1[35]	+0 to +<1[35]	+0 to +<1[35]
	Summer	<1[35]	+<1[35] to +1	+<1[35] to +2	+<1[35] to +4	+<1[35] to +9
	Fall	0	+0 to +<1[35]	+0 to +<1[35]	+0 to +<1[35]	+0 to +<1[35]
Days with Maximum Temperature Over 100°F	Annual	0	+0 to +<1[35]	+0 to +<1[35]	+<1[35] to +1	+<1[35] to +2
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +<1[35]
	Summer	0	+0 to +<1[35]	+0 to +<1[35]	+<1[35] to +1	+<1[35] to +2
	Fall	0	+0 to +0	+0 to +0	+0 to +<1[35]	+0 to +<1[35]

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Cape Cod basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Cape Cod basin is expected to see days with daily maximum temperatures over 90 °F increase by 2 to 9 more days by mid-century, and 3 to 34 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 2 to 9 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Cape Cod basin is expected to have 3 to 32 more days.

[34] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CAPE COD BASIN

Cape Cod Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	1	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Winter	1	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Spring	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	105	-14 to -28	-19 to -42	-23 to -54	-25 to -67
	Winter	71	-6 to -12	-7 to -20	-10 to -30	-11 to -38
	Spring	24	-5 to -11	-7 to -15	-8 to -17	-10 to -19
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	10	-0 to -6	-0 to -8	-0 to -10	-0 to -11

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Cape Cod basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 7 to 20 fewer days by mid-century, and 11 to 38 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 10 to 19 fewer days by end of century.
    - Fall is expected to have 5 to 8 fewer days by mid-century, and 5 to 11 fewer days by end of century.

CAPE COD BASIN

Cape Cod Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	5957	-475 to -913	-686 to -1374	-774 to -1828	-854 to -2172
	Winter	2996	-165 to -348	-220 to -521	-277 to -698	-304 to -832
	Spring	1754	-152 to -285	-190 to -445	-230 to -585	-267 to -650
	Summer	94	-30 to -58	-42 to -70	-45 to -81	-45 to -85
	Fall	1106	-132 to -269	-227 to -393	-215 to -547	-242 to -620
Cooling Degree-Days (Base 65°F)	Annual	436	+145 to +364	+224 to +601	+250 to +965	+314 to +1226
	Winter	0	+0 to +1	+0 to +4	+1 to +3	+0 to +4
	Spring	7	+3 to +9	+5 to +20	+6 to +34	+72 to +52
	Summer	384	+107 to +279	+149 to +457	+184 to +702	+229 to +875
	Fall	44	+31 to +80	+42 to +138	+49 to +224	+72 to +297
Growing Degree-Days (Base 50°F)	Annual	2421	+343 to +691	+460 to +1078	+519 to +1678	+618 to +2104
	Winter	5	+0 to +10	+0 to +15	+2 to +26	+4 to +36
	Spring	198	+51 to +105	+69 to +195	+78 to +277	+78 to +343
	Summer	1670	+138 to +332	+191 to +520	+225 to +789	+278 to +959
	Fall	546	+108 to +248	+175 to +397	+169 to +572	+215 to +717

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Cape Cod basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 220-521 degree-days by mid-century (a decrease of 7-17%), and a decrease of 304-832 degree-days by the end of century (a decrease of 10-28%).
    - The spring season is expected to decrease in heating degree-days by 11-25% (190-445 degree-days) by mid-century, and by 15-37% (267-650 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-36% (227-393 degree-days) by mid-century, and by and 22-56% (242-620 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 39-119% (149-457 degree-days) by mid-century, and by 60-228% (229-875 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 11-31% (190.73-520.48 degree-days) by mid-century, and by 17-57% (278-959 degree-days) by end of century.
    - Spring is expected to see an increase by 35-99% (69-195 degree-days) by mid-century and 39-174% (78-343 degree-days) by end of century.
    - Fall is expected to see an increase by 32-73% (175-397 degree-days) by mid-century and 39-131% (215-717 degree-days) by end of century.

CAPE COD BASIN

Cape Cod Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+<1[37] to +2	+1 to +3	+<1[37] to +3	+1 to +3
	Winter	1	+0 to +1	+<1[37] to +1	+<1[37] to +1	+<1[37] to +1
	Spring	2	+0 to +1	+<1[37] to +1	+<1[37] to +1	+<1[37] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[37]	+<1[37] to +1	+<1[37] to +1	+<1[37] to +1
	Winter	<1[35]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]
	Spring	<1[37]	+0 to +<1[37]	+<1[37] to +<1[37]	+<1[37] to +<1[37]	+0 to +<1[37]
	Summer	<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]
	Fall	<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]
Days with Precipitation Over 4"	Annual	<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]
	Winter	0	+0 to +0	+0 to +<1[37]	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[37]	+0 to +0	+0 to +<1[37]	+0 to +0
	Summer	0	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]
	Fall	<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]	+0 to +<1[37]

- The projections for expected number of days receiving precipitation over one inch are variable for the Cape Cod basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-1 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-1 days by the end of century.

[35] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CAPE COD BASIN

Cape Cod Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	44.9	-1.1 to +3.5	-0.4 to +4.5	-0.8 to +5.8	-0.8 to +5.5
	Winter	11.6	-0.4 to +1.2	-0.2 to +1.6	-0.1 to +2.1	-0.0 to +3.1
	Spring	11.5	-0.0 to +1.5	-0.3 to +1.7	-0.2 to +2.1	+0.1 to +2.5
	Summer	10.2	-1.0 to +1.2	-1.1 to +1.7	-1.6 to +2.0	-2.2 to +1.7
	Fall	11.6	-1.0 to +0.9	-1.0 to +1.1	-1.4 to +1.6	-1.5 to +1.3

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Cape Cod basin.
    - The winter season is expected to experience the greatest change with a decrease of 2% to an increase of 14% by mid-century, and an increase of 0-27% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Cape Cod or basin could see a decrease of 1.1 to an increase of 1.7 inches by mid-century (decrease of 10% to increase of 17%), and a decrease of 2.2 to an increase of 1.7 inches by the end of the century (decrease of 22% to increase of 16%).
        - The fall season projections for the Cape Cod basin could see a decrease of -1 to an increase of 1.1 inches by mid-century (decrease of 9% to increase of 9%), and a decrease of 1.5 to an increase of 1.3 inches by the end of the century (decrease of 13% to increase of 11%).

Cape Cod Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	19	-1 to +2	-1 to +3	-0 to +4	-0 to +5
	Winter	10	-1 to +2	-0 to +1	-0 to +2	-1 to +2
	Spring	12	-1 to +1	-1 to +2	-1 to +1	-1 to +2
	Summer	15	-1 to +2	-1 to +3	-1 to +4	-1 to +5
	Fall	13	-1 to +2	-0 to +2	+0 to +3	+0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Cape Cod basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The summer season is expected to experience a decrease of 1 day to an increase of 5 days in consecutive dry days by the end of the century.

CHARLES BASIN

MUNICIPALITIES WITHIN CHARLES BASIN:

Ashland, Arlington, Bellingham, Belmont, Boston, Brookline, Cambridge, Dedham, Dover, Franklin, Holliston, Hopedale, Hopkinton, Lexington, Lincoln, Medfield, Medway, Mendon, Milford, Millis, Natick, Needham, Newton, Norfolk, Sherborn, Somerville, Walpole, Waltham, Watertown, Wayland, Wellesley, Weston, Westwood, and Wrentham

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

CHARLES BASIN

Charles Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.4	+2.1 to +4.0	+2.7 to +6.1	+3.2 to +8.8	+3.5 to +10.7
	Winter	28.5	+1.0 to +4.3	+2.5 to +6.4	+3.1 to +8.2	+3.6 to +9.6
	Spring	47.2	+1.5 to +3.3	+2.2 to +5.5	+2.4 to +7.8	+3.0 to +9.6
	Summer	69.8	+2.0 to +4.2	+2.6 to +7.0	+3.1 to +10.2	+3.7 to +12.7
	Fall	51.6	+2.0 to +4.8	+3.6 to +6.5	+3.4 to +9.3	+3.9 to +11.5
Maximum Temperature	Annual	60.1	+1.9 to +3.8	+2.5 to +5.9	+3.0 to +8.8	+3.2 to +10.6
	Winter	38.3	+1.5 to +3.9	+2.1 to +5.9	+2.6 to +7.5	+3.0 to +8.7
	Spring	58.1	+1.4 to +3.2	+1.9 to +5.4	+2.3 to +7.9	+2.9 to +9.6
	Summer	81.0	+1.9 to +4.3	+2.5 to +6.9	+3.1 to +10.4	+3.6 to +12.9
	Fall	62.6	+2.2 to +4.6	+3.4 to +6.6	+3.2 to +9.3	+3.7 to +11.8
Minimum Temperature	Annual	38.7	+2.2 to +4.3	+2.9 to +6.2	+3.5 to +8.8	+3.8 to +10.8
	Winter	18.8	+2.2 to +4.9	+2.9 to +7.0	+3.7 to +8.9	+4.1 to +10.3
	Spring	36.3	+1.6 to +3.4	+2.5 to +5.8	+2.6 to +7.6	+3.1 to +9.5
	Summer	58.6	+2.1 to +4.4	+2.7 to +7.3	+3.2 to +10.0	+3.9 to +12.5
	Fall	40.6	+2.0 to +5.0	+3.6 to +6.4	+3.5 to +9.1	+4.0 to +11.4

- The Charles basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.5 °F to 6.9 °F (3-9% increase); end of century increase of 3.6 °F to 12.9 °F (4-16% increase).
    - Fall mid-century increase of 3.4°F to 6.6°F (5-11% increase); end of century increase by and 3.8 °F to 11.8 °F (6-19% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 2.9 °F to 7 °F (16-37% increase); end of century increase by 4.1 °F to 10.3 °F (22-55% increase).
    - Fall mid-century of 3.6 °F to 6.4 °F (9-16% increase); end of century increase of 4.0 °F to 11.4 °F (10-28% increase).

CHARLES BASIN

Charles Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	9	+7 to +20	+10 to +35	+13 to +57	+15 to +76
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	1	+<1[38] to +1	+<1[38] to +1	+<1[38] to +3	+<1[38] to +4
	Summer	8	+6 to +17	+8 to +30	+11 to +46	+13 to +59
	Fall	<1[36]	+1 to +2	+1 to +5	+1 to +10	+2 to +13
Days with Maximum Temperature Over 95°F	Annual	1	+2 to +8	+3 to +16	+4 to +32	+6 to +49
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[38]	+<1[38] to +<1[38]	+<1[38] to +<1[38]	+<1[38] to +1	+<1[38] to +2
	Summer	1	+2 to +8	+3 to +14	+4 to +29	+5 to +42
	Fall	<1[38]	+<1[38] to +1	+<1[38] to +2	+<1[38] to +4	+<1[38] to +5
Days with Maximum Temperature Over 100°F	Annual	<1[38]	+<1[38] to +2	+<1[38] to +5	+1 to +11	+1 to +20
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[38]	+0 to +<1[38]	+0 to +<1[38]	+0 to +<1[38]
	Summer	<1[38]	+<1[38] to +2	+<1[38] to +5	+1 to +10	+1 to +19
	Fall	0	+0 to +<1[38]	+0 to +<1[38]	+<1[38] to +1	+<1[38] to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Charles basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Charles basin is expected to see days with daily maximum temperatures over 90 °F increase by 10 to 35 more days by mid-century, and 15 to 76 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 8 to 30 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Charles basin is expected to have 13 to 59 more days.

[36] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CHARLES BASIN

Charles Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	5	-1 to -3	-1 to -3	-2 to -3	-2 to -4
	Winter	5	-1 to -2	-1 to -3	-2 to -3	-2 to -4
	Spring	<1[37]	-0 to +<1[39]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[39]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	136	-10 to -26	-17 to -39	-20 to -52	-22. to -63
	Winter	81	-3 to -7	-3 to -12	-5 to -20	-6 to -26
	Spring	32	-3 to -11	-6 to -15	-7 to -19	-8 to -20
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	23	-4 to -9	-7 to -12	-8 to -15	-7 to -18

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Charles basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 3 to 12 fewer days by mid-century, and 6 to 26 fewer by end of century.
    - Spring is expected to have 6 to 15 fewer days by mid-century, and 8 to 20 fewer days by end of century.
    - Fall is expected to have 7 to 12 fewer days by mid-century, and 7 to 18 fewer days by end of century.

[37] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CHARLES BASIN

Charles Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6329	-483 to -1015	-660 to -1444	-777 to -1936	-875 to -2311
	Winter	3303	-170 to -397	-219 to -597	-278 to -745	-323 to -881
	Spring	1661	-121 to -277	-182 to -457	-204 to -611	-264 to -724
	Summer	85	-29 to -50	-38 to -67	-43 to -75	-45 to -78
	Fall	1274	-143 to -342	-261 to -423	-243 to -597	-259 to -683
Cooling Degree-Days (Base 65°F)	Annual	608	+229 to +462	+298 to +789	+348 to +1225	+407 to +1598
	Winter	0	+0 to +2	-1 to +3	+1 to +3	+1 to +4
	Spring	25	+12 to +30	+20 to +59	+23 to +103	+21 to +140
	Summer	526	+156 to +345	+192 to +579	+236 to +867	+285 to +1089
	Fall	54	+39 to +103	+55 to +177	+64 to +274	+93 to +361
Growing Degree-Days (Base 50°F)	Annual	2651	+407 to +809	+553 to +1276	+629 to +1989	+720 to +2491
	Winter	7	+0 to +13	+1 to +15	+4 to +24	+3 to +31
	Spring	318	+65 to +141	+90 to +248	+96 to +392	+110 to +508
	Summer	1822	+186 to +390	+240 to +641	+286 to +938	+342 to +1165
	Fall	501	+116 to +304	+195 to +423	+184 to +629	+233 to +799

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Charles basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-18% (219-597 degree-days) by mid-century, and a decrease of 10-27% (323-881 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 11-28% (182-457 degree-days) by mid-century, and by 16-44% (264-724 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-33% (261-423 degree-days) by mid-century, and by and 20-54% (259-683 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 37-110% (192-579 degree-days) by mid-century, and by 54-207% (285-1089 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 13-35% (240-641 degree-days) by mid-century, and by 19-64% (342-1165 degree-days) by end of century.
    - Spring is expected to see an increase by 28-78% (90-248 degree-days) by mid-century and 35-160% (110-508 degree-days) by end of century.
    - Fall is expected to see an increase by 39-84% (195-424 degree-days) by mid-century and 47-159% (233-799 degree-days) by end of century.

CHARLES BASIN

Charles Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[40] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+0 to +1	+<1[40] to +1	+<1[40] to +2	+<1[40] to +2
	Spring	2	+0 to +1	+<1[40] to +1	+<1[40] to +1	+<1[40] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[40]	+<1[40] to +<1[40]	+<1[40] to +1	+<1[40] to +1
	Winter	<1[38]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]
	Spring	<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]	+<1[40] to +<1[40]
	Summer	<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]
	Fall	<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]
Days with Precipitation Over 4"	Annual	<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[40]	+0 to +<1[40]	+0 to +0	+0 to +<1[40]
	Summer	<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]
	Fall	<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]	+0 to +<1[40]

- The projections for expected number of days receiving precipitation over one inch are variable for the Charles basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-1.2 days by the end of century.

[38] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CHARLES BASIN

Charles Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	46.6	-0.0 to +4.8	+0.2 to +6.1	+1.2 to +7.5	+0.7 to +8.2
	Winter	11.7	-0.4 to +2.0	+0.1 to +2.4	+0.4 to +3.0	+0.3 to +4.1
	Spring	11.7	-0.1 to +2.1	-0.0 to +2.1	+0.2 to +2.4	+0.1 to +2.4
	Summer	10.9	-0.4 to +1.6	-0.4 to +2.1	-1.0 to +2.6	-1.5 to +2.3
	Fall	12.2	-1.2 to +1.3	-1.2 to +1.7	-1.6 to +1.6	-1.8 to +1.7

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Charles basin.
    - The winter season is expected to experience the greatest change with an increase of 1-21% by mid-century, and of 3-35% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Charles or basin could see a decrease of 0.4 to an increase of 2.1 inches by mid-century (decrease of 4% to increase of 19%), and a decrease of 1.5 to an increase of 2.3 inches by the end of the century (decrease of 13% to increase of 21%).
        - The fall season projections for the Charles basin could see a decrease of 1.2 to an increase of 1.7 inches by mid-century (decrease of 10% to increase of 14%), and a decrease of 1.8 to an increase of 1.7 inches by the end of the century (decrease of 14% to increase of 14%).

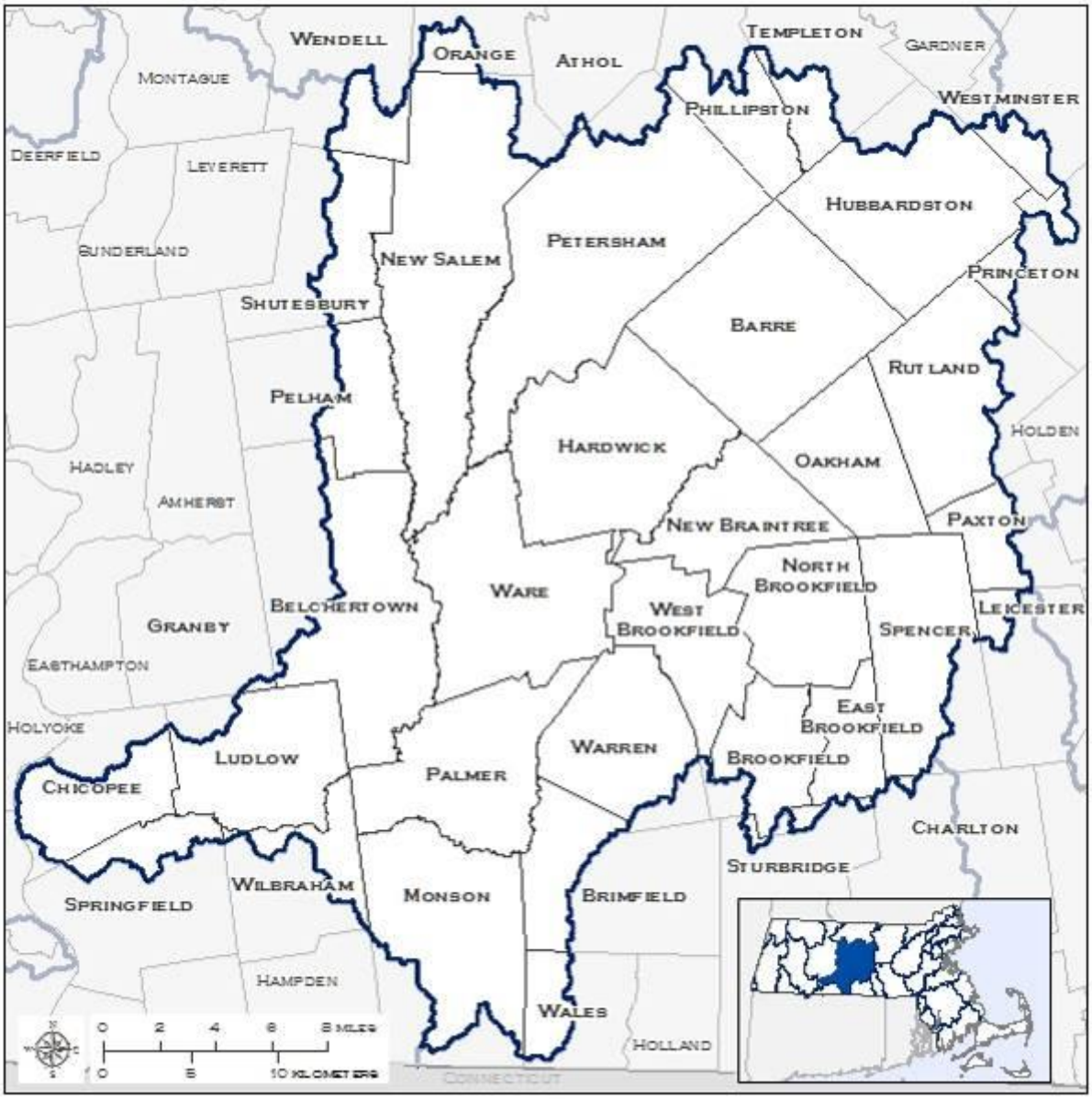
Charles Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-0 to +1	-1 to +2	-1 to +3	-1 to +3
	Winter	12	-1 to +1	-1 to +2	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-2 to +1	-1 to +1
	Summer	12	-1 to +2	-1 to +2	-1 to +3	-1 to +2
	Fall	13	-0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Charles basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

CHICOPEE BASIN

MUNICIPALITIES WITHIN CHICOPEE BASIN:

Barre, Belchertown, Brimfield, Brookfield, Chicopee, East Brookfield, Hardwick, Hubbardston, Leicester, Ludlow, Monson, New Braintree, New Salem, North Brookfield, Oakham, Orange, Palmer, Paxton, Pelham, Petersham, Phillipston, Princeton, Rutland, Shutesbury, Spencer, Springfield, Sturbridge, Templeton, Wales, Ware, Warren, Wendell, West Brookfield, Westminster, and Wilbraham



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

CHICOPEE BASIN

Chicopee Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	46.2	+2.2 to +4.5	+3.0 to +6.4	+3.6 to +9.0	+4.0 to +11.0
	Winter	24.6	+2.3 to +5.2	+3.0 to +7.8	+3.8 to +9.4	+4.2 to +10.8
	Spring	44.5	+1.5 to +3.3	+2.3 to +5.3	+2.6 to +7.4	+3.1 to +9.2
	Summer	66.8	+2.4 to +4.6	+3.2 to +7.2	+3.6 to +10.3	+4.0 to +12.8
	Fall	48.4	+2.3 to +5.3	+3.9 to +6.8	+3.8 to +9.6	+4.3 to +11.7
Maximum Temperature	Annual	57.4	+2.1 to +4.2	+2.8 to +6.5	+3.2 to +9.1	+3.6 to +11.0
	Winter	34.7	+1.9 to +4.6	+2.6 to +7.0	+3.1 to +8.5	+3.5 to +9.7
	Spring	56.0	+1.3 to +3.3	+2.2 to +5.3	+2.6 to +7.7	+3.1 to +9.3
	Summer	78.7	+2.1 to +4.7	+3.0 to +7.3	+3.4 to +10.6	+3.9 to +13.2
	Fall	59.8	+2.4 to +5.1	+3.8 to +7.1	+3.6 to +9.9	+4.2 to +12.2
Minimum Temperature	Annual	34.9	+2.4 to +4.8	+3.3 to +6.6	+3.9 to +8.9	+4.4 to +10.9
	Winter	14.5	+2.6 to +5.9	+3.5 to +8.4	+4.4 to +10.2	+4.7 to +11.7
	Spring	32.9	+1.6 to +3.6	+2.4 to +5.8	+2.8 to +7.3	+3.1 to +8.9
	Summer	54.9	+2.5 to +4.7	+3.4 to +7.3	+3.7 to +10.1	+4.2 to +12.4
	Fall	37.1	+2.0 to +5.4	+3.7 to +6.7	+3.9 to +9.3	+4.3 to +11.5

- The Chicopee basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 3 °F to 7.3 °F (4-9% increase); end of century increase of 3.9 °F to 13.2 °F (5-17% increase).
    - Fall mid-century increase of 3.78°F to 7.1°F (6-12% increase); end of century increase by and 4.2 °F to 12.2 °F (7-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.5 °F to 8.4 °F (24-58% increase); end of century increase by 4.7 °F to 11.7 °F (33-81% increase).
    - Fall mid-century of 3.7 °F to 6.7 °F (10-18% increase); end of century increase of 4.3 °F to 11.5 °F (12-31% increase).

CHICOPEE BASIN

Chicopee Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	3	+5 to +15	+8 to +29	+9 to +49	+11 to +69
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[39]	+<1[41] to +1	+<1[41] to +1	+<1[41] to +3	+<1[41] to +4
	Summer	3	+4 to +13	+7 to +25	+8 to +42	+10 to +56
	Fall	<1[41]	+<1[41] to +1	+<1[41] to +3	+<1[41] to +7	+1 to +9
Days with Maximum Temperature Over 95°F	Annual	<1[41]	+1 to +5	+2 to +12	+2 to +25	+3 to +40
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[41]	+<1[41] to +<1[41]	+<1[41] to +1	+<1[41] to +1
	Summer	<1[41]	+1 to +5	+2 to +11	+2 to +22	+3 to +36
	Fall	<1[41]	+<1[41] to +<1[41]	+<1[41] to +1	+<1[41] to +2	+<1[41] to +3
Days with Maximum Temperature Over 100°F	Annual	0	+<1[41] to +1	+<1[41] to +3	+<1[41] to +7	+<1[41] to +16
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[41]	+0 to +<1[41]	+0 to +<1[41]	+0 to +<1[41]
	Summer	0	+<1[41] to +1	+<1[41] to +3	+<1[41] to +7	+<1[41] to +15
	Fall	0	+0 to +<1[41]	+0 to +<1[41]	+0 to +<1[41]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Chicopee basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Chicopee basin is expected to see days with daily maximum temperatures over 90 °F increase by 8 to 29 more days by mid-century, and 11 to 69 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 7 to 25 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Chicopee basin is expected to have 10 to 56 more days.

[39] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CHICOPEE BASIN

Chicopee Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	11	-4 to -7	-5 to -8	-5 to -9	-5 to -9
	Winter	11	-4 to -7	-5 to -8	-5 to -8	-5 to -9
	Spring	<1[40]	-0 to -0	-0 to -0	-0 to -0	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[42]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	162	-11 to -28	-19 to -38	-22 to -52	-23 to -63
	Winter	86	-1 to -5	-2 to -8	-3 to -15	-4 to -19
	Spring	43	-3 to -10	-6 to -15	-7 to -19	-8 to -21
	Summer	<1[42]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	33	-6 to -13	-10 to -16	-9 to -20	-10 to -23

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Chicopee basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 2 to 8 fewer days by mid-century, and 4 to 19 fewer by end of century.
    - Spring is expected to have 6 to 15 fewer days by mid-century, and 8 to 21 fewer by end of century.
    - Fall is expected to have 10 to 16 fewer days by mid-century, and 10 to 23 fewer days by end of century.

[40] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CHICOPEE BASIN

Chicopee Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7263	-598 to -1245	-828 to -1728	-958 to -2273	-1089 to -2653
	Winter	3657	-194 to -484	-263 to -712	-338 to -850	-383 to -991
	Spring	1904	-122 to -289	-198 to -455	-221 to -598	-271 to -714
	Summer	163	-58 to -98	-80 to -121	-85 to -139	-92 to -144
	Fall	1539	-179 to -422	-313 to -501	-293 to -695	-317 to -796
Cooling Degree-Days (Base 65°F)	Annual	375	+198 to +408	+267 to +698	+315 to +1073	+361 to +1426
	Winter	0	+0 to +3	+0 to +7	+0 to +4	+0 to +4
	Spring	15	+9 to +24	+14 to +48	+19 to +80	+16 to +112
	Summer	328	+162 to +324	+203 to +536	+234 to +816	+268 to +1034
	Fall	29	+23 to +72	+38 to +120	+46 to +204	+61 to +276
Growing Degree-Days (Base 50°F)	Annual	2158	+405 to +800	+545 to +1231	+656 to +1873	+737 to +2353
	Winter	3	-1 to +8	+0 to +9	+0 to +13	+1 to +18
	Spring	242	+58 to +126	+87 to +221	+106 to +333	+109 to +435
	Summer	1546	+216 to +421	+292 to +656	+327 to +951	+368 to +1174
	Fall	357	+107 to +279	+172 to +385	+167 to +577	+214 to +725

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Chicopee basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-19% (263-712 degree-days) by mid-century, and a decrease of 10-27% (383-991 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 10-24% (198-455 degree-days) by mid-century, and by 14-38% (271-714 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-33% (313-501 degree-days) by mid-century, and by and 21-52% (317-796 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 62-163% (203-536 degree-days) by mid-century, and by 82-315% (268-1034 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 19-42% (292-656 degree-days) by mid-century, and by 24-76% (368-1174 degree-days) by end of century.
    - Spring is expected to see an increase by 36-92% (87-221 degree-days) by mid-century and 45-180% (109-435 degree-days) by end of century.
    - Fall is expected to see an increase by 48-108% (172-385 degree-days) by mid-century and 60-203% (214-725 degree-days) by end of century.

CHICOPEE BASIN

Chicopee Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	6	+0 to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	1	+0 to +1	+<1[43] to +1	+<1[43] to +1	+<1[43] to +2
	Spring	1	+0 to +1	+0 to +1	+<1[43] to +1	+<1[43] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[43]	+<1[43] to +<1[43]	+0 to +<1[43]	+<1[43] to +1
	Winter	<1[41]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]
	Spring	<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]	+<1[43] to +<1[43]
	Summer	<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]
	Fall	<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]
Days with Precipitation Over 4"	Annual	0	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Summer	0	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]
	Fall	0	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]	+0 to +<1[43]

- The projections for expected number of days receiving precipitation over one inch are variable for the Chicopee basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and by 0-2 days by the end of century.
    - The spring season is expected to an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-1 days by the end of century.

[41] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CHICOPEE BASIN

Chicopee Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	46.6	-0.2 to +4.7	+1.1 to +6.0	+1.8 to +7.0	+1.4 to +7. 7
	Winter	10.6	-0.4 to +1.9	+0.1 to +2.4	+0.3 to +2.9	+0.6 to +3.9
	Spring	11.9	-0.1 to +2.1	+0.0 to +1.9	+0.3 to +2.6	+0.2 to +2.8
	Summer	12.1	-0.2 to +1.5	-0.2 to +2.0	-0.5 to +2.0	-1.2 to +2.0
	Fall	12.1	-1.1 to +1.3	-1.2 to +1.7	-1.6 to +1.8	-1.7 to +1.5

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Chicopee basin.
    - The winter season is expected to experience the greatest change with an increase of 0-23% by mid-century, and of 6-37% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Chicopee or basin could see a decrease of 0.2 to an increase of 2 inches by mid-century (decrease of 2% to increase of 17%), and a decrease of 1.2 to an increase of 2.0 inches by the end of the century (decrease of 10% to increase of 17%).
        - The fall season projections for the Chicopee basin could see a decrease of 1.2 to an increase of 1.7 inches by mid-century (decrease of 10% to increase of 14%), and a decrease of 1.7 to an increase of 1.5 inches by the end of the century (decrease of 14% to increase of 12%).

Chicopee Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-1 to +1	-1 to +2	-1 to +2	-1 to +3
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	11	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Fall	12	-0 to +2	-1 to +3	-1 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Chicopee basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

CONNECTICUT BASIN

MUNICIPALITIES WITHIN CONNECTICUT BASIN:

Agawam, Amherst, Ashfield, Belchertown, Bernardston, Chesterfield, Chicopee, Conway, Deerfield, East Longmeadow, Easthampton, Erving, Gill, Goshen, Granby, Greenfield, Hadley, Hampden, Hatfield, Holyoke, Huntington, Leverett, Leyden, Longmeadow, Ludlow, Monson, Montague, Montgomery, Northampton, Northfield, Pelham, Royalston, Shutesbury, South Hadley, Southampton, Southwick, Springfield, Sunderland, Warwick, Wendell, West Springfield, Westfield, Westhampton, Whately, Wilbraham, and Williamsburg

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

CONNECTICUT BASIN

Connecticut Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	47.0	+2.2 to +4.5	+3.0 to +6.4	+3.6 to +9.0	+4.0 to +10.9
	Winter	25.0	+2.4 to +5.4	+3.0 to +8.0	+4.0 to +9.5	+4.2 to +10.8
	Spring	45.4	+1.5 to +3.3	+2.3 to +5.2	+2.8 to +7.2	+3.1 to +8.8
	Summer	67.9	+2.2 to +4.5	+3.2 to +7.2	+3.4 to +10.5	+3.9 to +12.9
	Fall	49.2	+2.3 to +5.2	+3.8 to +6.8	+3.8 to +9.6	+4.2 to +11.7
Maximum Temperature	Annual	58.5	+2.0 to +4.2	+2.7 to +6.6	+3.2 to +9.1	+3.6 to +11.0
	Winter	35.2	+2.0 to +4.7	+2.6 to +7.1	+3.2 to +8.5	+3.4 to +9.6
	Spring	57.2	+1.4 to +3.2	+2.1 to +5.2	+2.7 to +7.5	+3.2 to +9.0
	Summer	80.2	+1.9 to +4.7	+2.8 to +7.5	+3.3 to +10.9	+3.8 to +13.4
	Fall	60.8	+2.5 to +5.0	+3.7 to +7.2	+3.5 to +9.9	+4.2 to +12.2
Minimum Temperature	Annual	35.5	+2.4 to +4.8	+3.4 to +6.6	+3.9 to +8.9	+4.4 to +10.9
	Winter	14.8	+2.6 to +6.0	+3.6 to +8.8	+4.5 to +10.5	+4.9 to +11.8
	Spring	33.5	+1.6 to +3.6	+2.4 to +5.6	+3.0 to +7.1	+3.3 to +8.6
	Summer	55.7	+2.3 to +4.6	+3.2 to +7.3	+3.6 to +10.1	+4.1 to +12.5
	Fall	37.7	+2.0 to +5.3	+3.6 to +6.6	+3.8 to +9.2	+4.2 to +11.4

- The Connecticut basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.8 °F to 7.5 °F (3-9% increase); end of century increase of 3.8 °F to 13.4 °F (5-17% increase).
    - Fall mid-century increase of 3.7°F to 7.2°F (6-12% increase); end of century increase by and 4.2 °F to 12.2 °F (7-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.6 °F to 8.8 °F (24-59% increase); end of century increase by 4.9 °F to 11.8 °F (33-80% increase).
    - Fall mid-century of 3.6 °F to 6.6 °F (10-18% increase); end of century increase of 4.2°F to 11.4 °F (11-30% increase).

CONNECTICUT BASIN

Connecticut Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	6	+6 to +20	+10 to +35	+12 to +57	+15 to +76
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[42]	+<1[44] to +1	+<1[44] to +2	+<1[44] to +3	+<1[44] to +5
	Summer	6	+6 to +17	+8 to +30	+10 to +46	+12 to +60
	Fall	<1[44]	+<1[44] to +2	+1 to +5	+1 to +9	+1 to +12
Days with Maximum Temperature Over 95°F	Annual	<1[44]	+2 to +7	+3 to +16	+4 to +33	+5 to +50
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[44]	+<1[44] to +<1[44]	+<1[44] to +1	+<1[44] to +2
	Summer	<1[44]	+2 to +7	+3 to +15	+3 to +29	+4 to +43
	Fall	<1[44]	+<1[44] to +1	+<1[44] to +1	+<1[44] to +3	+<1[44] to +5
Days with Maximum Temperature Over 100°F	Annual	0	+<1[44] to +2	+<1[44] to +4	+<1[44] to +12	+<1[44] to +23
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[44]	+0 to +<1[44]	+0 to +0	+0 to +<1[44]
	Summer	0	+<1[44] to +1	+<1[44] to +4	+<1[44] to +11	+<1[44] to +21
	Fall	0	+0 to +<1[44]	+0 to +<1[44]	+<1[44] to +1	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Connecticut basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Connecticut basin is expected to see days with daily maximum temperatures over 90 °F increase by 10 to 35 more days by mid-century, and 15 to 76 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 8 to 30 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Connecticut basin is expected to have 12 to 60 more days.

[42] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CONNECTICUT BASIN

Connecticut Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	11	-4 to -7	-5 to -8	-5 to -9	-6 to -10
	Winter	11	-4 to -7	-5 to -8	-5 to -9	-5 to -9
	Spring	<1[43]	-0 to -0	-0 to -0	-0 to -0	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[45]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	159	-11 to -28	-19 to -37	-22 to -51	-23 to -60
	Winter	85	-1 to -56	-2 to -9	-4 to -16	-4 to -19
	Spring	42	-3 to -10	-6 to -14	-7 to -18	-9 to -19
	Summer	<1[45]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	32	-5 to -13	-10 to -16	-9 to -20	-9 to -22

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Connecticut basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 2 to 9 fewer days by mid-century, and 4 to 19 fewer by end of century.
    - Spring is expected to have 6 to 14 fewer days by mid-century, and 9 to 19 fewer by end of century.
    - Fall is expected to have 10 to 16 fewer days by mid-century, and 9 to 22 fewer days by end of century.

[43] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CONNECTICUT BASIN

Connecticut Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7038	-579 to -1221	-808 to -1697	-932 to -2214	-1061 to -2563
	Winter	3617	-197 to -492	-268 to -732	-349 to -867	-385 to -998
	Spring	1827	-122 to -279	-189 to -437	-226 to -567	-272 to -667
	Summer	127	-46 to -80	-63 to -102	-67 to -117	-73 to -119
	Fall	1471	-176 to -404	-299 to -487	-283 to -675	-307 to -768
Cooling Degree-Days (Base 65°F)	Annual	459	+201 to +431	+273 to +749	+327 to +1142	+380 to +1505
	Winter	0	+0 to +2	+0 to +7	+0 to +3	+0 to +7
	Spring	20	+10 to +29	+18 to +55	+21 to +93	+21 to +122
	Summer	396	+162 to +335	+204 to +565	+235 to +854	+271 to +1075
	Fall	38	+26 to +85	+41 to +137	+50 to +223	+64 to +304
Growing Degree-Days (Base 50°F)	Annual	2348	+392 to +801	+536 to +1252	+652 to +1895	+739 to +2380
	Winter	4	+0 to +9	+0 to +9	+1 to +14	+2 to +19
	Spring	279	+60 to +131	+92 to +225	+118 to +331	+118 to +435
	Summer	1650	+201 to +417	+279 to +665	+315 to +966	+359 to +1190
	Fall	403	+105 to +284	+170 to +395	+167 to +591	+211 to +734

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Connecticut basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-20% (268-732 degree-days) by mid-century, and a decrease of 11-28% (385-998 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 10-24% (189-437 degree-days) by mid-century, and by 15-36% (272-667 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-33% (299-487 degree-days) by mid-century, and by and 21-52% (307-768 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 52-142% (204-565 degree-days) by mid-century, and by 68-271% (271-1075 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 17-40% (279-665 degree-days) by mid-century, and by 22-72% (359-1190 degree-days) by end of century.
    - Spring is expected to see an increase by 33-81% (92-225 degree-days) by mid-century and 42-156% (118-435 degree-days) by end of century.
    - Fall is expected to see an increase by 42-98% (170-395 degree-days) by mid-century and 52-182% (211-734 degree-days) by end of century.

CONNECTICUT BASIN

Connecticut Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+<1[46] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	1	+0 to +1	+<1[46] to +1	+<1[46] to +1	+<1[46] to +2
	Spring	2	+0 to +1	+<1[46] to +1	+<1[46] to +1	+<1[46] to +2
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+<1[46] to +1
	Winter	<1[44]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]
	Spring	<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]
	Summer	<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]
	Fall	<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]
Days with Precipitation Over 4"	Annual	0	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Summer	0	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]
	Fall	0	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]	+0 to +<1[46]

- The projections for expected number of days receiving precipitation over one inch are variable for the Connecticut basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.

[44] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

CONNECTICUT BASIN

Connecticut Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	46.4	-0.4 to +5.0	+1.3 to +6.2	+2.0 to +7.3	+1.7 to +8.3
	Winter	10.3	-0.4 to +2.1	+0.1 to +2.6	+0.3 to +3.0	+0.7 to +3.9
	Spring	12.1	-0.1 to +2.1	+0.3 to +2.1	+0.6 to +2.8	+0.5 to +2.9
	Summer	12.0	-0.4 to +1.8	-0.2 to +2.1	-0.3 to +1.9	-1.0 to +1.9
	Fall	11.9	-1.2 to +1.5	-1.3 to +1.7	-1.5 to +1.8	-1.7 to +1.5

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Connecticut basin.
    - The winter season is expected to experience the greatest change with an increase of 1-25% by mid-century, and of 7-37% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Connecticut or basin could see a decrease of 0.2 to an increase of 2.1 inches by mid-century (decrease of 1% to increase of 18%), and a decrease of 1.0 to an increase of 1.9 inches by the end of the century (decrease of 9% to increase of 16%).
        - The fall season projections for the Connecticut basin could see a decrease of 1.3 to an increase of 1.7 inches by mid-century (decrease of 11% to increase of 14% and a decrease of 1.7 to an increase of 1.5 inches by the end of the century (decrease of 14% to increase of 12%).

Connecticut Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-0 to +1	-0 to +2	-1 to +2	-0 to +2
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Spring	12	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	12	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Fall	12	-0 to +2	-0 to +2	-1 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Connecticut basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

DEERFIELD BASIN

MUNICIPALITIES WITHIN DEERFIELD BASIN:

Adams, Ashfield, Bernardston, Buckland, Charlemont, Colrain, Conway, Deerfield, Florida, Goshen, Greenfield, Hawley, Heath, Leyden, Monroe, North Adams, Plainfield, Rowe, Savoy, and Shelburne

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

DEERFIELD BASIN

Deerfield Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	444	+2.2 to +4.6	+3.2 to +6.7	+3.7 to +9.4	+4.2 to +11.4
	Winter	22.2	+2.4 to +5.7	+3.1 to +8.6	+4.2 to +10.3	+4.6 to +11.7
	Spring	42.7	+1.9 to +3.8	+2.7 to +5.7	+3.2 to +8.0	+3.8 to +9.5
	Summer	65.4	+2.2 to +4.6	+3.1 to +7.3	+3.6 to +10.5	+4.1 to +12.8
	Fall	46.8	+2.2 to +5.1	+3.5 to +6.6	+3.5 to +9.6	+3.8 to +11.9
Maximum Temperature	Annual	55.3	+2.1 to +4.5	+2.8 to +6.9	+3.3 to +9.5	+3.8 to +11.5
	Winter	32.0	+2.1 to +5.0	+2.6 to +7.7	+3.4 to +9.2	+3.9 to +10.4
	Spring	53.9	+1.8 to +3.8	+2.6 to +5.8	+3.1 to +8.3	+3.7 to +9.8
	Summer	77.3	+2.0 to +4.8	+2.8 to +7.6	+3.4 to +11.0	+3.9 to +13.4
	Fall	57.7	+2.4 to +5.0	+3.4 to +7.1	+3.3 to +10.0	+3.9 to +12.3
Minimum Temperature	Annual	33.4	+2.4 to +5.0	+3.5 to +6.9	+4.1 to +9.2	+4.5 to +11.4
	Winter	12.4	+2.7 to +6.5	+3.7 to +9.4	+4.9 to +11.4	+5.2 to +12.7
	Spring	31.5	+2.1 to +4.1	+2.8 to +6.1	+3.5 to +7.6	+3.9 to +9.3
	Summer	53.6	+2.5 to +4.7	+3.3 to +7.3	+3.8 to +10.0	+4.3 to +12.3
	Fall	35.9	+1.9 to +5.1	+3.3 to +6.6	+3.6 to +9.3	+3.7 to +11.5

- The Deerfield basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.8 °F to 7.6 °F (4-10% increase); end of century increase of 3.9 °F to 13.4 °F (5-17% increase).
    - Fall mid-century increase of 3.4 °F to 7.1°F (6-12% increase); end of century increase by and 3.9 °F to 12.3 °F (7-21% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.7 °F to 9.4 °F (30-76% increase); end of century increase by 5.2 °F to 12.7 °F (42-103% increase).
    - Fall mid-century of 3.3 °F to 6.6 °F (9-18% increase); end of century increase of 3.7°F to 11.5 °F (10-32% increase).

DEERFIELD BASIN

Deerfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	3	+4 to +13	+6 to +25	+8 to +43	+9 to +60
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[45]	+<1[47] to +1	+<1[47] to +1	+<1[47] to +2	+<1[47] to +4
	Summer	2	+4 to +11	+5 to +22	+6 to +37	+8 to +50
	Fall	<1[47]	+<1[47] to +1	+<1[47] to +2	+<1[47] to +5	+<1[47] to +7
Days with Maximum Temperature Over 95°F	Annual	<1[47]	+1 to +4	+1 to +10	+2 to +21	+2 to +35
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[47]	+<1[47] to +<1[47]	+0 to +1	+0 to +1
	Summer	<1[47]	+1 to +4	+1 to +9	+1 to +19	+2 to +32
	Fall	0	+<1[47] to +<1[47]	+<1[47] to +1	+<1[47] to +1	+<1[47] to +2
Days with Maximum Temperature Over 100°F	Annual	0	+<1[47] to +1	+<1[47] to +2	+<1[47] to +6	+<1[47] to +13
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +<1[47]	+0 to +<1[47]	+0 to +<1[47]
	Summer	0	+<1[47] to +1	+<1[47] to +2	+<1[47] to +5	+<1[47] to +12
	Fall	0	+0 to +<1[47]	+0 to +<1[47]	+0 to +<1[47]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Deerfield basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Deerfield basin is expected to see days with daily maximum temperatures over 90 °F increase by 6 to 25 more days by mid-century, and 9 to 60 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 5 to 22 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Deerfield basin is expected to have 8 to 50 more days.

[45] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

DEERFIELD BASIN

Deerfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	16	-6 to -10	-8 to -12	-9 to -13	-9 to -14
	Winter	15	-5 to -10	-7 to -12	-8 to -13	-9 to -14
	Spring	1	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to - 0
Days with Minimum Temperature Below 32°F	Annual	172	-11 to -29	-20 to -38	-23 to -53	-24 to -63
	Winter	88	-1 to -4	-1 to -7	-2 to -13	-3 to -16
	Spring	47	-5 to -11	-7 to -15	-8 to -20	-10 to -22
	Summer	<1[46]	-0 to +0[48]	-0 to -0	-0 to -0	-0 to -0
	Fall	37	-5 to -14	-9 to -16	-9 to -23	-10 to -26

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Deerfield basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 1 to 7 fewer days by mid-century, and 3 to 16 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 10 to 22 fewer days by end of century.
    - Fall is expected to have 9 to 16 fewer days by mid-century, and 10 to 26 fewer days by end of century.

[46] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

DEERFIELD BASIN

Deerfield Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7826	-665 to -1371	-907 to -1922	-1063 to -2526	-1184 to -2910
	Winter	3870	-204 to -531	-274 to -788	-370 to -938	-425 to -1076
	Spring	2063	-164 to -333	-231 to -496	-279 to -662	-328 to -761
	Summer	218	-70 to -129	-97 to -167	-113 to -190	-124 to -201
	Fall	1677	-179 to -419	-294 to -529	-286 to -744	-306 to -861
Cooling Degree-Days (Base 65°F)	Annual	296	+165 to +355	+222 to +623	+266 to +973	+308 to +1294
	Winter	0	0 to 0	0 to 0	0 to 0	0 to 0
	Spring	13	+8 to +21	+11 to +40	+13 to +67	13 to +96
	Summer	259	+140 to +294	+176 to +500	+207 to +770	+240 to +975
	Fall	22	+14 to +53	+22 to +91	+27 to +164	+35 to +224
Growing Degree-Days (Base 50°F)	Annual	1952	+362 to +747	+499 to +1197	+612 to +1779	+691 to +2248
	Winter	3	-2 to +6	+0 to +7	+0 to +10	+1 to +14
	Spring	211	+57 to +123	+88 to +203	+103 to +300	+108 to +395
	Summer	1423	+203 to +421	+282 to +665	+328 to +960	+372 to +1171
	Fall	305	+86 to +235	+126 to +342	+133 to +534	+176 to +670

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Deerfield basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-20% (274-788 degree-days) by mid-century, and a decrease of 11-28% (425-1076 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 11-24% (231-496 degree-days) by mid-century, and by 16-37% (328-761 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 18-32% (294-529 degree-days) by mid-century, and by 18-51% (306-861 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 68-193% (176-500 degree-days) by mid-century, and by 93-377% (240-975 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 20-47% (282-665 degree-days) by mid-century, and by 26-82% (372-1171 degree-days) by end of century.
    - Spring is expected to see an increase by 42-96% (88-203 degree-days) by mid-century and 51-187% (108-395 degree-days) by end of century.
    - Fall is expected to see an increase by 41-112% (126-342 degree-days) by mid-century and 58-220% (176-670 degree-days) by end of century.

DEERFIELD BASIN

Deerfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+0 to +2	+1 to +4	+1 to +4	+1 to +5
	Winter	1	+0 to +1	+<1[49] to +1	+<1[49] to +1	+<1[49] to +2
	Spring	2	+0 to +1	+<1[49] to +1	+<1[49] to +1	+<1[49] to +2
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	-1 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +1	+0 to +1	+<1[49] to +1	+<1[49] to +1
	Winter	0	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]
	Spring	<1[47]	+0 to +<1[49]	+0 to +<1[49]	+<1[49] to +<1[49]	+<1[49] to +<1[49]
	Summer	<1[49]	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]
	Fall	<1[49]	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]
Days with Precipitation Over 4"	Annual	0	+0 to +0	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +<1[49]	+0 to +<1[49]
	Summer	0	+0 to +0	+0 to +<1[49]	+0 to +<1[49]	+0 to +0
	Fall	0	+0 to +0	+0 to +<1[49]	+0 to +<1[49]	+0 to +<1[49]

- The projections for expected number of days receiving precipitation over one inch are variable for the Deerfield basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.

[47] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

DEERFIELD BASIN

Deerfield Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	50.4	-0.5 to +5.7	+1.2 to +7.3	+2.0 to +7.6	+2.5 to +9.0
	Winter	11.3	-0.4 to +2.0	+0.2 to +2.7	+0.5 to +3.3	+1.0 to +4.2
	Spring	13.5	+0.0 to +2.2	+0.3 to +2.3	+0.8 to +3.0	+0.8 to +3.3
	Summer	12.8	-0.4 to +2.3	-0.3 to +2.4	-0.1 to +1.7	-0.8 to +2.0
	Fall	12.8	-1.4 to +1.9	-1.4 to +1.8	-1.8 to +1.8	-1.8 to +1.6

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Deerfield basin.
  - The winter season is expected to experience the greatest change with an increase of 2-24% by mid-century, and of 9-38% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Deerfield or basin could see a decrease of 0.3 to an increase of 2.4 inches by mid-century (decrease of 2% to increase of 19%), and a decrease of 0.8 to an increase of 2 inches by the end of the century (decrease of 6% to increase of 15%).
    - The fall season projections for the Deerfield basin could see a decrease of 1.4 to an increase of 1.8 inches by mid-century (decrease of 11% to increase of 14% and a decrease of 1.8 to an increase of 1.6 inches by the end of the century (decrease of 14% to increase of 12%).

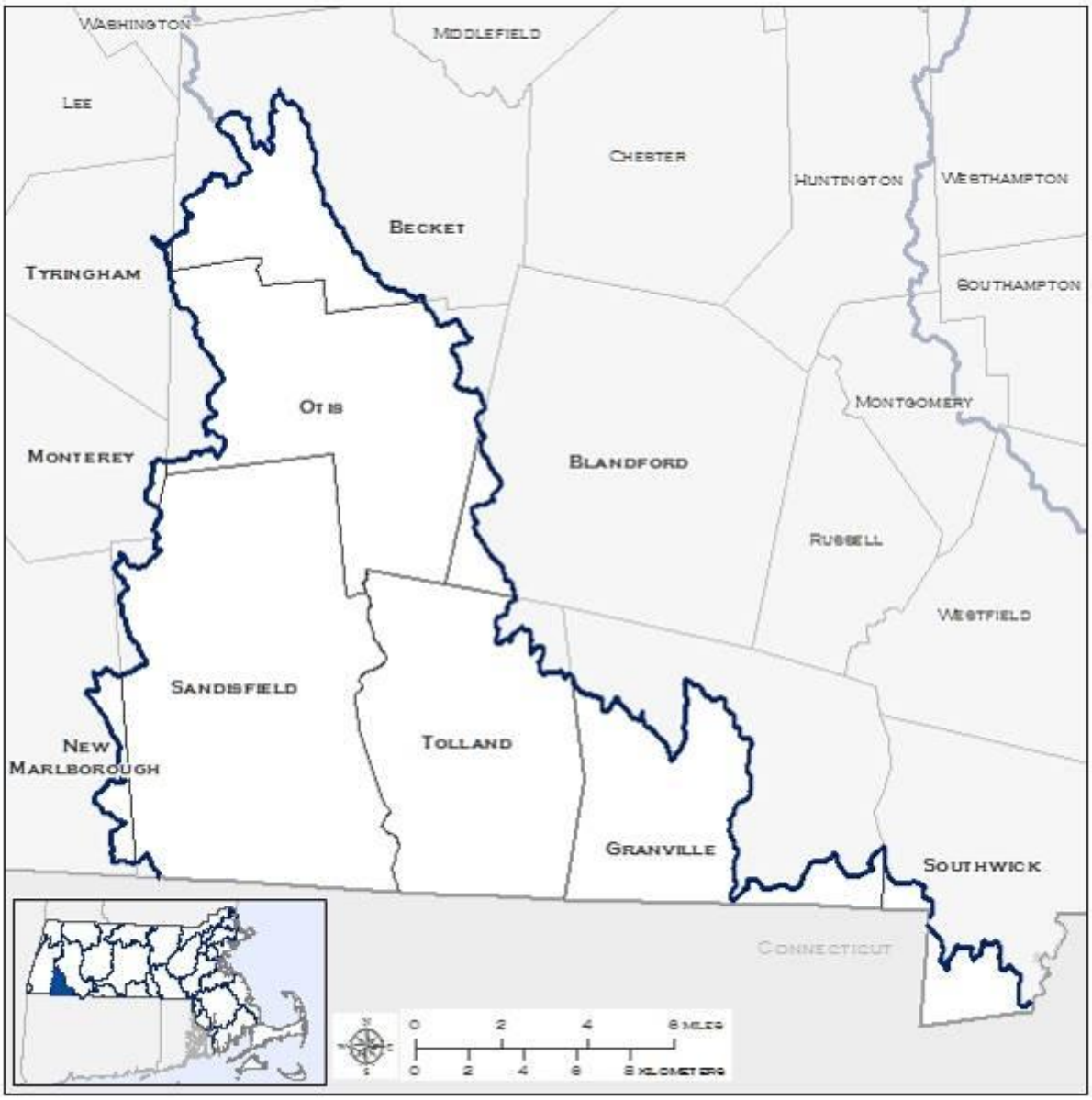
Deerfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	15	-0 to +1	-0 to +2	-0 to +2	-1 to +2
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	10	-1 to +1	-0 to +1	-1 to +1	-1 to +1
	Fall	11	+0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Deerfield basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

FARMINGTON BASIN

MUNICIPALITIES WITHIN FARMINGTON BASIN:

Becket, Blandford, Granville, Monterey, New Marlborough, Otis, Sandisfield, Southwick, Tolland, and Tyringham



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

FARMINGTON BASIN

Farmington Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	44.1	+2.3 to +4.5	+3.0 to +6.6	+3.6 to +9.1	+4.1 to +11.1
	Winter	22.3	+2.4 to +5.4	+3.0 to +8.1	+4.0 to +9.7	+4.3 to +11.1
	Spring	42.3	+1.8 to +3.5	+2.5 to +5.7	+3.0 to +7.7	+3.5 to +9.5
	Summer	64.9	+2.3 to +4.4	+3.0 to +6.9	+3.4 to +9.8	+4.0 to +12.1
	Fall	46.6	+2.3 to +5.4	+3.9 to +7.2	+3.9 to +10.0	+4.3 to +12.3
Maximum Temperature	Annual	55.0	+2.0 to +4.3	+2.7 to +6.6	+3.2 to +9.2	+3.7 to +11.2
	Winter	31.9	+1.9 to +4.7	+2.7 to +7.3	+3.3 to +8.8	+3.7 to +10.1
	Spring	53.7	+1.7 to +3.4	+2.4 to +5.5	+2.9 to +8.0	+3.5 to +9.7
	Summer	76.5	+2.1 to +4.5	+2.7 to +7.1	+3.3 to +10.2	+3.8 to +12.5
	Fall	57.3	+2.5 to +5.3	+3.7 to +7.4	+3.8 to +10.3	+4.3 to +12.6
Minimum Temperature	Annual	33.3	+2.3 to +4.7	+3.3 to +6.7	+4.0 to +9.0	+4.5 to +11.1
	Winter	12.7	+2.7 to +6.0	+3.5 to +8.7	+4.7 to +10.6	+5.1 to +12.1
	Spring	30.9	+1.9 to +3.7	+2.6 to +6.1	+3.1 to +7.7	+3.6 to +9.3
	Summer	53.4	+2.4 to +4.6	+3.2 to +7.0	+3.5 to +9.5	+4.1 to +11.7
	Fall	35.9	+2.1 to +5.4	+3.9 to +7.0	+4.0 to +9.7	+4.3 to +11.9

- The Farmington basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.7 °F to 7.1 °F (4-9% increase); end of century increase of 3.8 °F to 12.5 °F (5-16% increase).
    - Fall mid-century increase of 3.7 °F to 7.4°F (6-13% increase); end of century increase by and 4.3 °F to 12.6 °F (7-22% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.5 °F to 8.7 °F (28-68% increase); end of century increase by 5.1 °F to 12.1 °F (40-95% increase).
    - Fall mid-century of 3.9 °F to 7 °F (11-19% increase); end of century increase of 4.3°F to 11.9 °F (12-33% increase).

FARMINGTON BASIN

Farmington Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	1	+3 to +9	+4 to +19	+4 to +36	+6 to +53
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+<1[50] to +<1[50]	+<1[50] to +1	+<1[50] to +1	+<1[50] to +3
	Summer	1	+3 to +9	+3 to +17	+4 to +31	+6 to +45
	Fall	<1[48]	+<1[50] to +1	+<1[50] to +1	+<1[50] to +4	+<1[50] to +6
Days with Maximum Temperature Over 95°F	Annual	<1[50]	+<1[50] to +2	+<1[50] to +5	+1 to +13	+1 to +24
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[50]	+0 to +<1[50]	+0 to +<1[50]	+0 to +1
	Summer	<1[50]	+<1[50] to +2	+<1[50] to +5	+1 to +11	+1 to +22
	Fall	0	+0 to +<1[50]	+<1[50] to +<1[50]	+<1[50] to +1	+0 to +1
Days with Maximum Temperature Over 100°F	Annual	0	+<1[50] to +<1[50]	+<1[50] to +1	+<1[50] to +2	+0 to +6
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +<1[50]	+0 to +<1[50]
	Summer	0	+<1[50] to +<1[50]	+<1[50] to +1	+<1[50] to +2	+0 to +5
	Fall	0	+0 to +<1[50]	+0 to +<1[50]	+0 to +<1[50]	+0 to +<1[50]

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Farmington basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Farmington basin is expected to see days with daily maximum temperatures over 90 °F increase by 4 to 19 more days by mid-century, and 6 to 53 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 3 to 17 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Farmington basin is expected to have 6 to 45 more days.

[48] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

FARMINGTON BASIN

Farmington Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	15	-5 to -10	-7 to -11	-8 to -12	-8 to -13
	Winter	14	-5 to -9	-7 to -11	-7 to -11	-8 to -12
	Spring	1	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	+0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	173	-11 to -27	-19 to -38	-22 to -53	-24 to -61
	Winter	87	-1 to -5	-1 to -7	-3 to -13	-3 to -16
	Spring	49	-5 to -10	-6 to -15	-7 to -20	-9 to -22
	Summer	<1[49]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	37	-5 to -14	-10 to -17	-10 to -22	-10 to -25

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Farmington basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 1 to 7 fewer days by mid-century, and 3 to 16 fewer days by end of century.
    - Spring is expected to have 6 to 15 fewer days by mid-century, and 9 to 22 fewer days by end of century.
    - Fall is expected to have 10 to 17 fewer days by mid-century, and 10 to 25 fewer days by end of century.

[49] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

FARMINGTON BASIN

Farmington Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7888	-657 to -1341	-891 to -1887	-1029 to -2476	-1201 to -2867
	Winter	3863	-203 to -500	-268 to -745	-349 to -881	-402 to -1019
	Spring	2095	-153 to -309	-215 to -499	-264 to -645	-314 to -779
	Summer	229	-76 to -128	-104 to -166	-119 to -193	-131 to -204
	Fall	1696	-189 to -446	-325 to -560	-322 to -768	-343 to -885
Cooling Degree-Days (Base 65°F)	Annual	251	+158 to +335	+211 to +592	+247 to +909	+286 to +1235
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	10	+6 to +16	+9 to +32	+13 to +57	+11 to +90
	Summer	223	+126 to +283	+164 to +464	+191 to +710	+229 to +913
	Fall	18	+16 to +54	+25 to +93	+30 to +174	+41 to +235
Growing Degree-Days (Base 50°F)	Annual	1867	+385 to +743	+505 to +1179	+605 to +1759	+685 to +2228
	Winter	3	-1 to +7	+1 to +8	+0 to +13	+1 to +16
	Spring	195	+55 to +114	+78 to +196	+95 to +303	+95 to +400
	Summer	1377	+212 to +400	+271 to +630	+308 to +900	+359 to +1109
	Fall	287	+104 to +261	+155 to +374	+163 to +566	+211 to +708

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Farmington basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-19% (268-745 degree-days) by mid-century, and a decrease of 10-26% (402-1019 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 10-24% (215-499 degree-days) by mid-century, and by 15-37% (314-779 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 19-33% (325-560 degree-days) by mid-century, and by 20-52% (343-885 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 74-208% (164-464 degree-days) by mid-century, and by 26-81% (229-913 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 20-46% (27-630 degree-days) by mid-century, and by 26-81% (359-1109 degree-days) by end of century.
    - Spring is expected to see an increase by 40-101% (78-196 degree-days) by mid-century and 49-206% (95-400 degree-days) by end of century.
    - Fall is expected to see an increase by 54-130% (155-374 degree-days) by mid-century and 74-247% (211-708 degree-days) by end of century.

FARMINGTON BASIN

Farmington Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[52] to +2	+1 to +4	+1 to +4	+1 to +5
	Winter	1	+0 to +1	+<1[52] to +1	+<1[52] to +1	+<1[52] to +2
	Spring	2	+0 to +1	+<1[52] to +1	+<1[52] to +1	+<1[52] to +2
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +2
Days with Precipitation Over 2"	Annual	1	+0 to +<1[52]	+0 to +1	+<1[52] to +1	+<1[52] to +1
	Winter	<1[50]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]
	Spring	<1[52]	+0 to +<1[52]	+0 to +<1[52]	+<1[52] to +<1[52]	+<1[52] to +<1[52]
	Summer	<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]
	Fall	<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]
Days with Precipitation Over 4"	Annual	<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]
	Summer	<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]
	Fall	<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]	+0 to +<1[52]

- The projections for expected number of days receiving precipitation over one inch are variable for the Farmington basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.

[50] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

FARMINGTON BASIN

Farmington Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	51.4	+0.1 to +5.1	+1.2 to +6.4	+1.8 to +7.9	+1.7 to +9.0
	Winter	11.6	-0.6 to +2.4	+0.0 to +2.9	+0.3 to +3.2	+0.7 to +3.9
	Spring	13.6	-0.1 to +2.0	+0.3 to +2.0	+0.5 to +2.9	+0.6 to +3.1
	Summer	13.2	-0.2 to +1.8	-0.1 to +2.2	-0.2 to +2.1	-1.1 to +2.0
	Fall	13.0	-1.4 to +1.6	-1.4 to +2.2	-1.7 to +2.2	-2.1 to +1.9

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Farmington basin.
    - The winter season is expected to experience the greatest change with an increase of 0-25% by mid-century, and of 6-34% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Farmington or basin could see a decrease of 0.1 to an increase of 2.2 inches by mid-century (decrease of 1% to increase of 17%), and a decrease of 1.1 to an increase of 2 inches by the end of the century (decrease of 8% to increase of 15%).
        - The fall season projections for the Farmington basin could see a decrease of 1.4 to an increase of 2.2 inches by mid-century (decrease of 11% to increase of 17% and a decrease of 2.1 to an increase of 1.9 inches by the end of the century (decrease of 16% to increase of 14%).

Farmington Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-0 to +1	-0 to +2	-1 to +2	-1 to +2
	Winter	11	-1 to +1	-0 to +1	-1 to +1	-1 to +1
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	11	-1 to +2	-1 to +1	-1 to +2	-1 to +3
	Fall	12	-0 to +2	+0 to +3	-0 to +3	+0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Farmington basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

FRENCH BASIN

MUNICIPALITIES WITHIN FRENCH BASIN:

Auburn, Charlton, Douglas, Dudley, Leicester, Millbury, Oxford, Spencer, and Webster

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

FRENCH BASIN

French Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	47.1	+2.2 to +4.4	+3.0 to +6.4	+3.6 to +9.2	+3.9 to +11.2
	Winter	25.8	+2.3 to +5.1	+2.9 to +7.7	+3.7 to +9.4	+4.2 to +10.8
	Spring	45.2	+1.5 to +3.4	+2.4 to +5.7	+2.6 to +8.1	+3.1 to +9.9
	Summer	67.6	+2.3 to +4.3	+3.0 to +6.9	+3.4 to +10.1	+4.0 to +12.4
	Fall	49.4	+2.3 to +5.4	+4.1 to +7.0	+3.9 to +9.8	+4.4 to +12.0
Maximum Temperature	Annual	57.7	+2.1 to +4.2	+2.8 to +6.4	+3.3 to +9.2	+3.6 to +11.1
	Winter	35.5	+1.8 to +4.6	+2.6 to +7.1	+3.1 to +8.6	+3.6 to +10.0
	Spring	56.0	+1.3 to +3.4	+2.2 to +5.7	+2.5 to +8.2	+3.1 to +9.9
	Summer	78.5	+2.1 to +4.4	+2.8 to +6.9	+3.3 to +10.4	+3.8 to +12.7
	Fall	60.1	+2.4 to +5.1	+3.8 to +7.2	+3.7 to +10.0	+4.3 to +12.4
Minimum Temperature	Annual	36.5	+2.3 to +4.6	+3.3 to +6.6	+3.9 to +9.1	+4.2 to +11.2
	Winter	16.0	+2.7 to +5.6	+3.4 to +8.2	+4.4 to +10.2	+4.6 to +11.7
	Spring	34.3	+1.6 to +3.7	+2.6 to +6.1	+2.8 to +7.9	+3.2 to +9.7
	Summer	56.6	+2.3 to +4.4	+3.1 to +6.9	+3.5 to +9.9	+4.2 to +12.2
	Fall	38.7	+2.2 to +5.5	+4.0 to +6.9	+4.0 to +9.6	+4.5 to +12.0

- The French basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.8 °F to 6.9 °F (4-9% increase); end of century increase of 3.8 °F to 127 °F (5-16% increase).
    - Fall mid-century increase of 3.8 °F to 7.2°F (6-12% increase); end of century increase by and 4.3 °F to 12.4 °F (7-21% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.4 °F to 8.2 °F (21-51% increase); end of century increase by 4.6 °F to 11.7 °F (29-73% increase).
    - Fall mid-century of 4.0 °F to 6.9 °F (10-18% increase); end of century increase of 4.5°F to 12 °F (12-31% increase).

FRENCH BASIN

French Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	3	+4 to +13	+7 to +25	+8 to +45	+10 to +64
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[51]	+<1[51] to +1	+<1[51] to +1	+<1[51] to +2	+<1[51] to +3
	Summer	3	+4 to +12	+6 to +21	+7 to +38	+9 to +52
	Fall	<1[51]	+<1[51] to +1	+<1[51] to +3	+<1[51] to +7	+1 to +9
Days with Maximum Temperature Over 95°F	Annual	<1[51]	+1 to +4	+1 to +9	+2 to +20	+2 to +33
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[51]	+<1[51] to +<1[51]	+<1[51] to +1	+<1[51] to +1
	Summer	<1[51]	+1 to +3	+1 to +8	+2 to +18	+2 to +29
	Fall	0	+<1[51] to +<1[51]	+<1[51] to +1	+<1[51] to +2	+<1[51] to +3
Days with Maximum Temperature Over 100°F	Annual	0	+<1[51] to +1	+<1[51] to +2	+<1[51] to +5	+<1[51] to +10
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +<1[51]	+0 to +<1[51]	+0 to +<1[51]
	Summer	0	+<1[51] to +<1[51]	+<1[51] to +2	+<1[51] to +4	+<1[51] to +10
	Fall	0	+0 to +<1[51]	+0 to +<1[51]	+0 to +<1[51]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the French basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the French basin is expected to see days with daily maximum temperatures over 90 °F increase by 7 to 25 more days by mid-century, and 10 to 64 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 6 to 21 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the French basin is expected to have 9 to 52 more days.

[51] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

FRENCH BASIN

French Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	9	-3 to -5	-3 to -6	-4 to -7	-4 to -7
	Winter	8	-3 to -5	-3 to -6	-4 to -6	-4 to -7
	Spring	<1[52]	-0 to +<1[52]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[52]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	151	-9 to -27	-19 to -40	-21 to -55	-24 to -67
	Winter	84	-1 to -7	-3 to -10	-4 to -18	-5 to -24
	Spring	39	-3 to -11	-6 to -16	-7 to -21	-8 to -22
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	28	-5 to -12	-9 to -15	-9 to -19	-9 to -21

- Due to projected increases in average and minimum temperatures throughout the end of the century, the French basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 3 to 10 fewer days by mid-century, and 5 to 24 fewer days by end of century.
    - Spring is expected to have 6 to 16 fewer days by mid-century, and 8 to 22 fewer by end of century.
    - Fall is expected to have 9 to 15 fewer days by mid-century, and 9 to 21 fewer days by end of century.

[52] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

FRENCH BASIN

French Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6983	-562 to -1206	-796 to -1714	-936 to -2267	-1069 to -2658
	Winter	3554	-193 to -476	-261 to -703	-331 to -853	-387 to -992
	Spring	1840	-122 to -297	-203 to -488	-222 to -659	-278 to -777
	Summer	131	-46 to -78	-65 to -101	-69 to -114	-75 to -120
	Fall	1453	-175 to -412	-309 to -498	-288 to -687	-313 to -787
Cooling Degree-Days (Base 65°F)	Annual	419	+212 to +415	+283 to +707	+329 to +1110	+373 to +1458
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	16	+7 to +24	+14 to +50	+19 to +85	+18 to +117
	Summer	368	+158 to +323	+198 to +532	+237 to +819	+278 to +1024
	Fall	32	+31 to +86	+46 to +140	+53 to +229	+76 to +312
Growing Degree-Days (Base 50°F)	Annual	2277	+412 to +796	+574 to +1265	+662 to +1935	+740 to +2424
	Winter	5	-2 to +9	+0 to +12	+3 to +18	+2 to +23
	Spring	254	+57 to +131	+81 to +235	+100 to +368	+104 to +470
	Summer	1617	+207 to +397	+271 to +630	+312 to +930	+362 to +1140
	Fall	393	+123 to +304	+193 to +419	+188 to +618	+239 to +779

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the French basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-20% (261-703 degree-days) by mid-century, and a decrease of 11-28% (387-992 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 11-27% (203-488 degree-days) by mid-century, and by 15-42% (278-777 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-34% (309-498 degree-days) by mid-century, and by 22-54% (313-787 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 54-145% (198 -532 degree-days) by mid-century, and by 76-279% (278-1024 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 17-39% (271 -630 degree-days) by mid-century, and by 22-70% (362 -1140 degree-days) by end of century.
    - Spring is expected to see an increase by 32-92% (81 -235 degree-days) by mid-century and 41-185% (104 -470 degree-days) by end of century.
    - Fall is expected to see an increase by 49-107% (193 -419 degree-days) by mid-century and 61-198% (239 -779 degree-days) by end of century.

FRENCH BASIN

French Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[53] to +2	+1 to +4	+1 to +3	+1 to +5
	Winter	2	+0 to +1	+<1[53] to +1	+<1[53] to +2	+<1[53] to +2
	Spring	2	+0 to +1	+<1[53] to +1	+<1[53] to +1	+<1[53] to +2
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	3	+0 to +1	+0 to +1	+0 to +1	-1 to +1
Days with Precipitation Over 2"	Annual	1	+<1[53] to +<1[53]	+<1[53] to +1	+<1[53] to +1	+<1[53] to +1
	Winter	<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]
	Spring	<1[53]	+0 to +<1[53]	+0 to +<1[53]	+<1[53] to +<1[53]	+<1[53] to +<1[53]
	Summer	<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]
	Fall	<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]
Days with Precipitation Over 4"	Annual	<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]
	Summer	<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]
	Fall	0	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]	+0 to +<1[53]

- The projections for expected number of days receiving precipitation over one inch are variable for the French basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.

[53] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

FRENCH BASIN

French Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	47.4	+0.3 to +5.5	+1.3 to +6.9	+2.7 to +8.6	+2.0 to +9.3
	Winter	11.2	-0.4 to +2.2	+0.3 to +3.0	+0.2 to +3.7	+0.6 to +4.6
	Spring	11.9	-0.2 to +2.1	+0.1 to +2.1	+0.4 to +2.8	+0.4 to +2.8
	Summer	11.6	-0.2 to +1.8	-0.3 to +2.4	-0.6 to +2.7	-1.5 to +2.4
	Fall	12.7	-1.3 to +1.5	-1.4 to +2.1	-1.7 to +2.1	-1.9 to +1.9

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the French basin.
  - The winter season is expected to experience the greatest change with an increase of 2-26% by mid-century, and of 5-41% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the French or basin could see a decrease of 0.3 to an increase of 2.4 inches by mid-century (decrease of 3% to increase of 20%), and a decrease of 1.5 to an increase of 2.4 inches by the end of the century (decrease of 13% to increase of 21%).
    - The fall season projections for the French basin could see a decrease of 1.4 to an increase of 2.1 inches by mid-century (decrease of 11% to increase of 17% and a decrease of 1.9 to an increase of 1.9 inches by the end of the century (decrease of 15% to increase of 15%).

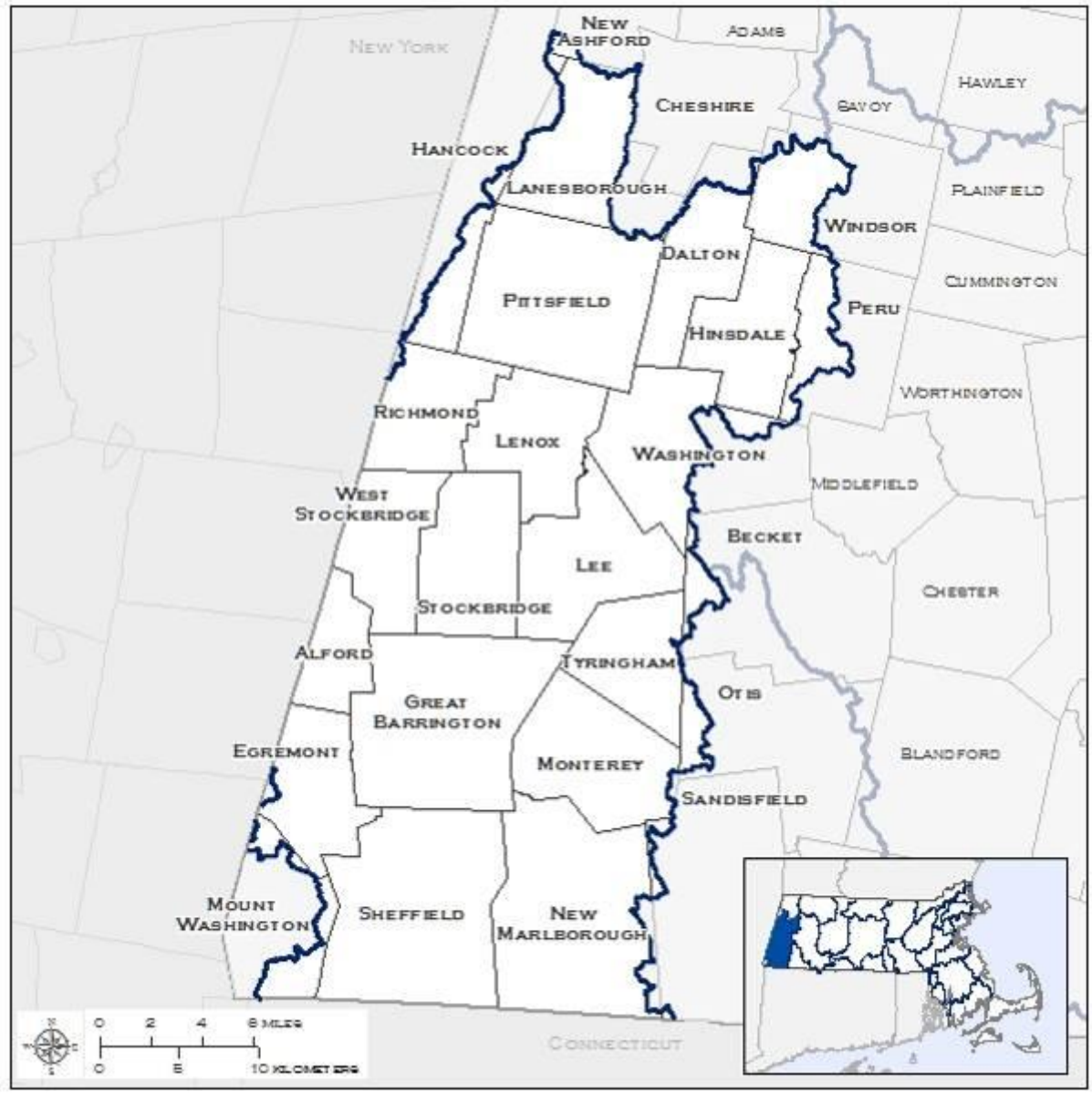
French Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-1 to +2	-1 to +2	-1 to +2	-1 to +3
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	12	-1 to +2	-1 to +2	-1 to +2	-1 to +3
	Fall	12	+0 to +2	-1 to +3	-1 to +3	+0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the French basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The summer season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

HOUSATONIC BASIN

MUNICIPALITIES WITHIN HOUSATONIC BASIN:

Alford, Becket, Cheshire, Dalton, Egremont, Great Barrington, Hancock, Hinsdale, Lanesborough, Lee, Lenox, Monterey, Mount Washington, New Ashford, New Marlborough, Otis, Peru, Pittsfield, Richmond, Sandisfield, Sheffield, Stockbridge, Tyringham, Washington, West Stockbridge, and Windsor



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

HOUSATONIC BASIN

Housatonic Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	44.3	+2.2 to +4.6	+3.1 to +6.7	+3.7 to +9.3	+4.3 to +11.3
	Winter	22.5	+2.6 to +5.9	+3.3 to +8.8	+4.4 to +10.5	+4.7 to +12.0
	Spring	42.7	+1.8 to +3.4	+2.4 to +5.6	+3.0 to +7.7	+3.5 to +9.5
	Summer	65.1	+2.3 to +4.4	+3.0 to +6.9	+3.5 to +10.0	+4.1 to +12.3
	Fall	46.6	+2.4 to +5.3	+3.8 to +6.9	+3.8 to +9.8	+4.1 to +12.0
Maximum Temperature	Annual	55.4	+2.0 to +4.4	+2.7 to +6.9	+3.3 to +9.5	+3.9 to +11.4
	Winter	32.3	+2.1 to +5.1	+2.8 to +7.9	+3.6 to +9.4	+3.9 to +10.9
	Spring	54.2	+1.5 to +3.4	+2.3 to +5.6	+2.8 to +8.0	+3.5 to +9.6
	Summer	77.0	+2.1 to +4.6	+2.7 to +7.3	+3.4 to +10.5	+4.0 to +12.8
	Fall	57.7	+2.5 to +5.2	+3.5 to +7.4	+3.6 to +10.1	+4.2 to +12.4
Minimum Temperature	Annual	33.2	+2.4 to +4.9	+3.5 to +6.9	+4.2 to +9.1	+4.5 to +11.3
	Winter	12.6	+2.8 to +6.6	+3.9 to +9.6	+5.2 to +11.5	+5.5 to +13.1
	Spring	31.2	+1.9 to +3.7	+2.5 to +6.0	+3.3 to +7.5	+3.7 to +9.2
	Summer	53.1	+2.5 to +4.6	+3.3 to +7.1	+3.8 to +9.7	+4.2 to +11.8
	Fall	35.6	+2.1 to +5.3	+3.6 to +6.8	+3.9 to +9.4	+4.0 to +11.6

- The Housatonic basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.7 °F to 7.3 °F (3-9% increase); end of century increase of 4 °F to 12.8 °F (5-17% increase).
    - Fall mid-century increase of 3.5 °F to 7.4°F (6-13% increase); end of century increase by and 4.2 °F to 12.4 °F (7-21% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.9 °F to 9.6 °F (31-76% increase); end of century increase by 5.5 °F to 13.1 °F (43-104% increase).
    - Fall mid-century of 3.6 °F to 6.8 °F (10-19% increase); end of century increase of 4.0°F to 11.6 °F (11-33% increase).

HOUSATONIC BASIN

Housatonic Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	1	+3 to +10	+4 to +20	+6 to +39	+7 to +57
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[54]	+<1[54] to +<1[54]	+<1[54] to +1	+<1[54] to +2	+<1[54] to +3
	Summer	1	+3 to +9	+4 to +18	+5 to +33	+7 to +47
	Fall	<1[54]	+<1[54] to +1	+<1[54] to +2	+<1[54] to +5	+<1[54] to +7
Days with Maximum Temperature Over 95°F	Annual	<1[54]	+<1[54] to +3	+<1[54] to +6	+1 to +15	+1 to +27
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[54]	+0 to +<1[54]	+0 to +<1[54]	+0 to +1
	Summer	<1[54]	+<1[54] to +3	+<1[54] to +6	+1 to +14	+1 to +25
	Fall	0	+0 to +<1[54]	+<1[54] to +<1[54]	+<1[54] to +1	+0 to +2
Days with Maximum Temperature Over 100°F	Annual	0	+0 to +<1[54]	+<1[54] to +1	+<1[54] to +3	+<1[54] to +7
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +<1[54]	+0 to +<1[54]
	Summer	0	+0 to +<1[54]	+<1[54] to +1	+<1[54] to +3	+<1[54] to +7
	Fall	0	+0 to +<1[54]	+0 to +<1[54]	+0 to +<1[54]	+0 to +<1[54]

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Housatonic basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Housatonic basin is expected to see days with daily maximum temperatures over 90 °F increase by 4 to 20 more days by mid-century, and 7 to 57 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 4 to 18 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Housatonic basin is expected to have 7 to 47 more days.

[54] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

HOUSATONIC BASIN

Housatonic Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	16	-5 to -10	-7 to -12	-8 to -13	-9 to -14
	Winter	15	-5 to -10	-7 to -11	-8 to -12	-8 to -13
	Spring	1	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	173	-11 to -28	-19 to -39	-22 to -54	-24 to -63
	Winter	87	-1 to -6	-12 to -9	-3 to -16	-4 to -20
	Spring	49	-4 to -10	-6 to -15	-7 to -19	-9 to -21
	Summer	<1[55]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	37	-5 to -13	-9 to -16	-9 to -21	-9 to -25

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Housatonic basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 2 to 9 fewer days by mid-century, and 4 to 20 fewer days by end of century.
    - Spring is expected to have 6 to 15 fewer days by mid-century, and 9 to 21 fewer days by end of century.
    - Fall is expected to have 9 to 16 fewer days by mid-century, and 9 to 25 fewer days by end of century.

[55] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

HOUSATONIC BASIN

Housatonic Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7822	-670 to -1372	-901 to -1924	-1058 to -2516	-1214 to -2905
	Winter	3850	-215 to -543	-291 to -807	-389 to -952	-437 to -1099
	Spring	2059	-149 to -298	-209 to -481	-257 to -639	-310 to -765
	Summer	224	-75 to -127	-100 to -164	-120 to -193	-130 to -202
	Fall	1690	-193 to -432	-311 to -538	-309 to -744	-325 to -863
Cooling Degree-Days (Base 65°F)	Annual	261	+160 to +348	+223 to +603	+263 to +940	+310 to +1262
	Winter	0	+0 to +0	+1 to +4	+2 to +2	+2 to +11
	Spring	12	+6 to +19	+11 to +37	+14 to +63	+12 to +97
	Summer	231	+127 to +281	+169 to +473	+200 to +730	+239 to +931
	Fall	18	+18 to +60	+28 to +99	+35 to +177	+42 to +235
Growing Degree-Days (Base 50°F)	Annual	1900	+387 to +744	+528 to +1187	+627 to +1776	+714 to +2238
	Winter	3	+0 to +8	+1 to +8	+0 to +14	+2 to +20
	Spring	207	+52 to +118	+83 to +203	+104 to +308	+109 to +407
	Summer	1389	+213 to +406	+276 to +636	+322 to +920	+376 to +1127
	Fall	293	+101 to +259	+154 to +363	+158 to +550	+201 to +688

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Housatonic basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 8-21% (291-807 degree-days) by mid-century, and a decrease of 11-29% (437 -1099 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 10-23% (209-481 degree-days) by mid-century, and by 15-37% (310 -765 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 18-32% (311 -538 degree-days) by mid-century, and by 19-51% (325 -863 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 73-205% (169 -473 degree-days) by mid-century, and by 104-403% (239-931 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 20-46% (276 -636 degree-days) by mid-century, and by 27-81% (376 -1127 degree-days) by end of century.
    - Spring is expected to see an increase by 40-98% (83-203 degree-days) by mid-century and 53-197% (109-407 degree-days) by end of century.
    - Fall is expected to see an increase by 53-124% (154-362 degree-days) by mid-century and 69-235% (201-688 degree-days) by end of century.

HOUSATONIC BASIN

Housatonic Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	6	+0 to +2	+<1[56] to +3	+1 to +3	<1[56] to +4
	Winter	1	+0 to +1	+<1[56] to +1	+<1[56] to +1	<1[56] to +1
	Spring	1	+0 to +<1[56]	+0 to +1	+0 to +1	<1[56] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[56]	+0 to +<1[56]	+<1[56] to +1	<1[56] to +1
	Winter	<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]
	Spring	<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]
	Summer	<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]
	Fall	<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]
Days with Precipitation Over 4"	Annual	<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +<1[56]
	Summer	0	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]
	Fall	0	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]	+0 to +<1[56]

- The projections for expected number of days receiving precipitation over one inch are variable for the Housatonic basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-1 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-1 days by the end of century.

[56] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

HOUSATONIC BASIN

Housatonic Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	47.4	+0.2 to +4.4	+1.1 to +6.4	+1.6 to +6.9	+1.6 to +7.7
	Winter	10.2	-0.5 to +1.8	+0.1 to +2.4	+0.2 to +2.8	+0.8 to +3.5
	Spring	12.1	-0.1 to +1.7	+0.2 to +1.8	+0.4 to +2.4	+0.5 to +2.8
	Summer	13.2	-0.2 to +2.2	-0.1 to +2.2	-0.4 to +1.9	-0.8 to +1.9
	Fall	11.9	-1.4 to +1.4	-1.3 to +1.8	-1.4 to +1.8	-1.7 to +1.7

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Housatonic basin.
    - The winter season is expected to experience the greatest change with an increase of 1-23% by mid-century, and of 8-34% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Housatonic or basin could see a decrease of 0.1 to an increase of 2.2 inches by mid-century (decrease of 1% to increase of 16%), and a decrease of 0.8 to an increase of 1.9 inches by the end of the century (decrease of 6% to increase of 14%).
        - The fall season projections for the Housatonic basin could see a decrease of 1.3 to an increase of 1.8 inches by mid-century (decrease of 11% to increase of 15% and a decrease of 1.7 to an increase of 1.7 inches by the end of the century (decrease of 14% to increase of 14%).

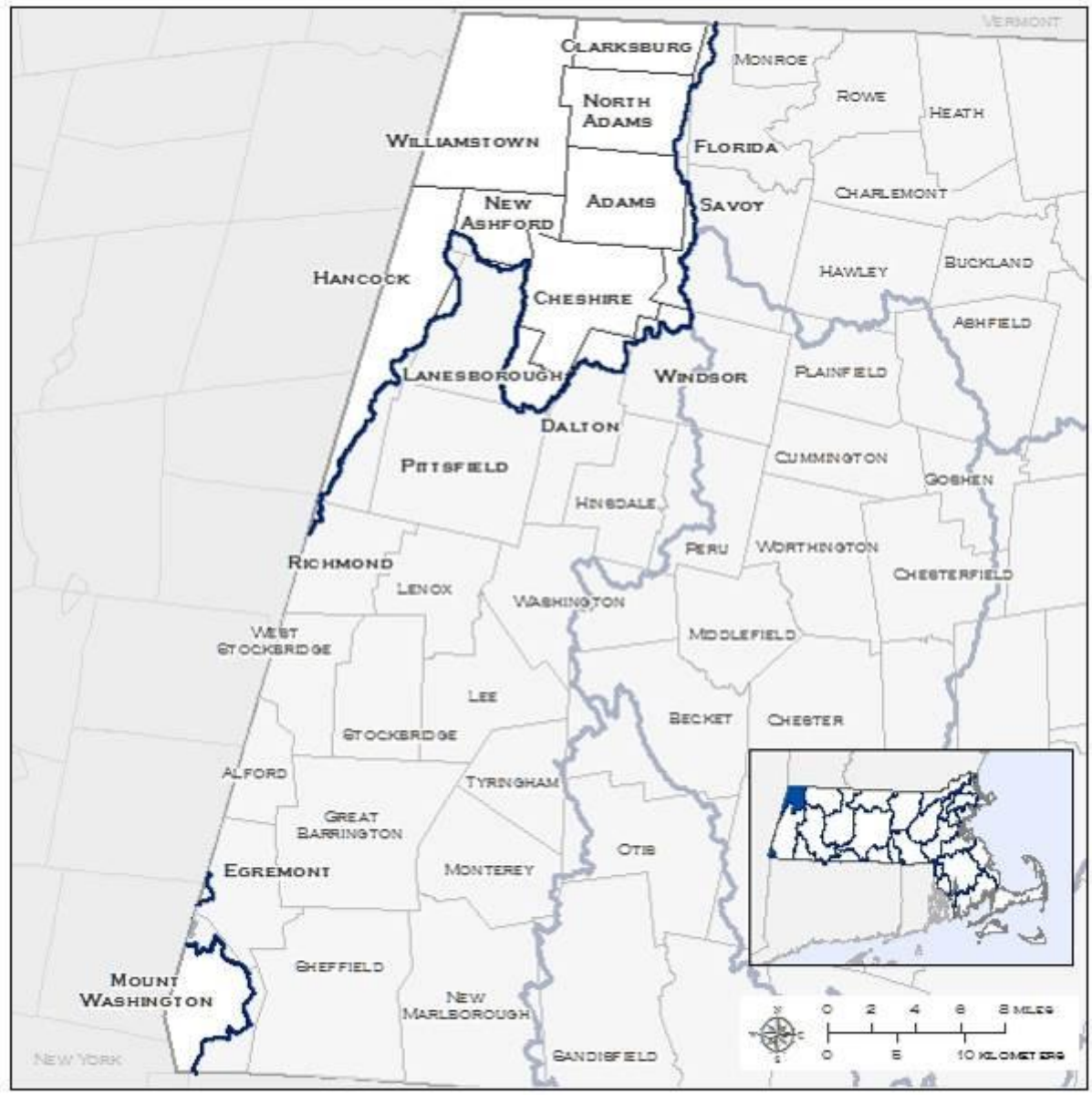
Housatonic Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-0 to +1	-0 to +2	-0 to +2	-0 to +2
	Winter	11	-13 to +1	-1 to +1	-1 to +1	-1 to +1
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	11	-1 to +1	-0 to +1	-1 to +2	-1 to +2
	Fall	11	-0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Housatonic basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

HUDSON BASIN

MUNICIPALITIES WITHIN HUDSON BASIN:

Adams, Cheshire, Clarksburg, Dalton, Florida, Hancock, Lanesborough, Mount Washington, New Ashford, North Adams, Pittsfield, Savoy, Williamstown, and Windsor



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

HUDSON BASIN

Hudson Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	43.3	+2.4 to +4.8	+3.3 to +7.0	+3.8 to +9.6	+4.4 to +11.7
	Winter	21.3	+2.6 to +6.1	+3.3 to +9.2	+4.5 to +11.1	+4.9 to +12.6
	Spring	41.7	+2.1 to +4.0	+2.9 to +6.1	+3.4 to +8.3	+4.1 to +10.2
	Summer	64.1	+2.5 to +4.5	+3.3 to +7.0	+3.8 to +9.9	+4.3 to +12.1
	Fall	45.9	+2.2 to +5.2	+3.6 to +6.8	+3.6 to +9.8	+3.9 to +12.2
Maximum Temperature	Annual	53.9	+2.2 to +4.7	+2.9 to +7.1	+3.5 to +9.8	+4.1 to +11.8
	Winter	30.8	+2.2 to +5.4	+2.9 to +8.4	+3.8 to +9.9	+4.3 to +11.4
	Spring	52.5	+1.9 to +4.0	+2.8 to +6.1	+3.3 to +8.7	+4.0 to +10.4
	Summer	75.7	+2.3 to +4.7	+3.0 to +7.3	+3.7 to +10.5	+4.2 to +12.7
	Fall	56.3	+2.4 to +5.1	+3.4 to +7.3	+3.4 to +10.3	+4.0 to +12.6
Minimum Temperature	Annual	32.7	+2.6 to +5.1	+3.7 to +7.1	+4.3 to +9.5	+4.7 to +11.7
	Winter	11.9	+2.9 to +6.7	+3.9 to +10.0	+5.3 to +12.2	+5.5 to +13.7
	Spring	30.8	+2.3 to +4.3	+3.0 to +6.4	+3.7 to +8.0	+4.3 to +9.9
	Summer	52.6	+2.6 to +4.7	+3.5 to +7.1	+4.0 to +9.6	+4.3 to +11.7
	Fall	35.4	+1.9 to +5.1	+3.4 to +6.7	+3.7 to +9.5	+3.8 to +11.8

- The Hudson basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 3 °F to 7.3 °F (4-10% increase); end of century increase of 4.2 °F to 12.7 °F (5-17% increase).
    - Fall mid-century increase of 3.4 °F to 7.3°F (6-13% increase); end of century increase by and 4.0 °F to 12.6 °F (7-22% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.9 °F to 10 °F (33-84% increase); end of century increase by 5.5 °F to 13.7 °F (47-116% increase).
    - Fall mid-century of 3.4 °F to 6.7 °F (10-19% increase); end of century increase of 3.8°F to 11.8 °F (11-33% increase).

HUDSON BASIN

Hudson Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	<1[57]	+3 to +8	+4 to +17	+5 to +34	+6 to +50
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+<1[57] to +<1[57]	+<1[57] to +1	+<1[57] to +1	+<1[57] to +3
	Summer	<1[57]	+2 to +8	+4 to +15	+4 to +28	+6 to +42
	Fall	0	+<1[57] to +1	+<1[57] to +1	+<1[57] to +4	+<1[57] to +5
Days with Maximum Temperature Over 95°F	Annual	0	+<1[57] to +2	+<1[57] to +5	+1 to +11	+1 to +21
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[57]	+0 to +<1[57]	+0 to +<1[57]	+0 to +1
	Summer	0	+<1[57] to +2	+<1[57] to +5	+1 to +10	+1 to +20
	Fall	0	+0 to +<1[57]	+0 to +<1[57]	+<1[57] to +1	+0 to +1
Days with Maximum Temperature Over 100°F	Annual	0	+0 to +<1[57]	+0 to +1	+0 to +2	+0 to +5
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +<1[57]	+0 to +<1[57]
	Summer	0	+0 to +<1[57]	+0 to +1	+0 to +2	+0 to +5
	Fall	0	+0 to +<1[57]	+0 to +<1[57]	+0 to +<1[57]	+0 to +<1[57]

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Hudson basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Hudson basin is expected to see days with daily maximum temperatures over 90 °F increase by 4 to 17 more days by mid-century, and 6 to 50 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 4 to 15 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Hudson basin is expected to have 6 to 42 more days.

[57] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

HUDSON BASIN

Hudson Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	18	-6 to -11	-8 to -14	-10 to -14	-10 to -15
	Winter	17	-6 to -11	-8 to -13	-9 to -14	-9 to -15
	Spring	1	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[58]	-0 to +<1[58]	-0 to +<1[58]	-0 to +<1[58]	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	174	-11 to -30	-20 to -41	-23 to -57	-25 to -67
	Winter	87	-1 to -5	-1 to -8	-3 to -16	-3 to -20
	Spring	49	-6 to -11	-8 to -16	-9 to -21	-10 to -23
	Summer	<1[58]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	37	-4 to -13	-9 to -16	-9 to -23	-9 to -26

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Hudson basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 1 to 8 fewer days by mid-century, and 3 to 20 fewer days by end of century.
    - Spring is expected to have 8 to 16 fewer days by mid-century, and 10 to 23 fewer days by end of century.
    - Fall is expected to have 9 to 16 fewer days by mid-century, and 9 to 26 fewer days by end of century.

[58] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

HUDSON BASIN

Hudson Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	8134	-716 to -1462	-976 to -2053	-1129 to -2696	-1285 to -3112
	Winter	3953	-221 to -569	-293 to -843	-401 to -1003	-450 to -1159
	Spring	2156	-179 to -351	-251 to -532	-300 to -702	-363 to -828
	Summer	269	-89 to -145	-116 to -191	-140 to -220	-151 to -233
	Fall	1755	-185 to -435	-301 to -553	-299 to -776	-318 to -904
Cooling Degree-Days (Base 65°F)	Annual	214	+161 to +330	+223 to +568	+254 to +880	+291 to +1194
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	10	+6 to +19	+11 to +37	+14 to +61	+12 to +94
	Summer	189	+133 to +273	+177 to +448	+199 to +695	+238 to +886
	Fall	15	+13 to +48	+20 to +84	+25 to +156	+31 to +214
Growing Degree-Days (Base 50°F)	Annual	1761	+389 to +741	+538 to +1177	+632 to +1751	+707 to +2213
	Winter	3	-1 to +7	+1 to +7	+0 to +12	+2 to +16
	Spring	182	+59 to +126	+88 to +210	+107 to +310	+115 to +411
	Summer	1304	+227 to +415	+297 to +637	+342 to +913	+392 to +1114
	Fall	265	+89 to +232	+133 to +345	+144 to +535	+181 to +674

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Hudson basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-21% (293-843 degree-days) by mid-century, and a decrease of 11-29% (450 -1159 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-25% (251 -532 degree-days) by mid-century, and by 17-38% (363 -828 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 17-31% (301 -553 degree-days) by mid-century, and by 18-51% (318 -904 degree-days) by the end of century.

- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 94-237% (177 -448 degree-days) by mid-century, and by 126-469% (238-886 degree-days) by end of century.
- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 23-49% (297 -637 degree-days) by mid-century, and by 30-85% (392 -1114 degree-days) by end of century.
    - Spring is expected to see an increase by 48-115% (88 -210 degree-days) by mid-century and 63-226% (115 -411 degree-days) by end of century.
    - Fall is expected to see an increase by 20-130% (133 -345 degree-days) by mid-century and 68-254% (181 -674 degree-days) by end of century.

HUDSON BASIN

Hudson Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	6	+0 to +2	+1 to +2	+1 to +3	+1 to +4
	Winter	1	+0 to +<1[59]	+<1[59] to +1	+<1[59] to +1	+<1[59] to +1
	Spring	1	+0 to +<1[59]	+<1[59] to +1	+<1[59] to +1	+<1[59] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[59]	+0 to +<1[59]	+0 to +1	+0 to +1
	Winter	<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]
	Spring	<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to <1[59]
	Summer	<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to <1[59]
	Fall	<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to <1[59]
Days with Precipitation Over 4"	Annual	<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Summer	<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to <1[59]
	Fall	0	+0 to +<1[59]	+0 to +<1[59]	+0 to +<1[59]	+0 to <1[59]

- The projections for expected number of days receiving precipitation over one inch are variable for the Hudson basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-1 days by the end of century.
    - The spring season is expected to see increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-1 days by the end of century.

[59] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

HUDSON BASIN

Hudson Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	48.2	-0.1 to +4.6	+0.8 to +6.5	+1.5 to +6.6	+1.8 to +7.8
	Winter	9.7	-0.3 to +1.6	+0.2 to +2.3	+0.3 to +2.7	+0.9 to +3.5
	Spring	12.2	+0.0 to +1.7	+0.2 to +1.8	+0.4 to +2.2	+0.5 to +2.9
	Summer	14.2	-0.5 to +2.3	-0.3 to +2.6	-0.2 to +1.7	-0.5 to +1.9
	Fall	12.1	-1.3 to +1.4	-1.4 to +1.6	-1.7 to +1.5	-1.7 to +1.4

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Hudson basin.
  - The winter season is expected to experience the greatest change with an increase of 2-23% by mid-century, and of 9-36% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Hudson or basin could see a decrease of 0.3 to an increase of 2.6 inches by mid-century (decrease of 2% to increase of 19%) and a decrease of 0.5 to an increase of 1.9 inches by the end of the century (decrease of 9% to increase of 36%).
    - The fall season projections for the Hudson basin could see a decrease of 1.4 to an increase of 1.6 inches by mid-century (decrease of 12% to increase of 13% and a decrease of 1.7 to an increase of 1.4 inches by the end of the century (decrease of 14% to increase of 12%).

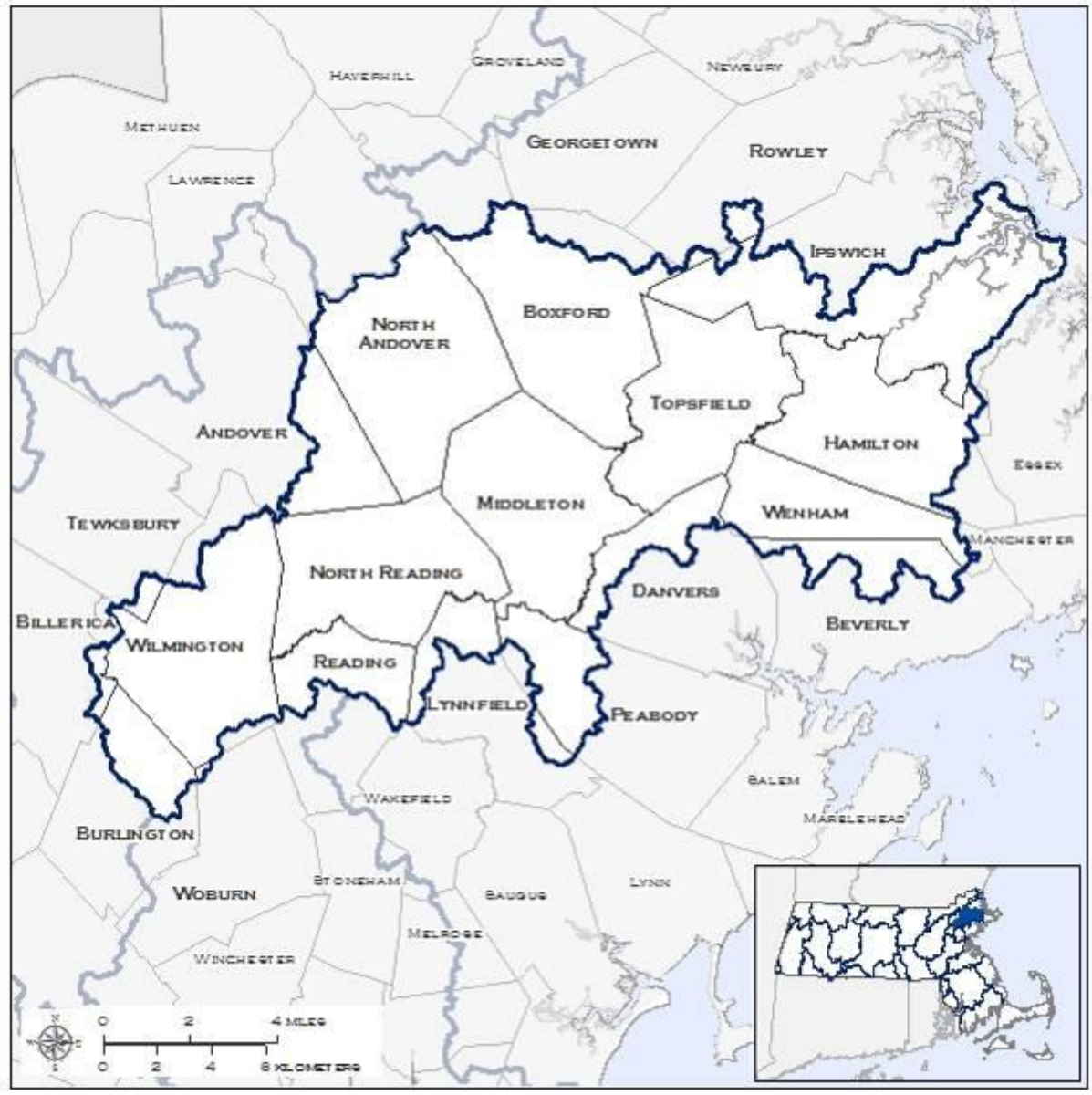
Hudson Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	15	-0 to +2	-0 to +2	-0 to +2	-0 to +2
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	10	-0 to +2	-0 to +1	-1 to +1	-1 to +2
	Fall	11	-0 to +2	-0 to +3	-0 to +3	-0 to +4

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Hudson basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-4 days in consecutive dry days by the end of the century.

IPSWICH BASIN

MUNICIPALITIES WITHIN IPSWICH BASIN:

Andover, Beverly, Billerica, Boxford, Burlington, Danvers, Hamilton, Ipswich, Lynnfield, Middleton, North Andover, North Reading, Peabody, Reading, Rowley, Tewksbury, Topsfield, Wenham, Wilmington, and Woburn



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

IPSWICH BASIN

Ipswich Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.5	+2.1 to +4.3	+2.7 to +6.2	+3.3 to +8.9	+3.6 to +10.8
	Winter	29.0	+2.1 to +4.8	+2.8 to +7.2	+3.6 to +9.0	+3.9 to +10.5
	Spring	47.0	+1.9 to +3.7	+2.6 to +5.5	+2.7 to +7.9	+3.4 to +9.6
	Summer	69.6	+2.1 to +4.2	+2.7 to +6.6	+3.1 to +9.5	+3.7 to +12.0
	Fall	52.0	+1.9 to +4.6	+3.3 to +6.5	+3.0 to +9.4	+3.5 to +11.8
Maximum Temperature	Annual	59.6	+2.0 to +4.0	+2.5 to +6.0	+3.0 to +8.9	+3.3 to +10.7
	Winter	38.3	+1.8 to +4.3	+2.4 to +6.7	+3.1 to +8.3	+3.4 to +9.6
	Spring	57.4	+1.8 to +3.5	+2.3 to +5.5	+2.7 to +8.1	+3.2 to +9.5
	Summer	80.2	+1.8 to +4.3	+2.6 to +6.5	+3.0 to +9.7	+3.5 to +12.2
	Fall	62.2	+2.0 to +4.4	+2.9 to +6.7	+2.9 to +9.6	+3.4 to +12.1
Minimum Temperature	Annual	39.3	+2.2 to +4.6	+3.0 to +6.3	+3.6 to +8.9	+3.9 to +10.9
	Winter	19.7	+2.4 to +5.2	+3.2 to +7.7	+4.1 to +9.7	+4.3 to +11.1
	Spring	36.5	+2.0 to +3.9	+2.9 to +5.8	+2.9 to +7.7	+3.5 to +9.5
	Summer	58.9	+2.2 to +4.3	+2.8 to +6.9	+3.2 to +9.3	+3.9 to +11.9
	Fall	41.8	+1.8 to +4.8	+3.2 to +6.3	+3.1 to +9.3	+3.7 to +11.6

- The Ipswich basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.6 °F to 6.5 °F (3-8% increase); end of century increase of 3.5 °F to 12.2 °F (4-15% increase).
    - Fall mid-century increase of 2.9 °F to 6.7°F (5-11% increase); end of century increase by and 3.4 °F to 12.1 °F (5-19% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.2 °F to 7.7 °F (16-39% increase); end of century increase by 4.3 °F to 11.1 °F (22-56% increase).
    - Fall mid-century of 3.2 °F to 6.3 °F (8-15% increase); end of century increase of 3.7°F to 11.6 °F (9-28% increase).

IPSWICH BASIN

Ipswich Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	7	+6 to +17	+8 to +31	+10 to +50	+12 to +69
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[60]	+<1[60] to +1	+<1[60] to +1	+<1[60] to +2	+<1[60] to +4
	Summer	6	+5 to +15	+7 to +25	+9 to +41	+11 to +55
	Fall	<1[60]	+<1[60] to +2	+1 to +5	+1 to +9	+1 to +12
Days with Maximum Temperature Over 95°F	Annual	1	+2 to +6	+2 to +13	+3 to +26	+5 to +41
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+<1[60] to +<1[60]	+<1[60] to +<1[60]	+<1[60] to +1	+<1[60] to +1
	Summer	1	+2 to +6	+2 to +11	+3 to +23	+4 to +35
	Fall	0	+<1[60] to +1	+<1[60] to +1	+<1[60] to +3	+<1[60] to +5
Days with Maximum Temperature Over 100°F	Annual	<<1[60]	+<1[60] to +1	+<1[60] to +3	+<1[60] to +8	+<1[60] to +14
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[60]	+0 to +<1[60]	+0 to +<1[60]	+0 to +<1[60]
	Summer	<1[60]	+<1[60] to +1	+<1[60] to +3	+<1[60] to +7	+<1[60] to +13
	Fall	0	+0 to +<1[60]	+0 to +<1[60]	+0 to +1	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Ipswich basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Ipswich basin is expected to see days with daily maximum temperatures over 90 °F increase by 8 to 31 more days by mid-century, and 12 to 69 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 7 to 25 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Ipswich basin is expected to have 11 to 55 more days.

[60] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

IPSWICH BASIN

Ipswich Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	4	-1 to -3	-1 to -3	-1 to -3	-1 to -3
	Winter	4	-1 to -3	-1 to -2	-1 to -3	-1 to -3
	Spring	<1[61]	-0 to +<1[61]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[61]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	130	-12 to -28	-18 to -42	-21 to -55	-23 to -65
	Winter	79	-3 to -9	-4 to -16	-6 to -24	-8 to -31
	Spring	31	-5 to -11	-7 to -15	-8 to -18	-9 to -20
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	20	-4 to -9	-6 to -11	-7 to -15	-6 to -16

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Ipswich basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 4 to 16 fewer days by mid-century, and 8 to 31 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 20 fewer days by end of century.
    - Fall is expected to have 6 to 11 fewer days by mid-century, and 6 to 16 fewer days by end of century.

[61] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

IPSWICH BASIN

Ipswich Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6269	-515 to -1104	-690 to -1507	-829 to -2019	-925 to -240
	Winter	3257	-189 to -442	-248 to -660	-316 to -816	-358 to -960
	Spring	1682	-158 to -305	-215 to -458	-230 to -625	-295 to -735
	Summer	88	-32 to -56	-40 to -71	-48 to -80	-52 to -83
	Fall	1240	-124 to -333	-232 to -427	-221 to -612	-241 to -701
Cooling Degree-Days (Base 65°F)	Annual	590	+213 to +448	+292 to +754	+342 to +1152	+399 to +1521
	Winter	0	-1 to +2	-0 to +6	+0 to +3	+0 to +6
	Spring	23	+14 to +34	+22 to +57	+26 to +98	+20 to +147
	Summer	507	+154 to +335	+197 to +539	+233 to +797	+280 to +1025
	Fall	54	+31 to +93	+45 to +178	+54 to +276	+79 to +358
Growing Degree-Days (Base 50°F)	Annual	2628	+398 to +811	+556 to +1237	+632 to +1938	+716 to +2438
	Winter	6	+0 to +15	+2 to +18	+6 to +31	+5 to +40
	Spring	299	+82 to +158	+105 to +258	+120 to +387	+130 to +502
	Summer	1800	+190 to +388	+247 to +603	+286 to +874	+341 to +1107
	Fall	516	+96 to +289	+167 to +424	+154 to +645	+210 to +815

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Ipswich basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 8-20% (248 -660 degree-days) by mid-century, and a decrease of 11-29% (358-960 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 13-27% (215-458 degree-days) by mid-century, and by 18-44% (295 -735 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 19-34% (232-427 degree-days) by mid-century, and by 19-57% (241 -701 degree-days) by the end of century.

- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 39-106% (196 -539 degree-days) by mid-century, and by 55-202% (280-1025 degree-days) by end of century.
- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 14-34% (247 -603 degree-days) by mid-century, and by 19-61% (341 -1107 degree-days) by end of century.
    - Spring is expected to see an increase by 35-86% (105 -258 degree-days) by mid-century and 43-168% (130 -502 degree-days) by end of century.
    - Fall is expected to see an increase by 32-82% (167 -424 degree-days) by mid-century and 41-158% (210 -815 degree-days) by end of century.

IPSWICH BASIN

Ipswich Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[62] to +2	+<1[62] to +3	+1 to +2	+1 to +3
	Winter	2	+<1[62] to +1	+<1[62] to +1	+<1[62] to +1	+<1[62] to +2
	Spring	2	+0 to +1	+0 to +1	+<1[62] to +1	+<1[62] to +1
	Summer	2	+0 to +<1[62]	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+<1[62] to +<1[62]	+0 to +1	+<1[62] to +1	+<1[62] to +1
	Winter	<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]	+<1[62] to +<1[62]
	Spring	<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]
	Summer	<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]
	Fall	<1[62]	+0 to +<1[62]	+0 to +<1[62]	+<1[62] to +<1[62]	+0 to +<1[62]
Days with Precipitation Over 4"	Annual	<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]
	Winter	0	+0 to +0	+0 to +0	+0 to +<1[62]	+0 to +<1[62]
	Spring	0	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]
	Summer	0	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]
	Fall	0	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]	+0 to +<1[62]

- The projections for expected number of days receiving precipitation over one inch are variable for the Ipswich basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1. days by the end of century.

[62] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

IPSWICH BASIN

Ipswich Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.6	-0.1 to +4.3	+0.0 to +5.4	+0.5 to +6.6	+0.7 to +7.0
	Winter	11.6	-0.3 to +1.7	+0.1 to +2.3	+0.2 to +3.0	+0.5 to +4.0
	Spring	11.6	-0.4 to +2.3	-0.1 to +2.1	+0.1 to +2.6	+0.1 to +2.6
	Summer	10.2	-0.4 to +1.3	-0.6 to +1.9	-0.8 to +2.0	-1.6 to +1.8
	Fall	12.2	-1.0 to +0.9	-1.1 to +1.4	-1.8 to +1.6	-1.6 to +1.3

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Ipswich basin.
  - The winter season is expected to experience the greatest change with an increase of 1-20% by mid-century, and of 4-34% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Ipswich or basin could see a decrease of 0.6 to an increase of 1.9 inches by mid-century (decrease of 5% to increase of 19%) and a decrease of 1.6 to an increase of 1.8 inches by the end of the century (decrease of 16% to increase of 18%).
    - The fall season projections for the Ipswich basin could see a decrease of 1.1 to an increase of 1.4 inches by mid-century (decrease of 9% to increase of 12% and a decrease of 1.6 to an increase of 1.3 inches by the end of the century (decrease of 13% to increase of 11%).

Ipswich Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	+0 to +2	-0 to +3	-1 to +3	-0 to +3
	Winter	12	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	13	-1 to +2	-1 to +2	-1 to +3	-1 to +2
	Fall	12	+0 to +2	+0 to +3	-0 to +4	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Ipswich basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The summer season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

MERRIMACK BASIN

MUNICIPALITIES WITHIN MERRIMACK BASIN:

Amesbury, Andover, Ashburnham, Ashby, Ayer, Boxborough, Boxford, Chelmsford, Dracut, Dunstable, Georgetown, Groton, Groveland, Harvard, Haverhill, Lawrence, Littleton, Lowell, Merrimac, Methuen, Newbury, Newburyport, North Andover, Salisbury, Tewksbury, West Newbury, and Westford

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

MERRIMACK BASIN

Merrimack Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	48.1	+2.2 to +4.4	+3.0 to +6.4	+3.6 to +9.1	+3.9 to +10.9
	Winter	26.8	+2.5 to +5.3	+3.2 to +7.8	+4.0 to +9.5	+4.3 to +10.8
	Spring	46.1	+1.7 to +3.5	+2.6 to +5.4	+2.7 to +7.7	+3.3 to +9.4
	Summer	68.8	+2.1 to +4.3	+2.8 to +6.7	+3.2 to +9.9	+3.8 to +12.5
	Fall	50.3	+2.3 to +5.0	+3.3 to +6.7	+3.5 to +9.6	+4.0 to +11.8
Maximum Temperature	Annual	59.1	+2.1 to +4.2	+2.7 to +6.3	+3.3 to +9.1	+3.6 to +10.9
	Winter	36.7	+2.1 to +4.8	+2.8 to +7.3	+3.4 to +8.8	+3.8 to +10.0
	Spring	57.5	+1.6 to +3.4	+2.2 to +5.5	+2.6 to +7.9	+3.2 to +9.4
	Summer	80.5	+1.9 to +4.4	+2.7 to +6.7	+3.1 to +10.2	+3.6 to +12.8
	Fall	61.5	+2.4 to +4.9	+3.5 to +6.9	+3.4 to +9.9	+3.9 to +12.2
Minimum Temperature	Annual	37.0	+2.3 to +4.8	+3.2 to +6.5	+3.9 to +9.1	+4.2 to +11.0
	Winter	16.9	+2.7 to +5.8	+3.6 to +8.3	+4.6 to +10.2	+4.8 to +11.6
	Spring	34.7	+1.9 to +3.8	+2.7 to +5.7	+2.9 to +7.5	+3.4 to +9.3
	Summer	57.1	+2.2 to +4.5	+3.0 to +7.1	+3.4 to +9.7	+4.0 to +12.2
	Fall	39.1	+2.2 to +5.2	+3.5 to +6.6	+3.6 to +9.4	+4.1 to +11.6

- The Merrimack basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.7 °F to 6.7 °F (3-8% increase); end of century increase of 3.6 °F to 12.8 °F (4-16% increase).
    - Fall mid-century increase of 3.5 °F to 6.9°F (6-11% increase); end of century increase by and 3.9 °F to 12.2 °F (6-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.6 °F to 8.3 °F (21-49% increase); end of century increase by 4.8 °F to 11.6 °F (28-68% increase).
    - Fall mid-century of 3.5 °F to 6.6 °F (9-17% increase); end of century increase of 4.1°F to 11.6 °F (11-30% increase).

MERRIMACK BASIN

Merrimack Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	7	+7 to +20	+11 to +33	+13 to +55	+15 to +74
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[63]	+<1[63] to +1	+<1[63] to +2	+<1[63] to +3	+<1[63] to +5
	Summer	7	+6 to +17	+9 to +28	+11 to +44	+13 to +58
	Fall	<1[63]	+1 to +3	+1 to +5	+1 to +9	+1 to +13
Days with Maximum Temperature Over 95°F	Annual	1	+2 to +8	+3 to +16	+4 to +31	+6 to +49
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+<1[63] to +<1[63]	+<1[63] to +<1[63]	+<1[63] to +1	+<1[63] to +2
	Summer	1	+2 to +8	+3 to +14	+4 to +27	+5 to +42
	Fall	0	+<1[63] to +1	+<1[63] to +2	+<1[63] to +4	+<1[63] to +6
Days with Maximum Temperature Over 100°F	Annual	<1[63]	+<1[63] to +2	+<1[63] to +5	+1 to +11	+1 to +22
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[63]	+0 to +<1[63]	+0 to +<1[63]	+0 to +1
	Summer	<1[63]	+<1[63] to +2	+<1[63] to +5	+1 to +10	+1 to +20
	Fall	0	+0 to +<1[63]	+<1[63] to +<1[63]	+0 to +1	+0 to +2

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Merrimack basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Merrimack basin is expected to see days with daily maximum temperatures over 90 °F increase by 11 to 33 more days by mid-century, and 15 to 74 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 9 to 28 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Merrimack basin is expected to have 13 to 58 more days.

[63] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MERRIMACK BASIN

Merrimack Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	7	-2 to -4	-2 to -5	-3 to -5	-3 to -5
	Winter	7	-2 to -4	-2 to -4	-2 to -5	-2 to -5
	Spring	<1[64]	-0 to +<1[64]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[64]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	148	-12 to -30	-19 to -43	-23 to -56	-25 to -66
	Winter	83	-2 to -7	-3 to -12	-5 to -20	-6 to -25
	Spring	37	-4 to -12	-7 to -15	-8 to -19	-9 to -21
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	27	-5 to -11	-9 to -15	-9 to -18	-9 to -20

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Merrimack basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 3 to 12 fewer days by mid-century, and 6 to 25 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 21 fewer by end of century.
    - Fall is expected to have 9 to 15 fewer days by mid-century, and 9 to 20 fewer days by end of century.

[64] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MERRIMACK BASIN

Merrimack Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6693	-572 to -1185	-769 to -1621	-914 to -2135	-1032 to -2503
	Winter	3450	-217 to -492	-282 to -714	-353 to -865	-395 to -997
	Spring	1762	-144 to -291	-213 to -449	-225 to -613	-290 to -720
	Summer	106	-34 to -62	-43 to -79	-54 to -90	-54 to -92
	Fall	1381	-160 to -374	-279 to -463	-266 to -649	-285 to -735
Cooling Degree-Days (Base 65°F)	Annual	526	+209 to +444	+283 to +737	+341 to +1154	+399 to +1518
	Winter	0	+1 to +2	+0 to +4	+1 to +4	+2 to +3
	Spring	20	+10 to +30	+19 to +51	+20 to +90	+16 to +126
	Summer	455	+156 to +337	+199 to +542	+236 to +828	+278 to +1057
	Fall	43	+31 to +94	+48 to +167	+55 to +258	+78 to +335
Growing Degree-Days (Base 50°F)	Annual	2466	+406 to +812	+549 to +1226	+641 to +1923	+730 to +2413
	Winter	6	-1 to +11	+2 to +15	+5 to +24	+3 to +32
	Spring	276	+63 to +136	+89 to +239	+110 to +362	+116 to +471
	Summer	1729	+191 to +398	+258 to +614	+297 to +912	+344 to +1147
	Fall	442	+109 to +296	+179 to +416	+169 to +622	+214 to +779

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Merrimack basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 8-21% (282 -714 degree-days) by mid-century, and a decrease of 11-29% (395 -997 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-25% (213-449 degree-days) by mid-century, and by 16-41% (290 -720 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-34% (279 -463 degree-days) by mid-century, and by 21-53% (285 -1518 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 44-119% (199 -542 degree-days) by mid-century, and by 61-233% (278-1027 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 15-36% (258 -614 degree-days) by mid-century, and by 20-66% (344 -1147 degree-days) by end of century.
    - Spring is expected to see an increase by 32-86% (89 -239 degree-days) by mid-century and 42-171% (116 -471 degree-days) by end of century.
    - Fall is expected to see an increase by 41-94% (179 -415 degree-days) by mid-century and 49-176% (214 -779 degree-days) by end of century.

MERRIMACK BASIN

Merrimack Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+<1[65] to +2	+<1[65] to +3	+1 to +3	+1 to +4
	Winter	2	-0 to +1	+<1[65] to +1	+<1[65] to +1	+<1[65] to +2
	Spring	2	-0 to +1	-0 to +1	+<1[65] to +1	+<1[65] to +1
	Summer	1	-0 to +<1[65]	-0 to +1	-0 to +1	+0 to +1
	Fall	2	-0 to +1	-0 to +1	-0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+<1[65] to +<1[65]	+0 to +1	+<1[65] to +1	+<1[65] to +1
	Winter	<1[65]	-0 to +<1[65]	-0 to +1	-0 to +<1[65]	+0 to +<1[65]
	Spring	<1[65]	-0 to +<1[65]	-0 to +<1[65]	-0 to +<1[65]	+0 to +<1[65]
	Summer	<1[65]	-0 to +<1[65]	-0 to +<1[65]	-0 to +<1[65]	+0 to +<1[65]
	Fall	<1[65]	-0 to +<1[65]	-0 to +<1[65]	-0 to +<1[65]	+0 to +<1[65]
Days with Precipitation Over 4"	Annual	<1[65]	-0 to +<1[65]	-0 to +<1[65]	-0 to +<1[65]	+0 to +<1[65]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +<1[65]
	Spring	0	-0 to +<1[65]	+0 to +<1[65]	-0 to +<1[65]	+0 to +<1[65]
	Summer	<1[65]	-0 to +<1[65]	-0 to +<1[65]	-0 to +<1[65]	+0 to +<1[65]
	Fall	<1[65]	-0 to +<1[65]	-0 to +<1[65]	-0 to +<1[65]	+0 to +<1[65]

- The projections for expected number of days receiving precipitation over one inch are variable for the Merrimack basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[65] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MERRIMACK BASIN

Merrimack Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	44.2	+0.1 to +4.5	-0.0 to +5.8	+0.9 to +6.9	+0.9 to +7.6
	Winter	10.8	-0.5 to +1.9	-0.0 to +2.4	+0.4 to +3.0	+0.4 to +3.8
	Spring	11.3	-0.1 to +2.2	-0.1 to +2.1	+0.1 to +2.6	+0.2 to +2.5
	Summer	10.3	-0.2 to +1.3	-0.6 to +2.0	-0.8 to +1.8	-1.1 to +1.8
	Fall	11.9	-1.1 to +1.1	-1.1 to +1.5	-1.6 to +1.4	-1.4 to +1.3

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Merrimack basin.
    - The winter season is expected to experience the greatest change with an increase of 0-22% by mid-century, and of 4-35% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Merrimack or basin could see a decrease of 0.6 to an increase of 2.0 inches by mid-century (decrease of 6% to increase of 20%) and a decrease of 1.1 to an increase of 1.8 inches by the end of the century (decrease of 10% to increase of 17%).
        - The fall season projections for the Merrimack basin could see a decrease of 1.1 to an increase of 1.5 inches by mid-century (decrease of 10% to increase of 13% and a decrease of 1.4 to an increase of 1.3 inches by the end of the century (decrease of 12% to increase of 11%).

Merrimack Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-1 to +1	-0 to +2	-1 to +2	-0 to +3
	Winter	12	-1 to +1	-1 to +2	-1 to +2	-1 to +2
	Spring	12	-1 to +1	-1 to +1	-2 to +1	-1 to +1
	Summer	13	-1 to +1	-1 to +2	-1 to +2	-1 to +2
	Fall	12	-0 to +2	-0 to +2	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Merrimack basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The summer season is expected to experience a decrease of 1 day to an increase of 2 days in consecutive dry days by the end of the century.

MILLERS BASIN

MUNICIPALITIES WITHIN MILLERS BASIN:

Ashburnham, Athol, Erving, Gardner, Hubbardston, Montague, New Salem, Northfield, Orange, Petersham, Phillipston, Royalston, Templeton, Warwick, Wendell, Westminster, and Winchendon

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

MILLERS BASIN

Millers Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	44.7	+2.2 to +4.5	+3.0 to +6.3	+3.5 to +8.9	+3.9 to +10.8
	Winter	22.4	+2.4 to +5.2	+2.9 to +7.6	+3.8 to +9.1	+4.2 to +10.5
	Spring	43.2	+1.5 to +3.4	+2.3 to +5.2	+2.6 to +7.3	+3.0 to +8.9
	Summer	66.0	+2.2 to +4.5	+3.1 to +7.1	+3.4 to +10.5	+3.8 to +12.9
	Fall	47.0	+2.1 to +5.2	+3.6 to +6.5	+3.5 to +9.4	+4.0 to +11.7
Maximum Temperature	Annual	56.6	+2.0 to +4.2	+2.6 to +6.4	+3.1 to +9.1	+3.5 to +11.0
	Winter	33.1	+1.9 to +4.5	+2.5 to +6.7	+3.0 to +8.0	+3.4 to +9.0
	Spring	55.2	+1.3 to +3.2	+2.1 to +5.3	+2.6 to +7.6	+3.1 to +9.2
	Summer	78.7	+1.9 to +4.7	+2.8 to +7.4	+3.2 to +11.0	+3.6 to +13.6
	Fall	58.8	+2.3 to +5.0	+3.5 to +7.0	+3.3 to +9.9	+3.9 to +12.2
Minimum Temperature	Annual	32.9	+2.3 to +4.9	+3.3 to +6.4	+3.8 to +8.8	+4.2 to +10.9
	Winter	11.6	+2.7 to +6.1	+3.5 to +8.4	+4.4 to +10.2	+4.8 to +11.7
	Spring	31.1	+1.6 to +3.8	+2.4 to +5.6	+2.7 to +7.1	+3.1 to +8.8
	Summer	53.3	+2.4 to +4.6	+3.2 to +7.3	+3.6 to +9.9	+4.0 to +12.3
	Fall	35.2	+1.8 to +5.3	+3.4 to +6.6	+3.6 to +9.0	+4.0 to +11.4

- The Millers basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.8 °F to 7.4 °F (3-9% increase); end of century increase of 3.6 °F to 13.6 °F (5-17% increase).
    - Fall mid-century increase of 3.5 °F to 7.0°F (6-12% increase); end of century increase by and 3.9 °F to 12.2 °F (7-21% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.5 °F to 8.4 °F (30-72% increase); end of century increase by 4.8 °F to 11.7 °F (41-100% increase).
    - Fall mid-century of 3.4 °F to 6.6 °F (10-19% increase); end of century increase of 4°F to 11.4 °F (11-32% increase).

MILLERS BASIN

Millers Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	4	+5 to +16	+8 to +30	+10 to +51	+12 to +70
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[66]	+<1[66] to +1	+<1[66] to +2	+<1[66] to +3	+<1[66] to +5
	Summer	4	+5 to +15	+7 to +26	+9 to +43	+10 to +57
	Fall	<1[66]	+<1[66] to +1	+<1[66] to +3	+<1[66] to +7	+1 to +9
Days with Maximum Temperature Over 95°F	Annual	<1[66]	+1 to +6	+2 to +13	+2 to +28	+3 to +44
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[66]	+<1[66] to +<1[66]	+<1[66] to +1	+0 to +2
	Summer	<1[66]	+1 to +5	+2 to +12	+2 to +25	+3 to +40
	Fall	0	+0 to +<1[66]	+<1[66] to +1	+<1[66] to +2	+<1[66] to +3
Days with Maximum Temperature Over 100°F	Annual	0	+<1[66] to +1	+<1[66] to +3	+<1[66] to +9	+<1[66] to +20
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[66]	+0 to +<1[66]	+0 to +<1[66]	+0 to +<1[66]
	Summer	0	+<1[66] to +1	+<1[66] to +3	+<1[66] to +9	+<1[66] to +19
	Fall	0	+0 to +<1[66]	+0 to +<1[66]	+0 to +<1[66]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Millers basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Millers basin is expected to see days with daily maximum temperatures over 90 °F increase by 8 to 30 more days by mid-century, and 12 to 70 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 7 to 26 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Millers basin is expected to have 10 to 57 more days.

[66] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MILLERS BASIN

Millers Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	19	-6 to -11	-8 to -13	-9 to -14	-9 to -15
	Winter	18	-5 to -10	-7 to -12	-8 to -13	-8 to -14
	Spring	1	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[67]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	177	-11 to -28	-19 to -35	-22 to -49	-22 to -58
	Winter	88	-1 to -4	-1 to -5	-2 to -10	-2 to -13
	Spring	49	-4 to -10	-6 to -15	-7 to -19	-9 to -21
	Summer	<1[67]	-0 to -0	-0 to -1	-0 to -1	-0 to -1
	Fall	40	-5 to -14	-10 to -17	-9 to -22	-10 to -26

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Millers basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 1 to 5 fewer days by mid-century, and 2 to 13 fewer by end of century.
    - Spring is expected to have 6 to 15 fewer days by mid-century, and 9 to 21 fewer days by end of century.
    - Fall is expected to have 10 to 17 by mid-century, and 10 to 26 fewer days by end of century.

[67] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MILLERS BASIN

Millers Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7741	-610 to -1278	-824 to -1742	-970 to -2303	-1076 to -2685
	Winter	3857	-200 to -486	-259 to -702	-341 to -826	-387 to -963
	Spring	2019	-126 to -293	-196 to -446	-216 to -595	-268 to -700
	Summer	201	-65 to -113	-88 to -145	-96 to -166	-103 to -176
	Fall	1666	-170 to -423	-304 to -510	-284 to -716	-304 to -839
Cooling Degree-Days (Base 65°F)	Annual	327	+171 to +367	+233 to +647	+266 to +1016	+308 to +1349
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	13	+8 to +22	+12 to +43	+17 to +73	+14 to +102
	Summer	289	+142 to +302	+177 to +511	+205 to +796	+232 to +1014
	Fall	23	+17 to +60	+26 to +100	+32 to +172	+44 to +236
Growing Degree-Days (Base 50°F)	Annual	2002	+362 to +746	+487 to +1189	+589 to +1777	+667 to +2253
	Winter	2	-3 to +6	-2 to +7	-1 to +9	+1 to +10
	Spring	215	+55 to +114	+78 to +202	+98 to +307	+97 to +401
	Summer	1471	+202 to +415	+277 to +654	+308 to +961	+345 to +1184
	Fall	305	+93 to +249	+142 to +350	+139 to +541	+184 to +677

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Millers basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-18% (259 -702 degree-days) by mid-century, and a decrease of 10-25% (387 -963 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 10-22% (196-446 degree-days) by mid-century, and by 13-35% (268 -700 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 18-31% (304 -510 degree-days) by mid-century, and by 18-50% (304 -839 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 61-177% (177 -511 degree-days) by mid-century, and by 80-351% (232 -1014 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 19-44% (277 -654 degree-days) by mid-century, and by 23-81% (345 -1184 degree-days) by end of century.
    - Spring is expected to see an increase by 36-94% (78 -202 degree-days) by mid-century and 45-186% (97 -401 degree-days) by end of century.
    - Fall is expected to see an increase by 47-115% (142 -350 degree-days) by mid-century and 60-222% (184 -677 degree-days) by end of century.

MILLERS BASIN

Millers Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	6	+0 to +2	+<1[68] to +2	+1 to +3	+1 to +3
	Winter	1	+0 to +1	+<1[68] to +1	+<1[68] to +1	+<1[68] to +1
	Spring	1	+0 to +1	+0 to +1	+<1[68] to +1	+<1[68] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+<1[68] to +<1[68]
	Winter	<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]
	Spring	<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]
	Summer	<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]
	Fall	<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]
Days with Precipitation Over 4"	Annual	0	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Summer	0	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]
	Fall	0	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]	+0 to +<1[68]

- The projections for expected number of days receiving precipitation over one inch are variable for the Millers basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-1 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[68] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MILLERS BASIN

Millers Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.6	-0.2 to +4.6	+1.0 to +5.9	+1.4 to +7.0	+1.3 to +7.4
	Winter	10.4	-0.4 to +1.8	+0.1 to +2.2	+0.4 to +2.7	+0.7 to +3.7
	Spring	11.5	-0.2 to +2.1	+0.0 to +1.8	+0.3 to +2.5	+0.0 to +2.7
	Summer	12.0	-0.3 to +1.5	-0.2 to +2.1	-0.3 to +1.7	-0.8 to +1.9
	Fall	11.7	-1.2 to +1.4	-1.2 to +1.5	-1.5 to +1.6	-1.7 to +1.4

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Millers basin.
  - The winter season is expected to experience the greatest change with an increase of 1-21% by mid-century, and of 6-36% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Millers or basin could see a decrease of 0.2 to an increase of 2.1 inches by mid-century (decrease of 1% to increase of 17%) and a decrease of 0.8 to an increase of 1.9 inches by the end of the century (decrease of 7% to increase of 16%).
    - The fall season projections for the Millers basin could see a decrease of 1.2 to an increase of 1.5 inches by mid-century (decrease of 10% to increase of 13% and a decrease of 1.7 to an increase of 1.4 inches by the end of the century (decrease of 14% to increase of 12%).

Millers Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16.	-0 to +2	-1 to +2	-1 to +2	-0 to +2
	Winter	11	-1 to +1	-1 to +2	-1 to +1	-1 to +1
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	12	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Fall	12	-0 to +2	-0 to +2	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Millers basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

NARRAGANSETT BAY & MT. HOPE BAY BASIN

MUNICIPALITIES WITHIN NARRAGANSETT BAY & MT. HOPE BAY BASIN:
Attleboro, Dighton, Fall River, Rehoboth, Seekonk, Somerset, Swansea, and Westport

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

NARRAGANSETT BAY & MT. HOPE BAY BASIN

Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	50.5	+2.1 to +3.8	+2.7 to +6.0	+3.2 to +8.7	+3.5 to +10.6
	Winter	30.6	+2.3 to +4.6	+3.0 to +7.0	+3.6 to +9.1	+4.1 to +10.5
	Spring	47.9	+1.8 to +3.5	+2.5 to +5.6	+2.7 to +7.7	+3.2 to +9.4
	Summer	70.2	+1.6 to +3.8	+2.2 to +6.2	+2.8 to +9.5	+3.3 to +11.6
	Fall	52.8	+2.1 to +4.5	+3.4 to +6.4	+3.3 to +9.1	+3.7 to +11.2
Maximum Temperature	Annual	60.3	+1.9 to +3.8	+2.5 to +6.0	+3.0 to +8.7	+3.2 to +10.5
	Winter	39.5	+2.0 to +4.5	+2.7 to +6.5	+3.2 to +8.5	+3.7 to +9.8
	Spring	58.1	+1.6 to +3.4	+2.2 to +5.4	+2.7 to +7.8	+3.1 to +9.2
	Summer	80.6	+1.6 to +3.7	+2.0 to +6.1	+2.7 to +9.7	+3.1 to +11.6
	Fall	62.8	+2.1 to +4.4	+3.3 to +6.4	+3.2 to +9.0	+3.5 to +11.3
Minimum Temperature	Annual	40.6	+2.2 to +3.9	+2.9 to +6.2	+3.5 to +8.7	+3.8 to +10.7
	Winter	21.7	+2.7 to +4.8	+3.3 to +7.4	+4.1 to +9.6	+4.5 to +11.0
	Spring	37.8	+1.9 to +3.6	+2.8 to +5.9	+2.7 to +7.7	+3.3 to +9.4
	Summer	59.8	+1.7 to +3.8	+2.3 to +6.3	+2.8 to +9.4	+3.6 to +11.4
	Fall	42.8	+2.0 to +4.6	+3.5 to +6.4	+3.3 to +9.0	+3.9 to +11.1

- The Narragansett Bay and Mt. Hope Bay basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.0 °F to 6.1 °F (3-8% increase); end of century increase of 3.1 °F to 11.6 °F (4-14% increase).
    - Fall mid-century increase of 3.3 °F to 6.4 °F (5-10% increase); end of century increase by and 3.5 °F to 11.3 °F (6-18% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.3 °F to 7.4 °F (15-34% increase); end of century increase by 4.5 °F to 11.0 °F (21-51% increase).
    - Fall mid-century of 3.5 °F to 6.4 °F (8-15% increase); end of century increase of 3.9°F to 11.1 °F (9-26% increase).

NARRAGANSETT BAY & MT. HOPE BAY BASIN

Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (Days)	jected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	7	+5 to +14	+7 to +29	+9 to +51	+12 to +66
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	1	+<1[69] to +1	+<1[69] to +1	+<1[69] to +2	+<1[69] to +3
	Summer	6	+4 to +12	+6 to +25	+8 to +43	+10 to +54
	Fall	<1[69]	+<1[69] to +2	+1 to +4	+1 to +7	+1 to +10
Days with Maximum Temperature Over 95°F	Annual	1	+1 to +4	+2 to +10	+3 to +24	+3 to +38
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[69]	+0 to +<1[69]	+<1[69] to +<1[69]	+<1[69] to +<1[69]	+<1[69] to +1
	Summer	1	+1 to +4	+2 to +9	+2 to +22	+3 to +34
	Fall	<1[69]	+<1[69] to +1	+<1[69] to +1	+<1[69] to +2	+<1[69] to +3
Days with Maximum Temperature Over 100°F	Annual	<1[69]	+<1[69] to +1	+<1[69] to +2	+<1[69] to +6	+<1[69] to +12
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[69]	+0 to +<1[69]	+0 to +<1[69]	+0 to +<1[69]
	Summer	<1[69]	+<1[69] to +1	+<1[69] to +2	+<1[69] to +5	+<1[69] to +11
	Fall	0	+0 to +<1[69]	+0 to +<1[69]	+0 to +<1[69]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Narragansett Bay and Mt Hope Bay basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Narragansett Bay and Mt Hope Bay basin is expected to see days with daily maximum temperatures over 90 °F increase by 7 to 29 more days by mid-century, and 12 to 66 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 6 to 25 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Narragansett Bay and Mt Hope Bay basin is expected to have 10 to 54 more days.

[69] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NARRAGANSETT BAY & MT. HOPE BAY BASIN

Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	2	-0 to -1	-1 to -1	-1 to -1	-1 to -1
	Winter	2	-0 to -1	-1 to -1	-1 to -1	-1 to -1
	Spring	<1[70]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	121	-14 to -29	-20 to -46	-24 to -59	-26 to -69
	Winter	76	-5 to -12	-7 to -20	-9 to -29	-11 to -36
	Spring	27	-5 to -11	-7 to -15	-8 to -18	-9 to -20
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	17	-4 to -9	-7 to -11	-8 to -13	-7 to -15

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Narragansett Bay and Mt. Hope Bay basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 7 to 20 fewer days by mid-century, and 11 to 36 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 20 fewer days by end of century.
    - Fall is expected to have 7 to 11 fewer days by mid-century, and 7 to 15 fewer days by end of century.

[70] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NARRAGANSETT BAY & MT. HOPE BAY BASIN

Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	5948	-521 to -1014	-719 to -1490	-830 to -1955	-915 to -2320
	Winter	3116	-213 to -424	-270 to -638	-324 to -821	-370 to -962
	Spring	1590	-144 to -298	-209 to -469	-228 to -623	-284 to -726
	Summer	68	-23 to -41	-31 to -52	-35 to -60	-37 to -65
	Fall	1173	-139 to -317	-245 to -412	-223 to -580	-246 to -662
Cooling Degree-Days (Base 65°F)	Annual	635	+207 to +433	+266 to +734	+315 to +1166	+376 to +1489
	Winter	0	+0 to +4	+0 to +5	+0 to +4	+1 to +6
	Spring	21	+11 to +29	+18 to +56	+20 to +91	+20 to +121
	Summer	547	+126 to +312	+165 to +520	+215 to +818	+263 to +1004
	Fall	62	+39 to +97	+56 to +176	+67 to +267	+97 to +348
Growing Degree-Days (Base 50°F)	Annual	2742	+387 to +776	+515 to +1224	+592 to +1939	+680 to +2424
	Winter	7	+1 to +19	+3 to +22	+8 to +39	+8 to +58
	Spring	316	+75 to +147	+101 to +255	+105 to +391	+112 to +506
	Summer	1859	+150 to +352	+199 to +570	+253 to +877	+307 to +1065
	Fall	552	+106 to +284	+190 to +422	+180 to +618	+233 to +783

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Narragansett Bay and Mt. Hope Bay basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 9-20% (270 -638 -days) by mid-century, and a decrease of 12-31% (370 -962 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 13-29% (209-469 degree-days) by mid-century, and by 18-46% (284 -726 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-35% (245.-412 degree-days) by mid-century, and by 21-56% (246 -662 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 30-95% (165 -520 degree-days) by mid-century, and by 48-183% (263 -1004 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 11-31% (199 -570 degree-days) by mid-century, and by 17-57% (307 -1065 degree-days) by end of century.
    - Spring is expected to see an increase by 32-81% (101 -255 degree-days) by mid-century and 36-160% (112 -506 degree-days) by end of century.
    - Fall is expected to see an increase by 34-77% (190 -422 degree-days) by mid-century and 42-142% (233 -783 degree-days) by end of century.

NARRAGANSETT BAY & MT. HOPE BAY BASIN

Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[71] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+<1[71] to +1	+<1[71] to +1	+<1[71] to +1	+<1[71] to +2
	Spring	2	+<1[71] to +1	+<1[71] to +1	+<1[71] to +1	+<1[71] to +1
	Summer	2	+0 to +<1[71]	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+<1[71] to +<1[71]	+<1[71] to +1	+<1[71] to +1	+<1[71] to +1
	Winter	<1[71]	+0 to +<1[71]	-0.02 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]
	Spring	<1[71]	+0 to +<1[71]	+0 to +<1[71]	+<1[71] to +<1[71]	+<1[71] to +<1[71]
	Summer	<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]
	Fall	<1[71]	+0 to +<1[71]	+<1[71] to +<1[71]	+<1[71] to +<1[71]	+0 to +<1[71]
Days with Precipitation Over 4"	Annual	<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +<1[71]
	Spring	<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]
	Summer	<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]
	Fall	0	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]	+0 to +<1[71]

- The projections for expected number of days receiving precipitation over one inch are variable for the Narragansett Bay & Mt. Hope Bay basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[71] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NARRAGANSETT BAY & MT. HOPE BAY BASIN

Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	46.7	-0.1 to +4.2	+0.7 to +5.9	+1.4 to +7.0	+0.8 to +8.1
	Winter	11.9	-0.3 to +1.8	+0.0 to +2.2	+0.2 to +2.8	+0.1 to +4.0
	Spring	11.9	-0.1 to +1.9	+0.2 to +2.1	+0.2 to +2.5	+0.3 to +3.0
	Summer	11.0	-0.7 to +1.3	-0.7 to +1.9	-1.6 to +2.2	-1.7 to +2.0
	Fall	12.0	-0.7 to +1.0	-0.8 to +1.6	-1.4 to +1.7	-1.7 to +1.6

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Narragansett Bay & Mt. Hope Bay basin.
  - The winter season is expected to experience the greatest change with an increase of 0-19% by mid-century, and of 0-34% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Narragansett Bay & Mt. Hope Bay or basin could see a decrease of 0.7 to an increase of 1.9 inches by mid-century (decrease of 7% to increase of 17%) and a decrease of 1.7 to an increase of 2.0 inches by the end of the century (decrease of 16% to increase of 18%).
    - The fall season projections for the Narragansett Bay & Mt. Hope Bay basin could see a decrease of 0.8 to an increase of 1.6 inches by mid-century (decrease of 7% to increase of 13% and a decrease of 1.7 to an increase of 1.6 inches by the end of the century (decrease of 14% to increase of 13%).

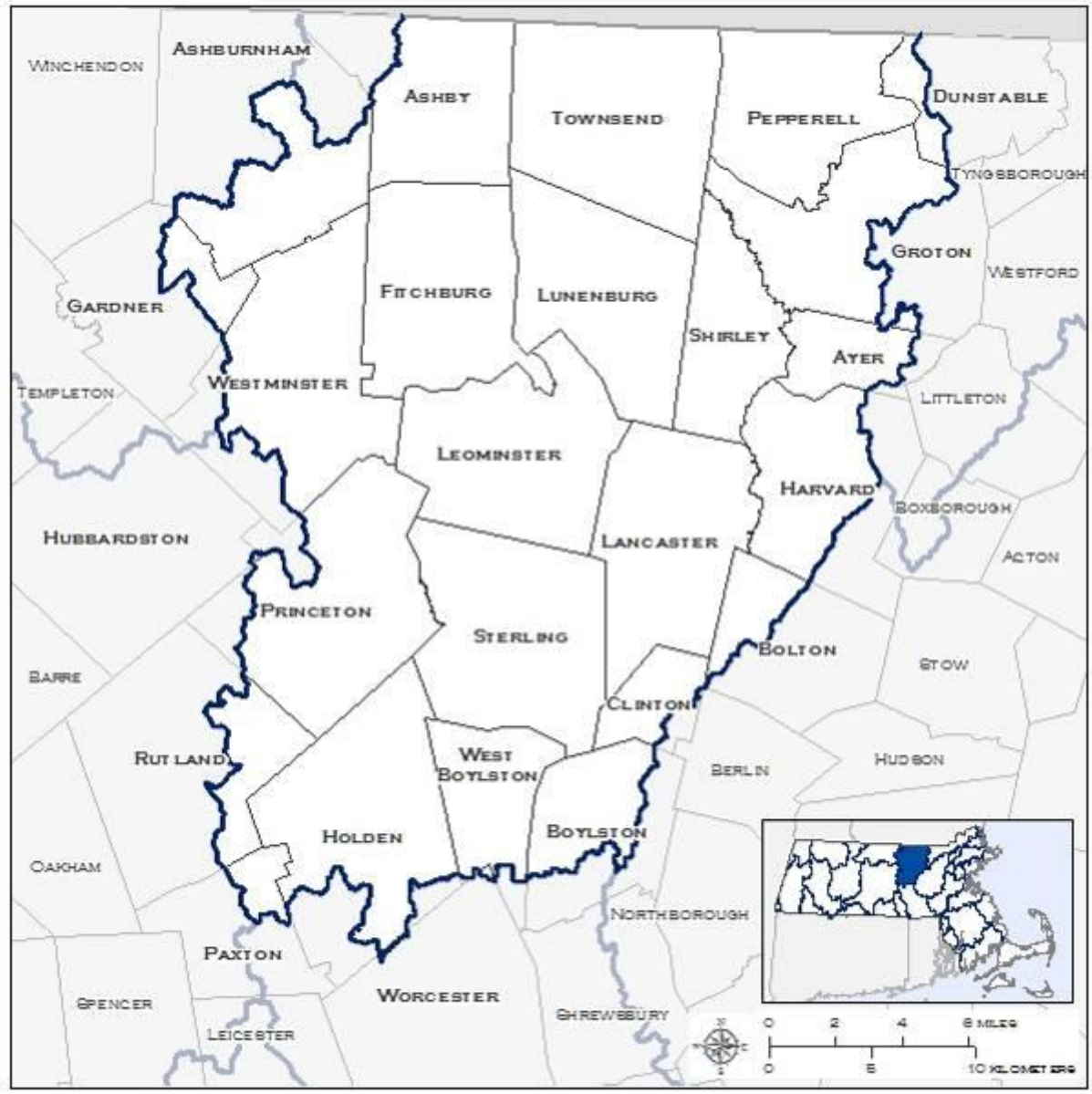
Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	+0 to +2	-0 to +2	-1 to +3	-1 to +4
	Winter	10	-1 to +2	-1 to +2	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	13	-1 to +2	-1 to +2	-1 to +3	-1 to +3
	Fall	13	-0 to +2	-0 to +2	-1 to +3	-1 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Narragansett Bay & Mt. Hope Bay basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience a decrease of 1 day to an increase of 3 days in consecutive dry days by the end of the century.

NASHUA BASIN

MUNICIPALITIES WITHIN NASHUA BASIN:

Ashburnham, Ashby, Ayer, Bolton, Boyslton, Clinton, Dunstable, Fitchburg, Gardner, Groton, Harvard, Holden, Hubbardston, Lancaster, Leominster, Lunenburg, Paxton, Pepperell, Princeton, Rutland, Shirley, Sterling, Townsend, West Boyslton, Westminster, and Worcester



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

NASHUA BASIN

Nashua Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	46.8	+2.2 to +4.4	+3.0 to +6.4	+3.5 to +9.0	+3.9 to +11.0
	Winter	25.2	+2.2 to +5.1	+2.8 to +7.6	+3.7 to +9.2	+3.9 to +10.6
	Spring	44.9	+1.6 to +3.5	+2.5 to +5.5	+2.7 to +7.7	+3.3 to +9.5
	Summer	67.6	+2.2 to +4.6	+3.1 to +7.0	+3.5 to +10.1	+4.0 to +12.6
	Fall	49.0	+2.2 to +5.1	+3.7 to +6.6	+3.6 to +9.5	+4.1 to +11.8
Maximum Temperature	Annual	57.8	+2.1 to +4.3	+2.7 to +6.5	+3.2 to +9.1	+3.6 to +11.0
	Winter	35.1	+1.8 to +4.6	+2.4 to +7.1	+3.0 to +8.4	+3.4 to +9.6
	Spring	56.2	+1.5 to +3.4	+2.4 to +5.5	+2.7 to +7.9	+3.3 to +9.6
	Summer	79.2	+2.0 to +4.7	+3.0 to +7.2	+3.4 to +10.5	+3.9 to +12.9
	Fall	60.2	+2.3 to +4.9	+3.6 to +7.0	+3.5 to +9.8	+4.0 to +12.3
Minimum Temperature	Annual	35.8	+2.3 to +4.8	+3.3 to +6.5	+3.8 to +8.9	+4.2 to +11.0
	Winter	15.3	+2.5 to +5.6	+3.3 to +8.1	+4.2 to +10.0	+4.4 to +11.4
	Spring	33.7	+1.8 to +3.8	+2.7 to +5.9	+2.8 to +7.5	+3.3 to +9.3
	Summer	56.0	+2.5 to +4.6	+3.2 to +7.2	+3.7 to +9.8	+4.1 to +12.3
	Fall	37.8	+2.0 to +5.2	+3.6 to +6.6	+3.7 to +9.3	+4.1 to +11.6

- The Nashua basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 3 °F to 7.2 °F (4-9% increase); end of century increase of 3.9 °F to 12.9 °F (5-16% increase).
    - Fall mid-century increase of 3.6 °F to 7 °F (6-12% increase); end of century increase by and 4 °F to 12.3 °F (7-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.3 °F to 8.1 °F (21-53% increase); end of century increase by 4.4 °F to 11.4 °F (29-75% increase).
    - Fall mid-century of 3.6 °F to 6.6 °F (10-17% increase); end of century increase of 4.1°F to 11.6 °F (11-31% increase).

NASHUA BASIN

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	4	+6 to +17	+9 to +30	+10 to +50	+13 to +70
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[72]	-0 to +1	+<1[72] to +1	+<1[72] to +3	+<1[72] to +4
	Summer	4	+5 to +15	+8 to +26	+10 to +42	+11 to +56
	Fall	<1[72]	+<1[72] to +1	+<1[72] to +3	+<1[72] to +7	+1 to +10
Days with Maximum Temperature Over 95°F	Annual	<1[72]	+1 to +6	+2 to +13	+3 to +27	+4 to +42
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[72]	+0 to +<1[72]	+0 to +1	+0 to +1
	Summer	<1[72]	+1 to +6	+2 to +12	+2 to +24	+3 to +37
	Fall	<1[72]	+<1[72] to +<1[72]	+<1[72] to +1	+<1[72] to +2	+<1[72] to +3
Days with Maximum Temperature Over 100°F	Annual	<1[72]	+<1[72] to +1	+<1[72] to +3	+<1[72] to +9	+<1[72] to +17
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[72]	+0 to +<1[72]	+0 to +<1[72]	+0 to +<1[72]
	Summer	<1[72]	+<1[72] to +1	+<1[72] to +3	+<1[72] to +8	+<1[72] to +16
	Fall	0	+0 to +<1[72]	+0 to +<1[72]	+0 to +<1[72]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Nashua basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Nashua basin is expected to see days with daily maximum temperatures over 90 °F increase by 9 to 30 more days by mid-century, and 13 to 70 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 8 to 26 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Nashua basin is expected to have 11 to 56 more days.

[72] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NASHUA BASIN

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	9	-3 to -6	-4 to -7	-4 to -7	-4 to -8
	Winter	9	-3 to -6	-4 to -6	-4 to -7	-4 to -7
	Spring	<1[73]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[73]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	156	-11 to -28	-19 to -38	-22 to -54	-23 to -64
	Winter	85	-1 to -5	-2 to -8	-3 to -16	-4 to -20
	Spring	40	-4 to -12	-6 to -16	-8 to -20	-9 to -22
	Summer	<1[73]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	31	-5 to -12	-9 to -15	-9 to -19	-9 to -22

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Nashua basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 2 to 8 fewer days by mid-century, and 4 to 20 fewer days by end of century.
    - Spring is expected to have 6 to 16 fewer days by mid-century, and 9 to 22 fewer days by end of century.
    - Fall is expected to have 9 to 15 fewer days by mid-century, and 9 to 22 fewer days by end of century.

[73] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NASHUA BASIN

Nashua Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7092	-574 to -1223	-806 to -1701	-937 to -224	-1054 to -2623
	Winter	3602	-187 to -476	-248 to -697	-323 to -838	-366 to -974
	Spring	1861	-138 to -302	-215 to -473	-230 to -622	-290 to -736
	Summer	141	-49 to -84	-64 to -106	-73 to -120	-75 to -124
	Fall	1488	-169 to -400	-295 to -489	-276 to -683	-296 to -784
Cooling Degree-Days (Base 65°F)	Annual	432	+201 to +421	+271 to +712	+325 to +1091	+373 to +1458
	Winter	0	-2 to -2	+1 to +3	-1 to +1	-1 to +0
	Spring	17	+9 to +24	+15 to +48	+19 to +85	+15 to +118
	Summer	377	+163 to +335	+208 to +545	+241 to +817	+276 to +1038
	Fall	33	+23 to +78	+37 to +131	+44 to +216	+62 to +297
Growing Degree-Days (Base 50°F)	Annual	2270	+393 to +800	+533 to +1236	+647 to +1889	+730 to +2367
	Winter	4	-1 to +8	-0 to +10	+1 to +14	+2 to +19
	Spring	254	+59 to +127	+84 to +227	+101 to +346	+107 to +453
	Summer	1617	+206 to +417	+287 to +645	+323 to +931	+364 to +1158
	Fall	384	+109 to +283	+168 to +395	+159 to +593	+207 to +750

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Nashua basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-19% (248 -697 degree-days) by mid-century, and a decrease of 10-27% (366 -974 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-25% (215 -473 degree-days) by mid-century, and by 16-40% (290 -736 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-33% (295 -489 degree-days) by mid-century, and by 20-53% (296 -784 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 55-145% (208 -545 degree-days) by mid-century, and by 73-276% (276 -1038 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 18-40% (287 -645 degree-days) by mid-century, and by 23-72% (364 -1158 degree-days) by end of century.
    - Spring is expected to see an increase by 33-89% (84 -227 degree-days) by mid-century and 42-178% (107 -453 degree-days) by end of century.
    - Fall is expected to see an increase by 44-103% (168 -395 degree-days) by mid-century and 54-195% (207 -750 degree-days) by end of century.

NASHUA BASIN

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+<1[74] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+0 to +1	+<1[74] to +1	+<1[74] to +2	+<1[74] to +2
	Spring	2	+0 to +1	+0 to +1	+0 to +1	+<1[74] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[74]	+<1[74] to +<1[74]	+<1[74] to +1	+<1[74] to +1
	Winter	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Spring	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+<1[74] to +<1[74]	+<1[74] to +<1[74]
	Summer	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Fall	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
Days with Precipitation Over 4"	Annual	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Summer	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Fall	0	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]

- The projections for expected number of days receiving precipitation over one inch are variable for the Nashua basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[74] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NASHUA BASIN

Nashua Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.9	+0.4 to +4.9	+1.2 to +6.3	+2.3 to +7.9	+1.3 to +8.4
	Winter	11.0	-0.3 to +1.9	+0.2 to +2.5	+0.4 to +3.3	+0.6 to +4.3
	Spring	11.8	-0.0 to +2.2	+0.1 to +2.0	+0.5 to +3.0	+0.1 to +2.9
	Summer	11.3	-0.3 to +1.5	-0.3 to +2.2	-0.6 to +2.2	-1.1 to +2.2
	Fall	11.8	-1.1 to +1.1	-1.2 to +1.8	-1.6 to +1.7	-1.4 to +1.5

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Nashua basin.
    - The winter season is expected to experience the greatest change with an increase of 2-22% by mid-century, and of 6-39% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Nashua or basin could see a decrease of 0.3 to an increase of 2.2 inches by mid-century (decrease of 3% to increase of 20%) and a decrease of 1.1 to an increase of 2.2 inches by the end of the century (decrease of 10% to increase of 19%).
        - The fall season projections for the Nashua basin could see a decrease of 1.2 to an increase of 1.8 inches by mid-century (decrease of 10% to increase of 15% and a decrease of 1.4 to an increase of 1.5 inches by the end of the century (decrease of 12% to increase of 13%).

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-0 to +2	-1 to +2	-1 to +2	-1 to +3
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-2 to +1
	Summer	12	-1 to +2	-1 to +2	-1 to +3	-1 to +3
	Fall	12	-0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Nashua basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

NORTH COASTAL BASIN

MUNICIPALITIES WITHIN NORTH COASTAL BASIN:

Beverly, Danvers, Essex, Everett, Gloucester, Hamilton, Ipswich, Lynn, Lynnfield, Malden, Manchester, Marblehead, Melrose, Nahant, Peabody, Reading, Revere, Rockport, Salem, Salisbury, Saugus, Stoneham, Swampscott, Wakefield, and Wenham

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

NORTH COASTAL BASIN

North Coastal Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.7	+2.1 to +4.2	+2.7 to +6.2	+3.2 to +8.9	+3.5 to +10.8
	Winter	29.5	+2.1 to +4.7	+2.8 to +7.0	+3.5 to +8.9	+3.9 to +10.4
	Spring	47.0	+2.0 to +3.8	+2.7 to +5.7	+2.8 to +8.1	+3.4 to +9.9
	Summer	69.6	+1.9 to +4.1	+2.5 to +6.4	+2.9 to +9.5	+3.5 to +12.1
	Fall	52.3	+2.0 to +4.6	+3.3 to +6.5	+3.0 to +9.2	+3.5 to +11.6
Maximum Temperature	Annual	59.2	+2.0 to +4.0	+2.5 to +6.0	+3.0 to +8.9	+3.2 to +10.7
	Winter	38.1	+1.8 to +4.3	+2.4 to +6.6	+3.1 to +8.3	+3.4 to +9.5
	Spring	56.8	+1.9 to +3.7	+2.4 to +5.7	+2.8 to +8.3	+3.3 to +9.8
	Summer	79.6	+1.8 to +4.2	+2.4 to +6.3	+2.8 to +9.6	+3.3 to +12.2
	Fall	61.7	+2.0 to +4.4	+3.0 to +6.6	+2.9 to +9.5	+3.4 to +11.9
Minimum Temperature	Annual	40.2	+2.2 to +4.5	+2.9 to +6.4	+3.5 to +9.0	+3.8 to +10.9
	Winter	20.9	+2.4 to +5.1	+3.1 to +7.4	+4.0 to +9.5	+4.3 to +10.9
	Spring	37.3	+2.1 to +4.0	+2.9 to +5.9	+3.0 to +7.9	+3.5 to +9.8
	Summer	59.5	+2.0 to +4.1	+2.6 to +6.7	+3.0 to +9.3	+3.7 to +12.0
	Fall	42.9	+1.9 to +4.7	+3.3 to +6.3	+3.1 to +9.2	+3.7 to +11.4

- The North Coastal basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.4 °F to 6.3 °F (3-8% increase); end of century increase of 3.3 °F to 12.2 °F (4-15% increase).
    - Fall mid-century increase of 3 °F to 6.6 °F (5-11% increase); end of century increase by and 3.4 °F to 11.9 °F (5-19% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.1 °F to 7.4 °F (15-36% increase); end of century increase by 4.3 °F to 10.9 °F (20-52% increase).
    - Fall mid-century of 3.3 °F to 6.3 °F (8-15% increase); end of century increase of 3.7°F to 11.4 °F (9-27% increase).

NORTH COASTAL BASIN

North Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	8	+5 to +15	+7 to +26	+8 to +45	+10 to +62
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[75]	+<1[75] to +1	+<1[75] to +1	+<1[75] to +2	+<1[75] to +4
	Summer	7	+4 to +13	+6 to +22	+7 to +37	+9 to +50
	Fall	<1[75]	+<1[75] to +2	+1 to +4	+1 to +7	+1 to +10
Days with Maximum Temperature Over 95°F	Annual	1	+1 to +6	+2 to +11	+3 to +23	+4 to +37
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+<1[75] to +<1[75]	+0 to +<1[75]	+<1[75] to +1	+<1[75] to +1
	Summer	1	+1 to +5	+2 to +10	+3 to +20	+3 to +32
	Fall	<1[75]	+<1[75] to +<1[75]	+<1[75] to +1	+<1[75] to +3	+<1[75] to +4
Days with Maximum Temperature Over 100°F	Annual	<1[75]	+<1[75] to +1	+<1[75] to +3	+<1[75] to +7	+<1[75] to +13
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[75]	+0 to +<1[75]	+0 to +<1[75]	+0 to +<1[75]
	Summer	<1[75]	+<1[75] to +1	+<1[75] to +3	+<1[75] to +6	+<1[75] to +11
	Fall	0	+0 to +<1[75]	+0 to +<1[75]	+0 to +<1[75]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the North Coastal basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the North Coastal basin is expected to see days with daily maximum temperatures over 90 °F increase by 7 to 26 more days by mid-century, and 10 to 62 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 6 to 22 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the North Coastal basin is expected to have 9 to 50 more days.

[75] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NORTH COASTAL BASIN

North Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	3	-1 to -2	-1 to -2	-1 to -2	-1 to -3
	Winter	3	-1 to -2	-1 to -2	-1 to -2	-1 to -2
	Spring	<1[76]	-0 to +<1[76]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[76]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	121	-12 to -29	-18 to -44	-22 to -56	-23 to -66
	Winter	77	-4 to -11	-5 to -18	-7 to -27	-9 to -34
	Spring	27	-5 to -11	-7 to -15	-8 to -18	-9 to -20
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	17	-4 to -8	-6 to -10	-7 to -12	-6 to -14

- Due to projected increases in average and minimum temperatures throughout the end of the century, the North Coastal basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 5 to 18 fewer days by mid-century, and 9 to 34 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 7 to 20 fewer days by end of century.
    - Fall is expected to have 6 to 10 fewer days by mid-century, and 7 to 14 fewer days by end of century.

[76] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NORTH COASTAL BASIN

North Coastal Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6194	-529 to -1103	-692 to -1517	-830 to -2019	-929 to -2401
	Winter	3212	-188 to -430	-243 to -645	-310 to -808	-355 to -950
	Spring	1675	-166 to -316	-222 to -473	-239 to -650	-302 to -763
	Summer	88	-33 to -56	-40 to -71	-47 to -81	-51 to -83
	Fall	1215	-134 to -331	-239 to -425	-228 to -604	-249 to -688
Cooling Degree-Days (Base 65°F)	Annual	590	+204 to +434	+276 to +731	+320 to +1139	+371 to +1509
	Winter	0	+0 to +5	+0 to +6	+0 to +5	+0 to +6
	Spring	24	+13 to +33	+23 to +57	+24 to +94	+19 to +142
	Summer	507	+142 to +326	+182 to +523	+217 to +790	+264 to +1025
	Fall	56	+30 to +89	+44 to +177	+53 to +272	+76 to +354
Growing Degree-Days (Base 50°F)	Annual	2635	+387 to +795	+539 to +1228	+610 to +1942	+689 to +2449
	Winter	6	+1 to +15	+3 to +18	+6 to +33	+5 to +42
	Spring	296	+84 to +161	+108 to +262	+118 to +396	+129 to +514
	Summer	1800	+179 to +378	+228 to +588	+267 to +870	+322 to +1109
	Fall	528	+100 to +283	+171 to +427	+160 to +645	+214 to +811

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the North Coastal basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 8-20% (243 -645 degree-days) by mid-century, and a decrease of 11-30% (355 -950 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 13-28% (222-473 degree-days) by mid-century, and by 18-46% (302-763 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-35% (239-425 degree-days) by mid-century, and by 20-57% (249 -687 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 36-103% (182 -523 degree-days) by mid-century, and by 52-202% (264-1025 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 13-33% (228 -588 degree-days) by mid-century, and by 18-62% (322-1109 degree-days) by end of century.
    - Spring is expected to see an increase by 36-88% (108 -262 degree-days) by mid-century and 44-173% (129 -514 degree-days) by end of century.
    - Fall is expected to see an increase by 32-81% (171 -427 degree-days) by mid-century and 40-154% (214 -811 degree-days) by end of century.

NORTH COASTAL BASIN

North Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[77] to +2	+<1[77] to +3	+1 to +3	+1 to +4
	Winter	2	+<1[77] to +1	+<1[77] to +1	+<1[77] to +2	+<1[77] to +2
	Spring	2	+0 to +1	+0 to +1	+<1[77] to +1	+<1[77] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	-0.29 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+<1[77] to +1	+0 to +1	+<1[77] to +1	+<1[77] to +1
	Winter	<1[77]	+0 to +<1[77]	+<1[77] to +<1[77]	+0 to +<1[77v]	+<1[77] to +<1[77]
	Spring	<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]
	Summer	<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]
	Fall	<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]
Days with Precipitation Over 4"	Annual	<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]
	Winter	0	+0 to +0	+0 to +0	+0 to +<1[77]	+0 to +<1[77]
	Spring	0	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]
	Summer	<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]
	Fall	<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]	+0 to +<1[77]

- The projections for expected number of days receiving precipitation over one inch are variable for the North Coastal basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[77] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NORTH COASTAL BASIN

North Coastal Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.3	+0.0 to +4.4	+0.0 to +5.5	+0.7 to +6.7	+0.8 to +7.2
	Winter	11.7	-0.3 to +1.8	+0.2 to +2.4	+0.3 to +3.1	+0.5 to +4.1
	Spring	11.5	-0.2 to +2.2	-0.1 to +2.1	+0.1 to +2.6	+0.1 to +2.7
	Summer	10.1	-0.3 to +1.4	-0.6 to +1.9	-1.0 to +2.1	-1.7 to +1.8
	Fall	12.1	-1.1 to +0.9	-1.1 to +1.4	-1.9 to +1.5	-1.8 to +1.2

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the North Coastal basin.
  - The winter season is expected to experience the greatest change with an increase of 1-20% by mid-century, and of 4-35% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the North Coastal or basin could see a decrease of 0.3 to an increase of 2.2 inches by mid-century (decrease of 6% to increase of 19%) and a decrease of 1.1 to an increase of 2.2 inches by the end of the century (decrease of 17% to increase of 18%).
    - The fall season projections for the North Coastal basin could see a decrease of 1.2 to an increase of 1.8 inches by mid-century (decrease of 9% to increase of 11% and a decrease of 1.4 to an increase of 1.5 inches by the end of the century (decrease of 14% to increase of 10%).

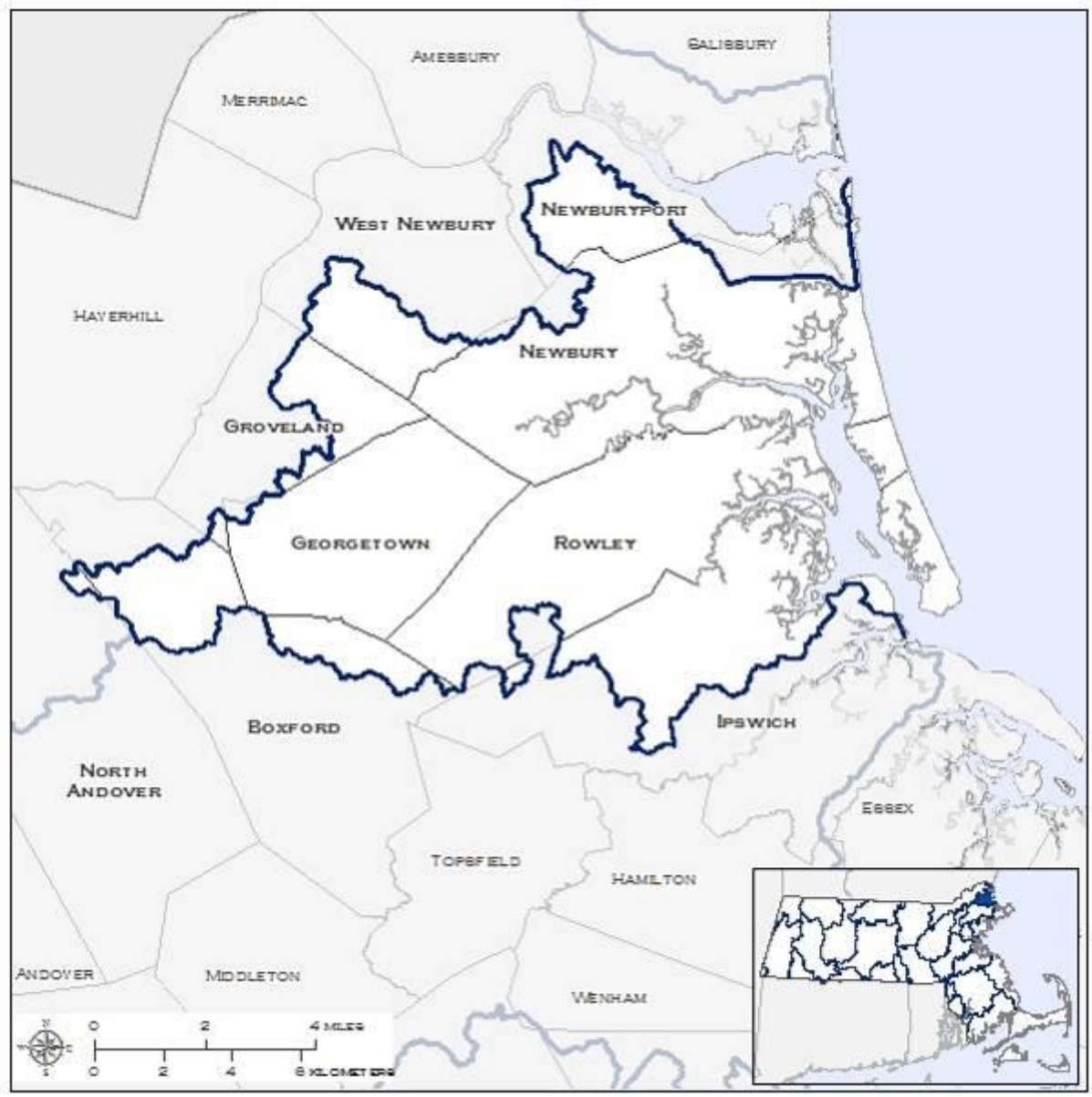
North Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-0 to +2	-0 to +3	-1 to +3	-0 to +3
	Winter	11	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	13	-1 to +1	-1 to +2	-1 to +3	-1 to +3
	Fall	12	-0 to +2	-0 to +3	-1 to +4	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the North Coastal basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

PARKER BASIN

MUNICIPALITIES WITHIN PARKER BASIN:

Boxford, Georgetown, Groveland, Ipswich, Newbury, Newburyport, North Andover, Rowley, and West Newbury



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

PARKER BASIN

Parker Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.2	+2.2 to +4.3	+2.9 to +6.3	+3.4 to +9.0	+3.7 to +10.9
	Winter	28.5	+2.3 to +5.0	+3.1 to +7.5	+3.8 to +9.4	+4.1 to +11.0
	Spring	46.8	+2.0 to +3.8	+2.8 to +5.6	+2.9 to +8.0	+3.5 to +9.8
	Summer	69.4	+1.9 to +4.1	+2.6 to +6.2	+3.0 to +9.2	+3.6 to +11.8
	Fall	51.6	+2.0 to +4.7	+3.3 to +6.6	+3.2 to +9.5	+3.6 to +11.9
Maximum Temperature	Annual	59.4	+2.1 to +4.1	+2.7 to +6.1	+3.1 to +9.0	+3.4 to +10.8
	Winter	37.8	+2.0 to +4.7	+2.7 to +7.0	+3.4 to +8.8	+3.7 to +10.2
	Spring	57.4	+1.8 to +3.6	+2.5 to +5.7	+2.8 to +8.2	+3.4 to +9.7
	Summer	80.4	+1.8 to +4.2	+2.5 to +6.1	+2.9 to +9.4	+3.5 to +12.0
	Fall	61.8	+2.0 to +4.6	+3.1 to +6.7	+3.1 to +9.7	+3.5 to +12.2
Minimum Temperature	Annual	38.9	+2.3 to +4.6	+3.1 to +6.4	+3.7 to +9.0	+4.0 to +11.0
	Winter	19.2	+2.6 to +5.4	+3.5 to +8.0	+4.3 to +10.1	+4.6 to +11.6
	Spring	36.2	+2.1 to +4.0	+3.0 to +5.9	+3.0 to +7.9	+3.6 to +9.8
	Summer	58.5	+2.0 to +4.1	+2.7 to +6.6	+3.1 to +9.1	+3.8 to +11.6
	Fall	41.3	+1.9 to +4.8	+3.3 to +6.4	+3.3 to +9.4	+3.8 to +11.7

- The Parker basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.5 °F to 6.1 °F (3-8% increase); end of century increase of 3.5 °F to 12 °F (4-15% increase).
    - Fall mid-century increase of 3.1 °F to 6.7 °F (5-11% increase); end of century increase by and 3.5 °F to 12.2 °F (6-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.5 °F to 8 °F (18-41% increase); end of century increase by 4.6 °F to 11.6 °F (24-60% increase).
    - Fall mid-century of 3.3 °F to 6.4 °F (8-16% increase); end of century increase of 3.8°F to 11.7 °F (9-28% increase).

PARKER BASIN

Parker Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	8	+6 to +17	+9 to +30	+11 to +49	+1 to +67
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[78]	+<1[78] to +1	+<1[78] to +1	+<1[78] to +3	+<1[78] to +4
	Summer	7	+5 to +15	+7 to +24	+9 to +40	+11 to +53
	Fall	<1[78]	+<1[78] to +2	+1 to +5	+1 to +8	+1 to +12
Days with Maximum Temperature Over 95°F	Annual	1	+2 to +7	+2 to +12	+3 to +26	+5 to +41
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+<1[78] to +<1[78]	+<1[78] to +<1[78]	+<1[78] to +1	+<1[78] to +2
	Summer	1	+2 to +6	+2 to +11	+3 to +23	+5 to +35
	Fall	0	+<1[78] to +1	+<1[78] to +2	+<1[78] to +4	+<1[78] to +5
Days with Maximum Temperature Over 100°F	Annual	<1[78]	+<1[78] to +2	+<1[78] to +4	+<1[78] to +8	+<1[78] to +15
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[78]	+0 to +<1[78]	+0 to +<1[78]	+0 to +<1[78]
	Summer	<1[78]	+<1[78] to +1	+<1[78] to +3	+<1[78] to +8	+<1[78] to +14
	Fall	0	+0 to +<1[78]	+0 to +<1[78]	+0 to +1	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Parker basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Parker basin is expected to see days with daily maximum temperatures over 90 °F increase by 9 to 30 more days by mid-century, and 13 to 67 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 7 to 24 more days with daily maximums over 90 °F by mid-century
    - By end of century, the Parker basin is expected to have 11 to 53 more days.

[78] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

PARKER BASIN

Parker Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	4	-1 to -3	-1 to -3	-1 to -3	-1 to -3
	Winter	4	-1 to -2	-1 to -3	-1 to -3	-1 to -3
	Spring	<1[79]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[79]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	133	-12 to -29	-19 to -44	-23 to -58	-24 to -68
	Winter	80	-3 to -9	-5 to -16	-7 to -25	-8 to -31
	Spring	32	-5 to -11	-7 to -15	-8 to -19	-9 to -21
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	21	-4 to -10	-7 to -12	-7 to -15	-6 to -17

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Parker basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 5 to 16 fewer days by mid-century, and 8 to 31 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 21 fewer days by end of century.
    - Fall is expected to have 7 to 12 fewer days by mid-century, and 6 to 17 fewer days by end of century.

[79] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

PARKER BASIN

Parker Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6361	-552 to -1139	-728 to -1558	-872 to -2081	-973 to -2478
	Winter	3300	-207 to -465	-271 to -690	-339 to -857	-381 to -1006
	Spring	1700	-165 to -315	-227 to -464	-242 to -639	-305 to -752
	Summer	90	-30 to -55	-39 to -69	-47 to -79	-49 to -80
	Fall	1274	-135 to -342	-243 to -435	-227 to -624	-251 to -717
Cooling Degree-Days (Base 65°F)	Annual	583	+207 to +433	+284 to +719	+338 to +1123	+398 to +1489
	Winter	0	+2 to +3	+1 to +5	+2 to +5	+1 to +4
	Spring	23	+15 to +34	+22 to +57	+25 to +97	+20 to +144
	Summer	499	+144 to +318	+191 to +509	+226 to +772	+276 to +1001
	Fall	52	+32 to +92	+47 to +176	+56 to +272	+83 to +354
Growing Degree-Days (Base 50°F)	Annual	2599	+391 to +795	+559 to +1205	+630 to +1913	+717 to +2418
	Winter	5	+1 to +15	+3 to +18	+5 to +32	+5 to +40.02
	Spring	292	+81 to +158	+107 to +261	+122 to +391	+132 to +508
	Summer	1789	+178 to +373	+237 to +574	+278 to +850	+333 to +1082
	Fall	498	+98 to +287	+173 to +422	+159 to +642	+215 to +811

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Parker basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 8-21% (271 -690 degree-days) by mid-century, and a decrease of 12-30% (381-1006 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 13-27% (227-464 degree-days) by mid-century, and by 18-44% (305 -752 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 19-34% (243 -435 degree-days) by mid-century, and by 20-56% (251 -717 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 38-102% (191-509 degree-days) by mid-century, and by 55-201% (275 - 1001 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 13-32% (237-574 degree-days) by mid-century, and by 19-61% (333-1082 degree-days) by end of century.
    - Spring is expected to see an increase by 37-89% (107-261 degree-days) by mid-century and 45-174% (132 -508 degree-days) by end of century.
    - Fall is expected to see an increase by 35-85% (173-422 degree-days) by mid-century and 43-163% (215-811 degree-days) by end of century.

PARKER BASIN

Parker Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[80] to +2	+<1[80] to +3	+1 to +3	+1 to +3
	Winter	2	+0 to +1	+<1[80] to +1	+<1[80] to +1	+<1[80] to +2
	Spring	2	+0 to +1	+0 to +1	+<1[80] to +1	+<1[80] to +1
	Summer	2	+0 to +<1[80]	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+<1[80] to +<1[80]	+<1[80] to +<1[80]	+<1[80] to +1	+<1[80] to +1
	Winter	<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
	Spring	<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
	Summer	<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
	Fall	<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
Days with Precipitation Over 4"	Annual	<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
	Winter	0	+0 to +0	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
	Spring	0	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
	Summer	<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]
	Fall	<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]	+0 to +<1[80]

- The projections for expected number of days receiving precipitation over one inch are variable for the Parker basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[80] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

PARKER BASIN

Parker Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.4	-0.2 to +4.3	+0.2 to +5.6	+0.6 to +6.8	+0.8 to +7.6
	Winter	11.5	-0.3 to +1.8	+0.2 to +2.5	+0.5 to +3.2	+0.5 to +3.9
	Spring	11.6	-0.1 to +2.4	-0.1 to +2.2	+0.2 to +2.6	+0.2 to +2.7
	Summer	10.1	-0.3 to +1.1	-0.7 to +1.6	-0.8 to +1.6	-1.5 to +1.6
	Fall	12.3	-1.2 to +1.2	-1.2 to +1.4	-1.6 to +1.6	-1.5 to +1.5

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Parker basin.
    - The winter season is expected to experience the greatest change with an increase of 1-22% by mid-century, and of 4-34% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Parker or basin could see a decrease of 0.7 to an increase of 1.6 inches by mid-century (decrease of 7% to increase of 16%) and a decrease of 1.5 to an increase of 1.6 inches by the end of the century (decrease of 14% to increase of 16%).
        - The fall season projections for the Parker basin could see a decrease of 1.2 to an increase of 1.4 inches by mid-century (decrease of 10% to increase of 12% and a decrease of 1.5 to an increase of 1.5 inches by the end of the century (decrease of 12% to increase of 12%).

Parker Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-1 to +1	-1 to +2	-1 to +3	-0 to +3
	Winter	12	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +2	-2 to +2	-1 to +1
	Summer	13	-1 to +1	-1 to +2	-1 to +3	-1 to +2
	Fall	12	-0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Parker basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

QUINEBAUG BASIN

MUNICIPALITIES WITHIN QUINEBAUG BASIN:
Brookfield, Brimfield, Charlton, Douglas, Dudley, East Brookfield, Holland, Monson, Southbridge, Spencer, Sturbridge, Wales, Warren, Webster, and West Brookfield

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

QUINEBAUG BASIN

Quinebaug Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	46.9	+2.2 to +4.3	+3.0 to +6.4	+3.6 to +9.0	+3.9 to +11.1
	Winter	25.4	+2.3 to +5.0	+2.9 to +7.6	+3.7 to +9.3	+4.2 to +10.7
	Spring	45.0	+1.4 to +3.3	+2.3 to +5.7	+2.6 to +7.8	+3.0 to +9.6
	Summer	67.5	+2.3 to +4.4	+3.1 to +7.1	+3.5 to +10.3	+4.0 to +12.6
	Fall	49.2	+2.3 to +5.4	+4.1 to +6.9	+3.9 to +9.6	+4.3 to +11.7
Maximum Temperature	Annual	57.8	+2.1 to +4.1	+2.7 to +6.4	+3.2 to +9.1	+3.6 to +10.9
	Winter	35.5	+1.8 to +4.6	+2.5 to +6.9	+3.0 to +8.5	+3.5 to +9.8
	Spring	56.3	+1.3 to +3.3	+2.1 to +5.6	+2.5 to +7.9	+3.0 to +9.6
	Summer	78.8	+2.1 to +4.5	+2.9 to +7.1	+3.4 to +10.5	+3.8 to +12.9
	Fall	60.3	+2.4 to +5.2	+3.9 to +7.0	+3.7 to +9.8	+4.3 to +12.1
Minimum Temperature	Annual	35.9	+2.3 to +4.6	+3.3 to +6.6	+3.9 to +9.0	+4.3 to +11.1
	Winter	15.3	+2.6 to +5.6	+3.3 to +8.1	+4.4 to +10.0	+4.8 to +11.6
	Spring	33.7	+1.5 to +3.6	+2.5 to +6.0	+2.7 to +7.8	+3.1 to +9.5
	Summer	56.1	+2.4 to +4.5	+3.2 to +7.1	+3.6 to +10.1	+4.2 to +12.3
	Fall	38.1	+2.2 to +5.5	+4.0 to +6.8	+4.0 to +9.4	+4.4 to +11.6

- The Quinebaug basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.9 °F to 7.1 °F (4-9% increase); end of century increase of 3.8 °F to 12.9 °F (5-16% increase).
    - Fall mid-century increase of 3.9 °F to 7.0 °F (6-12% increase); end of century increase by and 4.3 °F to 12.1 °F (7-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.3 °F to 8.1 °F (22-53% increase); end of century increase by 4.8 °F to 11.6 °F (31-76% increase).
    - Fall mid-century of 4 °F to 6.8 °F (10-18% increase); end of century increase of 4.4°F to 11.6 °F (12-31% increase).

QUINEBAUG BASIN

Quinebaug Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	3	+4 to +14	+7 to +27	+9 to +47	+11 to +66
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[81]	+0 to +1	+<1[81] to +1	+<1[81] to +2	+<1[81] to +3
	Summer	3	+4 to +12	+6 to +23	+8 to +40	+10 to +54
	Fall	<1[81]	+<1[81] to +1	+<1[81] to +3	+<1[81] to +7	+1 to +9
Days with Maximum Temperature Over 95°F	Annual	<1[81]	+1 to +4	+1 to +10	+2 to +22	+3 to +36
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[81]	+0 to +<1[81]	+0 to +1	+0 to +1
	Summer	<1[81]	+1 to +4	+1 to +10	+3 to +20	+3 to +32
	Fall	0	+0 to +<1[81]	+<1[81] to +1	+<1[81] to +1	+<1[81] to +3
Days with Maximum Temperature Over 100°F	Annual	0	+<1[81] to +1	+<1[81] to +2	+<1[81] to +6	+<1[81] to +12
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +<1[81]	+0 to +<1[81]	+0 to +<1[81]
	Summer	0	+<1[81] to +1	+<1[81] to +2	+<1[81] to +5	+<1[81] to +12
	Fall	0	+0 to +<1[81]	+0 to +<1[81]	+0 to +<1[81]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Quinebaug basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Quinebaug basin is expected to see days with daily maximum temperatures over 90 °F increase by 7 to 27 more days by mid-century, and 11 to 66 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 6 to 23 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Quinebaug basin is expected to have 10 to 54 more days.

[81] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

QUINEBAUG BASIN

Quinebaug Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	10	-3 to -6	-4 to -7	-5 to -8	-4 to -8
	Winter	10	-3 to -6	-4 to -7	-4 to -7	-4 to -8
	Spring	<1[82]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[82]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	155	-10 to -26	-19 to -38	-21 to -54	-24 to -65
	Winter	85	-1 to -6	-2 to -9	-3 to -16	-4 to -21
	Spring	40	-3 to -10	-6 to -16	-7 to -20	-8 to -22
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	30	-5 to -13	-9 to -16	-9 to -20	-9 to -23

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Quinebaug basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 2 to 9 fewer days by mid-century, and 4 to 21 fewer days by end of century.
    - Spring is expected to have 6 to 16 fewer days by mid-century, and 8 to 22 fewer days by end of century.
    - Fall is expected to have 9 to 16 fewer days by mid-century, and 9 to 23 fewer days by end of century.

[82] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

QUINEBAUG BASIN

Quinebaug Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7052	-563 to -1196	-801.48 to -1701	-931 to -2250	-1072 to -2634
	Winter	3587	-192 to -466	-258.66 to -691	-324 to -841	-384 to -980
	Spring	1854	-116 to -290	-196.45 to -484	-218 to -640	-271 to -758
	Summer	137	-46 to -82	-68.51 to -105	-72 to -120	-80 to -126
	Fall	1473	-178 to -416	-317.05 to -500	-295 to -683	-314 to -782
Cooling Degree-Days (Base 65°F)	Annual	417	+209 to +411	+278.31 to +715	+324 to +1097	+371 to +1442
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	16	+6 to +23	+12 to +47	+17 to +78	+16 to +109
	Summer	363	+158 to +328.19	+202 to +546	+239 to +829	+280 to +1037
	Fall	32	+27 to +77.46	+42 to +127	+51 to +216	+71 to +296
Growing Degree-Days (Base 50°F)	Annual	2266	+410 to +783.29	+562 to +1258	+657 to +1909	+735 to +2396
	Winter	5	-1 to +9.27	+0 to +11	+1 to +15	+1 to +21.95
	Spring	256	+52 to +125.44	+77 to +227	+92 to +351	+95 to +449
	Summer	1607	+209 to +406.29	+279 to +649	+319 to +945	+368 to +1158
	Fall	388	+118 to +296.63	+190 to +408	+183 to +597	+234 to +752

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Quinebaug basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-19% (259 -691 degree-days) by mid-century, and a decrease of 11-27% (384 -980 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 11-26% (196-484 degree-days) by mid-century, and by 15-41% (271-758 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 22-34% (317 -500 degree-days) by mid-century, and by 21-53% (314 -782 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 56-150% (202 -546 degree-days) by mid-century, and by 77-286% (280 -1037 degree-days) by end of century.
- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.

- The summer season is projected to increase by 17-40% (279-649 degree-days) by mid-century, and by 23-72% (368-1158 degree-days) by end of century.
- Spring is expected to see an increase by 30-89% (77-227 degree-days) by mid-century and 37-175% (95-449 degree-days) by end of century.
- Fall is expected to see an increase by 49-105% (190-48 degree-days) by mid-century and 60-194% (234.32-752.47 degree-days) by end of century.

QUINEBAUG BASIN

Quinebaug Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	-0 to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	-0 to +1	-0 to +1	+<1[83] to +2	+<1[83] to +2
	Spring	2	-0 to +1	-0 to +1	-0 to +1	+<1[83] to +2
	Summer	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Fall	3	-0 to +1	-0 to +1	-0 to +1	-1 to +1
Days with Precipitation Over 2"	Annual	1	-0 to +<1[83]	-0 to +1	+<1[83] to +1	+<1[83] to +1
	Winter	<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]
	Spring	<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]
	Summer	<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]
	Fall	<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]
Days with Precipitation Over 4"	Annual	0	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +0<1[83]
	Winter	0	-0 to +0	-0 to +0	-0 to +0	-0 to +0
	Spring	0	-0 to +0	-0 to +0	-0 to +0	-0 to +0
	Summer	0	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]
	Fall	0	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]	-0 to +<1[83]

- The projections for expected number of days receiving precipitation over one inch are variable for the Quinebaug basin, fluctuating between loss and gain of days.
  - Seasonally, the winter season is generally expected to see the highest projected increase.
  - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-2 days by the end of century.
  - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-2 days by the end of century.

[83] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

QUINEBAUG BASIN

Quinebaug Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	48.6	+0.0 to +5.0	+1.2 to +6.6	+2.0 to +7.7	+1.7 to +8.9
	Winter	11.5	-0.5 to +2.1	+0.1 to +3.0	+0.2 to +3.5	+0.5 to +4.4
	Spring	12.2	-0.2 to +2.1	+0.1 to +1.9	+0.3 to +2.7	+0.2 to +2.9
	Summer	11.8	-0.1 to +1.7	-0.3 to +2.2	-0.7 to +2.7	-1.4 to +2.7
	Fall	13.0	-1.3 to +1.5	-1.6 to +2.0	-1.8 to +2.0	-2.0 to +1.8

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Quinebaug basin.
  - The winter season is expected to experience the greatest change with an increase of 0-26% by mid-century, and of 5-38% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Quinebaug or basin could see a decrease of 0.3 to an increase of 2.2 inches by mid-century (decrease of 3% to increase of 18%) and a decrease of 1.4 to an increase of 2.7 inches by the end of the century (decrease of 12% to increase of 23%).
    - The fall season projections for the Quinebaug basin could see a decrease of 1.6 to an increase of 2.0 inches by mid-century (decrease of 12% to increase of 16% and a decrease of 2 to an increase of 1.8 inches by the end of the century (decrease of 15% to increase of 14%).

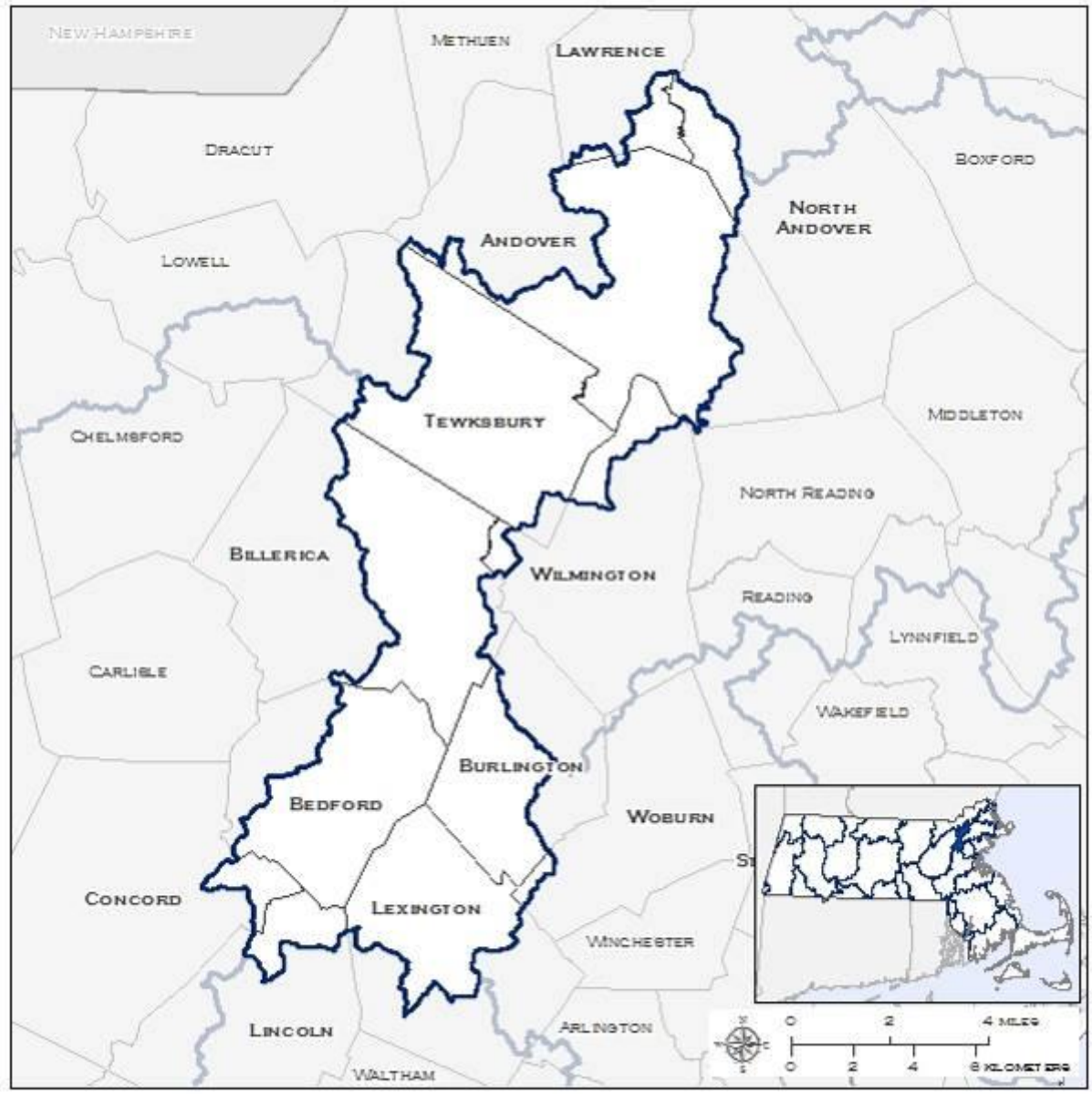
Quinebaug Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-1 to +1	-1 to +2	-1 to +2	-1 to +3
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-2 to +1	-1 to +1
	Summer	12	-1 to +2	-1 to +2	-1 to +2	-1 to +3
	Fall	12	-0 to +2	-1 to +3	-1 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Quinebaug basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

SHAWSHEEN BASIN

MUNICIPALITIES WITHIN SHAWSHEEN BASIN:

Andover, Bedford, Billerica, Burlington, Concord, Lawrence, Lexington, Lincoln, North Andover, Tewksbury, Wilmington, and Woburn



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

SHASHEEN BASIN

Shawsheen Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	48.9	+2.3 to +4.4	+2.9 to +6.4	+3.5 to +9.1	+3.8 to +11.0
	Winter	28.1	+2.4 to +5.0	+3.0 to +7.5	+3.8 to +9.4	+4.1 to +10.8
	Spring	46.8	+1.9 to +3.6	+2.6 to +5.5	+2.8 to +7.9	+3.4 to +9.7
	Summer	69.2	+2.2 to +4.4	+2.8 to +6.7	+3.2 to +9.8	+3.8 to +12.3
	Fall	51.0	+2.3 to +5.0	+3.7 to +6.8	+3.5 to +9.7	+4.0 to +12.1
Maximum Temperature	Annual	59.5	+2.1 to +4.2	+2.7 to +6.2	+3.2 to +9.2	+3.5 to +11.0
	Winter	37.7	+2.0 to +4.6	+2.6 to +7.0	+3.2 to +8.7	+3.6 to +10.0
	Spring	57.8	+1.7 to +3.5	+2.3 to +5.6	+2.7 to +8.1	+3.3 to +9.6
	Summer	80.3	+2.0 to +4.5	+2.7 to +6.6	+3.1 to +10.0	+3.6 to +12.4
	Fall	61.7	+2.4 to +4.9	+3.4 to +7.0	+3.4 to +10.0	+3.9 to +12.4
Minimum Temperature	Annual	38.3	+2.4 to +4.8	+3.2 to +6.5	+3.8 to +9.1	+4.2 to +11.1
	Winter	18.5	+2.6 to +5.5	+3.4 to +8.0	+4.4 to +10.1	+4.5 to +11.6
	Spring	35.8	+2.0 to +3.9	+2.9 to +5.8	+2.9 to +7.7	+3.5 to +9.6
	Summer	58.1	+2.3 to +4.4	+3.0 to +7.1	+3.3 to +9.6	+4.0 to +12.1
	Fall	40.3	+2.2 to +5.2	+3.6 to +6.7	+3.6 to +9.6	+4.1 to +11.8

- The Shawsheen basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.7 °F to 6.6 °F (3-8% increase); end of century increase of 3.6 °F to 12.4 °F (4-15% increase).
    - Fall mid-century increase of 3.4 °F to 7 °F (6-11% increase); end of century increase by and 3.9 °F to 12.4 °F (6-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.4 °F to 8.0 °F (18-43% increase); end of century increase by 4.5 °F to 11.6 °F (24-63% increase).
    - Fall mid-century of 3.6 °F to 6.7 °F (9-17% increase); end of century increase of 4.1°F to 11.8 °F (10-29% increase).

SHAWSHEEN BASIN

Shawsheen Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	7	+7 to +19	+10 to +32	+12 to +54	+14 to +72
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[84]	+<1[84] to +1	+<1[84] to +2	+<1[84] to +3	+<1[84] to +5
	Summer	6	+6 to +17	+8 to +27	+10 to +44	+12 to +56
	Fall	<1[84]	+1 to +2	+1 to +5	+1 to +9	+1 to +13
Days with Maximum Temperature Over 95°F	Annual	<1[84]	+2 to +8	+3 to +15	+4 to +30	+6 to +46
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+<1[84] to +<1[84]	+<1[84] to +<1[84]	+<1[84] to +1	+<1[84] to +2
	Summer	<1[84]	+2 to +7	+2 to +13	+3 to +26	+5 to +39
	Fall	0	+<1[84] to +1	+<1[84] to +2	+<1[84] to +4	+<1[84] to +6
Days with Maximum Temperature Over 100°F	Annual	<1[84]	+<1[84] to +2	+<1[84] to +4	+1 to +10	+1 to +19
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[84]	+0 to +<1[84]	+0 to +<1[84]	+0 to +1
	Summer	<1[84]	+<1[84] to +2	+<1[84] to +4	+1 to +9	+1 to +17
	Fall	0	+0 to +<1[84]	+0 to +<1[84]	+0 to +1	+<1[84] to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Shawsheen basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Shawsheen basin is expected to see days with daily maximum temperatures over 90 °F increase by 10to 32 more days by mid-century, and 14 to 72 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 8 to 27 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Shawsheen basin is expected to have 12 to 56 more days.

[84] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

SHAWSHEEN BASIN

Shawsheen Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	5	-1 to -3	-2 to -4	-2 to -4	-2 to -4
	Winter	5	-1 to -3	-2 to -4	-2 to -4	-2 to -4
	Spring	<1[85]	-0 to +<1[85]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[85]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	139	-12 to -30	-19 to -42	-22 to -57	-25 to -68
	Winter	81	-3 to -8	-4 to -14	-5 to -23	-7 to -29
	Spring	34	-4 to -11	-7 to -15	-8 to -19	-9 to -21
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	24	-5 to -11	-8 to -14	-8 to -17	-7 to -19

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Shawsheen basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 4 to 14 fewer days by mid-century, and 7 to 29 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 21 fewer days by end of century.
    - Fall is expected to have 8 to 14 fewer days by mid-century, and 7 to 19 fewer days by end of century.

[85] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

SHAWSHEEN BASIN

Shawsheen Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6457	-557 to -1157	-745 to -1579	-882 to -2104	-989 to -2493
	Winter	3341	-205 to -469	-268 to -688	-334 to -850	-375 to -994
	Spring	1697	-152 to -297	-215 to -450	-230 to -622	-298 to -732
	Summer	96	-34 to -59	-44 to -75	-53 to -85	-55 to -88
	Fall	1321	-157 to -363	-269 to -458	-256 to -646	-274 to -732
Cooling Degree-Days (Base 65°F)	Annual	554	+221 to +464	+298 to +761	+354 to +1183	+409 to +1536
	Winter	0	+0 to +1	+0 to +4	+1 to +3	+1 to +4
	Spring	22	+14 to +34	+23 to +59	+26 to +101	+20 to +144
	Summer	478	+165 to +347	+206 to +545	+238 to +825	+286 to +1043
	Fall	47	+34 to +99	+53 to +178	+61 to +274	+87 to +354
Growing Degree-Days (Base 50°F)	Annual	2547	+42 to +829	+579 to +1258	+660 to +1979	+740 to +2480
	Winter	6	+0 to +14	+2 to +18	+5 to +29	+5 to +38
	Spring	299	+76 to +154	+101 to +257	+118 to +388	+131 to +507
	Summer	1762	+199 to +404	+259 to +614	+296 to +905	+349 to +1128
	Fall	470	+114 to +303	+189 to +433	+177 to +652	+229 to +816

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Shawsheen basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 8-21% (268 -688 degree-days) by mid-century, and a decrease of 11-30% (375 -994 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 13-27% (215 -450 degree-days) by mid-century, and by 18-43% (298 -732 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-35% (269 -458 degree-days) by mid-century, and by 21-55% (274 -732 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 43-114% (206 -545 degree-days) by mid-century, and by 60-218% (286 -1043 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 15-35% (259 -614 degree-days) by mid-century, and by 20-64% (349 -1128 degree-days) by end of century.
    - Spring is expected to see an increase by 34-86% (101 -257 degree-days) by mid-century and 44-169% (131 -507 degree-days) by end of century.
    - Fall is expected to see an increase by 40-92% (189 -433 degree-days) by mid-century and 49-174% (223 -816 degree-days) by end of century.

SHAWSHEEN BASIN

Shawsheen Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1”	Annual	8	+<1[86] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	-0 to +1	+<1[86] to +1	+<1[86] to +1	+<1[86] to +2
	Spring	2	-0 to +1	+<1[86] to +1	+<1[86] to +1	+<1[86] to +1
	Summer	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Fall	3	-0 to +1	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2”	Annual	1	-0 to +1	+<1[86] to +1	+<1[86] to +1	+<1[86] to +1
	Winter	<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]
	Spring	<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	+<1[86] to +<1[86]
	Summer	<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]
	Fall	<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]
Days with Precipitation Over 4”	Annual	<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]
	Winter	0	-0 to +0	-0 to +0	-0 to +0	-0 to +<1[86]
	Spring	0	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]
	Summer	<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]
	Fall	<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]	-0 to +<1[86]

- The projections for expected number of days receiving precipitation over one inch are variable for the Shawsheen basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0- days by the end of century.

[86] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn’t crossed seasonally at all.

SHAWSHEEN BASIN

Shawsheen Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.0	+0.3 to +4.8	+0.2 to +6.5	+1.2 to +7.9	+1.2 to +8.3
	Winter	11.2	-0.6 to +1.9	+0.0 to +2.3	+0.3 to +2.9	+0.2 to +4.0
	Spring	11.4	-0.2 to +2.5	+0.1 to +2.2	+0.2 to +2.9	+0.3 to +2.8
	Summer	10.5	-0.1 to +1.4	-0.5 to +2.1	-0.5 to +2.7	-1.3 to +2.4
	Fall	12.0	-1.1 to +1.3	-1.2 to +1.7	-1.9 to +1.5	-1.6 to +1.3

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Shawsheen basin.
  - The winter season is expected to experience the greatest change with an increase of 0-21% by mid-century, and of 2-36% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Shawsheen or basin could see a decrease of 0.5 to an increase of 2.1 inches by mid-century (decrease of 5% to increase of 20%) and a decrease of 1.3 to an increase of 2.4 inches by the end of the century (decrease of 12% to increase of 23%).
    - The fall season projections for the Shawsheen basin could see a decrease of 1.2 to an increase of 1.7 inches by mid-century (decrease of 10% to increase of 14%) and a decrease of 1.6 to an increase of 1.3 inches by the end of the century (decrease of 13% to increase of 11%).

Shawsheen Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17.	-1 to +2	-1 to +2	-0 to +3	-0 to +3
	Winter	12	-1 to +2	-0 to +1	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	13	-1 to +1	-1 to +2	-1 to +3	-1 to +2
	Fall	12	-0 to +2	+0 to +3	-0 to +4	-0 to +4

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Shawsheen basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-4 days in consecutive dry days by the end of the century.

SUDBURY-ASSABET-CONCORD (SuAsCo) BASIN

MUNICIPALITIES WITHIN SuAsCo BASIN:

Acton, Ashland, Bedford, Berlin, Billerica, Bolton, Boxborough, Boylston, Carlisle, Chelmsford, Clinton, Concord, Framingham, Grafton, Harvard, Holliston, Hopkinton, Hudson, Lincoln, Littleton, Lowell, Marlborough, Maynard, Natick, Northborough, Sherborn, Shrewsbury, Southborough, Stow, Sudbury, Tewksbury, Upton, Wayland, Westborough, Westford, and Weston

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

SuAsCo BASIN

SuAsCo Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	48.7	+2.2 to +4.4	+2.9 to +6.3	+3.5 to +9.0	+3.8 to +10.9
	Winter	27.4	+2.2 to +4.9	+2.8 to +7.3	+3.6 to +8.9	+4.0 to +10.2
	Spring	46.8	+1.7 to +3.5	+2.5 to +5.7	+2.7 to +7.9	+3.2 to +9.6
	Summer	69.5	+2.1 to +4.4	+2.7 to +6.9	+3.2 to +10.2	+3.7 to +12.7
	Fall	50.8	+2.2 to +5.0	+3.7 to +6.6	+3.5 to +9.5	+4.0 to +11.7
Maximum Temperature	Annual	59.6	+2.0 to +4.1	+2.7 to +6.3	+3.2 to +9.1	+3.4 to +10.9
	Winter	37.3	+1.9 to +4.4	+2.5 to +6.7	+3.0 to +8.1	+3.4 to +9.4
	Spring	57.9	+1.6 to +3.4	+2.3 to +5.6	+2.6 to +8.0	+3.2 to +9.7
	Summer	80.7	+1.9 to +4.5	+2.6 to +7.1	+3.1 to +10.5	+3.6 to +13.0
	Fall	62.1	+2.4 to +4.8	+3.6 to +6.8	+3.3 to +9.6	+3.8 to +12.1
Minimum Temperature	Annual	37.9	+2.3 to +4.6	+3.1 to +6.4	+3.8 to +9.0	+4.1 to +11.0
	Winter	17.5	+2.5 to +5.5	+3.3 to +7.8	+4.1 to +9.6	+4.6 to +10.9
	Spring	35.8	+1.8 to +3.7	+2.7 to +6.0	+2.8 to +7.7	+3.3 to +9.5
	Summer	58.3	+2.1 to +4.5	+2.9 to +7.2	+3.3 to +9.9	+3.9 to +12.4
	Fall	39.6	+2.1 to +5.2	+3.6 to +6.6	+3.6 to +9.3	+4.1 to +11.6

- The SuAsCo basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.6 °F to 7.1 °F (3-9% increase); end of century increase of 3.6 °F to 13 °F (4-16% increase).
    - Fall mid-century increase of 3.6 °F to 6.8 °F (6-11% increase); end of century increase by and 3.8 °F to 12.1 °F (6-20% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.3 °F to 7.8 °F (19-44% increase); end of century increase by 4.6 °F to 10.9 °F (26-63% increase).
    - Fall mid-century of 3.6 °F to 6.6 °F (9-17% increase); end of century increase of 4.1°F to 11.6 °F (10-29% increase).

SuAsCo BASIN

SuAsCo Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	8	+7 to +20	+10 to +35	+12 to +56	+14 to +76
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	1	+<1[87] to +1	+<1[87] to +2	+<1[87] to +3	+<1[87] to +5
	Summer	7	+7 to +17	+9 to +30	+11 to +46	+13 to +60
	Fall	<1[87]	+<1[87] to +2	+1 to +5	+1 to +9	+1 to +12
Days with Maximum Temperature Over 95°F	Annual	1	+2 to +8	+3 to +17	+4 to +32	+6 to +48
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[87]	+<1[87] to +<1[87]	+<1[87] to +<1[87]	+<1[87] to +1	+<1[87] to +2
	Summer	1	+2 to +8	+3 to +15	+3 to +28	+5 to +42
	Fall	<1[87]	+<1[87] to +1	+<1[87] to +1	+<1[87] to +3	+<1[87] to +5
Days with Maximum Temperature Over 100°F	Annual	<1[87]	+<1[87] to +2	+<1[87] to +5	+1 to +12	+1 to +22
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[87]	+0 to +<1[87]	+0 to +<1[87]	+0 to +<1[87]
	Summer	<1[87]	+<1[87] to +2	+<1[87] to +5	+1 to +11	+1 to +20
	Fall	0	+0 to +<1[87]	+0 to +<1[87]	+0 to +1	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the SuAsCo basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the SuAsCo basin is expected to see days with daily maximum temperatures over 90 °F increase by 10 to 35 more days by mid-century, and 14 to 76 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 9 to 30 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the SuAsCo basin is expected to have 13 to 60 more days.

[87] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

SuAsCo BASIN

SuAsCo Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	6	-2 to -4	-2 to -4	-2 to -5	-2 to -5
	Winter	6	-2 to -3	-2 to -4	-2 to -4	-2 to -5
	Spring	<1[88]	-0 to +<1[88]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	143	-12 to -28	-19 to -40	-22 to -55	-24 to -65
	Winter	83	-2 to -7	-3 to -11	-5 to -20	-6 to -25
	Spring	34	-3 to -11	-7 to -15	-8 to -19	-9 to -20
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	26	-5 to -11	-8 to -14	-9 to -18	-8 to -20

- Due to projected increases in average and minimum temperatures throughout the end of the century, the SuAsCo basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 3 to 11 fewer days by mid-century, and 6 to 25 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 20 fewer days by end of century.
    - Fall is expected to have 8 to 14 fewer days by mid-century, and 8 to 20 fewer days by end of century.

[88] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

SuAsCo BASIN

SuAsCo Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6535	-544 to -1137	-750 to -1587	-873 to -2094	-984 to -2460
	Winter	3406	-194 to -454	-251 to -669	-316 to -807	-369 to -942
	Spring	1695	-137 to -293	-207 to -473	-225 to -619	-284 to -726
	Summer	90	-29 to -56	-40 to -72	-47 to -81	-48 to -84
	Fall	1340	-166 to -374	-279 to -461	-262 to -639	-276 to -731
Cooling Degree-Days (Base 65°F)	Annual	585	+216 to +456	+285 to +771	+343 to +1197	+398 to +158
	Winter	0	-1 to +2	+0 to +2	+1 to +3	+2 to +4
	Spring	25	+12 to +31	+20 to +62	+24 to +105	+22 to +143
	Summer	505	+158 to +350	+197 to +569	+238 to +860	+282 to +1086
	Fall	49	+30 to +95	+44 to +159	+52 to +254	+77 to +341
Growing Degree-Days (Base 50°F)	Annual	2592	+408 to +822	+546 to +1274	+642 to +1976	+729 to +2475
	Winter	6	-1 to +11	+0 to +15	+4 to +23	+3 to +29
	Spring	314	+66 to +145	+92 to +251	+108 to +398	+120 to +500
	Summer	1795	+192 to +404	+251 to +636	+293 to +934	+342 to +1167
	Fall	469	+113 to +302	+180 to +412	+170 to +621	+217 to +792

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the SuAsCo basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-20% (251 -669 degree-days) by mid-century, and a decrease of 11-28% (369 -942 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-28% (207 -473 degree-days) by mid-century, and by 17-43% (284 -726 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-34% (279 -461 degree-days) by mid-century, and by 21-55% (276 -731 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 39-113% (197 -569 degree-days) by mid-century, and by 56-215% (282 -1086 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 14-35% (251 -636 degree-days) by mid-century, and by 19-65% (342 -1167 degree-days) by end of century.
    - Spring is expected to see an increase by 29-80% (92 -251 degree-days) by mid-century and 38-159% (120 -500 degree-days) by end of century.
    - Fall is expected to see an increase by 38-88% (180 -412 degree-days) by mid-century and 46-169% (217 -792 degree-days) by end of century.

SuAsCo BASIN

SuAsCo Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1”	Annual	7	+<1[89] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	-0 to +1	+<1[89] to +1	+<1[89] to +2	+<1[89] to +2
	Spring	1	-0 to +1	-0 to +1	+<1[89] to +1	+<1[89] to +1
	Summer	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Fall	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2”	Annual	1	-0 to +<1[89]	+<1[89] to +1	+<1[89] to +<1[89]	+<1[89] to +1
	Winter	<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]
	Spring	<1[89]	-0 to +<1[89]	+<1[89] to +<1[89]	-0 to +<1[89]	-0 to +<1[89]
	Summer	<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]
	Fall	<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]
Days with Precipitation Over 4”	Annual	<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]
	Winter	0	-0 to +0	+0 to +0	-0 to +0	-0 to +0
	Spring	0	-0 to +0	+0 to +<1[89]	-0 to +0	-0 to +<1[89]
	Summer	<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]
	Fall	<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]	-0 to +<1[89]

- The projections for expected number of days receiving precipitation over one inch are variable for the SuAsCo basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of -0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[89] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn’t crossed seasonally at all.

SuAsCo BASIN

SuAsCo Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.4	+0.2 to +4.8	+0.6 to +6.1	+1.5 to +7.8	+1.2 to +8.0
	Winter	11.2	-0.4 to +2.1	+0.1 to +2.6	+0.5 to +3.2	+0.4 to +4.1
	Spring	11.6	-0.1 to +2.4	+0.0 to +2.1	+0.3 to +2.6	+0.2 to +2.6
	Summer	10.8	-0.2 to +1.5	-0.5 to +2.2	-0.6 to +2.4	-1.1 to +2.2
	Fall	12.0	-1.2 to +1.1	-1.3 to +1.7	-1.8 to +1.6	-1.5 to +1.4

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the SuAsCo basin.
  - The winter season is expected to experience the greatest change with an increase of 1-23% by mid-century, and of 3-36% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the SuAsCo or basin could see a decrease of 0.5 to an increase of 2.2 inches by mid-century (decrease of 4 to increase of 20%) and a decrease of 1.1 to an increase of 2.2 inches by the end of the century (decrease of 11% to increase of 20%).
    - The fall season projections for the SuAsCo basin could see a decrease of 1.3 to an increase of 1.7 inches by mid-century (decrease of 11% to increase of 14%) and a decrease of 1.5 to an increase of 1.4 inches by the end of the century (decrease of 13% to increase of 11%).

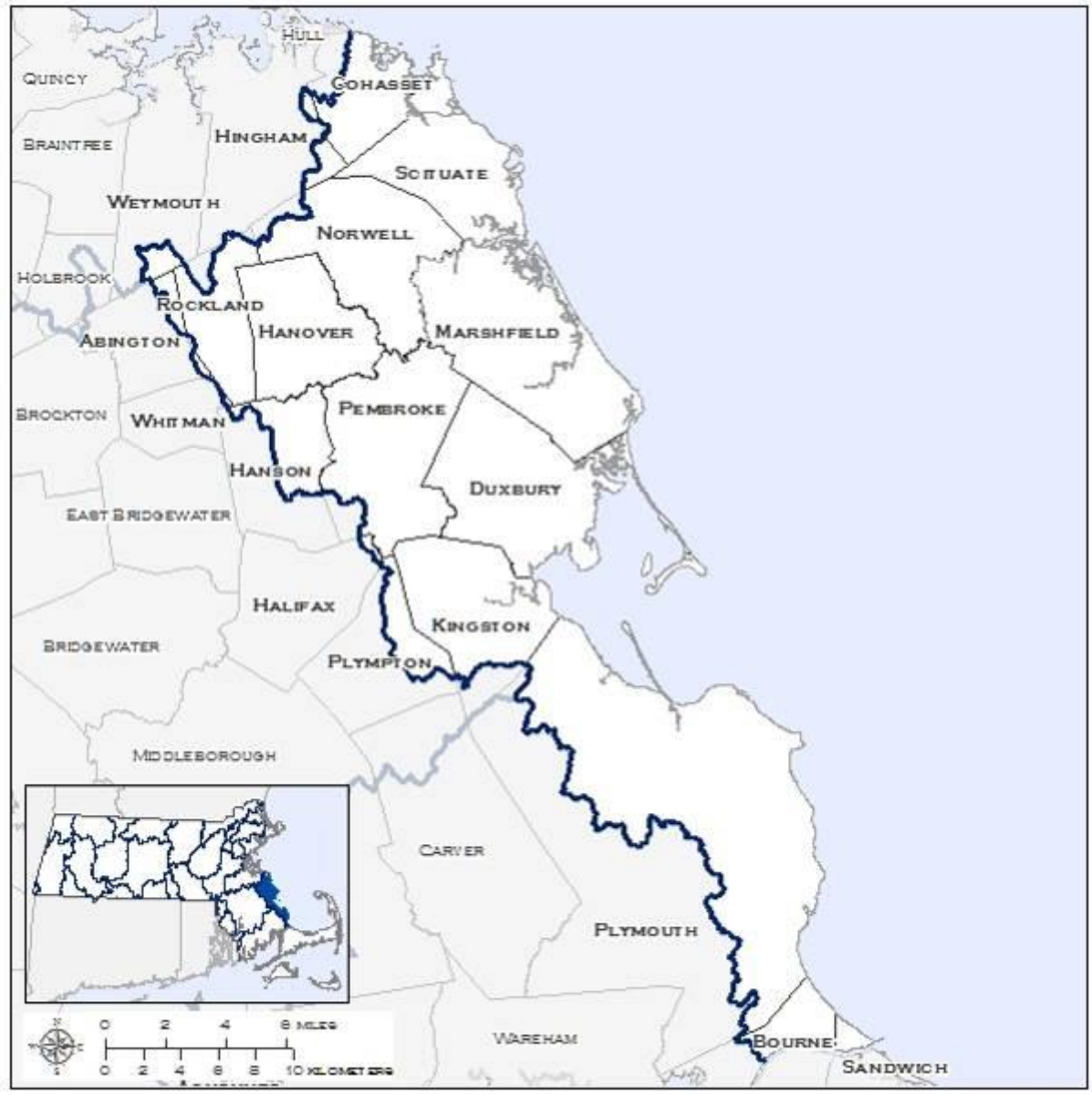
SuAsCo Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-1 to +1	-0 to +2	-1 to +2	-1 to +3
	Winter	12	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	12	-1 to +2	-1 to +2	-1 to +3	-1 to +2
	Fall	12	-0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the SuAsCo basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to an increase of 0-3 days in consecutive dry days by the end of the century.

SOUTH COASTAL BASIN

MUNICIPALITIES WITHIN SOUTH COASTAL BASIN:

Abington, Bourne, Cohasset, Duxbury, Halifax, Hanover, Hanson, Hingham, Kingston, Marshfield, Norwell, Pembroke, Plymouth, Plympton, Rockland, Sandwich, Scituate, Weymouth, and Whitman



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

SOUTH COASTAL

South Coastal Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.7	+1.9 to +3.7	+2.6 to +5.8	+2.9 to +8.5	+3.2 to +10.3
	Winter	30.3	+1.9 to +4.1	+2.6 to +6.3	+3.2 to +8.3	+3.5 to +9.8
	Spring	46.7	+1.8 to +3.5	+2.4 to +5.6	+2.7 to +7.8	+3.2 to +9.5
	Summer	69.1	+1.5 to +3.7	+2.0 to +6.1	+2.6 to +9.2	+3.2 to +11.4
	Fall	52.4	+2.0 to +4.2	+3.3 to +6.2	+3.0 to +8.8	+3.6 to +10.9
Maximum Temperature	Annual	59.5	+1.8 to +3.6	+2.4 to +5.7	+2.6 to +8.5	+2.9 to +10.2
	Winter	62.2	+1.9 to +4.3	+3.1 to +6.3	+2.9 to +8.8	+3.3 to +11.0
	Spring	56.7	+1.7 to +3.4	+2.1 to +5.4	+2.6 to +7.9	+3.0 to +9.4
	Summer	79.1	+1.4 to +3.5	+1.9 to +6.0	+2.5 to +9.3	+2.9 to +11.4
	Fall	62.2	+1.9 to +4.3	+3.1 to +6.3	+2.9 to +8.8	+3.3 to +11.0
Minimum Temperature	Annual	40.0	+2.0 to +3.8	+2.8 to +5.9	+3.2 to +8.5	+3.5 to +10.5
	Winter	21.1	+2.2 to +4.4	+3.0 to +6.7	+3.7 to +9.0	+4.0 to +10.5
	Spring	36.8	+1.8 to +3.6	+2.7 to +5.8	+2.7 to +7.6	+3.3 to +9.4
	Summer	59.1	+1.6 to +3.8	+2.2 to +6.3	+2.7 to +9.1	+3.4 to +11.3
	Fall	42.6	+2.0 to +4.5	+3.4 to +6.1	+3.2 to +8.8	+3.8 to +10.9

- The South Coastal basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 1.9 °F to 6 °F (2-8% increase); end of century increase of 2.9 °F to 11.4 °F (4-14% increase).
    - Fall mid-century increase of 3.1 °F to 6.3 °F (5-10% increase); end of century increase by and 3.3 °F to 11.0 °F (5-18% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.3 °F to 7.8 °F (14-32% increase); end of century increase by 4.6 °F to 10.9 °F (19-50% increase).
    - Fall mid-century of 3.6 °F to 6.6 °F (8-14% increase); end of century increase of 4.1°F to 11.6 °F (9-26% increase).

SOUTH COASTAL BASIN

South Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	5	+4 to +11	+5 to +23	+7 to +41	+9 to +58
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[90]	+<1[90] to +1	+<1[90] to +1	+<1[90] to +2	+<1[90] to +3
	Summer	5	+3 to +10	+4 to +20	+6 to +35	+8 to +47
	Fall	<1[90]	+<1[90] to +1	+1 to +3	+1 to +6	+1 to +8
Days with Maximum Temperature Over 95°F	Annual	1	+1 to +4	+1 to +9	+2 to +18	+3 to +31
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[90]	+<1[90] to +<1[90]	+<1[90] to +1	+<1[90] to +1
	Summer	1	+1 to +4	+1 to +8	+2 to +16	+3 to +27
	Fall	0	+<1[90] to +<1[90]	+<1[90] to +1	+<1[90] to +2	+<1[90] to +3
Days with Maximum Temperature Over 100°F	Annual	<1[90]	+<1[90] to +1	+<1[90] to +3	+<1[90] to +5	+<1[90] to +10
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[90]	+0 to +<1[90]	+0 to +<1[90]	+0 to +<1[90]
	Summer	<1[90]	+<1[90] to +1	+<1[90] to +2	+<1[90] to +5	+<1[90] to +9
	Fall	0	+0 to +<1[90]	+0 to +<1[90]	+0 to +<1[90]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the South Coastal basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the South Coastal basin is expected to see days with daily maximum temperatures over 90 °F increase by 5 to 23 more days by mid-century, and 9 to 58 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 4 to 20 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the South Coastal basin is expected to have 8 to 47 more days.

[90] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

SOUTH COASTAL BASIN

South Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	2	-0 to -1	-1 to -1	-1 to -1	-1 to -1
	Winter	2	-0 to -1	-1 to -1	-1 to -1	-1 to -1
	Spring	0	-0 to +<1[91]	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	125	-13 to -27	-17 to -42	-21 to -55	-22 to -66
	Winter	77	-4 to -9	-5 to -16	-7 to -25	-8 to -33
	Spring	30	-4 to -11	-7 to -15	-8 to -19	-9 to -20
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	18	-4 to -8	-6 to -10	-7 to -13	-7 to -15

- Due to projected increases in average and minimum temperatures throughout the end of the century, the South Coastal basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 5 to 16 fewer days by mid-century, and 8 to 33 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 9 to 20 fewer days by end of century.
    - Fall is expected to have 6 to 10 fewer days by mid-century, and 7 to 15 fewer days by end of century.

[91] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

SOUTH COASTAL BASIN

South Coastal Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6147	-492 to -968	-682 to -1438	-792 to -1940	-857 to -2311
	Winter	3146	-174 to -374	-223 to -571	-286 to -753	-316 to -891
	Spring	1697	-151 to -294	-201 to -463	-226 to -633	-283 to -741
	Summer	94	-29 to -54	-40 to -69	-42 to -80	-50 to -85
	Fall	1201	-136 to -306	-242 to -408	-227 to -584	-249 to -666
Cooling Degree-Days (Base 65°F)	Annual	543	+180 to +379	+239 to +674	+283 to +1080	+334 to +1400
	Winter	0	-1 to +3	-2 to +7	-1 to +3	-1 to +7
	Spring	17	+13 to +27	+16 to +51	+19 to +83	+19 to +116
	Summer	473	+107 to +287	+146 to +493	+191 to +765	+237 to +969
	Fall	52	+31 to +85	+50 to +160	+58 to +246	+82 to +324
Growing Degree-Days (Base 50°F)	Annual	2559	+364 to +745	+483 to +1165	+545 to +1860	+631 to +2337
	Winter	7	+1 to +14	+2 to +17	+6 to +32	+6 to +46
	Spring	270	+73 to +145	+92 to +246	+102 to +376	+108 to +487
	Summer	1759	+135 to +337	+186 to +558	+235 to +845	+290 to +1051
	Fall	522	+99 to +266	+178 to +405	+171 to +606	+222 to +760

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the South Coastal basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-18% (223 -571 degree-days) by mid-century, and a decrease of 10-28% (316 -891 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-27% (201-463 degree-days) by mid-century, and by 14-44% (283 -741 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-34% (242 -408 degree-days) by mid-century, and by 21-55% (249 -666 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 31-104% (146 -493 degree-days) by mid-century, and by 50-205% (237 -969 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 11-32% (186 -558 degree-days) by mid-century, and by 16-60% (290 -1051 degree-days) by end of century.
    - Spring is expected to see an increase by 34-91% (92 -246 degree-days) by mid-century and 40-180% (108 -487 degree-days) by end of century.
    - Fall is expected to see an increase by 34-78% (178 -405 degree-days) by mid-century and 43-146% (222 -760 degree-days) by end of century.

SOUTH COASTAL BASIN

South Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1”	Annual	9	+<1[92] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	-0 to +1	+<1[92] to +1	+<1[92] to +1	+<1[92] to +2
	Spring	2	-0 to +1	+<1[92] to +1	+<1[92] to +1	+<1[92] to +1
	Summer	2	-0 to +1	+<1[92] to +1	-0 to +1	-0 to +1
	Fall	3	-0 to +1	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2”	Annual	1	-0 to +1	+<1[92] to +1	+<1[92] to +1	+<1[92] to +1
	Winter	<1[92]	-0 to +<1[92]	-0 to +<1[92]	+0 to +<1[92]	-0 to +<1[92]
	Spring	<1[92]	-0 to +<1[92]	-0 to +<1[92]	+<1[92] to +<1[92]	+<1[92] to +<1[92]
	Summer	<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]
	Fall	<1[92]	-0 to +<1[92]	-0 to +<1[92]	+<1[92] to +<1[92]	-0 to +<1[92]
Days with Precipitation Over 4”	Annual	<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]
	Winter	0	-0 to +0	-0 to +0	-0 to +<1[92]	-0 to +<1[92]
	Spring	0	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]
	Summer	0	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]
	Fall	<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]	-0 to +<1[92]

- The projections for expected number of days receiving precipitation over one inch are variable for the South Coastal basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see either an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[92] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn’t crossed seasonally at all.

SOUTH COASTAL BASIN

South Coastal Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	47.5	-0.2 to +3.9	+0.0 to +5.0	+0.3 to +6.2	-0.2 to +6.4
	Winter	12.5	-0.3 to +1.5	+0.1 to +1.9	+0.1 to +2.8	+0.1 to +3.7
	Spring	12.1	-0.1 to +1.8	-0.1 to +2.2	+0.1 to +2.4	+0.1 to +2.8
	Summer	10.4	-0.7 to +1.2	-0.7 to +1.8	-1.5 to +2.4	-2.1 to +2.3
	Fall	12.5	-0.9 to +1.1	-1.1 to +1.4	-1.7 to +1.7	-1.8 to +1.1

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the South Coastal basin.
    - The winter season is expected to experience the greatest change with an increase of 0-15% by mid-century, and of 0-30% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the South Coastal or basin could see a decrease of 0.7 to an increase of 1.8 inches by mid-century (decrease of 7% to increase of 17%) and a decrease of 2.1 to an increase of 2.3 inches by the end of the century (decrease of 20% to increase of 22%).
        - The fall season projections for the South Coastal basin could see a decrease of 1.1 to an increase of 1.4 inches by mid-century (decrease of 9% to increase of 11%) and a decrease of 1.8 to an increase of 1.1 inches by the end of the century (decrease of 15% to increase of 9%).

South Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-1 to +2	-0 to +3	-1 to +3	-0 to +4
	Winter	10	-0 to +2	-1 to +2	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-1 to +2
	Summer	14	-1 to +2	-1 to +2	-1 to +3	-1 to +4
	Fall	13	+0 to +3	+0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the South Coastal basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The summer season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

TAUNTON BASIN

MUNICIPALITIES WITHIN TAUNTON BASIN:

Abington, Attleboro, Avon, Berkley, Bridgewater, Brockton, Carver, Dighton, East Bridgewater, Easton, Fall River, Foxborough, Freetown, Halifax, Hanson, Holbrook, Kingston, Lakeville, Mansfield, Middleborough, New Bedford, North Attleborough, Norton, Pembroke, Plainville, Plymouth, Plympton, Raynham, Rehoboth, Rochester, Rockland, Sharon, Somerset, Stoughton, Swansea, Taunton, West Bridgewater, Whitman, and Wrentham

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

TAUNTON BASIN

Taunton Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.9	+2.0 to +3.8	+2.7 to +5.9	+3.1 to +8.6	+3.4 to +10.5
	Winter	30.0	+2.2 to +4.4	+2.9 to +6.7	+3.5 to +8.8	+3.9 to +10.1
	Spring	47.3	+1.7 to +3.4	+2.4 to +5.4	+2.6 to +7.5	+3.1 to +9.2
	Summer	69.6	+1.7 to +3.9	+2.2 to +6.3	+2.8 to +9.6	+3.4 to +11.6
	Fall	52.1	+2.1 to +4.5	+3.4 to +6.3	+3.2 to +9.0	+3.7 to +11.2
Maximum Temperature	Annual	60.3	+1.9 to +3.7	+2.5 to +5.9	+2.8 to +8.6	+3.1 to +10.4
	Winter	39.5	+1.8 to +4.2	+2.5 to +6.2	+3.0 to +8.1	+3.4 to +9.4
	Spring	58.0	+1.5 to +3.4	+2.0 to +5.2	+2.5 to +7.6	+3.0 to +9.0
	Summer	80.5	+1.6 to +3.8	+2.1 to +6.2	+2.7 to +9.7	+3.1 to +11.6
	Fall	62.7	+2.1 to +4.4	+3.3 to +6.4	+3.1 to +9.0	+3.4 to +11.3
Minimum Temperature	Annual	39.4	+2.1 to +3.9	+2.9 to +6.1	+3.4 to +8.6	+3.8 to +10.6
	Winter	20.5	+2.5 to +4.7	+3.2 to +7.3	+4.1 to +9.4	+4.4 to +10.8
	Spring	36.7	+1.8 to +3.5	+2.7 to +5.7	+2.7 to +7.4	+3.2 to +9.1
	Summer	58.6	+1.8 to +3.9	+2.4 to +6.5	+2.9 to +9.4	+3.6 to +11.5
	Fall	41.6	+2.1 to +4.7	+3.5 to +6.3	+3.3 to +9.0	+4.0 to +11.1

- The Taunton basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.1 °F to 6.2 °F (3-8% increase); end of century increase of 3.1 °F to 11.6 °F (4-14% increase).
    - Fall mid-century increase of 3.3 °F to 6.4 °F (5-10% increase); end of century increase by and 3.4 °F to 11.3 °F (5-18% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.2 °F to 7.3 °F (16-35% increase); end of century increase by 4.4 °F to 10.8 °F (21-52% increase).
    - Fall mid-century of 3.5 °F to 6.3 °F (8-15% increase); end of century increase of 4 °F to 11.1 °F (10-27% increase).

TAUNTON BASIN

Taunton Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	7	+5 to +15	+7 to +29	+9 to +50	+12 to +65
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	1	+<1[93] to +1	+<1[93] to +1	+<1[93] to +2	+<1[93] to +3
	Summer	7	+5 to +13	+6 to +25	+8 to +42	+11 to +53
	Fall	<1[93]	+1 to +2	+1 to +4	+1 to +7	+1 to +10
Days with Maximum Temperature Over 95°F	Annual	1	+1 to +5	+2 to +11	+3 to +25	+4 to +38
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[93]	+0 to +<1[93]	+<1[93] to +<1[93]	+<1[93] to +<1[93]	+<1[93] to +1
	Summer	1	+1 to +4	+2 to +10	+2 to +22	+3 to +34
	Fall	<1[93]	+<1[93] to +1	+<1[93] to +1	+<1[93] to +3	+<1[93] to +4
Days with Maximum Temperature Over 100°F	Annual	<1[93]	+<1[93] to +1	+<1[93] to +3	+<1[93] to +6	+<1[93] to +13
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[93]	+0 to +<1[93]	+0 to +<1[93]	+0 to +<1[93]
	Summer	<1[93]	+<1[93] to +1	+<1[93] to +3	+<1[93] to +6	+<1[93] to +12
	Fall	0	+0 to +<1[93]	+<1[93] to +<1[93]	+<1[93] to +<1[93]	+<1[93] to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Taunton basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Taunton basin is expected to see days with daily maximum temperatures over 90 °F increase by 7 to 29 more days by mid-century, and 12 to 65 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 6 to 25 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Taunton basin is expected to have 11 to 53 more days.

[93] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

TAUNTON BASIN

Taunton Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	3	-1 to -2	-1 to -2	-1 to -2	-1 to -2
	Winter	3	-1 to -2	-1 to -2	-1 to -2	-1 to -2
	Spring	<1[94]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	130	-13 to -28	-19 to -44	-23 to -57	-25 to -68
	Winter	78	-4 to -9	-5 to -16	-7 to -25	-8 to -31
	Spring	30	-4 to -11	-7 to -16	-8 to -19	-9 to -21
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	21	-5 to -10	-8 to -12	-8 to -16	-8 to -17

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Taunton basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 5 to 16 fewer days by mid-century, and 8 to 31 fewer days by end of century.
    - Spring is expected to have 7 to 16 fewer days by mid-century, and 9 to 21 fewer days by end of century.
    - Fall is expected to have 8 to 12 fewer days by mid-century, and 8 to 17 fewer days by end of century.

[94] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

TAUNTON BASIN

Taunton Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6130	-510 to -1001	-710 to -1479	-825 to -1957	-907 to -2325
	Winter	3167	-200 to -403	-255 to -616	-314 to -794	-355 to -931
	Spring	1644	-137 to -290	-198 to -458	-219 to -612	-275 to -71
	Summer	85	-29 to -51	-38 to -66	-43 to -76	-48 to -82
	Fall	1226	-141 to -320	-252 to -422	-229 to -596	-253 to -681
Cooling Degree-Days (Base 65°F)	Annual	580	+203 to +411	+260 to +706	+303 to +1123	+365 to +1439
	Winter	0	-1 to +4	+0 to +6	+0 to +3	+0 to +6
	Spring	20	+10 to +26	+16 to +49	+18 to +81	+17 to +108
	Summer	505	+126 to +312	+164 to +518	+209 to +80	+259 to +993
	Fall	55	+34 to +90	+52 to +163	+61 to +250	+89 to +328
Growing Degree-Days (Base 50°F)	Annual	2622	+378 to +759	+506 to +1190	+576 to +1889	+665 to +2362
	Winter	6	+1 to +16	+2 to +18	+7 to +33	+7 to +47
	Spring	297	+67 to +132	+89 to +232	+96 to +361	+101 to +472
	Summer	1800	+158 to +360	+204 to +580	+254 to +879	+311 to +1069
	Fall	518	+104 to +272	+182 to +406	+173 to +604	+226 to +766

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Taunton basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 8-19% (255 -616 degree-days) by mid-century, and a decrease of 11-29% (355 -931 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-28% (198-458 degree-days) by mid-century, and by 17-44% (275 -717 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-34% (252 -422 degree-days) by mid-century, and by 21-56% (253 -681 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 33-103% (164 -518 degree-days) by mid-century, and by 51-197% (259 -993 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 11-32% (204 -580 degree-days) by mid-century, and by 17-59% (311 -1069 degree-days) by end of century.
    - Spring is expected to see an increase by 30-78% (89 -232 degree-days) by mid-century and 34-159% (101 -472 degree-days) by end of century.
    - Fall is expected to see an increase by 35-78% (182 -406 degree-days) by mid-century and 44-148% (226 -766 degree-days) by end of century.

TAUNTON BASIN

Taunton Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	8	+<1[95] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+<1[95] to +1	+<1[95] to +1	+<1[95] to +1	+<1[95] to +2
	Spring	2	+<1[95] to +1	+<1[95] to +1	+<1[95] to +1	+<1[95] to +2
	Summer	2	-0 to +<1[95]	-0 to +1	-0 to +1	-0 to +1
	Fall	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2"	Annual	1	-0 to +<1[95]	+<1[95] to +1	+<1[95] to +1	+<1[95] to +1
	Winter	<1[95]	-0 to +<1[95]	+<1[95] to +<1[95]	+<1[95] to +<1[95]	-0 to +<1[95]
	Spring	<1[95]	-0 to +<1[95]	+<1[95] to +<1[95]	-0 to +<1[95]	-0 to +<1[95]
	Summer	<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]
	Fall	<1[95]	-0 to +<1[95]	+<1[95] to +<1[95]	+<1[95] to +<1[95]	-0 to +<1[95]
Days with Precipitation Over 4"	Annual	<1[95]	-0 to +<1[95]	+<1[95] to +<1[95]	-0 to +<1[95]	-0 to +<1[95]
	Winter	0	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]
	Spring	0	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]
	Summer	<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]
	Fall	<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]	-0 to +<1[95]

- The projections for expected number of days receiving precipitation over one inch are variable for the Taunton basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[95] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

TAUNTON BASIN

Taunton Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	47.5	-0.1 to +4.1	+0.3 to +5.4	+0.9 to +6.6	+0.4 to +7.3
	Winter	12.1	-0.3 to +1.5	+0.0 to +2.0	+0.2 to +2.7	+0.1 to +3.8
	Spring	11.9	-0.1 to +1.8	+0.0 to +2.0	+0.1 to +2.4	+0.2 to +2.6
	Summer	11.0	-0.6 to +1.1	-0.7 to +1.7	-1.7 to +2.4	-1.9 to +2.1
	Fall	12.4	-0.8 to +1.1	-0.9 to +1.5	-1.5 to +1.7	-1.7 to +1.4

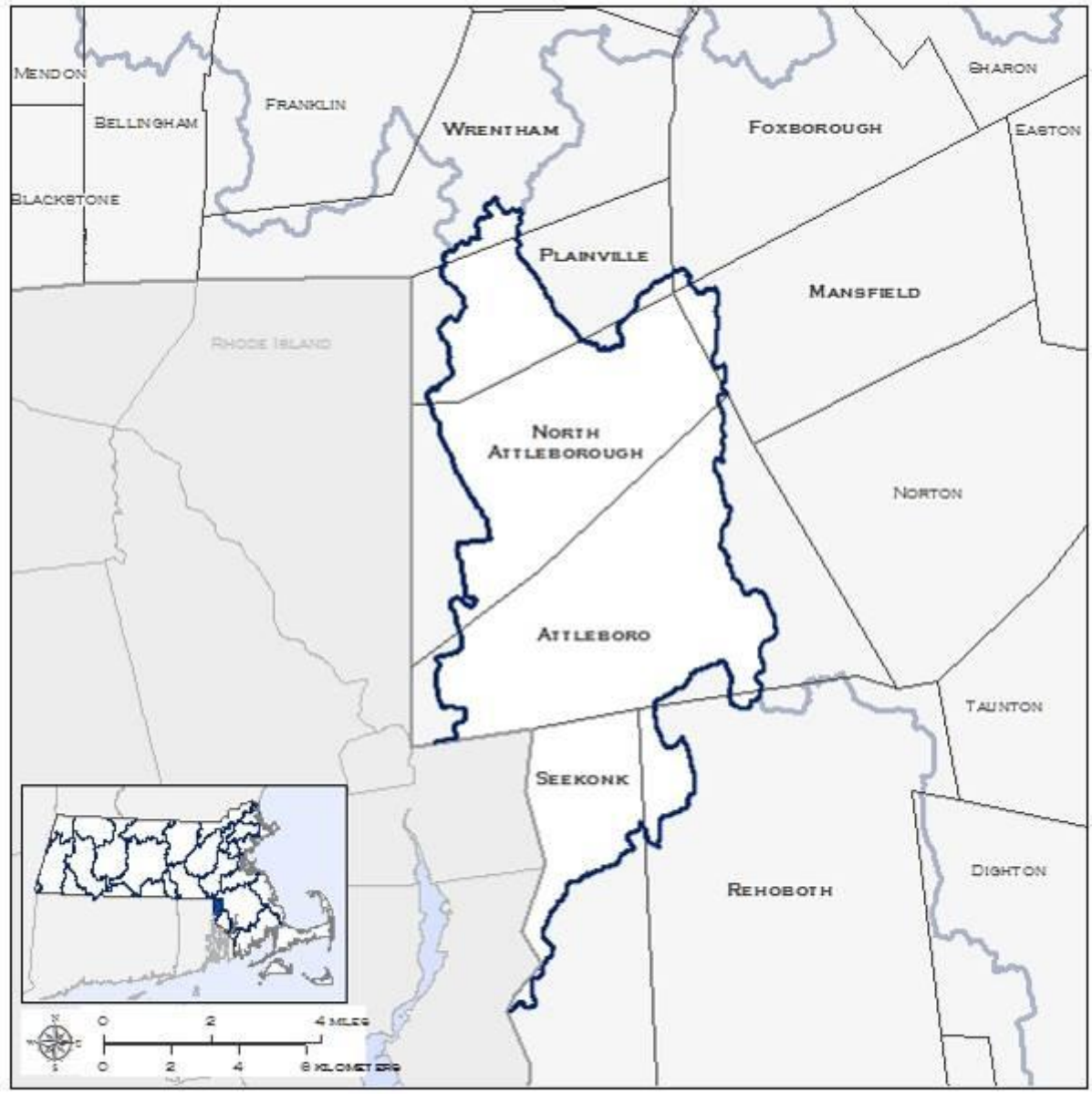
- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Taunton basin.
    - The winter season is expected to experience the greatest change with an increase of 0-16% by mid-century, and of 1-32% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Taunton or basin could see a decrease of 0.7 to an increase of 1.7 inches by mid-century (decrease of 6% to increase of 16%) and a decrease of 1.9 to an increase of 2.1 inches by the end of the century (decrease of 17% to increase of 19%).
        - The fall season projections for the Taunton basin could see a decrease of 0.9 to an increase of 1.5 inches by mid-century (decrease of 7% to increase of 12%) and a decrease of 1.7 to an increase of 1.4 inches by the end of the century (decrease of 14% to increase of 11%).

Taunton Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-0 to +1	-0 to +3	-1 to +3	-0 to +4
	Winter	11	-1 to +2	-1 to +2	-1 to +2	-1 to +2
	Spring	12	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	14	-1 to +1	-1 to +2	-1 to +2	-1 to +3
	Fall	13	-0 to +2	-0 to +3	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Taunton basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The summer season is expected to experience a decrease of 1 day to an increase of 3 days in consecutive dry days by the end of the century.

TEN MILE BASIN

MUNICIPALITIES WITHIN TEN MILE BASIN:
Attleboro, Foxborough, Mansfield, North Attleborough, Plainville, Rehoboth, Seekonk, and Wrentham



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

TEN MILE

Ten Mile Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	49.5	+2.0 to +3.8	+2.7 to +6.0	+3.2 to +8.7	+3.5 to +10.6
	Winter	29.2	+2.1 to +4.3	+2.7 to +6.7	+3.4 to +8.7	+3.8 to +10.1
	Spring	47.3	+1.7 to +3.4	+2.4 to +5.4	+2.5 to +7.7	+3.0 to +9.4
	Summer	69.5	+1.9 to +4.0	+2.5 to +6.4	+3.0 to +9.7	+3.6 to +11.9
	Fall	51.5	+2.1 to +4.7	+3.6 to +6.6	+3.4 to +9.3	+3.9 to +11.5
Maximum Temperature	Annual	60.3	+1.9 to +3.7	+2.5 to +5.9	+2.9 to +8.7	+3.1 to +10.5
	Winter	38.9	+1.7 to +4.2	+2.3 to +6.2	+2.8 to +8.0	+3.2 to +9.2
	Spring	58.4	+1.4 to +3.2	+2.0 to +5.3	+2.5 to +7.8	+2.9 to +9.1
	Summer	80.9	+1.8 to +3.9	+2.3 to +6.3	+2.9 to +9.9	+3.4 to +12.0
	Fall	62.5	+2.2 to +4.5	+3.4 to +6.7	+3.3 to +9.3	+3.7 to +11.7
Minimum Temperature	Annual	38.6	+2.2 to +4.1	+2.9 to +6.2	+3.5 to +8.6	+3.8 to +10.7
	Winter	19.4	+2.4 to +4.7	+3.1 to +7.3	+4.0 to +9.3	+4.2 to +10.7
	Spring	36.1	+1.7 to +3.5	+2.7 to +5.8	+2.7 to +7.5	+3.2 to +9.3
	Summer	58.1	+2.0 to +4.0	+2.6 to +6.6	+3.1 to +9.5	+3.7 to +11.7
	Fall	40.5	+2.0 to +4.9	+3.6 to +6.5	+3.4 to +9.2	+4.1 to +11.5

- The Ten Mile basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.3 °F to 6.3 °F (3-8% increase); end of century increase of 3.4 °F to 12 °F (4-15% increase).
    - Fall mid-century increase of 3.4 °F to 6.7 °F (5-11% increase); end of century increase by and 3.7 °F to 11.7 °F (6-19% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.1 °F to 7.3 °F (16-37% increase); end of century increase by 4.2 °F to 10.7 °F (22-55% increase).
    - Fall mid-century of 3.6 °F to 6.5 °F (9-16% increase); end of century increase of 4.1°F to 11.5 °F (10-28% increase).

TEN MILE BASIN

Ten Mile Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	7	+7 to +16	+9 to +32	+11 to +54	+14 to +71
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	1	+<1[96] to +1	+<1[96] to +1	+<1[96] to +2	+<1[96] to +4
	Summer	7	+5 to +14	+8 to +27	+10 to +44	+12 to +56
	Fall	<1[96]	+<1[96] to +2	+1 to +5	+1 to +9	+1 to +12
Days with Maximum Temperature Over 95°F	Annual	1	+2 to +6	+2 to +12	+3 to +28	+4 to +43
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[96]	+0 to +<1[96]	+<1[96] to +<1[96]	+<1[96] to +1	+<1[96] to +1
	Summer	1	+2 to +5	+2 to +11	+3 to +25	+4 to +38
	Fall	<1[96]	+<1[96] to +1	+<1[96] to +1	+<1[96] to +3	+<1[96] to +5
Days with Maximum Temperature Over 100°F	Annual	<1[96]	+<1[96] to +1	+<1[96] to +3	+<1[96] to +7	+<1[96] to +15
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +<1[96]
	Spring	0	+0 to +<1[96]	+0 to +<1[96]	+0 to +<1[96]	+0 to +<1[96]
	Summer	<1[96]	+<1[96] to +1	+<1[96] to +3	+<1[96] to +7	+<1[96] to +13
	Fall	0	+0 to +<1[96]	+0 to +<1[96]	+<1[96] to +1	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Ten Mile basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Ten Mile basin is expected to see days with daily maximum temperatures over 90 °F increase by 9 to 32 more days by mid-century, and 14 to 71 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 8 to 27 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Ten Mile basin is expected to have 12 to 56 more days.

[96] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

TEN MILE BASIN

Ten Mile Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	4	-1 to -2	-1 to -3	-1 to -3	-1 to -3
	Winter	4	-1 to -2	-1 to -3	-1 to -3	-1 to -3
	Spring	<1[97]	-0 to +<1[97]	-0 to +<1[97]	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	136	-12 to -27	-18 to -42	-22 to -56	-24 to -68
	Winter	80	-3 to -8	-4 to -14	-5 to -22	-7 to -28
	Spring	33	-4 to -11	-7 to -16	-7 to -20	-8 to -21
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	23	-4 to -10	-8 to -13	-8 to -17	-8 to -19

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Ten Mile basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 4 to 14 fewer days by mid-century, and 7 to 28 fewer days by end of century.
    - Spring is expected to have 7 to 16 fewer days by mid-century, and 8 to 21 fewer days by end of century.
    - Fall is expected to have 8 to 13 fewer days by mid-century, and 8 to 19 fewer days by end of century.

[97] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

TEN MILE BASIN

Ten Mile Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	6262	-506 to -1009	-694 to -1482	-813 to -1956	-900 to -2341
	Winter	3243	-187 to -401	-238 to -615	-299 to -788	-346 to -927
	Spring	1652	-134 to -285	-196 to -451	-211 to -613	-268 to -721
	Summer	87	-32 to -53	-41 to -70	-47 to -79	-51 to -86
	Fall	1277	-150 to -340	-260 to -432	-238 to -613	-261 to -699
Cooling Degree-Days (Base 65°F)	Annual	571	+213 to +428	+278 to +734	+327 to +1151	+380 to +1481
	Winter	0	-1 to +4	+0 to +6	+1 to +4	+1 to +5
	Spring	20	+11 to +28	+19 to +54	+23 to +91	+20 to +121
	Summer	498	+139 to +321	+180 to +526	+224 to +812	+271 to +1013
	Fall	50	+38 to +96	+57 to +173	+67 to +264	+97 to +341
Growing Degree-Days (Base 50°F)	Annual	2593	+402 to +776	+539 to +1220	+610 to +1927	+692 to +2412
	Winter	6	+0 to +15	+2 to +18	+6 to +29	+5 to +40
	Spring	301	+71 to +140	+94 to +249	+100 to +381	+109 to +494
	Summer	1792	+172 to +370	+225 to +592	+273 to +890	+329 to +1091
	Fall	490	+109 to +290	+193 to +420	+184 to +619	+234 to +784

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Ten Mile basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-19% (238 -615 degree-days) by mid-century, and a decrease of 11-29% (346 -927 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-27% (196-451 degree-days) by mid-century, and by 16-44% (268 -721 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 20-34% (260 -432 degree-days) by mid-century, and by 20-55% (261 -699 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 36-106% (180 -526 degree-days) by mid-century, and by 54-203% (271 -1013 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 13-33% (225 -592 degree-days) by mid-century, and by 18-61% (329 -1091 degree-days) by end of century.
    - Spring is expected to see an increase by 31-83% (94 -249 degree-days) by mid-century and 36-164% (109 -494 degree-days) by end of century.
    - Fall is expected to see an increase by 39-86% (193 -420 degree-days) by mid-century and 48-160% (234 -784 degree-days) by end of century.

TEN MILE BASIN

Ten Mile Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+<1[98] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+<1[98] to +1	+<1[98] to +1	+<1[98] to +2	+<1[98] to +2
	Spring	2	-0 to +1	+<1[98] to +1	+<1[98] to +1	+<1[98] to +1
	Summer	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Fall	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2"	Annual	1	-0 to +<1[98]	+<1[98] to +<1[98]	+<1[98] to +<1[98]	+<1[98] to +1
	Winter	<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]
	Spring	<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]
	Summer	<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]
	Fall	<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]
Days with Precipitation Over 4"	Annual	<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]
	Winter	0	-0 to +0	-0 to +0	-0 to +0	-0 to +0
	Spring	0	-0 to +0	-0 to +<1[98]	-0 to +<1[98]	-0 to +0
	Summer	<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]
	Fall	0	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]	-0 to +<1[98]

- The projections for expected number of days receiving precipitation over one inch are variable for the Ten Mile basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of an increase of 0-1 days by the end of century.

[98] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

TEN MILE BASIN

Ten Mile Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	47.8	+0.0 to +4.7	+0.5 to +6.6	+1.3 to +7.3	+0.9 to +8.3
	Winter	11.8	-0.5 to +1.7	+0.1 to +2.3	+0.3 to +2.9	+0.2 to +3.9
	Spring	12.1	-0.1 to +1.9	-0.2 to +2.0	+0.1 to +2.4	+0.1 to +2.4
	Summer	11.3	-0.4 to +1.5	-0.5 to +2.1	-1.1 to +2.7	-1.7 to +2.2
	Fall	12.6	-1.1 to +1.3	-1.3 to +1.7	-1.5 to +1.6	-2.0 to +1.4

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Ten Mile basin.
    - The winter season is expected to experience the greatest change with an increase of 1-19% by mid-century, and of 2-33% by end of century.
    - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
        - The summer season projections for the Ten Mile or basin could see a decrease of 0.5 to an increase of 2.1 inches by mid-century (decrease of 4% to increase of 19%) and a decrease of 1.7 to an increase of 2.2 inches by the end of the century (decrease of 15% to increase of 20%).
        - The fall season projections for the Ten Mile basin could see a decrease of 1.3 to an increase of 1.7 inches by mid-century (decrease of 10% to increase of 14%) and a decrease of 2 to an increase of 1.4 inches by the end of the century (decrease of 16% to increase of 11%).

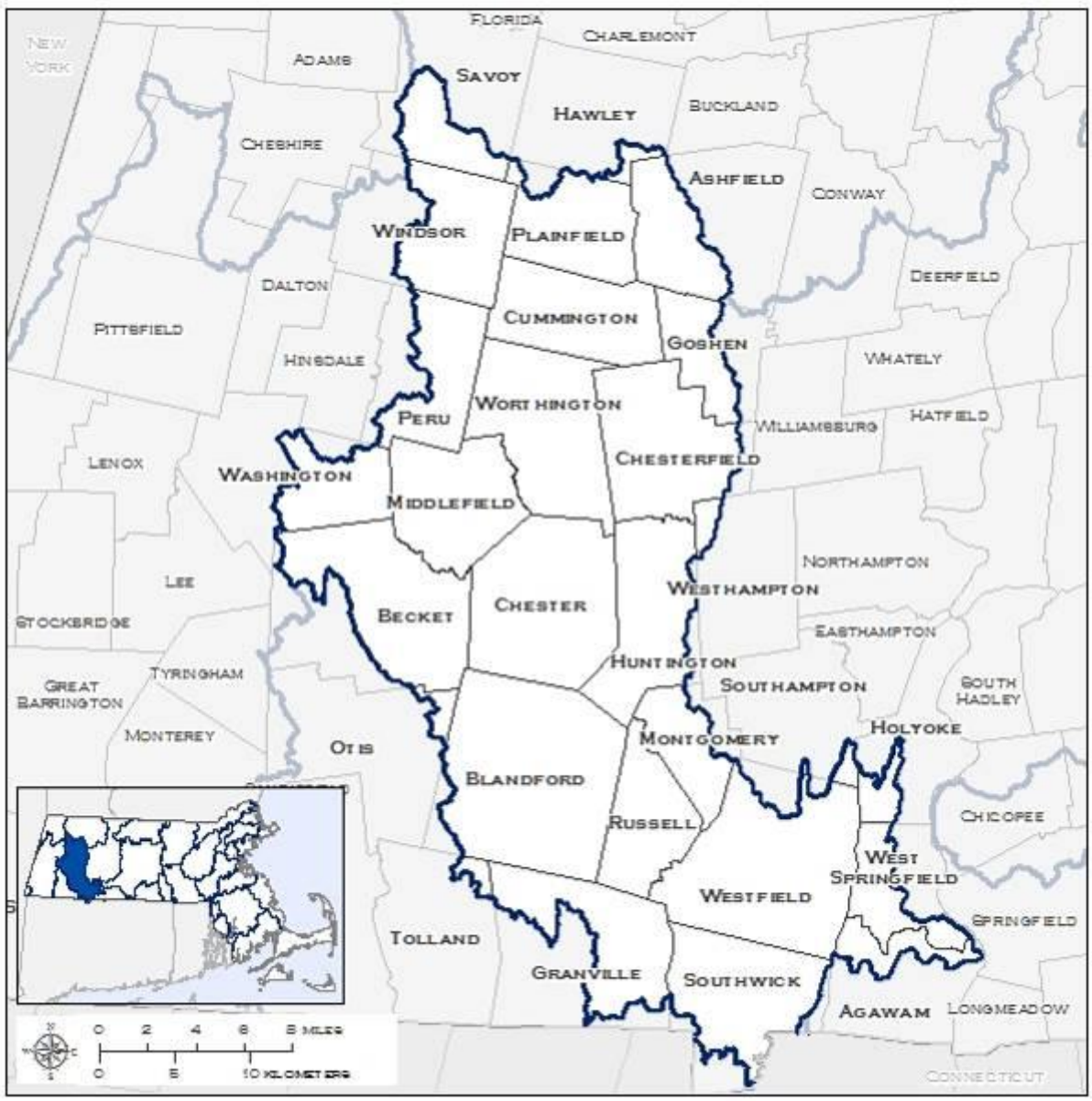
Ten Mile Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-0 to +2	+0 to +2	-1 to +3	-1 to +3
	Winter	11	-1 to +1	-0 to +2	-1 to +2	-1 to +2
	Spring	12	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	12	-0 to +2	-1 to +2	-1 to +3	-1 to +2
	Fall	13	-0 to +2	-0 to +3	-1 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
    - For all the temporal parameters, the Ten Mile basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
    - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
        - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

WESTFIELD BASIN

MUNICIPALITIES WITHIN WESTFIELD BASIN:

Agawam, Ashfield, Becket, Blandford, Chester, Chesterfield, Cummington, Goshen, Granville, Hawley, Holyoke, Huntington, Middlefield, Montgomery, Otis, Peru, Planfield, Russell, Savoy, Southampton, Southwick, Tolland, Washington, West Springfield, Westfield, Westhampton, Windsor, and Worthington



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

WESTFIELD BASIN

Westfield Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	45.0	+2.3 to +4.6	+3.1 to +6.6	+3.6 to +9.2	+4.2 to +11.2
	Winter	23.3	+2.5 to +5.5	+3.2 to +8.3	+4.1 to +9.9	+4.5 to +11.2
	Spring	43.2	+1.8 to +3.6	+2.5 to +5.7	+3.1 to +7.7	+3.6 to +9.4
	Summer	65.7	+2.3 to +4.5	+3.0 to +7.1	+3.5 to +10.2	+4.0 to +12.5
	Fall	47.4	+2.3 to +5.3	+3.8 to +6.9	+3.8 to +9.9	+4.2 to +12.1
Maximum Temperature	Annual	55.8	+2.1 to +4.4	+2.8 to +6.7	+3.3 to +9.3	+3.8 to +11.3
	Winter	32.9	+2.0 to +4.9	+2.8 to +7.4	+3.4 to +8.9	+3.8 to +10.0
	Spring	54.4	+1.7 to +3.5	+2.4 to +5.6	+3.0 to +8.0	+3.6 to +9.7
	Summer	77.3	+2.1 to +4.7	+2.8 to +7.3	+3.3 to +10.6	+3.9 to +13.0
	Fall	58.3	+2.5 to +5.2	+3.6 to +7.3	+3.6 to +10.2	+4.2 to +12.5
Minimum Temperature	Annual	34.2	+2.4 to +4.8	+3.4 to +6.8	+4.1 to +9.0	+4.5 to +11.1
	Winter	13.6	+2.7 to +6.2	+3.7 to +8.9	+4.8 to +10.8	+5.2 to +12.0
	Spring	32.1	+1.9 to +3.8	+2.6 to +6.0	+3.3 to +7.6	+3.7 to +9.2
	Summer	54.2	+2.5 to +4.6	+3.3 to +7.1	+3.6 to +9.8	+4.1 to +12.0
	Fall	36.6	+2.0 to +5.3	+3.7 to +6.8	+3.9 to +9.5	+4.2 to +11.8

- The Westfield basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.8 °F to 7.3 °F (4-9% increase); end of century increase of 3.9 °F to 13.0 °F (5-17% increase).
    - Fall mid-century increase of 3.6 °F to 7.3 °F (6-13% increase); end of century increase by and 4.2 °F to 12.5 °F (7-21% increase).
- Seasonally, minimum winter and fall temperature projections are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 3.7 °F to 8.9 °F (27-65% increase); end of century increase by 5.2 °F to 12.0 °F (38-88% increase).
    - Fall mid-century of 3.7 °F to 6.8 °F (10-19% increase); end of century increase of 4.2°F to 11.8 °F (11-32% increase).

WESTFIELD BASIN

Westfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	3	+4 to +13	+6 to +24	+7 to +42	+9 to +60
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[99]	+<1[99] to +<1[99]	+<1[99] to +1	+<1[99] to +2	+<1[99] to +3
	Summer	3	+4 to +11	+5 to +21	+6 to +36	+8 to +49
	Fall	<1[99]	+<1[99] to +1	+<1[99] to +2	+<1[99] to +6	+1 to +8
Days with Maximum Temperature Over 95°F	Annual	<1[99]	+1 to +4	+1 to +9	+2 to +20	+2 to +33
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[99]	+0 to +<1[99]	+<1[99] to +<1[99]	+0 to +1
	Summer	<1[99]	+1 to +4	+1 to +9	+1 to +18	+2 to +30
	Fall	<1[99]	+<1[99] to +<1[99]	+<1[99] to +1	+<1[99] to +1	+<1[99] to +2
Days with Maximum Temperature Over 100°F	Annual	0	+<1[99] to +1	+<1[99] to +2	+<1[99] to +5	+<1[99] to +11
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[99]	+0 to +<1[99]	+0 to +<1[99]	+0 to +<1[99]
	Summer	0	+<1[99] to +1	+<1[99] to +2	+<1[99] to +5	+<1[99] to +11
	Fall	0	+0 to +<1[99]	+0 to +<1[99]	+0 to +<1[99]	+0 to +1

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Westfield basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Westfield basin is expected to see days with daily maximum temperatures over 90 °F increase by 6 to 24 more days by mid-century, and 9 to 60 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 5 to 21 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Westfield basin is expected to have 8 to 49 more days.

[99] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

WESTFIELD BASIN

Westfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	13	-5 to -9	-7 to -10	-7 to -11	-8 to -12
	Winter	12	-5 to -8	-6 to -10	-7 to -11	-7 to -11
	Spring	1	-0 to -1	-0 to -1	-0 to -1	-0 to -1
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[100]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	167	-11 to -28	-20 to -38	-22 to -53	-24 to -62
	Winter	86	-1 to -5	-2 to -8	-3 to -14	-3 to -17
	Spring	46	-5 to -10	-6 to -15	-8 to -20	-9 to -22
	Summer	<1[100]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	34	-5 to -13	-10 to -16	-10 to -22	-10 to -24

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Westfield basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 2 to 8 fewer days by mid-century, and 3 to 17 fewer days by end of century.
    - Spring is expected to have 6 to 15 fewer days by mid-century, and 9 to 22 fewer days by end of century.
    - Fall is expected to have 10 to 16 fewer days by mid-century, and 10 to 24 fewer days by end of century.

[100] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

WESTFIELD BASIN

Westfield Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7620	-658 to -1335	-901 to -1866	-1031 to -2442	-1186 to -2821
	Winter	3775	-207 to -512	-279 to -758	-366 to -897	-417 to -1027
	Spring	2017	-151 to -313	-217 to -491	-269 to -636	-317 to -753
	Summer	206	-69 to -120	-93 to -154	-109 to -178	-120 to -189
	Fall	1621	-187 to -431	-313 to -535	-305 to -743	-328 to -853
Cooling Degree-Days (Base 65°F)	Annual	317	+176 to +362	+231 to +631	+271 to +978	+314 to +1311
	Winter	0	-1 to +3	+1 to +7	-0 to +4	+0 to +11
	Spring	15	+6 to +20	+12 to +39	+15 to +68	+15 to +99
	Summer	275	+139 to +299	+176 to +493	+204 to +755	+241 to +961
	Fall	25	+19 to +63	+28 to +104	+35 to +184	+45 to +251
Growing Degree-Days (Base 50°F)	Annual	2013	+382 to +764	+517 to +1204	+620 to +1807	+702 to +2283
	Winter	3	-1 to +7	+1 to +8	+0 to +12	+2 to +18
	Spring	223	+54 to +118	+80 to +207	+102 to +307	+102 to +409
	Summer	1451	+209 to +410	+276 to +647	+316 to +931	+364 to +1144
	Fall	326	+102 to +261	+155 to +374	+158 to +570	+204 to +710

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Westfield basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-20% (279 -758 degree-days) by mid-century, and a decrease of 11-27% (417 -1027 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 11-24% (217-491 degree-days) by mid-century, and by 16-37% (317-753 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 19-33% (313-535 degree-days) by mid-century, and by 20-53% (328 -853 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 64-180% (176 -493 degree-days) by mid-century, and by 88-350% (241-961 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 19-45% (276-647 degree-days) by mid-century, and by 25-79% (363-1144 degree-days) by end of century.
    - Spring is expected to see an increase by 36-93% (78-207 degree-days) by mid-century and 46-184% (102-409 degree-days) by end of century.
    - Fall is expected to see an increase by 47-115% (155-374 degree-days) by mid-century and 62-218% (204-710 degree-days) by end of century.

WESTFIELD BASIN

Westfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1”	Annual	8	+<1[101] to +2	+1 to +4	+1 to +3	+1 to +5
	Winter	1	-0 to +1	+<1[101] to +1	+<1[101] to +1	+<1[101] to +2
	Spring	2	-0 to +1	+<1[101] to +1	+<1[101] to +1	+<1[101] to +2
	Summer	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Fall	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2”	Annual	1	-0 to +1	-0 to +1	+<1[101] to +1	+<1[101] to +1
	Winter	<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]
	Spring	<1[101]	-0 to +<1[101]	-0 to +<1[101]	+<1[101] to +<1[101]	+<1[101] to +<1[101]
	Summer	<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]
	Fall	<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]
Days with Precipitation Over 4”	Annual	<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]
	Winter	0	-0 to +0	-0 to +0	-0 to +0	-0 to +0
	Spring	<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]
	Summer	<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]
	Fall	<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]	-0 to +<1[101]

- The projections for expected number of days receiving precipitation over one inch are variable for the Westfield basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-2 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch 0-1 days by mid-century, and of an increase of 0-2 days by the end of century.

[101] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn’t crossed seasonally at all.

WESTFIELD BASIN

Westfield Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	50.7	-0.2 to +5.1	+1.2 to +6.9	+2.0 to +8.1	+2.1 to +9.1
	Winter	11.2	-0.4 to +2.3	+0.2 to +2.8	+0.3 to +3.2	+0.8 to +4.1
	Spring	13.4	+0.0 to +2.2	+0.3 to +2.2	+0.7 to +3.0	+0.7 to +3.1
	Summer	13.2	-0.1 to +2.0	-0.1 to +2.1	-0.1 to +2.1	-0.6 to +2.0
	Fall	12.9	-1.4 to +1.7	-1.4 to +2.0	-1.7 to +2.0	-2.1 to +1.7

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Westfield basin.
  - The winter season is expected to experience the greatest change with an increase of 2-25% by mid-century, and of 7-36% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Westfield or basin could see a decrease of 0.1 to an increase of 2.1 inches by mid-century (decrease of 1% to increase of 16%) and a decrease of 0.6 to an increase of 2.0 inches by the end of the century (decrease of 5% to increase of 15%).
    - The fall season projections for the Westfield basin could see a decrease of 1.4 to an increase of 2 inches by mid-century (decrease of 10% to increase of 15%) and a decrease of 2.1 to an increase of 1.7 inches by the end of the century (decrease of 16% to increase of 13%).

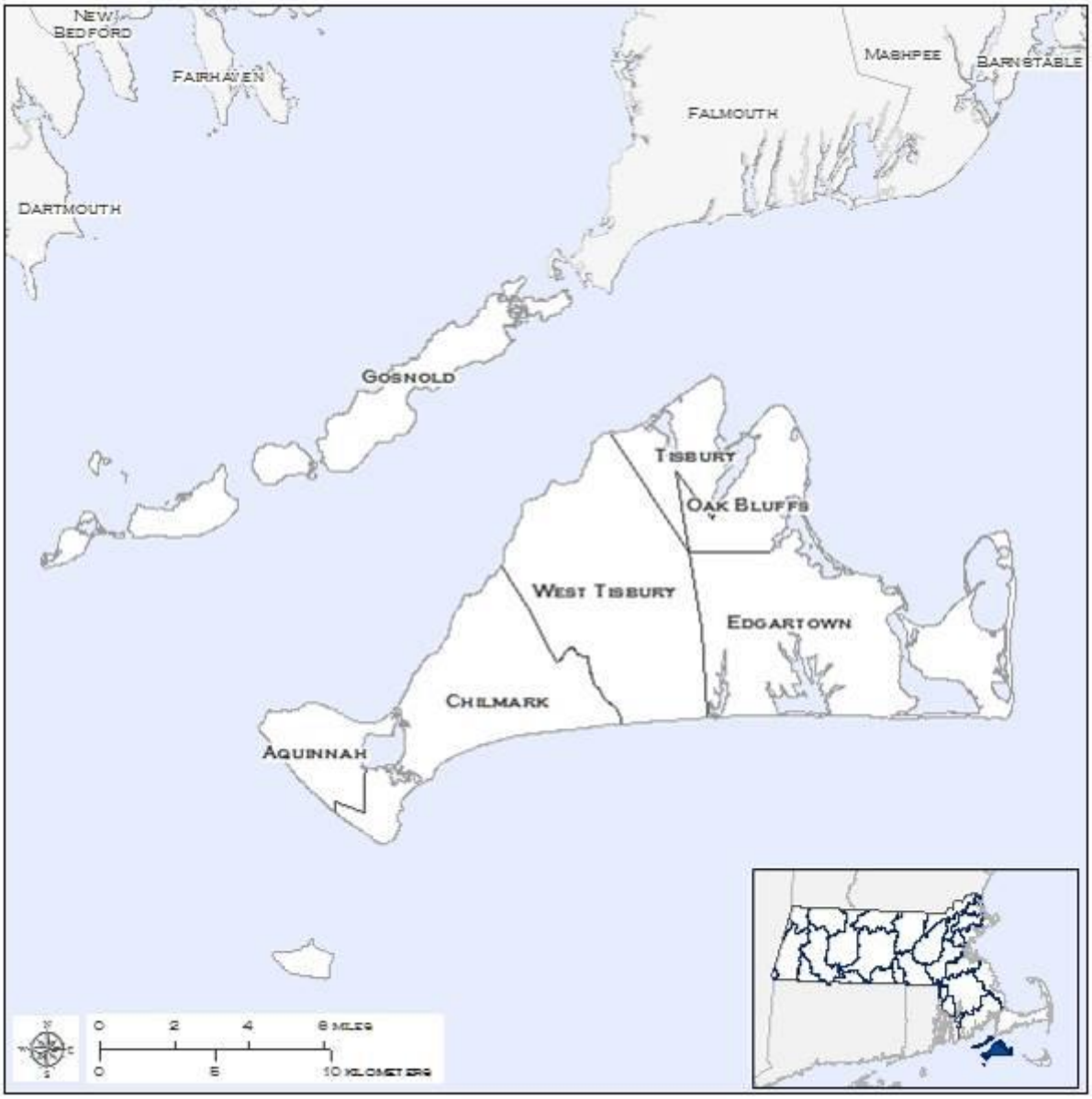
Westfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17	-0 to +1	-0 to +2	-1 to +2	-0 to +3
	Winter	12	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Spring	12	-1 to +1	-1 to +1	-1 to +1	-1 to +1
	Summer	11	-1 to +1	-0 to +1	-1 to +2	-2 to +2
	Fall	12	-0 to +2	-0 to +2	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Westfield basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The fall season is expected to experience an increase of 0-3 days in consecutive dry days by the end of the century.

MARTHA'S VINEYARD BASIN

MUNICIPALITIES WITHIN MARTHA'S VINEYARD BASIN:

Aquinnah, Chilmark, Edgartown, Gosnold, Oak Bluffs, Tisbury West Tisbury



Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

MARTHA'S VINEYAR BASIN

Martha's Vineyard Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	50.6	+1.8 to +3.3	+2.4 to +5.2	+2.7 to +7.4	+3.0 to +9.1
	Winter	32.4	+1.7 to +3.5	+2.4 to +5.2	+2.7 to +7.1	+3.0 to +8.7
	Spring	46.6	+1.5 to +3.0	+1.9 to +4.9	+2.3 to +6.6	+2.6 to +7.2
	Summer	68.8	+1.8 to +4.0	+2.6 to +5.8	+3.1 to +8.5	+3.6 to +9.9
	Fall	54.1	+1.8 to +3.6	+2.9 to +5.5	+2.8 to +7.9	+3.1 to +9.7
Maximum Temperature	Annual	58.8	+1.7 to +3.4	+2.2 to +5.1	+2.5 to +7.4	+2.8 to +8.9
	Winter	40.6	+1.5 to +3.5	+2.0 to +4.7	+2.4 to +6.8	+2.7 to +8.2
	Spring	54.9	+1.4 to +2.9	+1.7 to +4.6	+2.0 to +6.4	+2.2 to +7.1
	Summer	77.1	+1.7 to +4.0	+2.5 to +5.8	+3.0 to +8.4	+3.4 to +9.6
	Fall	62.5	+1.8 to +3.5	+2.7 to +5.5	+2.7 to +7.7	+2.9 to +9.7
Minimum Temperature	Annual	42.3	+1.9 to +3.4	+2.6 to +5.3	+3.0 to +7.4	+3.3 to +9.1
	Winter	24.3	+1.9 to +3.6	+2.7 to +5.6	+3.1 to +7.8	+3.5 to +9.2
	Spring	38.4	+1.5 to +3.2	+2.2 to +5.2	+2.4 to +6.9	+2.8 to +7.4
	Summer	60.5	+1.9 to +4.1	+2.8 to +5.9	+3.2 to +8.5	+3.8 to +10.0
	Fall	45.8	+1.9 to +3.7	+3.0 to +5.6	+2.8 to +8.1	+3.3 to +9.9

- The Martha's Vineyard basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.5 °F to 5.8 °F (3-8% increase); end of century increase of 3.4 °F to 9.6 °F (4-12% increase).
    - Fall mid-century increase of 2.7 °F to 5.5 °F (4-9% increase); end of century increase by and 2.9 °F to 9.7 °F (5-16% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 2.7 °F to 5.6 °F (11-23% increase); end of century increase by 3.5 °F to 9.2 °F (14-38% increase).
    - Fall mid-century of 3 °F to 5.6 °F (6-12% increase); end of century increase of 3.3°F to 9.9°F (7-22% increase).

MARTHA'S VINEYARD BASIN

Martha's Vineyard Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	1	+1 to +5	+2 to +10	+3 to +21	+4 to +31
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[102]	+0 to +<1[102]	+0 to +<1[102]	+0 to +<1[102]	+0 to +<1[102]
	Summer	1	+1 to +5	+2 to +10	+3 to +20	+4 to +29
	Fall	0	+<1[102] to +<1[102]	+<1[102] to +<1[102]	+<1[102] to +1	+<1[102] to +2
Days with Maximum Temperature Over 95°F	Annual	<1[102]	+<1[102] to +1	+<1[102] to +2	+<1[102] to +4	+1 to +8
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +<1[102]	+0 to +<1[102]	+0 to +<1[102]
	Summer	<1[102]	+<1[102] to +1	+<1[102] to +2	+<1[102] to +4	+1 to +7
	Fall	0	+0 to +<1[102]	+0 to +<1[102]	+0 to +<1[102]	+0 to +<1[102]
Days with Maximum Temperature Over 100°F	Annual	0	+0 to +<1[102]	+0 to +<1[102]	+0 to +1	+0 to +1
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Summer	0	+0 to +<1[102]	+0 to +<1[102]	+0 to +1	+0 to +1
	Fall	0	+0 to +0	+0 to +0	+0 to +0	+0 to +<1[102]

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Martha's Vineyard basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Martha's Vineyard basin is expected to see days with daily maximum temperatures over 90 °F increase by 2 to 10 more days by mid-century, and 4 to 31 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 2 to 10 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Martha's Vineyard basin is expected to have 4 to 49 more days.

[102] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MARTHA'S VINEYARD BASIN

Martha's Vineyard Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	<1[103]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Winter	<1[103]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Spring	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	105	-13 to -25	-19 to -39	-21 to -51	-23 to -63
	Winter	71	-4 to -11	-7 to -17	-8 to -27	-10 to -36
	Spring	24	-4 to -11	-7 to -15	-8 to -17	-10 to -19
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	10	-3 to -5	-5 to -7	-5 to -9	-5 to -10

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Martha's Vineyard basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 7 to 17 fewer days by mid-century, and 10 to 36 fewer days by end of century.
    - Spring is expected to have 7 to 15 fewer days by mid-century, and 10 to 19 fewer days by end of century.
    - Fall is expected to have 5 to 7 fewer days by mid-century, and 5 to 10 fewer days by end of century.

[103] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MARTHA'S VINEYARD BASIN

Martha's Vineyard Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	5772	-432 to -847	-656 to -1291	-731 to -1747	-769 to -2069
	Winter	2950	-149 to -321	-211 to -473	-244 to -643	-28 to -788
	Spring	1696	-135 to -273	-174 to -435	-204 to -577	-237 to -624
	Summer	77	-28 to -54	-43 to -66	-43 to -75	-44 to -79
	Fall	1045	-128 to -256	-214 to -378	-208 to -530	-229 to -604
Cooling Degree-Days (Base 65°F)	Annual	486	+171 to +399	+267 to +589	+280 to +941	+362 to +1142
	Winter	0	+0 to +0	+3 to +3	+0 to +0	+4 to +4
	Spring	8	+1 to +7	+2 to +16	+3 to +29	+5 to +40
	Summer	426	+138 to +327	+197 to +476	+235 to +697	+282 to +829
	Fall	54	+27 to +73	+42 to +123	+45 to +207	+64 to +279
Growing Degree-Days (Base 50°F)	Annual	2553	+366 to +703	+493 to +1069	+540 to +1626	+648 to +2021
	Winter	5	-1 to +9	+0 to +16	+2 to +26	+4 to +38
	Spring	222	+39 to +97	+51 to +186	+62 to +275	+64 to +315
	Summer	1729	+163 to +372	+243 to +536	+285 to +780	+333 to +907
	Fall	598	+99 to +229	+168 to +379	+162 to +556	+201 to +700

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Martha's Vineyard basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-16% (211 -473 degree-days) by mid-century, and a decrease of 10-27% (282 -788 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 10-26% (174 -435 degree-days) by mid-century, and by 14-37% (237 -624 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 21-36% (214-378 degree-days) by mid-century, and by 22-58% (229 -604 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 46-112% (197 -476 degree-days) by mid-century, and by 66-195% (282 -829 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 14-31% (243 -536 degree-days) by mid-century, and by 19-52% (333 -907 degree-days) by end of century.
    - Spring is expected to see an increase by 23-84% (51 -186 degree-days) by mid-century and 29-142% (64 -315 degree-days) by end of century.
    - Fall is expected to see an increase by 28-63% (168 -379 degree-days) by mid-century and 34-117% (201 -700 degree-days) by end of century.

MARTHA'S VINEYARD BASIN

Martha's Vineyard Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+<1[104] to +2	+1 to +3	+1 to +3	+1 to +3
	Winter	1	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Spring	2	+<1[104] to +1	+<1[104] to +1	+<1[104] to +1	+<1[104] to +1
	Summer	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Fall	2	-0 to +1	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2"	Annual	1	-0 to +<1[104]	+<1[104] to +<1[104]	+<1[104] to +<1[104]	+<1[104] to +1
	Winter	<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]
	Spring	<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]
	Summer	<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]
	Fall	<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]
Days with Precipitation Over 4"	Annual	<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]
	Winter	0	-0 to +0	-0 to +0	-0 to +0	-0 to +0
	Spring	0	-0 to +0	-0 to +0	-0 to +0	-0 to +0
	Summer	0	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]
	Fall	<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]	-0 to +<1[104]

- The projections for expected number of days receiving precipitation over one inch are variable for the Martha's Vineyard basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-1 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-1 days by the end of century.

[104] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

MARTHA'S VINEYARD BASIN

Martha's Vineyard Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	46.0	-1.0 to 2.5	-1.0 to +3.8	-0.9 to +5.1	-0.7 to +4.9
	Winter	11.9	-0.5 to +1.3	-0.4 to +1.6	-0.2 to +2.0	-0.2 to +2.8
	Spring	12.1	-0.2 to +1.5	-0.5 to +1.8	+0.1 to +2.0	-0.2 to +2.2
	Summer	10.4	-0.8 to +0.9	-1.1 to +1.5	-1.5 to +1.6	-1.9 to +1.6
	Fall	11.7	-1.0 to +0.7	-1.2 to +0.9	-1.0 to +1.4	-1.9 to +1.2

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Martha's Vineyard basin.
  - The winter season is expected to experience the greatest change with a decrease of 4% to an increase of 14% by mid-century, and a decrease of 1% to an increase of 24% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Martha's Vineyard or basin could see a decrease of 1.1 to an increase of 1.5 inches by mid-century (decrease of 10% to increase of 15%) and a decrease of 1.9 to an increase of 1.6 inches by the end of the century (decrease of 18% to increase of 15%).
    - The fall season projections for the Martha's Vineyard basin could see a decrease of 1.2 to an increase of 0.9 inches by mid-century (decrease of 10% to increase of 8%) and a decrease of 1.9 to an increase of 1.2 inches by the end of the century (decrease of 16% to increase of 10%).

Martha's Vineyard Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	18	-1 to +2	-0 to +2	+0 to +3	-1 to +4
	Winter	10	-1 to +1	-0 to +2	-0 to +2	-1 to +2
	Spring	10	-1 to +1	-1 to +1	-1 to +1	-2 to +1
	Summer	15	-1 to +2	-1 to +2	-1 to +3	-0 to +4
	Fall	13	-0 to +2	+0 to +2	-0 to +3	-0 to +3

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Martha's Vineyard basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The summer season is expected to experience an increase of 0-4 days in consecutive dry days by the end of the century.

NANTUCKET ISLAND BASIN

MUNICIPALITIES WITHIN NANTUCKET ISLAND BASIN:

Nantucket

Many municipalities fall within more than one basin, so it is advised to use the climate projections for the basin that contains the majority of the land area of the municipality.

NANTUCKET BASIN

Nantucket Island Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	50.1	+1.8 to +3.5	+2.5 to +5.4	+2.9 to +7.6	+3.2 to +9.2
	Winter	33.0	+1.8 to +3.6	+2.4 to +5.5	+3.0 to +7.4	+3.3 to +8.9
	Spring	45.7	+1.8 to +3.5	+2.4 to +5.4	+2.8 to +7.2	+3. to +8.12
	Summer	67.5	+1.6 to +3.9	+2.6 to +5.9	+2.9 to +8.7	+3.5 to +10.0
	Fall	54.1	+1.6 to +3.5	+2.7 to +5.5	+2.7 to +7.9	+3.2 to +9.5
Maximum Temperature	Annual	57.4	+1.6 to +3.5	+2.3 to +5.3	+2.6 to +7.5	+3.0 to +9.1
	Winter	40.3	+1.5 to +3.6	+2.1 to +5.1	+2.6 to +7.1	+2.9 to +8.4
	Spring	52.9	+1.6 to +3.4	+2.2 to +5.2	+2.5 to +7.1	+2.8 to +7.9
	Summer	74.7	+1.6 to +3.9	+2.6 to +5.9	+2.8 to +8.5	+3.2 to +9.8
	Fall	61.4	+1.5 to +3.4	+2.5 to +5.4	+2.5 to +7.6	+2.9 to +9.4
Minimum Temperature	Annual	42.8	+2.0 to +3.6	+2.8 to +5.6	+3.2 to +7.7	+3.5 to +9.3
	Winter	25.7	+2.1 to +3.9	+2.8 to +6.0	+3.4 to +8.1	+3.7 to +9.5
	Spring	38.5	+1.8 to +3.7	+2.7 to +5.6	+2.9 to +7.4	+3.4 to +8.4
	Summer	60.3	+1.6 to +4.0	+2.7 to +5.9	+3.1 to +8.7	+3.7 to +10.2
	Fall	46.7	+1.7 to +3.8	+2.9 to +5.5	+2.8 to +8.1	+3.4 to +9.7

- The Nantucket basin is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for annual and seasonal projections.
- Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century.
    - Summer mid-century increase of 2.6 °F to 5.9 °F (3-8% increase); end of century increase of 3.2 °F to 9.8 °F (4-13% increase).
    - Fall mid-century increase of 2.5 °F to 5.4 °F (4-9% increase); end of century increase by and 2.9 °F to 9.4 °F (5-15% increase).
- Seasonally, minimum winter and fall temperatures are expected to see increases throughout the 21st century.
    - Winter mid-century increase of 2.8 °F to 5.6 °F (11-23% increase); end of century increase by 3.5 °F to 9.3 °F (14-37% increase).
    - Fall mid-century of 2.9 °F to 5.5 °F (6-12% increase); end of century increase of 3.4°F to 9.7 °F (7-21% increase).

NANTUCKET ISLAND BASIN

Nantucket Island Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	<1[105]	+<1[105] to +2	+1 to +4	+1 to +9	+1 to +17
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[105]	+0 to +<1[105]	+0 to +<1[105]	+0 to +<1[105]
	Summer	<1[105]	+<1[105] to +2	+1 to +3	+1 to +8	+1 to +17
	Fall	0	+0 to +<1[105]	+<1[105] to +<1[105]	+<1[105] to +<1[105]	+<1[105] to +
Days with Maximum Temperature Over 95°F	Annual	<1[105]	+0 to +<1[105]	+<1[105] to +1	+<1[105] to +1	+<1[105] to +3
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +<1[105]	+0 to +<1[105]	+0 to +<1[105]
	Summer	<1[105]	+0 to +<1[105]	+<1[105] to +<1[105]	+<1[105] to +1	+<1[105] to +3
	Fall	0	+0 to +0	+0 to +0	+0 to +<1[105]	+0 to +<1[105]
Days with Maximum Temperature Over 100°F	Annual	0	+0 to +<1[105]	+0 to +<1[105]	+0 to +<1[105]	+0 to +<1[105]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Summer	0	+0 to +<1[105]	+0 to +<1[105]	+0 to +<1[105]	+0 to +<1[105]
	Fall	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0

- Due to projected increases in average and maximum temperatures throughout the end of the century, the Nantucket basin is also expected to experience an increase in days with daily maximum temperatures over 90 °F, 95 °F, and 100 °F.
    - Annually, the Nantucket basin is expected to see days with daily maximum temperatures over 90 °F increase by 1 to 4 more days by mid-century, and 1 to 17 more days by the end of the century.
    - Seasonally, summer is expected to see an increase of 1 to 3 more days with daily maximums over 90 °F by mid-century.
    - By end of century, the Nantucket basin is expected to have 1 to 17 more days.

[105] Over the observed period, there were some years with at least 1 day with seasonal Tmax over a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NANTUCKET ISLAND BASIN

Nantucket Island Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	<1[106]	-0 to +<1[106]	-0 to -0	-0 to -0	-0 to -0
	Winter	<1[106]	-0 to +<1[106]	-0 to -0	-0 to -0	-0 to -0
	Spring	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	97	-15 to -28	-20 to -43	-25 to -56	-28 to -68
	Winter	67	-8 to -15	-8 to -24	-12 to -34	-1 to -43
	Spring	22	-6 to -11	-7 to -14	-9 to -17	-11 to -19
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	8	-3 to -4	-3 to -5	-3 to -6	-3 to -7

- Due to projected increases in average and minimum temperatures throughout the end of the century, the Nantucket basin is expected to experience a decrease in days with daily minimum temperatures below 32 °F and 0 °F.
- Seasonally, winter, spring and fall are expected to see the largest decreases in days with daily minimum temperatures below 32 °F.
    - Winter is expected to have 8 to 24 fewer days by mid-century, and 15 to 43 fewer days by end of century.
    - Spring is expected to have 7 to 14 fewer days by mid-century, and 11 to 19 fewer days by end of century.
    - Fall is expected to have 3 to 5 fewer days by mid-century, and 3 to 7 fewer days by end of century.

[106] Over the observed period, there were some years with at least 1 day with seasonal Tmin under a certain threshold while in all the other years that threshold wasn't crossed seasonally at all.

NANTUCKET ISLAND BASIN

Nantucket Island Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	5823	-478 to -936	-715 to -1400	-787 to -1873	-876 to -2179
	Winter	2894	-162 to -333	-214 to -500	-274 to -675	-295 to -804
	Spring	1777	-165 to -315	-216 to -477	-247 to -633	-291 to -706
	Summer	107	-41 to -78	-60 to -94	-64 to -114	-67 to -120
	Fall	1040	-108 to -250	-201 to -366	-194 to -517	-225 to -581
Cooling Degree-Days (Base 65°F)	Annual	382	+136 to +376	+243 to +571	+263 to +928	+324 to +1139
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+1 to +1
	Spring	6	+2 to +8	+3 to +19	+5 to +31	+4 to +43
	Summer	335	+106 to +299	+175 to +454	+207 to +674	+241 to +801
	Fall	44	+28 to +74	+44 to +127	+43 to +214	+69 to +284
Growing Degree-Days (Base 50°F)	Annual	2360	+346 to +717	+509 to +1095	+569 to +1655	+674 to +2053
	Winter	5	-1 to +8	+0 to +17	+1 to +28	+4 to +42
	Spring	169	+52 to +118	+7 to +215	+89 to +301	+92 to +363
	Summer	1608	+144 to +360	+239 to +542	+268 to +795	+318 to +923
	Fall	580	+105 to +233	+170 to +382	+158 to +559	+208 to +695

- Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Nantucket basin is expected to experience a decrease in heating degree-days, and increases in both cooling degree-days and growing degree-days.
- Seasonally, winter historically exhibits the highest number of heating degree-days and is expected to see the largest decrease of any season, but spring and fall are also expected to see significant change.
    - The winter season is expected to see a decrease of 7-17% (214 -500 degree-days) by mid-century, and a decrease of 10-28% (295 -804 degree-days) by the end of century.
    - The spring season is expected to decrease in heating degree-days by 12-27% (216-477 degree-days) by mid-century, and by 16-40% (291-706 degree-days) by the end of century.
    - The fall season is expected to decreases in heating degree-days by 19-35% (201-366 degree-days) by mid-century, and by 22-56% (225-581 degree-days) by the end of century.
- Conversely, due to projected increasing temperatures, summer cooling degree-days are expected to increase by 52-136% (175 -454 degree-days) by mid-century, and by 72-239% (241-801 degree-days) by end of century.

- Seasonally, summer historically exhibits the highest number of growing degree-days and is expected to see the largest decrease of any season, but the shoulder seasons of spring and fall are also expected to see an increase in growing degree-days.
    - The summer season is projected to increase by 15-34% (239 -542 degree-days) by mid-century, and by 20-57% (318 -923 degree-days) by end of century.
    - Spring is expected to see an increase by 45-127% (89 -301 degree-days) by mid-century and 54-214% (92 -363 degree-days) by end of century.
    - Fall is expected to see an increase by 29-66% (170 -382 degree-days) by mid-century and 36-120% (208 -695 degree-days) by end of century.

NANTUCKET ISLAND BASIN

Nantucket Island Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1”	Annual	5	+<1[107] to +2	+<1[107] to +2	+1 to +3	+1 to +3
	Winter	1	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Spring	1	-0 to +1	+<1[107] to +1	+<1[107] to +1	+<1[107] to +1
	Summer	1	-0 to +1	-0 to +1	-0 to +1	-0 to +1
	Fall	2	-0 to +<1[107]	-0 to +1	-0 to +1	-0 to +1
Days with Precipitation Over 2”	Annual	<1[107]	-0 to +<1[107]	-0 to +1	+<1[107] to +1	+<1[107] to +1
	Winter	<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]
	Spring	0	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]
	Summer	<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]
	Fall	<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]
Days with Precipitation Over 4”	Annual	<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]
	Winter	0	-0 to +0	-0 to +0	-0 to +<1[107]	-0 to +0
	Spring	0	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]
	Summer	<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]
	Fall	<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]	-0 to +<1[107]

- The projections for expected number of days receiving precipitation over one inch are variable for the Nantucket basin, fluctuating between loss and gain of days.
    - Seasonally, the winter season is generally expected to see the highest projected increase.
    - The winter season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and an increase of 0-1 days by the end of century.
    - The spring season is expected to see an increase in days with precipitation over one inch of 0-1 days by mid-century, and of 0-1 days by the end of century.

[107] Over the observed period, there were some years with at least 1 day with seasonal precipitation over a certain threshold while in all the other years that threshold wasn’t crossed seasonally at all.

NANTUCKET ISLAND BASIN

Nantucket Island Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	37.7	-0.6 to +3.0	+0.2 to +4.7	+0.0 to +5.5	+0.1 to +5.8
	Winter	9.6	-0.2 to +1.2	-0.3 to +1.3	+0.1 to +2.0	-0.4 to +2.8
	Spring	9.7	-0.1 to +1.4	-0.2 to +1.8	+0.2 to +2.3	+0.3 to +2.3
	Summer	8.7	-0.7 to +1.2	-0.8 to +1.7	-1.3 to +1.9	-1.9 to +1.6
	Fall	9.7	-1.2 to +0.9	-0.9 to +1.4	-1.0 to +1.7	-1.4 to +1.9

- Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Martha's Vineyard basin.
  - The winter season is expected to experience the greatest change with a decrease of 3% to an increase of 14% by mid-century, and a decrease of 4% to an increase of 30% by end of century.
  - Projections for the summer and fall seasons are more variable, and could see either a drop or increase in total precipitation throughout the 21st century.
    - The summer season projections for the Martha's Vineyard or basin could see a decrease of 1.1 to an increase of 1.5 inches by mid-century (decrease of 9% to increase of 20%) and a decrease of 1.9 to an increase of 1.6 inches by the end of the century (decrease of 22% to increase of 18%).
    - The fall season projections for the Martha's Vineyard basin could see a decrease of 1.2 to an increase of 0.9 inches by mid-century (decrease of 9% to increase of 14%) and a decrease of 1.9 to an increase of 1.2 inches by the end of the century (decrease of 14% to increase of 20%).

Nantucket Island Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	20	-1 to +2	-1 to +3	-1 to +4	-1 to +5
	Winter	11	-0 to +2	-0 to +2	-1 to +2	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +2	-1 to +2
	Summer	17	-1 to +2	-1 to +3	-1 to +4	-1 to +6
	Fall	13	-1 to +3	-1 to +2	-0 to +3	-0 to +4

- Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century.
  - For all the temporal parameters, the Martha's Vineyard basin is expected to see a slight decrease to an increase in consecutive dry days throughout this century.
  - Seasonally, the fall and summer seasons are expected to continue to experience the highest number of consecutive dry days.
    - The summer season is expected to experience a decrease of 1 day to an increase of 6 days in consecutive dry days by the end of the century.