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.

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 the climate model results.[3] They represent the best estimates that we can currently provide for a range of anticipated changes in greenhouse gases. Note that precipitation projections are generally more uncertain than temperature.

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[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 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}. In effect, they represent different pathways that society may or may not follow, to reduce emissions through climate change mitigation measures.

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

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.massclimatechange.org). The statewide projections are included in this guidebook, but temperature and precipitation projections at each of the Commonwealth's major basins are accessible on the website and as a supplemental PDF to this guide.

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 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 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] 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 degrees 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 the middle and end of the century, based on climate models and the medium and high pathways of future greenhouse gas emissions. 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] The values cited are the range of the most likely scenarios (10-90th percentile).

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[9]	Increase by 0 to 3 days	Increase by 1 to 9 days
Days with Tmax > 95°F	Annual	< 1 day[9]	Increase by 2 to 11 days	Increase by 3 to 35 days
	Winter	0 days	No change	No change
	Spring	< 1 day[9]	No change	Increase by 0 to 1 days Increase by
	Summer	< 1 day[9]	Increase by 2 to 10 days	Increase by 3 to 32 days
	Fall	< 1 day[9]	Increase by 0 to 1 day	Increase by 0 to 3 days
Days with Tmax > 100°F	Annual	< 1 day[9]	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[9]	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[9]	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[9]	No change	No change
	Summer	0 days	No change	No change
	Fall	< 1 day[9]	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

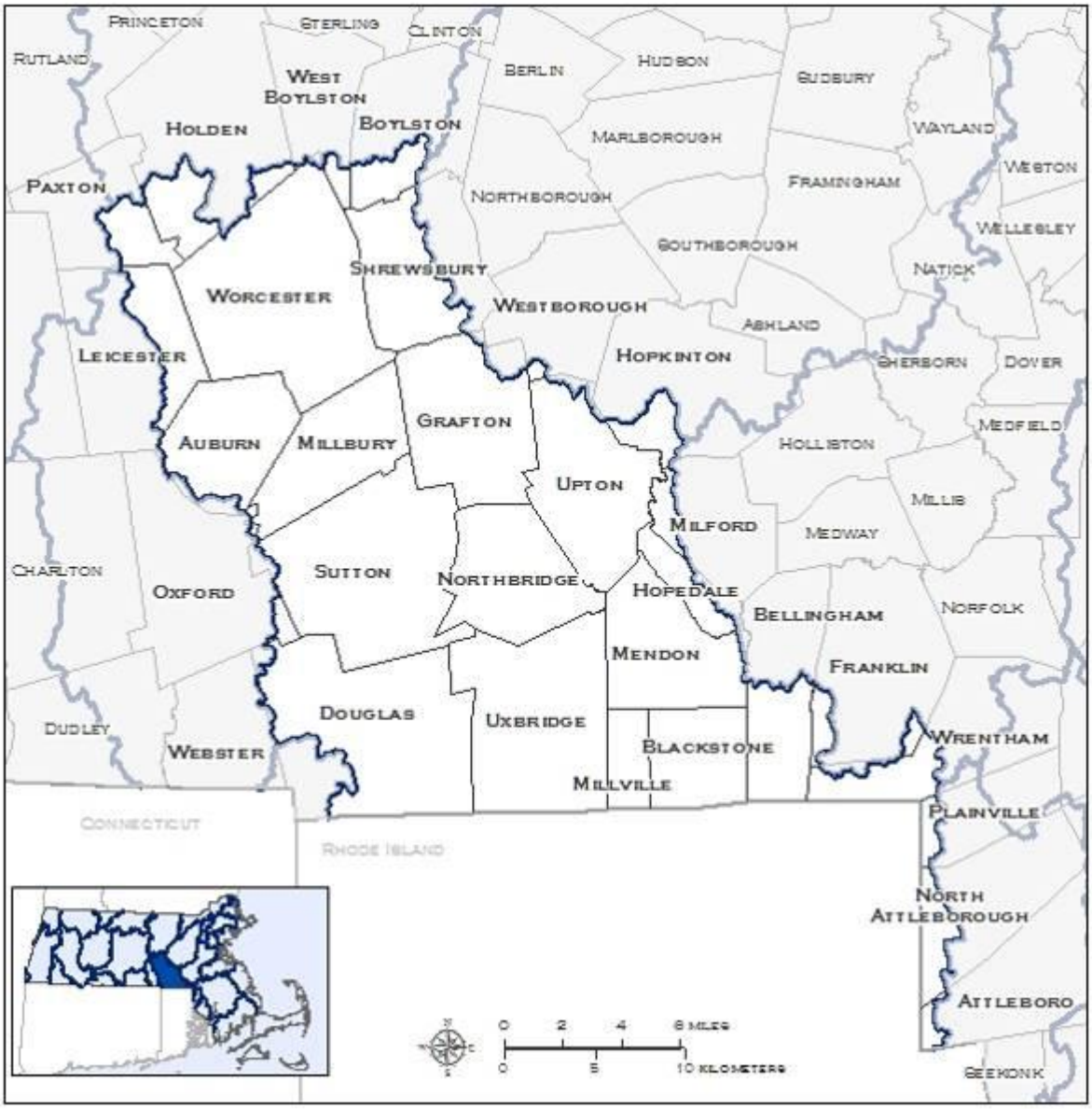
Climate Indicator		Observed Value 1971-2000 Average	Mid-Century Projected and Percent Change in 2050s (2040-2069)	End of Century Projected and Percent Change in 2090s (2080-2099)
Days with Precipitation Over 1”	Annual	7 days	Increase by 1 to 3 days	Increase by 1 to 4 days
	Winter	2 days	Increase by 0 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[10]	Increase by < 1 day[10]
	Spring	< 1 day[10]	Increase by < 1 day[10]	Increase by < 1 day[10]
	Summer	< 1 day[10]	Increase by < 1 day[10]	Increase by < 1 day[10]
	Fall	< 1 day[10]	Increase by < 1 day[10]	Increase by < 1 day[10]
Days with Precipitation Over 4”	Annual	< 1 day[10]	Increase by < 1 day[10]	Increase by < 1 day[10]
	Winter	0 days	No change	Increase by < 1 day[10]
	Spring	0 days	Increase by < 1 day[10]	Increase by < 1 day[10]
	Summer	< 1 day[10]	Increase by < 1 day[10]	Increase by < 1 day[10]
	Fall	< 1 day[10]	Increase by < 1 day[10]	Increase by < 1 day[10]
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.

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	+2.17 to +4.23	+2.88 to +6.29	+3.52 to +9.05	+3.78 to +11.06
	Winter	27.14	+2.18 to +4.73	+2.77 to +7.23	+3.50 to +8.98	+3.90 to +10.39
	Spring	46.21	+1.57 to +3.42	+2.40 to +5.59	+2.57 to +7.96	+3.09 to +9.74
	Summer	68.6	+2.22 to +4.32	+2.83 to +6.94	+3.32 to +10.23	+3.89 to +12.55
	Fall	50.45	+2.31 to +5.24	+3.96 to +6.90	+3.80 to +9.75	+4.25 to +12.06
Maximum Temperature	Annual	58.7	+2.06 to +4.05	+2.68 to +6.23	+3.23 to +9.10	+3.46 to +10.95
	Winter	36.79	+1.82 to +4.33	+2.40 to +6.69	+2.94 to +8.24	+3.37 to +9.61
	Spring	57	+1.47 to +3.37	+2.14 to +5.56	+2.50 to +8.08	+3.01 to +9.70
	Summer	79.48	+2.02 to +4.34	+2.70 to +6.87	+3.24 to +10.46	+3.73 to +12.78
	Fall	61.13	+2.42 to +4.99	+3.69 to +7.11	+3.65 to +9.85	+4.12 to +12.36
Minimum Temperature	Annual	37.7	+2.27 to +4.49	+3.13 to +6.50	+3.80 to +9.00	+4.09 to +11.11
	Winter	17.49	+2.48 to +5.22	+3.17 to +7.73	+4.15 to +9.71	+4.38 to +11.24
	Spring	35.42	+1.66 to +3.60	+2.64 to +5.96	+2.73 to +7.77	+3.17 to +9.62
	Summer	57.73	+2.27 to +4.35	+2.97 to +7.04	+3.40 to +10.01	+4.06 to +12.35
	Fall	39.78	+2.22 to +5.36	+3.91 to +6.81	+3.94 to +9.56	+4.38 to +11.97

- 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 2.70 °F to 6.87 °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	4.69	+5.41 to +15.55	+7.80 to +28.89	+9.95 to +51.17	+12.23 to +70.36
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.31	+0.02 to +0.69	+0.16 to +1.12	+0.24 to +2.37	+0.17 to +3.84
	Summer	4.2	+4.79 to +13.53	+6.62 to +24.66	+8.60 to +42.44	+10.98 to +56.11
	Fall	0.18	+0.40 to +1.73	+0.65 to +4.31	+0.68 to +8.13	+1.09 to +10.66
Days with Maximum Temperature Over 95°F	Annual	0.35	+1.36 to +5.29	+1.90 to +11.42	+2.55 to +24.98	+3.71 to +39.61
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.21	+0.02 to +0.32	+0.02 to +0.68	+0.03 to +1.27
	Summer	0.35	+1.32 to +4.85	+1.69 to +10.42	+2.38 to +22.62	+3.53 to +35.24
	Fall	0.00	+0.03 to +0.49	+0.04 to +0.91	+0.11 to +2.57	+0.16 to +3.98
Days with Maximum Temperature Over 100°F	Annual	0.02	+0.09 to +0.83	+0.16 to +2.75	+0.25 to +6.61	+0.19 to +14.02
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.03	-0.00 to +0.11	+0.00 to +0.25
	Summer	0.02	+0.05 to +0.73	+0.14 to +2.64	+0.23 to +6.15	+0.19 to +12.91
	Fall	0.00	+0.00 to +0.07	+0.00 to +0.17	+0.00 to +0.45	+0.00 to +0.83

- 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.

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	5.96	-1.95 to -3.7	-2.34 to -4.31	-2.59 to -4.87	-2.68 to -5.06
	Winter	5.9	-2.02 to -3.62	-2.33 to -4.11	-2.55 to -4.75	-2.67 to -4.97
	Spring	0.07	-0.21 to +0.03	-0.00 to -0.22	-0.01 to -0.26	-0.02 to -0.26
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.01	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00
Days with Minimum Temperature Below 32°F	Annual	142.52	-10.35 to -26.51	-17.60 to -38.76	-0.71 to -54.14	-22.84 to -65.55
	Winter	83.06	-2.24 to -7.14	-3.15 to -11.18	-4.37 to -19.94	-5.52 to -25.55
	Spring	34.7	-3.07 to -10.81	-5.94 to -15.34	-7.48 to -19.82	-8.21 to -21.09
	Summer	0.00	-0.08 to -0.00	-0.08 to -0.00	-0.09 to -0.00	-0.08 to -0.00
	Fall	24.73	-4.86 to -10.69	-8.13 to -13.09	-8.32 to -17.04	-8.03 to -19.44

- 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.

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	6650.72	-538.84 to -1133.04	-745.49 to -1599.20	-875.93 to -2128.13	-990.84 to -2515.37
	Winter	3429.45	-186.30 to -440.85	-245.48 to -663.13	-310.30 to -815.38	-362.52 to -956.44
	Spring	1747.73	-128.37 to -291.86	-200.70 to -470.07	-218.72 to -632.48	-273.58 to -747.07
	Summer	103.68	-37.50 to -64.33	-50.19 to -83.60	-57.38 to -93.48	-58.73 to -99.19
	Fall	1364.79	-169.45 to -389.97	-293.16 to -472.69	-272.88 to -653.75	-296.19 to -746.70
Cooling Degree-Days (Base 65°F)	Annual	499.29	+225.59 to +444.27	+295.30 to +758.47	+345.56 to +1188.08	+397.92 to +1547.94
	Winter	nan	+0.51 to +0.51	+1.04 to +2.39	+0.30 to +2.20	+0.14 to +4.62
	Spring	19.72	+10.70 to +29.08	+18.73 to +57.09	+23.70 to +95.11	+20.28 to +131.50
	Summer	435.09	+161.24 to +337.36	+199.79 to +557.86	+240.80 to +851.55	+286.26 to +1060.50
	Fall	40.33	+35.97 to +97.21	+51.30 to +164.68	+59.76 to +259.59	+86.45 to +347.34
Growing Degree-Days (Base 50°F)	Annual	2450.84	+426.76 to +817.08	+581.58 to +1286.71	+664.10 to +1991.79	+749.29 to +2492.22
	Winter	6.17	-1.61 to +9.67	+0.16 to +13.36	+2.90 to +21.64	+2.45 to +27.96
	Spring	285.3	+67.01 to +140.75	+91.09 to +246.18	+104.87 to +380.96	+110.94 to +496.40
	Summer	1711.52	+203.91 to +397.43	+259.87 to +637.50	+304.28 to +941.29	+356.92 to +1153.86
	Fall	441.81	+124.81 to +312.86	+200.47 to +434.62	+192.84 to +638.78	+241.55 to +810.26

- 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	8.45	+0.32 to +2.26	+0.62 to +3.49	+1.32 to +3.58	+1.27 to +4.95
	Winter	1.92	-0.05 to +0.92	+0.16 to +1.46	+0.26 to +1.75	+0.38 to +2.13
	Spring	1.8	-0.10 to +0.68	+0.03 to +1.02	+0.24 to +1.32	+0.13 to +1.61
	Summer	2.02	-0.16 to +0.58	-0.11 to +0.92	-0.08 to +0.88	-0.17 to +0.81
	Fall	2.69	-0.35 to +0.96	-0.23 to +1.13	-0.30 to +0.82	-0.59 to +0.98
Days with Precipitation Over 2”	Annual	0.98	+0.05 to +0.52	+0.13 to +0.57	+0.18 to +0.64	+0.19 to +0.87
	Winter	0.11	-0.04 to +0.08	-0.02 to +0.13	-0.03 to +0.17	-0.02 to +0.24
	Spring	0.15	-0.03 to +0.13	+0.01 to +0.13	+0.01 to +0.19	+0.03 to +0.29
	Summer	0.39	-0.06 to +0.19	-0.05 to +0.26	-0.04 to +0.26	-0.12 to +0.21
	Fall	0.33	-0.09 to +0.32	-0.07 to +0.32	-0.06 to +0.25	-0.10 to +0.33
Days with Precipitation Over 4”	Annual	0.01	-0.04 to +0.06	-0.02 to +0.08	-0.04 to +0.13	-0.04 to +0.15
	Winter	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to +0.00	-0.00 to +0.00
	Spring	0.00	-0.00 to +0.01	-0.00 to +0.02	-0.00 to +0.03	-0.00 to +0.04
	Summer	0.01	-0.03 to +0.04	-0.03 to +0.04	-0.04 to +0.04	-0.04 to +0.06
	Fall	0.00	-0.03 to +0.06	-0.03 to +0.06	-0.02 to +0.06	-0.02 to +0.07

- 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.

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	47.13	+0.26 to +5.53	+1.35 to +6.79	+2.49 to +8.67	+1.62 to +8.71
	Winter	11.42	-0.37 to +2.06	+0.31 to +2.84	+0.35 to +3.50	+0.44 to +4.45
	Spring	11.97	-0.09 to +2.16	+0.06 to +2.26	+0.47 to +2.83	+0.26 to +2.80
	Summer	11.34	-0.14 to +1.65	-0.39 to +2.25	-0.75 to +2.73	-1.62 to +2.61
	Fall	12.39	-1.15 to +1.39	-1.33 to +2.13	-1.59 to +1.89	-1.78 to +1.69

- 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	16.63	-0.36 to +1.48	-0.34 to +2.05	-1.00 to +2.42	-0.59 to +2.92
	Winter	11.53	-0.71 to +1.34	-0.63 to +1.50	-0.88 to +1.54	-1.07 to +1.68
	Spring	10.93	-1.19 to +0.78	-1.03 to +1.10	-1.35 to +1.06	-1.18 to +1.01
	Summer	12.09	-0.78 to +1.45	-0.79 to +2.09	-1.29 to +2.84	-1.28 to +2.87
	Fall	12.53	-0.30 to +1.80	-0.42 to +2.58	-0.49 to +3.06	-0.38 to +3.16

- 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	50.13	+2.07 to +3.99	+2.73 to +6.07	+3.18 to +8.92	+3.46 to +10.84
	Winter	29.84	+2.17 to +4.55	+2.87 to +6.89	+3.50 to +8.88	+3.87 to +10.34
	Spring	47.65	+1.69 to +3.44	+2.34 to +5.41	+2.58 to +8.02	+3.13 to +9.79
	Summer	70.07	+1.79 to +3.95	+2.34 to +6.52	+2.78 to +9.77	+3.39 to +12.11
	Fall	52.58	+2.03 to +4.69	+3.52 to +6.53	+3.30 to +9.31	+3.78 to +11.60
Maximum Temperature	Annual	59.55	+1.90 to +3.85	+2.56 to +6.00	+2.92 to +8.94	+3.19 to +10.74
	Winter	38.38	+1.85 to +4.32	+2.46 to +6.44	+3.02 to +8.26	+3.42 to +9.56
	Spring	57.46	+1.50 to +3.39	+2.03 to +5.42	+2.56 to +8.23	+3.08 to +9.66
	Summer	80.04	+1.69 to +3.99	+2.23 to +6.41	+2.70 to +9.90	+3.22 to +12.21
	Fall	61.93	+2.09 to +4.52	+3.30 to +6.66	+3.21 to +9.40	+3.63 to +11.78
Minimum Temperature	Annual	40.7	+2.17 to +4.24	+2.91 to +6.22	+3.45 to +8.91	+3.75 to +10.95
	Winter	21.31	+2.45 to +5.00	+3.24 to +7.34	+4.04 to +9.47	+4.33 to +10.91
	Spring	37.84	+1.75 to +3.47	+2.64 to +5.71	+2.62 to +7.81	+3.25 to +9.76
	Summer	60.11	+1.89 to +3.94	+2.44 to +6.76	+2.85 to +9.63	+3.56 to +12.02
	Fall	43.22	+1.99 to +4.81	+3.49 to +6.45	+3.39 to +9.29	+3.92 to +11.41

- 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	7.85	+5.60 to +15.57	+7.75 to +29.07	+9.46 to +49.32	+11.54 to +66.93
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.5	+0.20 to +0.77	+0.37 to +1.35	+0.40 to +2.36	+0.29 to +3.97
	Summer	7.04	+4.66 to +13.40	+6.18 to +24.21	+8.05 to +39.68	+10.28 to +51.95
	Fall	0.31	+0.51 to +2.14	+0.73 to +4.89	+0.91 to +8.34	+1.19 to +10.97
Days with Maximum Temperature Over 95°F	Annual	1.08	+1.77 to +6.53	+2.01 to +12.66	+2.92 to +26.38	+4.55 to +40.58
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.01	+0.02 to +0.20	+0.02 to +0.35	+0.08 to +0.70	+0.03 to +1.51
	Summer	1.05	+1.55 to +5.99	+1.89 to +11.24	+2.70 to +23.32	+4.34 to +35.56
	Fall	0.02	+0.06 to +0.67	+0.08 to +1.55	+0.16 to +3.53	+0.26 to +4.83
Days with Maximum Temperature Over 100°F	Annual	0.05	+0.24 to +1.40	+0.32 to +3.81	+0.47 to +8.58	+0.55 to +15.67
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.02	+0.00 to +0.06	+0.00 to +0.11	+0.00 to +0.36
	Summer	0.05	+0.21 to +1.24	+0.26 to +3.60	+0.45 to +7.71	+0.52 to +14.23
	Fall	0.00	+0.00 to +0.13	+0.00 to +0.28	+0.00 to +0.70	+0.01 to +1.21

- 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.

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	2.58	-0.73 to -1.72	-0.86 to -2.01	-1.02 to -2.05	-0.92 to -2.1
	Winter	2.57	-0.70 to -1.68	-0.85 to -1.96	-1.01 to -2.01	-0.91 to -2.06
	Spring	0.01	-0.08 to +0.01	-0.09 to +0.00	-0.11 to -0.00	-0.11 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	119.21	-11.79 to -27.09	-17.05 to -42.10	-21.02 to -54.79	-22.54 to -65.69
	Winter	76.48	-4.35 to -10.46	-5.24 to -17.45	-7.50 to -26.48	-8.93 to -34.12
	Spring	26.51	-3.44 to -10.21	-6.02 to -14.01	-6.70 to -18.17	-7.95 to -19.54
	Summer	0.00	-0.03 to -0.00	-0.04 to -0.00	-0.04 to -0.00	-0.03 to -0.00
	Fall	16.19	-4.11 to -8.13	-5.81 to -10.18	-6.64 to -12.56	-5.80 to -14.06

- 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.

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	6078.6	-500.54 to -1035.05	-672.05 to -1473.30	-798.29 to -1955.65	-899.41 to -2343.46
	Winter	3182.27	-190.90 to -420.59	-250.52 to -633.54	-311.79 to -805.90	-358.50 to -949.08
	Spring	1623.3	-132.42 to -284.51	-190.37 to -446.56	-215.51 to -630.49	-277.90 to -742.49
	Summer	77.66	-28.69 to -48.6	-34.41 to -61.51	-40.23 to -71.65	-43.54 to -74.94
	Fall	1190.96	-142.96 to -330.92	-248.43 to -418.08	-232.46 to -591.26	-253.57 to -668.90
Cooling Degree-Days (Base 65°F)	Annual	636.02	+216.50 to +443.48	+281.45 to +763.73	+326.69 to +1205.65	+381.04 to +1558.59
	Winter	nan	+0.30 to +4.18	-0.20 to +5.14	-0.53 to +3.30	-0.20 to +5.28
	Spring	26.94	+13.42 to +33.49	+23.11 to +63.87	+25.82 to +103.20	23.93 to +143.38
	Summer	544.48	+135.55 to +320.64	+175.30 to +541.04	+212.87 to +828.15	+260.68 to +1041.01
	Fall	60.45	+37.41 to +101.70	+57.30 to +191.31	+67.33 to +289.12	+94.46 to +375.83
Growing Degree-Days (Base 50°F)	Annual	2733.34	+393.15 to +798.33	+538.44 to +1251.18	+605.73 to +1995.52	+691.87 to +2508.24
	Winter	7.42	+1.44 to +16.84	+2.52 to +19.76	+7.07 to +36.68	+7.25 to +46.66
	Spring	326.56	+76.91 to +152.27	+101.00 to +261.65	+105.69 to +408.29	+122.03 to +527.10
	Summer	1846.85	+164.09 to +362.91	+214.53 to +599.63	+255.19 to +898.50	+311.56 to +1114.22
	Fall	547.36	+108.67 to +298.71	+198.14 to +441.05	+185.73 to +654.54	+236.44 to +817.90

- 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	9.06	+0.37 to +2.16	+0.78 to +3.05	+1.00 to +3.17	+1.28 to +4.43
	Winter	2.4	-0.02 to +0.97	+0.14 to +1.17	+0.30 to +1.57	+0.41 to +2.20
	Spring	2.04	-0.04 to +0.82	+0.00 to +1.08	+0.18 to +1.30	+0.23 to +1.33
	Summer	1.96	-0.10 to +0.54	-0.08 to +0.79	-0.14 to +0.68	-0.17 to +0.61
	Fall	2.64	-0.21 to +0.69	-0.11 to +0.99	-0.29 to +0.76	-0.33 to +1.01
Days with Precipitation Over 2”	Annual	1.27	+0.05 to +0.58	+0.10 to +0.74	+0.11 to +0.88	+0.27 to +1.19
	Winter	0.2	-0.02 to +0.17	-0.01 to +0.22	+0.00 to +0.30	+0.02 to +0.34
	Spring	0.21	-0.07 to +0.17	-0.01 to +0.24	-0.02 to +0.24	+0.01 to +0.36
	Summer	0.41	-0.08 to +0.23	-0.03 to +0.23	-0.09 to +0.15	-0.07 to +0.13
	Fall	0.44	-0.06 to +0.29	-0.04 to +0.26	+0.01 to +0.32	-0.08 to +0.45
Days with Precipitation Over 4”	Annual	0.08	-0.03 to +0.15	-0.01 to +0.13	-0.03 to +0.16	-0.03 to +0.20
	Winter	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Spring	0.00	-0.01 to +0.04	-0.00 to +0.03	-0.01 to +0.04	-0.00 to +0.06
	Summer	0.03	-0.03 to +0.07	-0.02 to +0.06	-0.03 to +0.06	-0.02 to +0.10
	Fall	0.05	-0.02 to +0.07	-0.01 to +0.08	-0.02 to +0.10	-0.02 to +0.12

- 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.

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	46.07	+0.02 to +4.67	+0.30 to +6.20	+1.19 to +7.67	+1.09 to +9.03
	Winter	11.82	-0.41 to +1.88	-0.02 to +2.35	+0.37 to +3.01	+0.37 to +4.07
	Spring	11.59	-0.10 to +2.24	+0.03 to +2.18	+0.14 to +2.71	+0.30 to +2.83
	Summer	10.51	-0.49 to +1.56	-0.41 to +1.86	-1.01 to +2.77	-1.66 to +2.23
	Fall	12.18	-0.92 to +1.18	-1.02 to +1.60	-1.74 to +2.08	-1.64 to +1.78

- 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%).

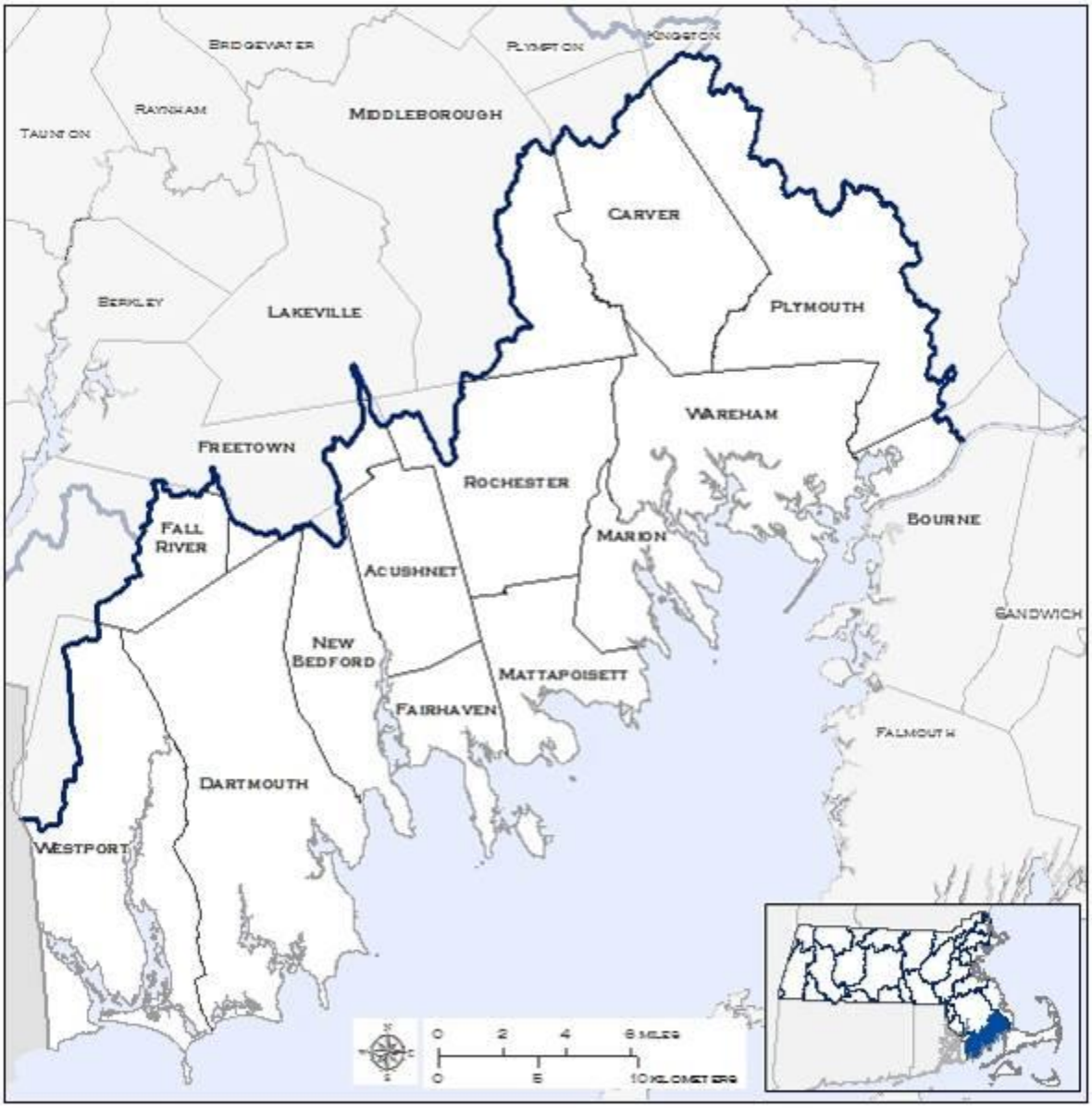
Boston Harbor Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17.46	-0.29 to +1.41	-0.41 to +2.17	-0.93 to +2.88	-0.59 to +3.64
	Winter	11.09	-0.72 to +1.44	-0.52 to +1.59	-0.69 to +2.08	-1.00 to +2.01
	Spring	11.37	-1.05 to +0.55	-1.10 to +1.24	-1.44 to +1.47	-1.31 to +1.27
	Summer	12.58	-1.16 to +1.27	-0.95 to +2.27	-1.26 to +3.05	-1.44 to +2.41
	Fall	12.78	-0.20 to +2.02	-0.18 to +2.66	-0.40 to +3.08	-0.45 to +3.00

- 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	50.67	+1.93 to +3.63	+2.56 to +5.85	+2.96 to +8.49	+3.28 to +10.34
	Winter	31.25	+2.09 to +4.15	+2.77 to +6.44	+3.25 to +8.45	+3.63 to +9.82
	Spring	47.34	+1.90 to +3.56	+2.55 to +5.67	+2.78 to +7.59	+3.28 to +9.17
	Summer	70.11	+1.55 to +3.72	+2.05 to +6.13	+2.56 to +9.35	+3.13 to +11.24
	Fall	53.64	+1.95 to +4.08	+3.22 to +6.10	+2.98 to +8.72	+3.47 to +10.73
Maximum Temperature	Annual	59.52	+1.83 to +3.63	+2.38 to +5.78	+2.69 to +8.48	+3.03 to +10.19
	Winter	39.72	+1.78 to +4.00	+2.42 to +5.94	+2.86 to +7.81	+3.28 to +9.12
	Spring	56.27	+1.75 to +3.52	+2.23 to +5.41	+2.72 to +7.60	+3.15 to +9.07
	Summer	79.16	+1.45 to +3.61	+1.93 to +6.08	+2.45 to +9.33	+2.88 to +11.16
	Fall	62.57	+1.90 to +4.10	+3.00 to +6.17	+2.90 to +8.58	+3.26 to +10.85
Minimum Temperature	Annual	41.82	+2.03 to +3.70	+2.77 to +5.97	+3.24 to +8.50	+3.57 to +10.44
	Winter	22.78	+2.36 to +4.40	+3.10 to +6.94	+3.71 to +9.10	+4.03 to +10.52
	Spring	38.4	+1.94 to +3.72	+2.87 to +5.93	+2.84 to +7.78	+3.40 to +9.22
	Summer	61.05	+1.65 to +3.79	+2.16 to +6.18	+2.67 to +9.30	+3.37 to +11.31
	Fall	44.72	+1.98 to +4.26	+3.29 to +6.10	+3.09 to +8.75	+3.72 to +10.72

- 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	4.41	+3.20 to +9.23	+4.20 to +20.84	+5.88 to +39.91	+8.16 to +55.00
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.18	+0.00 to +0.32	+0.03 to +0.53	+0.06 to +0.97	+0.08 to +1.46
	Summer	4.05	+2.99 to +8.48	+3.84 to +18.80	+5.59 to +35.46	+7.46 to +47.83
	Fall	0.19	+0.18 to +0.82	+0.30 to +1.59	+0.29 to +4.12	+0.53 to +6.14
Days with Maximum Temperature Over 95°F	Annual	0.64	+0.74 to +2.60	+1.01 to +6.45	+1.43 to +15.07	+2.06 to +25.37
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.03	-0.01 to +0.11	+0.00 to +0.16	+0.01 to +0.25	+0.01 to +0.39
	Summer	0.61	+0.70 to +2.46	+0.97 to +6.04	+1.38 to +14.13	+1.96 to +23.75
	Fall	0.00	+0.00 to +0.13	+0.02 to +0.29	+0.02 to +0.92	+0.04 to +1.43
Days with Maximum Temperature Over 100°F	Annual	0.05	+0.04 to +0.39	+0.09 to +1.40	+0.14 to +3.44	+0.12 to +7.30
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.03	+0.00 to +0.04	+0.00 to +0.10
	Summer	0.05	+0.04 to +0.39	+0.09 to +1.36	+0.14 to +3.38	+0.11 to +7.03
	Fall	0.00	+0.00 to +0.01	+0.00 to +0.03	+0.00 to +0.07	+0.00 to +0.23

- 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.

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	1.7	-0.32 to -0.75	-0.40 to -0.9	-0.48 to -0.89	-0.45 to -0.94
	Winter	1.7	-0.33 to -0.75	-0.39 to -0.89	-0.48 to -0.88	-0.45 to -0.93
	Spring	0.00	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	110.78	-13.67 to -27.90	-19.56 to -43.51	-23.01 to -55.47	-24.34 to -66.53
	Winter	73.38	-5.33 to -11.52	-6.62 to -19.83	-9.32 to -29.03	-10.37 to -36.99
	Spring	24.56	-4.98 to -10.8	-6.81 to -14.52	-7.77 to -17.95	-9.31 to -19.04
	Summer	0.00	-0.05 to -0.00	-0.04 to -0.00	-0.04 to -0.00	-0.04 to -0.00
	Fall	12.8	-3.86 to -7.32	-5.15 to -8.97	-5.88 to -11.08	-5.96 to -12.38

- 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	5866.07	-502.07	to	-972.40	-707.22	to	-1454.90	-811.86	to	-1927.02	-878.91	to	-2283.39
	Winter	3055.55	-189.79	to	-383.41	-246.96	to	-589.79	-293.52	to	-765.13	-327.13	to	-904.75
	Spring	1639.46	-160.90	to	-307.61	-217.22	to	-480.17	-241.36	to	-625.48	-297.03	to	-727.64
	Summer	66.92	-22.55	to	-44.08	-32.69	to	-53.58	-33.62	to	-62.98	-38.95	to	-66.27
	Fall	1100.85	-133.03	to	-290.86	-233.74	to	-399.50	-223.38	to	-563.66	-241.15	to	-637.87
Cooling Degree-Days (Base 65°F)	Annual	621.97	+190.86	to	+404.33	+242.16	to	+683.45	+284.03	to	+1120.38	+347.50	to	+1422.93
	Winter	nan	+0.04	to	+3.78	+0.18	to	+4.39	-1.17	to	+3.69	+0.68	to	+5.06
	Spring	16.08	+9.41	to	+25.22	+13.30	to	+47.93	+15.26	to	+78.39	+16.45	to	+103.66
	Summer	536.93	+119.64	to	+302.66	+152.55	to	+512.36	+199.66	to	+794.65	+245.69	to	+972.31
	Fall	67.47	+30.83	to	+87.11	+46.88	to	+160.43	+53.66	to	+250.81	+81.12	to	+329.68
Growing Degree-Days (Base 50°F)	Annual	2733.75	+363.23	to	+753.00	+485.70	to	+1198.52	+557.97	to	+1890.34	+655.10	to	+2361.45
	Winter	6.6	+1.12	to	+14.00	+1.76	to	+21.67	+5.80	to	+38.46	+6.67	to	+53.52
	Spring	280.36	+72.55	to	+144.02	+95.59	to	+245.61	+102.23	to	+368.72	+109.63	to	+478.66
	Summer	1850.06	+142.55	to	+341.83	+187.68	to	+563.70	+234.80	to	+860.40	+287.00	to	+1034.33
	Fall	593.39	+98.75	to	+263.17	+179.09	to	+410.67	+169.57	to	+602.92	+219.19	to	+764.68

- 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	8.03	+0.31 to +1.92	+0.81 to +2.67	+0.77 to +3.02	+1.08 to +3.79
	Winter	1.87	+0.02 to +0.77	+0.20 to +0.95	+0.19 to +1.17	+0.36 to +1.76
	Spring	1.87	+0.06 to +0.82	+0.13 to +1.08	+0.26 to +1.31	+0.30 to +1.38
	Summer	2.08	-0.34 to +0.56	-0.12 to +0.59	-0.14 to +0.51	-0.43 to +0.68
	Fall	2.2	-0.25 to +0.52	-0.24 to +0.89	-0.22 to +0.76	-0.28 to +1.14
Days with Precipitation Over 2"	Annual	0.99	+0.04 to +0.53	+0.17 to +0.70	+0.14 to +0.82	+0.23 to +1.01
	Winter	0.2	-0.04 to +0.19	+0.01 to +0.19	-0.01 to +0.27	+0.02 to +0.34
	Spring	0.14	-0.02 to +0.16	-0.01 to +0.27	+0.03 to +0.25	+0.01 to +0.30
	Summer	0.39	-0.09 to +0.15	-0.06 to +0.18	-0.08 to +0.19	-0.15 to +0.22
	Fall	0.26	-0.02 to +0.27	+0.01 to +0.28	+0.00 to +0.33	-0.06 to +0.39
Days with Precipitation Over 4"	Annual	0.05	-0.02 to +0.07	-0.01 to +0.05	+0.00 to +0.08	-0.01 to +0.09
	Winter	0.00	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.02	+0.00 to +0.04
	Spring	0.00	-0.01 to +0.03	-0.00 to +0.03	+0.00 to +0.05	-0.01 to +0.05
	Summer	0.04	-0.03 to +0.03	-0.02 to +0.03	-0.02 to +0.04	-0.02 to +0.03
	Fall	0.01	-0.01 to +0.03	-0.00 to +0.03	+0.00 to +0.03	-0.02 to +0.04

- 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.

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	47.76	-0.68	to	+3.87	+0.33	to	+5.43	+0.70	to	+6.13	+0.28	to	+6.76
	Winter	12.56	-0.30	to	+1.56	-0.01	to	+1.94	+0.21	to	+2.62	+0.13	to	+3.90
	Spring	12.15	-0.09	to	+1.91	-0.06	to	+2.18	+0.13	to	+2.36	+0.07	to	+2.67
	Summer	10.99	-0.97	to	+1.12	-0.87	to	+1.50	-1.80	to	+1.92	-2.29	to	+1.83
	Fall	12.05	-0.74	to	+0.82	-1.01	to	+1.51	-1.64	to	+1.73	-1.72	to	+1.21

- 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	17.49	-0.43	to	+1.86	-0.28	to	+2.26	-0.65	to	+3.31	-0.21	to	+4.08
	Winter	10.11	-0.57	to	+1.50	-0.50	to	+1.47	-0.40	to	+1.93	-0.80	to	+2.14
	Spring	11.36	-0.62	to	+0.76	-0.96	to	+1.35	-1.04	to	+1.17	-0.92	to	+1.40
	Summer	14.08	-1.03	to	+1.53	-0.77	to	+1.93	-0.72	to	+2.71	-0.49	to	+3.49
	Fall	13.31	-0.21	to	+2.35	-0.24	to	+2.57	-0.24	to	+2.74	-0.06	to	+3.18

- 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	49.92	+1.78 to +3.41	+2.41 to +5.39	+2.74 to +7.78	+3.11 to +9.52
	Winter	31.92	+1.76 to +3.72	+2.50 to +5.70	+3.07 to +7.69	+3.35 to +9.20
	Spring	45.98	+1.73 to +3.23	+2.16 to +5.04	+2.59 to +6.74	+2.94 to +7.69
	Summer	68.15	+1.50 to +3.62	+2.08 to +5.66	+2.45 to +8.58	+3.03 to +10.43
	Fall	53.32	+1.92 to +3.83	+3.03 to +5.86	+2.85 to +8.29	+3.35 to +10.06
Maximum Temperature	Annual	57.74	+1.63 to +3.38	+2.19 to +5.23	+2.43 to +7.73	+2.82 to +9.26
	Winter	39.76	+1.52 to +3.60	+2.10 to +5.27	+2.60 to +7.27	+3.01 to +8.65
	Spring	53.74	+1.44 to +3.11	+1.92 to +4.80	+2.30 to +6.54	+2.62 to +7.55
	Summer	75.95	+1.35 to +3.48	+1.95 to +5.60	+2.29 to +8.47	+2.68 to +10.27
	Fall	61.24	+1.84 to +3.80	+2.81 to +5.83	+2.76 to +8.00	+3.08 to +9.97
Minimum Temperature	Annual	42.09	+1.92 to +3.53	+2.67 to +5.50	+3.06 to +7.84	+3.42 to +9.67
	Winter	24.08	+2.06 to +3.97	+2.90 to +6.16	+3.53 to +8.34	+3.81 to +9.85
	Spring	38.23	+1.74 to +3.47	+2.51 to +5.28	+2.71 to +6.93	+3.19 to +7.83
	Summer	60.35	+1.65 to +3.75	+2.23 to +5.72	+2.61 to +8.66	+3.32 to +10.64
	Fall	45.41	+1.92 to +4.01	+3.14 to +5.88	+2.96 to +8.49	+3.63 to +10.28

- 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	0.76	+1.17 to +3.89	+1.93 to +9.25	+2.46 to +21.33	+3.23 to +33.89
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.01	-0.02 to +0.09	-0.02 to +0.13	+0.00 to +0.20	+0.00 to +0.29
	Summer	0.73	+1.06 to +3.58	+1.79 to +8.62	+2.34 to +19.96	+3.04 to +31.61
	Fall	0.01	+0.06 to +0.28	+0.10 to +0.68	+0.13 to +1.26	+0.19 to +2.26
Days with Maximum Temperature Over 95°F	Annual	0.06	+0.08 to +0.63	+0.19 to +1.88	+0.25 to +4.51	+0.26 to +9.49
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	-0.00 to +0.02	+0.00 to +0.05	+0.00 to +0.08
	Summer	0.06	+0.07 to +0.61	+0.18 to +1.85	+0.25 to +4.32	+0.26 to +9.11
	Fall	0.00	+0.00 to +0.03	+0.00 to +0.06	+0.00 to +0.17	+0.00 to +0.42
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.00 to +0.07	+0.00 to +0.31	+0.01 to +0.80	+0.03 to +1.71
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01
	Summer	0.00	+0.00 to +0.07	+0.00 to +0.31	+0.01 to +0.80	+0.02 to +1.69
	Fall	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.04

- 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.

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	0.79	-0.08 to -0.37	-0.09 to -0.39	-0.14 to -0.4	-0.15 to -0.4
	Winter	0.79	-0.08 to -0.37	-0.09 to -0.39	-0.14 to -0.4	-0.15 to -0.4
	Spring	0.00	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	104.75	-13.60 to -27.72	-19.29 to -41.91	-23.29 to -54.38	-24.54 to -66.71
	Winter	70.7	-5.68 to -12.20	-7.00 to -20.22	-10.21 to -29.71	-11.46 to -38.36
	Spring	23.8	-5.16 to -11.14	-7.22 to -14.64	-7.87 to -17.32	-9.50 to -18.96
	Summer	0.00	-0.05 to -0.00	-0.04 to -0.00	-0.04 to -0.00	-0.05 to -0.00
	Fall	10.16	-3.40 to -6.37	-4.69 to -8.2	-5.09 to -9.62	-5.34 to -10.71

- 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	5956.64	-475.48 to -913.39	-685.90 to -1374.26	-773.67 to -1828.23	-854.04 to -2171.56
	Winter	2996.33	-164.51 to -347.77	-220.16 to -520.87	-277.06 to -697.53	-304.13 to -831.96
	Spring	1753.89	-152.01 to -285.19	-190.19 to -444.68	-229.91 to -584.74	-267.48 to -649.94
	Summer	94.49	-30.02 to -57.56	-41.95 to -69.89	-44.65 to -80.65	-44.99 to -85.45
	Fall	1105.61	-131.82 to -268.87	-226.73 to -393.30	-215.14 to -547.22	-242.01 to -619.87
Cooling Degree-Days (Base 65°F)	Annual	435.71	+144.74 to +364.43	+224.26 to +601.17	+250.48 to +965.18	+314.49 to +1226.21
	Winter	nan	+0.13 to +1.43	+0.38 to +3.50	+0.92 to +3.19	-0.34 to +3.91
	Spring	7.08	+3.48 to +9.44	+4.94 to +20.08	+5.86 to +34.34	+7.02 to +52.03
	Summer	384.03	+107.28 to +279.41	+148.81 to +457.16	+184.27 to +701.82	+229.32 to +875.35
	Fall	43.77	+30.85 to +80.41	+41.77 to +138.18	+48.96 to +224.33	+71.67 to +296.72
Growing Degree-Days (Base 50°F)	Annual	2421.38	+343.19 to +690.79	+460.30 to +1078.12	+519.05 to +1678.13	+617.96 to +2104.38
	Winter	4.84	+0.24 to +9.74	+0.28 to +15.26	+2.10 to +25.74	+4.23 to +35.89
	Spring	197.63	+50.56 to +105.22	+69.23 to +195.43	+77.64 to +277.13	+77.88 to +342.92
	Summer	1669.64	+137.95 to +332.36	+190.73 to +520.48	+224.93 to +789.31	+278.12 to +958.80
	Fall	546.41	+107.92 to +248.13	+174.67 to +396.65	+168.86 to +571.84	+215.05 to +716.85

- 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	7.02	+0.16 to +1.76	+0.66 to +2.66	+0.45 to +2.92	+0.55 to +3.41
	Winter	1.45	-0.10 to +0.62	+0.08 to +0.67	+0.02 to +1.04	+0.09 to +1.35
	Spring	1.65	+0.08 to +0.65	+0.08 to +0.90	+0.22 to +1.05	+0.29 to +1.20
	Summer	1.92	-0.18 to +0.55	-0.13 to +0.78	-0.40 to +0.66	-0.46 to +0.58
	Fall	2.01	-0.23 to +0.62	-0.13 to +0.85	-0.31 to +0.94	-0.35 to +1.11
Days with Precipitation Over 2”	Annual	0.75	-0.04 to +0.43	+0.07 to +0.52	+0.08 to +0.71	+0.05 to +0.74
	Winter	0.09	-0.05 to +0.16	-0.02 to +0.15	-0.02 to +0.20	-0.02 to +0.27
	Spring	0.05	-0.03 to +0.13	+0.01 to +0.18	+0.02 to +0.19	-0.01 to +0.25
	Summer	0.33	-0.07 to +0.15	-0.05 to +0.23	-0.05 to +0.20	-0.05 to +0.22
	Fall	0.28	-0.04 to +0.13	-0.01 to +0.20	-0.01 to +0.23	-0.07 to +0.31
Days with Precipitation Over 4”	Annual	0.01	+0.00 to +0.03	+0.00 to +0.03	-0.01 to +0.05	-0.01 to +0.05
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.01	-0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.00
	Summer	0.00	-0.01 to +0.02	-0.01 to +0.02	-0.01 to +0.03	-0.01 to +0.03
	Fall	0.01	-0.00 to +0.02	+0.00 to +0.01	+0.00 to +0.02	+0.00 to +0.03

- 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.

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	44.94	-1.08 to +3.47	-0.38 to +4.54	-0.78 to +5.79	-0.83 to +5.45
	Winter	11.63	-0.40 to +1.24	-0.22 to +1.59	-0.05 to +2.10	-0.04 to +3.13
	Spring	11.51	-0.04 to +1.48	-0.26 to +1.67	-0.21 to +2.08	+0.08 to +2.45
	Summer	10.24	-0.95 to +1.19	-1.05 to +1.73	-1.64 to +2.00	-2.22 to +1.66
	Fall	11.62	-0.96 to +0.90	-0.99 to +1.09	-1.40 to +1.64	-1.52 to +1.26

- 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%).

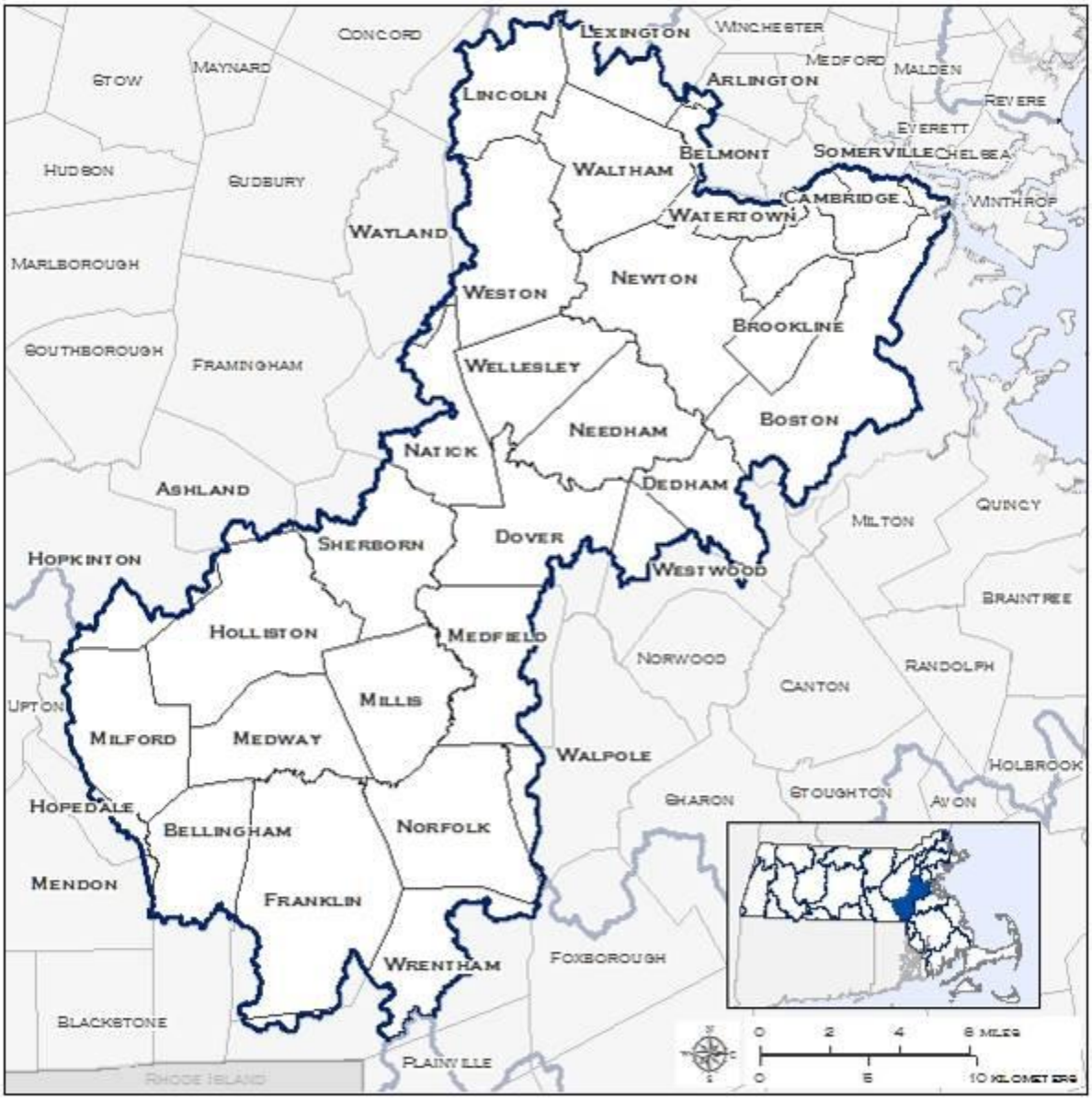
Cape Cod Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	18.72	-1.06 to +1.99	-0.56 to +2.62	-0.34 to +3.63	-0.26 to +4.65
	Winter	10.19	-0.52 to +1.53	-0.44 to +1.46	-0.31 to +1.83	-0.94 to +1.97
	Spring	11.59	-0.99 to +1.21	-0.86 to +1.50	-1.00 to +1.48	-1.34 to +1.58
	Summer	15.38	-1.00 to +2.02	-0.83 to +2.61	-0.89 to +4.38	-1.03 to +5.26
	Fall	13.05	-0.57 to +2.45	-0.04 to +2.29	+0.17 to +2.82	+0.04 to +3.45

- 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	49.38	+2.05 to +4.02	+2.67 to +6.07	+3.23 to +8.79	+3.49 to +10.72
	Winter	28.53	+1.87 to +4.29	+2.52 to +6.43	+3.14 to +8.21	+3.58 to +9.58
	Spring	47.21	+1.49 to +3.29	+2.21 to +5.47	+2.41 to +7.82	+2.99 to +9.59
	Summer	69.8	+2.02 to +4.24	+2.62 to +6.98	+3.12 to +10.20	+3.72 to +12.67
	Fall	51.6	+2.03 to +4.80	+3.60 to +6.46	+3.37 to +9.28	+3.85 to +11.50
Maximum Temperature	Annual	60.08	+1.86 to +3.81	+2.48 to +5.92	+2.95 to +8.83	+3.18 to +10.62
	Winter	38.29	+1.52 to +3.92	+2.10 to +5.89	+2.60 to +7.50	+2.96 to +8.71
	Spring	58.1	+1.41 to +3.24	+1.94 to +5.42	+2.33 to +7.92	+2.90 to +9.57
	Summer	80.95	+1.88 to +4.33	+2.51 to +6.92	+3.06 to +10.39	+3.55 to +12.86
	Fall	62.58	+2.17 to +4.58	+3.40 to +6.64	+3.23 to +9.31	+3.67 to +11.76
Minimum Temperature	Annual	38.68	+2.15 to +4.28	+2.91 to +6.17	+3.51 to +8.75	+3.81 to +10.80
	Winter	18.76	+2.22 to +4.86	+2.91 to +6.97	+3.74 to +8.86	+4.12 to +10.28
	Spring	36.32	+1.57 to +3.40	+2.47 to +5.81	+2.55 to +7.63	+3.07 to +9.46
	Summer	58.64	+2.05 to +4.36	+2.72 to +7.25	+3.18 to +10.01	+3.89 to +12.47
	Fall	40.62	+1.97 to +4.95	+3.55 to +6.40	+3.54 to +9.12	+4.04 to +11.40

- 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	8.95	+7.08 to +19.58	+10.01 to +35.04	+12.74 to +56.79	+15.17 to +75.87
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.51	+0.10 to +0.72	+0.24 to +1.48	+0.28 to +2.60	+0.24 to +4.19
	Summer	8.05	+6.21 to +16.77	+8.42 to +29.96	+11.02 to +45.92	+13.47 to +59.41
	Fall	0.39	+0.57 to +2.43	+0.97 to +5.49	+1.00 to +9.62	+1.51 to +12.74
Days with Maximum Temperature Over 95°F	Annual	1.15	+2.15 to +8.28	+3.17 to +15.90	+3.79 to +31.89	+5.68 to +48.95
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.01	+0.03 to +0.22	+0.02 to +0.43	+0.06 to +0.89	+0.08 to +1.69
	Summer	1.12	+2.03 to +7.58	+2.81 to +14.42	+3.54 to +28.61	+5.42 to +41.97
	Fall	0.01	+0.10 to +0.78	+0.16 to +1.55	+0.17 to +3.66	+0.32 to +5.35
Days with Maximum Temperature Over 100°F	Annual	0.05	+0.24 to +1.76	+0.39 to +4.80	+0.58 to +10.99	+0.79 to +20.49
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.04	+0.00 to +0.14	+0.00 to +0.38
	Summer	0.05	+0.20 to +1.59	+0.36 to +4.62	+0.55 to +10.30	+0.76 to +18.92
	Fall	0.00	+0.00 to +0.12	+0.00 to +0.25	+0.01 to +0.72	+0.02 to +1.29

- 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.

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	4.7	-1.23 to -2.57	-1.48 to -3.17	-1.71 to -3.42	-1.76 to -3.59
	Winter	4.64	-1.22 to -2.44	-1.46 to -3.04	-1.67 to -3.33	-1.72 to -3.5
	Spring	0.06	-0.15 to +0.02	-0.15 to +0.00	-0.01 to -0.20	-0.01 to -0.20
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.01	-0.00 to -0.00	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00
Days with Minimum Temperature Below 32°F	Annual	136.36	-10.38 to -25.73	-16.89 to -38.60	-20.22 to -52.35	-22.22 to -63.10
	Winter	81.31	-2.63 to -7.17	-3.40 to -11.99	-5.10 to -19.82	-6.44 to -25.53
	Spring	31.73	-2.98 to -10.63	-5.85 to -14.62	-6.94 to -19.10	-7.82 to -20.44
	Summer	0.00	-0.07 to -0.00	-0.12 to -0.00	-0.10 to -0.00	-0.09 to -0.00
	Fall	23.29	-4.43 to -9.42	-6.96 to -11.83	-7.57 to -15.49	-6.97 to -17.59

- 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.

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	6328.79	-482.80 to -1015.09	-659.94 to -1443.88	-777.15 to -1935.50	-875.21 to -2311.14
	Winter	3302.52	-169.76 to -396.84	-218.96 to -596.73	-278.46 to -745.47	-323.04 to -880.92
	Spring	1661.09	-121.25 to -276.56	-181.72 to -457.01	-203.93 to -611.33	-263.54 to -723.96
	Summer	84.5	-28.58 to -50.11	-37.84 to -66.50	-43.38 to -74.61	-45.10 to -78.21
	Fall	1274.38	-142.80 to -342.13	-260.75 to -422.77	-242.72 to -596.72	-258.78 to -682.61
Cooling Degree-Days (Base 65°F)	Annual	608.49	+228.69 to +462.31	+297.76 to +788.87	+347.81 to +1225.11	+407.01 to +1598.14
	Winter	nan	-0.41 to +2.30	-1.37 to +2.65	+0.85 to +2.80	+1.12 to +4.47
	Spring	25.37	+12.07 to +29.93	+19.51 to +58.93	+23.22 to +102.84	+21.45 to +140.46
	Summer	525.96	+155.73 to +344.85	+192.29 to +579.28	+236.22 to +867.11	+284.90 to +1089.31
	Fall	54.14	+39.03 to +103.48	+55.23 to +176.77	+64.43 to +274.41	+93.13 to +360.52
Growing Degree-Days (Base 50°F)	Annual	2650.53	+407.43 to +808.80	+552.96 to +1276.46	+628.97 to +1988.88	+720.08 to +2491.33
	Winter	6.62	-0.41 to +13.05	+0.65 to +15.00	+4.01 to +24.04	+3.15 to +30.97
	Spring	317.54	+64.59 to +140.52	+89.94 to +248.03	+95.73 to +391.83	+110.39 to +507.62
	Summer	1821.53	+185.88 to +389.66	+239.97 to +641.38	+286.30 to +938.17	+341.56 to +1164.84
	Fall	501.28	+115.58 to +304.16	+194.56 to +423.26	+184.29 to +629.36	+233.48 to +798.72

- 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	7.69	+0.30 to +2.15	+0.79 to +2.95	+1.17 to +3.10	+1.30 to +4.23
	Winter	1.96	-0.00 to +0.81	+0.26 to +1.14	+0.43 to +1.53	+0.43 to +1.91
	Spring	1.56	-0.11 to +0.60	+0.01 to +0.92	+0.12 to +1.11	+0.24 to +1.28
	Summer	1.83	-0.10 to +0.58	-0.05 to +0.77	-0.17 to +0.75	-0.17 to +0.75
	Fall	2.34	-0.30 to +0.78	-0.19 to +0.98	-0.37 to +0.72	-0.43 to +0.89
Days with Precipitation Over 2"	Annual	0.8	-0.00 to +0.41	+0.07 to +0.48	+0.09 to +0.51	+0.11 to +0.68
	Winter	0.1	-0.02 to +0.10	-0.01 to +0.13	-0.01 to +0.17	-0.00 to +0.22
	Spring	0.11	-0.01 to +0.10	-0.02 to +0.12	-0.02 to +0.14	+0.01 to +0.23
	Summer	0.37	-0.09 to +0.15	+0.00 to +0.24	-0.08 to +0.18	-0.05 to +0.19
	Fall	0.22	-0.12 to +0.21	-0.04 to +0.21	-0.06 to +0.22	-0.07 to +0.25
Days with Precipitation Over 4"	Annual	0.04	-0.04 to +0.09	+0.00 to +0.10	-0.02 to +0.10	-0.02 to +0.15
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.00	+0.00 to +0.01
	Summer	0.02	-0.03 to +0.05	-0.02 to +0.06	-0.01 to +0.06	-0.03 to +0.06
	Fall	0.02	-0.02 to +0.05	-0.02 to +0.06	-0.03 to +0.04	-0.02 to +0.07

- 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.

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	46.55	-0.04 to +4.77	+0.23 to +6.13	+1.24 to +7.47	+0.74 to +8.18
	Winter	11.73	-0.43 to +1.96	+0.14 to +2.43	+0.40 to +3.01	+0.32 to +4.14
	Spring	11.71	-0.05 to +2.13	-0.01 to +2.09	+0.19 to +2.42	+0.12 to +2.44
	Summer	10.9	-0.39 to +1.58	-0.40 to +2.12	-0.95 to +2.56	-1.46 to +2.32
	Fall	12.24	-1.16 to +1.25	-1.24 to +1.71	-1.62 to +1.59	-1.76 to +1.67

- 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%).

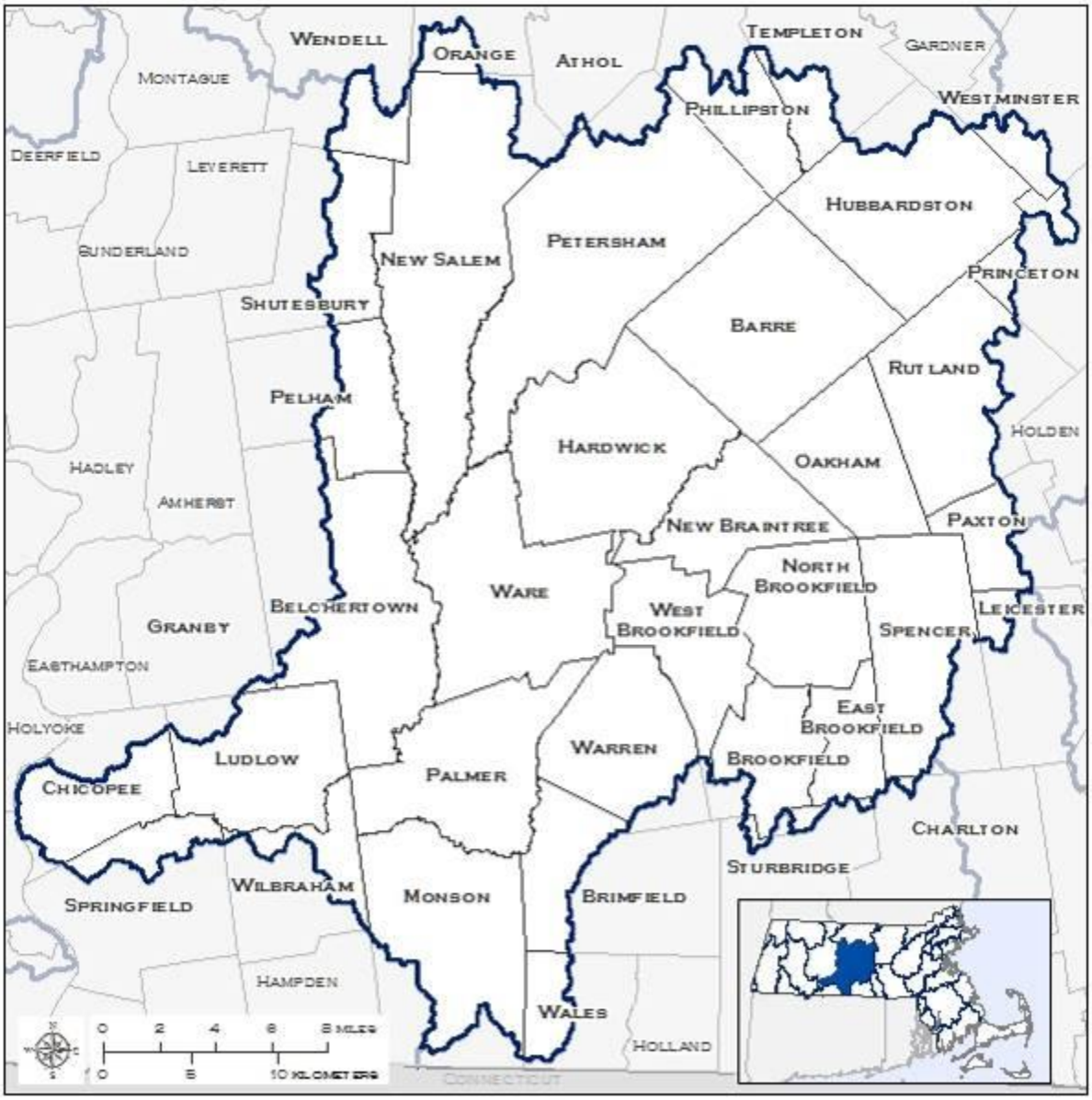
Charles Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16.92	-0.47 to +1.46	-0.65 to +2.35	-1.00 to +2.97	-0.77 to +2.71
	Winter	11.52	-0.59 to +1.49	-0.57 to +1.62	-0.73 to +1.91	-1.07 to +1.80
	Spring	11.47	-1.02 to +0.75	-1.18 to +1.21	-1.57 to +1.38	-1.26 to +1.21
	Summer	12.44	-0.86 to +1.69	-1.05 to +2.10	-1.15 to +2.59	-1.08 to +1.97
	Fall	12.6	-0.11 to +1.95	-0.20 to +2.94	-0.34 to +3.06	-0.13 to +3.20

- 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	46.16	+2.24 to +4.48	+3.03 to +6.40	+3.58 to +8.97	+4.01 to +10.98
	Winter	24.6	+2.34 to +5.20	+2.98 to +7.77	+3.83 to +9.35	+4.15 to +10.76
	Spring	44.45	+1.47 to +3.34	+2.32 to +5.34	+2.63 to +7.43	+3.06 to +9.15
	Summer	66.8	+2.35 to +4.58	+3.20 to +7.15	+3.58 to +10.34	+4.04 to +12.77
	Fall	48.4	+2.26 to +5.32	+3.91 to +6.80	+3.79 to +9.55	+4.28 to +11.71
Maximum Temperature	Annual	57.39	+2.09 to +4.24	+2.75 to +6.47	+3.22 to +9.09	+3.63 to +10.97
	Winter	34.7	+1.90 to +4.61	+2.58 to +7.03	+3.13 to +8.48	+3.49 to +9.66
	Spring	55.97	+1.31 to +3.31	+2.19 to +5.29	+2.59 to +7.65	+3.09 to +9.31
	Summer	78.72	+2.07 to +4.69	+2.96 to +7.32	+3.43 to +10.63	+3.89 to +13.15
	Fall	59.75	+2.43 to +5.11	+3.78 to +7.07	+3.57 to +9.85	+4.23 to +12.20
Minimum Temperature	Annual	34.93	+2.41 to +4.81	+3.33 to +6.59	+3.91 to +8.91	+4.37 to +10.94
	Winter	14.5	+2.62 to +5.87	+3.46 to +8.41	+4.42 to +10.22	+4.72 to +11.69
	Spring	32.93	+1.59 to +3.56	+2.42 to +5.75	+2.76 to +7.33	+3.11 to +8.94
	Summer	54.87	+2.48 to +4.68	+3.37 to +7.26	+3.73 to +10.05	+4.22 to +12.40
	Fall	37.06	+2.04 to +5.41	+3.71 to +6.70	+3.87 to +9.25	+4.31 to +11.50

- 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	3.34	+4.84 to +15.43	+7.78 to +28.70	+9.27 to +49.25	+11.38 to +68.89
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.16	+0.08 to +0.72	+0.21 to +1.24	+0.23 to +2.52	+0.17 to +3.98
	Summer	3.04	+4.21 to +13.33	+6.76 to +24.79	+8.22 to +41.76	+9.94 to +56.04
	Fall	0.15	+0.34 to +1.34	+0.40 to +3.12	+0.42 to +6.65	+0.75 to +9.29
Days with Maximum Temperature Over 95°F	Annual	0.15	+1.02 to +5.24	+1.71 to +11.67	+2.37 to +24.99	+3.00 to +40.27
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.14	+0.01 to +0.27	+0.01 to +0.64	+0.01 to +1.39
	Summer	0.15	+1.02 to +4.69	+1.51 to +10.76	+2.07 to +22.38	+2.76 to +35.78
	Fall	0.01	+0.01 to +0.44	+0.04 to +0.74	+0.06 to +1.90	+0.09 to +3.12
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.06 to +0.93	+0.07 to +2.70	+0.15 to +7.20	+0.13 to +15.75
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.03	+0.00 to +0.10	+0.00 to +0.30
	Summer	0.00	+0.04 to +0.76	+0.06 to +2.62	+0.14 to +6.67	+0.12 to +14.69
	Fall	0.00	+0.00 to +0.08	+0.00 to +0.18	+0.00 to +0.44	+0.00 to +0.76

- 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.

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	11.43	-3.83 to -6.82	-4.78 to -8.18	-5.36 to -8.67	-5.20 to -9.27
	Winter	11	-3.68 to -6.75	-4.52 to -7.82	-5.08 to -8.43	-5.05 to -8.95
	Spring	0.43	-0.11 to -0.44	-0.12 to -0.43	-0.15 to -0.49	-0.16 to -0.52
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.04	-0.02 to -0.00	-0.03 to -0.00	-0.03 to -0.00	-0.03 to -0.00
Days with Minimum Temperature Below 32°F	Annual	161.76	-10.68 to -28.08	-19.27 to -37.67	-21.85 to -52.29	-23.39 to -62.50
	Winter	85.68	-1.00 to -5.36	-2.10 to -7.82	-2.94 to -14.95	-3.66 to -19.22
	Spring	43.07	-3.35 to -10.27	-5.88 to -14.83	-6.68 to -19.09	-8.26 to -20.73
	Summer	0.08	-0.01 to -0.26	-0.02 to -0.39	-0.02 to -0.36	-0.02 to -0.36
	Fall	32.9	-5.52 to -13.12	-9.75 to -15.95	-9.40 to -20.21	-9.84 to -23.05

- 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.

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	7263.18	-598.23 to -1245.45	-827.95 to -1728.35	-957.79 to -2273.47	-1088.77 to -2653.16
	Winter	3657.35	-194.41 to -483.79	-263.16 to -712.01	-338.43 to -849.64	-383.42 to -990.51
	Spring	1903.92	-121.76 to -288.77	-198.02 to -455.03	-220.73 to -597.68	-271.49 to -714.33
	Summer	163.13	-58.34 to -97.51	-79.84 to -121.35	-84.63 to -139.40	-91.98 to -144.40
	Fall	1539.18	-178.57 to -422.17	-312.87 to -500.90	-292.93 to -695.09	-316.99 to -796.44
Cooling Degree-Days (Base 65°F)	Annual	375.33	+197.83 to +408.33	+267.27 to +697.70	+314.77 to +1073.13	+360.68 to +1425.81
	Winter	nan	-0.28 to +3.14	+0.27 to +6.75	-0.15 to +3.69	+0.02 to +3.87
	Spring	14.88	+8.50 to +24.26	+13.79 to +47.76	+19.40 to +80.37	+16.3 to +112.14
	Summer	328.39	+162.07 to +324.28	+202.84 to +535.84	+234.14 to +816.39	+267.92 to +1034.04
	Fall	28.51	+22.80 to +72.48	+37.52 to +120.15	+45.66 to +203.67	+61.26 to +276.10
Growing Degree-Days (Base 50°F)	Annual	2158.32	+405.46 to +800.14	+544.68 to +1230.84	+656.17 to +1872.87	+737.49 to +2353.15
	Winter	3.47	-0.53 to +8.22	-0.44 to +9.01	+0.30 to +12.75	+0.92 to +18.42
	Spring	241.52	+58.00 to +126.09	+86.62 to +221.45	+106.09 to +332.57	+109.04 to +434.93
	Summer	1546.4	+216.05 to +420.50	+292.13 to +656.38	+327.44 to +950.51	+368.49 to +1173.83
	Fall	356.65	+106.87 to +278.80	+172.30 to +385.46	+166.91 to +576.51	+214.04 to +724.69

- 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	6.46	-0.01 to +1.93	+0.73 to +3.08	+0.83 to +3.00	+0.69 to +4.12
	Winter	1.11	-0.07 to +0.59	+0.04 to +0.89	+0.16 to +1.27	+0.24 to +1.62
	Spring	1.39	-0.16 to +0.54	-0.03 to +0.67	+0.09 to +1.04	+0.12 to +1.36
	Summer	1.9	-0.30 to +0.67	-0.14 to +0.92	-0.19 to +0.78	-0.22 to +0.84
	Fall	2.04	-0.24 to +0.79	-0.09 to +0.82	-0.21 to +0.99	-0.34 to +1.02
Days with Precipitation Over 2"	Annual	0.53	-0.04 to +0.34	+0.01 to +0.34	+0.00 to +0.40	+0.02 to +0.52
	Winter	0.02	-0.02 to +0.06	-0.01 to +0.08	-0.01 to +0.07	-0.02 to +0.09
	Spring	0.09	-0.03 to +0.07	-0.02 to +0.08	-0.01 to +0.12	+0.01 to +0.17
	Summer	0.25	-0.08 to +0.13	-0.06 to +0.15	-0.07 to +0.15	-0.06 to +0.21
	Fall	0.17	-0.04 to +0.16	-0.02 to +0.19	-0.02 to +0.17	-0.03 to +0.21
Days with Precipitation Over 4"	Annual	0.00	-0.02 to +0.04	-0.01 to +0.04	-0.02 to +0.05	-0.01 to +0.07
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.00	-0.02 to +0.03	-0.02 to +0.03	-0.02 to +0.03	-0.02 to +0.04
	Fall	0.00	-0.02 to +0.03	-0.02 to +0.03	-0.01 to +0.03	-0.01 to +0.04

- 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.

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	46.64	-0.23 to +4.66	+1.14 to +5.98	+1.76 to +7.03	+1.37 to +7.67
	Winter	10.6	-0.38 to +1.94	+0.05 to +2.44	+0.32 to +2.93	+0.63 to +3.93
	Spring	11.85	-0.13 to +2.09	+0.01 to +1.85	+0.29 to +2.57	+0.15 to +2.75
	Summer	12.07	-0.23 to +1.47	-0.23 to +2.00	-0.50 to +2.04	-1.15 to +2.01
	Fall	12.1	-1.07 to +1.33	-1.18 to +1.70	-1.59 to +1.78	-1.72 to +1.49

- 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	15.63	-0.56 to +1.44	-0.93 to +1.97	-1.12 to +1.97	-0.69 to +2.74
	Winter	11.09	-0.80 to +0.87	-0.85 to +1.38	-1.26 to +1.24	-1.04 to +1.58
	Spring	11.31	-1.13 to +0.57	-0.96 to +0.88	-1.49 to +0.91	-1.22 to +1.01
	Summer	11.17	-0.72 to +1.34	-0.63 to +1.27	-0.96 to +1.94	-1.36 to +2.29
	Fall	11.74	-0.26 to +1.75	-0.51 to +2.67	-0.70 to +2.73	-0.26 to +2.77

- 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	46.98	+2.18 to +4.46	+3.00 to +6.43	+3.57 to +9.00	+4.04 to +10.94
	Winter	25.01	+2.36 to +5.37	+3.02 to +7.99	+3.95 to +9.54	+4.18 to +10.83
	Spring	45.35	+1.51 to +3.30	+2.26 to +5.21	+2.76 to +7.23	+3.11 to +8.81
	Summer	67.93	+2.19 to +4.54	+3.05 to +7.24	+3.44 to +10.52	+3.91 to +12.94
	Fall	49.24	+2.27 to +5.23	+3.81 to +6.81	+3.75 to +9.57	+4.21 to +11.69
Maximum Temperature	Annual	58.45	+2.03 to +4.24	+2.65 to +6.56	+3.18 to +9.13	+3.63 to +11.03
	Winter	35.23	+1.96 to +4.66	+2.61 to +7.11	+3.19 to +8.53	+3.43 to +9.63
	Spring	57.16	+1.38 to +3.23	+2.13 to +5.16	+2.66 to +7.53	+3.17 to +8.99
	Summer	80.18	+1.89 to +4.67	+2.75 to +7.45	+3.25 to +10.93	+3.76 to +13.41
	Fall	60.8	+2.47 to +5.04	+3.65 to +7.16	+3.54 to +9.91	+4.21 to +12.20
Minimum Temperature	Annual	35.51	+2.38 to +4.81	+3.35 to +6.64	+3.93 to +8.89	+4.37 to +10.89
	Winter	14.8	+2.63 to +6.03	+3.56 to +8.76	+4.51 to +10.54	+4.94 to +11.83
	Spring	33.53	+1.62 to +3.63	+2.38 to +5.64	+2.96 to +7.07	+3.29 to +8.59
	Summer	55.67	+2.34 to +4.62	+3.21 to +7.33	+3.63 to +10.13	+4.07 to +12.49
	Fall	37.68	+1.97 to +5.33	+3.58 to +6.64	+3.82 to +9.22	+4.21 to +11.37

- 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	6.41	+6.36 to +19.72	+9.87 to +35.35	+11.98 to +57.07	+14.50 to +76.01
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.39	+0.14 to +0.91	+0.30 to +1.76	+0.37 to +3.31	+0.28 to +5.00
	Summer	5.73	+5.53 to +16.97	+8.31 to +29.50	10.37 to +46.30	+12.47 to +60.30
	Fall	0.29	+0.44 to +2.09	+0.51 to +4.58	+0.61 to +8.80	+1.02 to +11.94
Days with Maximum Temperature Over 95°F	Annual	0.46	+1.74 to +7.34	+2.77 to +16.31	+3.55 to +32.96	+4.56 to +49.67
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.26	+0.02 to +0.49	+0.04 to +1.03	+0.03 to +1.93
	Summer	0.45	+1.71 to +6.53	+2.54 to +14.84	+3.05 to +28.97	+4.16 to +43.03
	Fall	0.01	+0.06 to +0.63	+0.09 to +1.19	+0.13 to +3.23	+0.20 to +4.87
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.14 to +1.54	+0.22 to +4.35	+0.41 to +11.64	+0.38 to +23.33
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.03	+0.00 to +0.06	+0.00 to +0.21	+0.00 to +0.45
	Summer	0.00	+0.13 to +1.45	+0.20 to +4.17	+0.36 to +10.72	+0.33 to +21.46
	Fall	0.00	+0.00 to +0.14	+0.00 to +0.37	+0.01 to +0.75	+0.00 to +1.29

- 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.

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	11.33	-4.01 to -7.02	-4.88 to -8.3	-5.42 to -8.76	-5.53 to -9.57
	Winter	11	-3.84 to -6.82	-4.67 to -7.96	-5.11 to -8.52	-5.33 to -9.1
	Spring	0.38	-0.08 to -0.44	-0.12 to -0.44	-0.18 to -0.49	-0.18 to -0.55
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.01	-0.02 to -0.00	-0.02 to -0.00	-0.02 to -0.00	-0.02 to -0.00
Days with Minimum Temperature Below 32°F	Annual	158.63	-10.58 to -28.13	-18.57 to -37.28	-22.18 to -50.76	-22.88 to -59.79
	Winter	85.33	-1.15 to -5.9	-2.37 to -8.5	-3.50 to -15.82	-4.26 to -19.49
	Spring	41.52	-3.47 to -9.56	-6.03 to -13.97	-6.70 to -17.87	-8.82 to -19.42
	Summer	0.02	-0.01 to -0.17	-0.01 to -0.27	-0.01 to -0.23	-0.01 to -0.26
	Fall	31.7	-4.87 to -12.57	-9.60 to -15.50	-8.89 to -19.96	-9.36 to -22.29

- 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.

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	7038.04	-579.08 to -1220.89	-807.65 to -1696.71	-932.31 to -2213.81	-1061.27 to -2563.22
	Winter	3617.34	-196.64 to -492.19	-267.53 to -731.67	-348.79 to -867.16	-385.45 to -997.60
	Spring	1827.32	-122.30 to -279.16	-188.81 to -436.93	-225.95 to -566.74	-272.18 to -666.52
	Summer	127	-45.72 to -80.45	-63.18 to -101.77	-66.76 to -116.60	-72.74 to -119.29
	Fall	1471.22	-176.19 to -404.39	-298.62 to -486.71	-283.22 to -674.74	-306.64 to -768.06
Cooling Degree-Days (Base 65°F)	Annual	459.27	+200.92 to +430.52	+272.64 to +749.47	+326.52 to +1142.40	+379.72 to +1504.58
	Winter	nan	-0.39 to +2.36	+0.05 to +6.58	-0.14 to +3.38	-0.29 to +7.15
	Spring	20.23	+10.02 to +28.89	+17.52 to +55.39	+21.11 to +92.67	+20.81 to +121.55
	Summer	396.24	+162.41 to +335.42	+204.13 to +564.51	+235.28 to +853.52	+270.64 to +1075.43
	Fall	37.72	+25.68 to +84.68	+40.57 to +136.51	+49.64 to +225.83	+63.95 to +304.46
Growing Degree-Days (Base 50°F)	Annual	2348.43	+392.37 to +801.41	+536.06 to +1252.31	+652.08 to +1894.77	+739.11 to +2379.52
	Winter	3.8	-0.26 to +8.95	+0.09 to +9.32	+0.51 to +14.24	+1.70 to +19.27
	Spring	278.98	+59.68 to +130.77	+91.58 to +225.48	+117.65 to +331.37	+117.61 to +434.70
	Summer	1649.87	+201.11 to +416.74	+279.05 to +664.79	+315.32 to +966.48	+358.57 to +1190.01
	Fall	403.13	+105.14 to +284.19	+169.55 to +395.11	+166.52 to +591.21	+211.39 to +734.09

- 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	6.5	+0.05 to +2.22	+0.52 to +3.15	+0.80 to +2.82	+0.67 to +4.35
	Winter	1.04	-0.04 to +0.74	+0.05 to +1.01	+0.06 to +1.30	+0.22 to +1.64
	Spring	1.56	-0.08 to +0.62	+0.08 to +0.81	+0.17 to +1.20	+0.21 to +1.62
	Summer	1.98	-0.37 to +0.57	-0.19 to +0.97	-0.34 to +0.66	-0.38 to +0.74
	Fall	1.89	-0.28 to +0.70	-0.17 to +0.82	-0.27 to +1.00	-0.40 to +1.17
Days with Precipitation Over 2”	Annual	0.55	-0.05 to +0.40	-0.01 to +0.39	+0.00 to +0.45	+0.04 to +0.58
	Winter	0.03	-0.02 to +0.05	-0.02 to +0.07	-0.01 to +0.08	-0.01 to +0.09
	Spring	0.1	-0.03 to +0.10	-0.03 to +0.09	-0.02 to +0.17	+0.00 to +0.25
	Summer	0.26	-0.06 to +0.16	-0.07 to +0.17	-0.06 to +0.17	-0.09 to +0.19
	Fall	0.16	-0.06 to +0.17	-0.06 to +0.16	-0.04 to +0.18	-0.05 to +0.19
Days with Precipitation Over 4”	Annual	0.00	-0.03 to +0.03	-0.02 to +0.03	-0.01 to +0.05	-0.01 to +0.05
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.00	-0.02 to +0.02	-0.02 to +0.02	-0.02 to +0.03	-0.02 to +0.03
	Fall	0.00	-0.02 to +0.03	-0.01 to +0.03	-0.01 to +0.04	-0.01 to +0.04

- 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.

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	46.39	-0.40 to +4.99	+1.25 to +6.22	+1.95 to +7.26	+1.68 to +8.30
	Winter	10.34	-0.39 to +2.08	+0.07 to +2.59	+0.30 to +3.03	+0.73 to +3.87
	Spring	12.12	-0.05 to +2.09	+0.32 to +2.13	+0.57 to +2.80	+0.45 to +2.87
	Summer	11.98	-0.37 to +1.76	-0.17 to +2.13	-0.34 to +1.85	-1.03 to +1.90
	Fall	11.94	-1.20 to +1.48	-1.26 to +1.65	-1.50 to +1.78	-1.73 to +1.49

- 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	16.41	-0.18 to +1.34	-0.42 to +1.75	-0.73 to +2.26	-0.35 to +2.44
	Winter	11.4	-0.77 to +1.14	-0.57 to +1.30	-0.80 to +1.18	-1.21 to +1.47
	Spring	11.95	-1.05 to +0.50	-0.91 to +1.05	-1.24 to +1.13	-1.24 to +0.76
	Summer	11.57	-0.70 to +1.46	-0.61 to +1.07	-0.91 to +1.61	-1.37 to +1.87
	Fall	12.03	-0.12 to +1.72	-0.21 to +2.35	-0.61 to +2.61	-0.13 to +2.78

- 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	44.39	+2.24 to +4.62	+3.15 to +6.72	+3.72 to +9.38	+4.22 to +11.35
	Winter	22.22	+2.41 to +5.71	+3.11 to +8.61	+4.19 to +10.32	+4.60 to +11.69
	Spring	42.71	+1.91 to +3.81	+2.67 to +5.70	+3.22 to +7.99	+3.75 to +9.51
	Summer	65.44	+2.22 to +4.61	+3.09 to +7.26	+3.60 to +10.46	+4.09 to +12.76
	Fall	46.8	+2.18 to +5.05	+3.53 to +6.62	+3.51 to +9.60	+3.82 to +11.89
Maximum Temperature	Annual	55.33	+2.10 to +4.48	+2.77 to +6.88	+3.31 to +9.53	+3.83 to +11.49
	Winter	32.04	+2.06 to +4.98	+2.63 to +7.71	+3.44 to +9.17	+3.87 to +10.36
	Spring	53.91	+1.81 to +3.77	+2.55 to +5.77	+3.07 to +8.33	+3.66 to +9.82
	Summer	77.3	+2.00 to +4.78	+2.82 to +7.61	+3.41 to +11.02	+3.93 to +13.42
	Fall	57.67	+2.37 to +4.98	+3.38 to +7.08	+3.29 to +9.95	+3.89 to +12.31
Minimum Temperature	Annual	33.44	+2.43 to +4.97	+3.53 to +6.86	+4.07 to +9.24	+4.45 to +11.35
	Winter	12.4	+2.72 to +6.45	+3.66 to +9.40	+4.88 to +11.44	+5.22 to +12.73
	Spring	31.5	+2.13 to +4.12	+2.80 to +6.08	+3.54 to +7.55	+3.91 to +9.27
	Summer	53.58	+2.47 to +4.74	+3.25 to +7.31	+3.80 to +9.98	+4.25 to +12.27
	Fall	35.92	+1.89 to +5.07	+3.28 to +6.56	+3.60 to +9.26	+3.74 to +11.51

- 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	2.51	+3.80 to +12.93	+6.11 to +24.67	+7.51 to +43.33	+9.15 to +60.11
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.14	+0.09 to +0.56	+0.17 to +1.15	+0.21 to +2.28	+0.16 to +3.66
	Summer	2.3	+3.53 to +11.48	+5.47 to +21.74	+6.46 to +36.62	+8.13 to +50.01
	Fall	0.07	+0.17 to +1.03	+0.22 to +2.32	+0.25 to +5.36	+0.35 to +7.39
Days with Maximum Temperature Over 95°F	Annual	0.13	+0.78 to +4.39	+1.11 to +9.76	+1.52 to +21.21	+2.03 to +35.12
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.09	+0.01 to +0.22	+0.00 to +0.52	+0.00 to +1.14
	Summer	0.13	+0.76 to +4.03	+0.99 to +9.10	+1.35 to +19.12	+1.90 to +31.70
	Fall	0.00	+0.02 to +0.24	+0.04 to +0.56	+0.03 to +1.31	+0.04 to +2.17
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.03 to +0.65	+0.05 to +2.26	+0.08 to +5.66	+0.08 to +12.54
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.05	+0.00 to +0.23
	Summer	0.00	+0.02 to +0.57	+0.04 to +2.19	+0.07 to +5.37	+0.08 to +11.95
	Fall	0.00	+0.00 to +0.05	+0.00 to +0.11	+0.00 to +0.29	+0.00 to +0.57

- 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.

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	15.88	-5.74 to -10.42	-7.69 to -12.49	-8.72 to -13.40	-8.95 to -14.22
	Winter	15.09	-5.36 to -9.98	-7.35 to -11.93	-8.09 to -12.70	-8.53 to -13.66
	Spring	0.83	-0.30 to -0.81	-0.34 to -0.82	-0.39 to -0.91	-0.39 to -0.94
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.03 to -0.00	-0.04 to -0.00	-0.04 to -0.00	-0.04 to - 0.00
Days with Minimum Temperature Below 32°F	Annual	171.7	-11.04 to -28.51	-19.57 to -37.92	-22.61 to -53.43	-23.58 to -63.13
	Winter	87.51	-0.51 to -4.16	-1.29 to -6.72	-2.32 to -12.99	-2.63 to -16.47
	Spring	47.46	-5.14 to -10.71	-7.04 to -15.37	-8.36 to -20.21	-10.18 to -22.18
	Summer	0.06	-0.01 to -0.25	-0.02 to -0.38	-0.02 to -0.37	-0.02 to -0.39
	Fall	36.62	-4.52 to -13.52	-9.15 to -16.45	-9.30 to -22.71	-9.60 to -25.77

- 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.

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	7825.96	-665.08 to -1371.17	-906.72 to -1922.07	-1062.81 to -2526.34	-1183.88 to -2909.57
	Winter	3870.41	-203.72 to -530.78	-273.96 to -788.27	-370.16 to -937.71	-425.39 to -1075.51
	Spring	2062.84	-163.78 to -332.84	-230.93 to -496.42	-279.46 to -661.65	-328.47 to -760.99
	Summer	218.11	-70.23 to -128.53	-96.90 to -167.00	-113.42 to -189.87	-124.42 to -201.32
	Fall	1676.85	-179.20 to -418.54	-293.82 to -528.86	-286.29 to -744.10	-305.83 to -860.87
Cooling Degree-Days (Base 65°F)	Annual	296.36	+165.12 to +355.20	+222.18 to +622.96	+266.25 to +973.36	+308.02 to +1293.74
	Winter	nan	nan to nan	nan to nan	nan to nan	nan to nan
	Spring	13.41	+7.55 to +21.15	+11.41 to +40.32	+13.36 to +67.45	12.97 to +96.06
	Summer	258.6	+140.26 to +293.82	+176.17 to +499.63	+207.01 to +769.68	+239.74 to +975.09
	Fall	21.96	+14.35 to +52.98	+21.54 to +91.39	+26.85 to +163.51	+34.83 to +223.97
Growing Degree-Days (Base 50°F)	Annual	1952.32	+362.20 to +747.29	+498.52 to +1196.83	+612.22 to +1779.03	+691.19 to +2248.03
	Winter	3.13	-1.79 to +6.01	+0.34 to +7.23	-0.08 to +9.67	+0.93 to +13.69
	Spring	210.74	+56.59 to +123.36	+88.03 to +203.32	+103.24 to +299.90	+108.34 to +394.87
	Summer	1423.27	+203.37 to +421.16	+281.98 to +664.88	+327.82 to +959.93	+371.90 to +1171.29
	Fall	305.14	+85.73 to +234.67	+126.40 to +342.37	+133.01 to +533.64	+176.41 to +670.27

- 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	7.28	-0.10 to +2.40	+0.92 to +3.53	+1.00 to +3.52	+1.01 to +4.71
	Winter	1.18	-0.01 to +0.71	+0.13 to +1.01	+0.19 to +1.32	+0.38 to +1.63
	Spring	1.85	-0.11 to +0.73	+0.06 to +0.92	+0.28 to +1.38	+0.36 to +1.69
	Summer	2.07	-0.21 to +0.75	-0.10 to +0.84	-0.22 to +0.78	-0.31 to +0.82
	Fall	2.15	-0.45 to +0.87	-0.26 to +0.98	-0.42 to +1.02	-0.33 to +1.28
Days with Precipitation Over 2"	Annual	0.78	-0.11 to +0.51	-0.05 to +0.52	+0.05 to +0.66	+0.12 to +0.93
	Winter	0.02	-0.05 to +0.05	-0.06 to +0.10	-0.04 to +0.11	-0.04 to +0.14
	Spring	0.24	-0.02 to +0.17	-0.01 to +0.17	+0.01 to +0.33	+0.05 to +0.47
	Summer	0.34	-0.06 to +0.23	-0.08 to +0.23	-0.10 to +0.20	-0.13 to +0.24
	Fall	0.18	-0.07 to +0.23	-0.04 to +0.22	-0.03 to +0.20	-0.05 to +0.26
Days with Precipitation Over 4"	Annual	0.00	-0.04 to +0.03	-0.03 to +0.03	-0.02 to +0.03	-0.01 to +0.04
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.02
	Summer	0.00	-0.02 to +0.01	-0.01 to +0.01	-0.02 to +0.01	-0.02 to +0.00
	Fall	0.00	-0.02 to +0.03	-0.01 to +0.03	-0.01 to +0.03	-0.01 to +0.03

- 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.

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	50.37	-0.46 to +5.66	+1.19 to +7.30	+2.01 to +7.56	+2.48 to +8.97
	Winter	11.3	-0.41 to +2.02	+0.21 to +2.68	+0.46 to +3.26	+1.01 to +4.24
	Spring	13.47	+0.03 to +2.24	+0.33 to +2.29	+0.76 to +3.00	+0.81 to +3.33
	Summer	12.78	-0.37 to +2.31	-0.27 to +2.42	-0.09 to +1.72	-0.81 to +1.97
	Fall	12.84	-1.35 to +1.86	-1.41 to +1.79	-1.84 to +1.75	-1.80 to +1.60

- 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%).

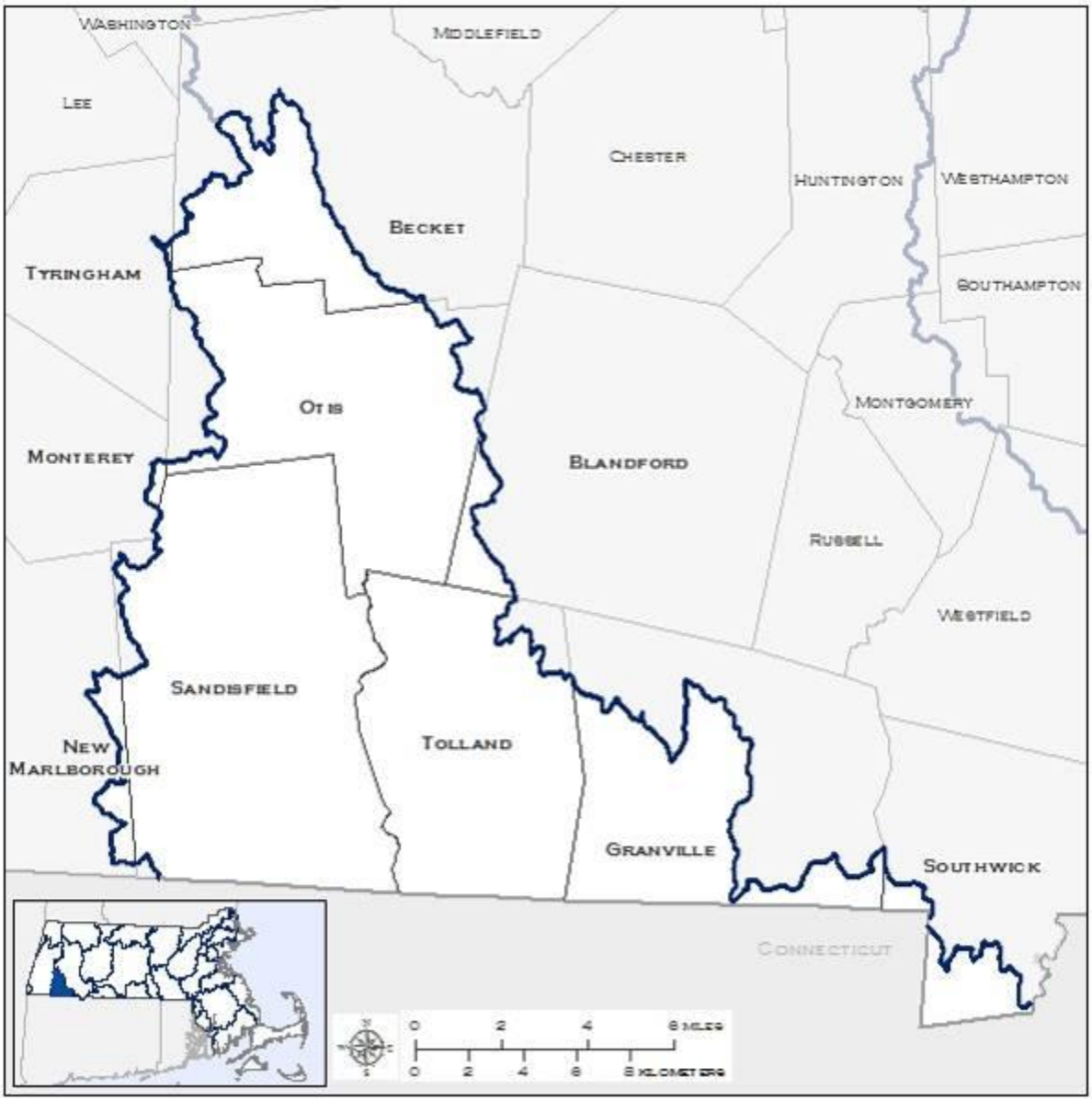
Deerfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	14.74	-0.04 to +1.46	-0.37 to +1.71	-0.32 to +2.06	-0.61 to +2.14
	Winter	10.68	-0.95 to +1.06	-0.77 to +1.25	-1.16 to +0.99	-1.02 to +1.25
	Spring	11.07	-1.29 to +0.70	-1.17 to +1.05	-1.23 to +1.13	-1.29 to +0.90
	Summer	10.35	-0.68 to +0.82	-0.46 to +0.75	-0.71 to +1.21	-1.05 to +1.24
	Fall	11.03	+0.12 to +1.90	-0.13 to +2.65	-0.04 to +3.09	-0.10 to +3.38

- 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	44.14	+2.25 to +4.48	+3.00 to +6.58	+3.57 to +9.10	+4.10 to +11.11
	Winter	22.33	+2.41 to +5.37	+3.04 to +8.11	+3.95 to +9.70	+4.34 to +11.08
	Spring	42.32	+1.79 to +3.50	+2.46 to +5.73	+3.04 to +7.67	+3.50 to +9.52
	Summer	64.94	+2.32 to +4.37	+2.98 to +6.87	+3.38 to +9.80	+3.96 to +12.08
	Fall	46.56	+2.28 to +5.39	+3.90 to +7.16	+3.93 to +10.00	+4.27 to +12.28
Maximum Temperature	Annual	54.96	+2.00 to +4.31	+2.73 to +6.63	+3.24 to +9.23	+3.74 to +11.17
	Winter	31.93	+1.94 to +4.74	+2.66 to +7.32	+3.25 to +8.78	+3.65 to +10.10
	Spring	53.7	+1.65 to +3.42	+2.35 to +5.49	+2.94 to +7.95	+3.54 to +9.73
	Summer	76.53	+2.12 to +4.49	+2.72 to +7.11	+3.32 to +10.23	+3.80 to +12.51
	Fall	57.26	+2.46 to +5.33	+3.70 to +7.39	+3.75 to +10.33	+4.29 to +12.56
Minimum Temperature	Annual	33.31	+2.33 to +4.73	+3.33 to +6.74	+3.97 to +8.99	+4.48 to +11.09
	Winter	12.74	+2.68 to +5.99	+3.52 to +8.72	+4.70 to +10.58	+5.14 to +12.08
	Spring	30.93	+1.88 to +3.72	+2.58 to +6.12	+3.11 to +7.73	+3.60 to +9.27
	Summer	53.35	+2.38 to +4.55	+3.16 to +6.97	+3.51 to +9.48	+4.07 to +11.66
	Fall	35.87	+2.11 to +5.36	+3.86 to +6.97	+4.02 to +9.67	+4.25 to +11.93

- 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	0.96	+2.94 to +9.23	+3.79 to +18.54	+4.48 to +35.85	+6.01 to +53.11
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.02 to +0.32	+0.04 to +0.67	+0.09 to +1.45	+0.05 to +2.74
	Summer	0.94	+2.79 to +8.50	+3.38 to +16.84	+3.96 to +31.03	+5.70 to +45.05
	Fall	0.02	+0.05 to +0.76	+0.13 to +1.45	+0.17 to +3.93	+0.26 to +5.94
Days with Maximum Temperature Over 95°F	Annual	0.03	+0.26 to +1.98	+0.36 to +5.15	+0.65 to +12.52	+0.55 to +23.97
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.03	+0.00 to +0.07	+0.00 to +0.29	+0.00 to +0.72
	Summer	0.03	+0.22 to +1.79	+0.37 to +4.92	+0.56 to +11.43	+0.51 to +22.01
	Fall	0.00	+0.00 to +0.18	+0.01 to +0.39	+0.01 to +0.84	+0.00 to +1.31
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.01 to +0.20	+0.01 to +0.63	+0.01 to +2.26	+0.00 to +5.63
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.03	+0.00 to +0.07
	Summer	0.00	+0.01 to +0.19	+0.01 to +0.62	+0.01 to +2.12	+0.00 to +5.49
	Fall	0.00	+0.00 to +0.01	+0.00 to +0.04	+0.00 to +0.16	+0.00 to +0.27

- 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.

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	15.16	-5.33 to -9.59	-6.96 to -11.44	-7.71 to -12.07	-8.39 to -12.95
	Winter	14.29	-5.03 to -9.16	-6.60 to -10.94	-7.26 to -11.44	-7.83 to -12.41
	Spring	0.9	-0.18 to -0.66	-0.27 to -0.72	-0.32 to -0.81	-0.33 to -0.80
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.04 to -0.00	-0.04 to -0.00	-0.04 to -0.00	-0.04 to -0.00
Days with Minimum Temperature Below 32°F	Annual	173.41	-10.83 to -27.15	-19.16 to -37.99	-21.75 to -52.54	-23.99 to -61.33
	Winter	87.36	-0.59 to -4.82	-1.28 to -6.68	-2.52 to -12.56	-2.98 to -15.64
	Spring	49.39	-4.50 to -9.73	-5.77 to -15.21	-7.48 to -20.11	-9.32 to -21.79
	Summer	0.1	-0.01 to -0.25	-0.01 to -0.35	-0.00 to -0.34	-0.01 to -0.34
	Fall	36.51	-4.70 to -13.92	-9.53 to -16.69	-9.68 to -21.68	-9.91 to -25.23

- 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.

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	7887.66	-656.54 to -1340.63	-890.89 to -1886.87	-1029.23 to -2475.80	-1200.59 to -2867.44
	Winter	3862.53	-202.94 to -500.38	-268.26 to -745.47	-348.98 to -880.78	-402.15 to -1018.65
	Spring	2095.4	-152.93 to -309.32	-214.92 to -498.91	-263.98 to -645.35	-314.47 to -778.60
	Summer	228.58	-75.51 to -127.82	-103.68 to -165.52	-119.16 to -193.39	-131.44 to -203.77
	Fall	1695.77	-188.73 to -446.02	-324.55 to -559.59	-322.38 to -768.47	-342.83 to -885.16
Cooling Degree-Days (Base 65°F)	Annual	251.41	+157.93 to +334.54	+210.96 to +592.46	+247.43 to +908.69	+286.01 to +1234.68
	Winter	nan	nan to nan	nan to nan	nan to nan	nan to nan
	Spring	10.24	+5.82 to +15.86	+8.70 to +31.69	+12.65 to +56.78	10.67 to +89.54
	Summer	223.19	+126.26 to +283.24	+164.17 to +464.16	+190.75 to +710.43	+229.15 to +912.98
	Fall	17.7	+15.85 to +53.50	+24.58 to +93.03	+30.27 to +173.90	+40.55 to +235.10
Growing Degree-Days (Base 50°F)	Annual	1866.79	+385.41 to +742.93	+505.33 to +1179.23	+605.15 to +1759.28	+684.88 to +2227.58
	Winter	2.77	-1.01 to +7.34	+0.55 to +7.77	-0.34 to +12.72	+0.80 to +15.55
	Spring	194.59	+55.01 to +114.43	+77.84 to +195.85	+94.77 to +302.80	+95.48 to +400.03
	Summer	1376.94	+211.81 to +400.12	+271.10 to +629.85	+307.69 to +900.48	+359.43 to +1109.37
	Fall	287.09	+104.15 to +260.68	+155.44 to +374.43	+162.91 to +565.53	+211.49 to +708.46

- 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	+0.06 to +2.49	+0.83 to +3.65	+0.78 to +3.72	+0.64 to +5.09
	Winter	1.48	-0.02 to +0.70	+0.12 to +1.23	+0.13 to +1.43	+0.30 to +1.71
	Spring	2.02	-0.12 to +0.59	+0.02 to +0.77	+0.11 to +1.25	+0.14 to +1.64
	Summer	2.16	-0.29 to +0.61	-0.16 to +1.02	-0.30 to +0.88	-0.28 to +0.82
	Fall	2.43	-0.37 to +0.84	-0.23 to +1.13	-0.19 to +1.14	-0.35 to +1.50
Days with Precipitation Over 2"	Annual	0.98	-0.11 to +0.43	-0.03 to +0.63	+0.04 to +0.82	+0.04 to +0.95
	Winter	0.06	-0.03 to +0.07	-0.01 to +0.10	-0.02 to +0.10	-0.02 to +0.12
	Spring	0.26	-0.03 to +0.16	-0.01 to +0.27	+0.01 to +0.35	+0.04 to +0.45
	Summer	0.38	-0.14 to +0.16	-0.05 to +0.20	-0.08 to +0.21	-0.07 to +0.22
	Fall	0.28	-0.09 to +0.22	-0.11 to +0.35	-0.12 to +0.34	-0.13 to +0.35
Days with Precipitation Over 4"	Annual	0.02	-0.03 to +0.06	-0.02 to +0.10	-0.02 to +0.12	-0.03 to +0.16
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	-0.01 to +0.01	-0.01 to +0.01	-0.01 to +0.02	-0.01 to +0.05
	Summer	0.01	-0.03 to +0.03	-0.02 to 0.05	-0.01 to +0.04	-0.03 to +0.08
	Fall	0.01	-0.03 to +0.04	-0.03 to +0.05	-0.03 to +0.06	-0.03 to +0.07

- 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.

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	+0.11 to +5.05	+1.21 to +6.43	+1.79 to +7.89	+1.72 to +8.97
	Winter	11.57	-0.55 to +2.36	+0.01 to +2.85	+0.25 to +3.16	+0.71 to +3.93
	Spring	13.64	-0.14 to +2.01	+0.31 to +1.98	+0.50 to +2.92	+0.59 to +3.05
	Summer	13.15	-0.23 to +1.75	-0.14 to +2.21	-0.19 to +2.05	-1.05 to +1.98
	Fall	13.02	-1.41 to +1.57	-1.43 to +2.17	-1.66 to +2.21	-2.13 to +1.87

- 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	16.22	-0.34 to +1.41	-0.24 to +2.30	-0.53 to +1.84	-0.50 to +2.13
	Winter	11.3	-1.00 to +1.03	-0.49 to +1.08	-0.68 to +1.11	-1.05 to +1.38
	Spring	10.74	-1.15 to +0.57	-1.01 to +1.12	-1.20 to +0.71	-1.45 to +0.79
	Summer	10.86	-0.97 to +1.76	-0.77 to +1.31	-0.94 to +2.09	-1.09 to +2.69
	Fall	11.71	-0.04 to +1.66	+0.03 to +2.64	-0.16 to +2.51	+0.19 to +2.90

- 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	47.07	+2.16 to +4.35	+2.99 to +6.40	+3.59 to +9.16	+3.92 to +11.17
	Winter	25.77	+2.26 to +5.12	+2.94 to +7.69	+3.74 to +9.41	+4.17 to +10.82
	Spring	45.15	+1.47 to +3.44	+2.40 to +5.73	+2.62 to +8.10	+3.12 to +9.86
	Summer	67.57	+2.26 to +4.32	+2.96 to +6.86	+3.41 to +10.12	+3.96 to +12.40
	Fall	49.4	+2.32 to +5.41	+4.06 to +6.96	+3.85 to +9.78	+4.35 to +12.04
Maximum Temperature	Annual	57.65	+2.06 to +4.15	+2.75 to +6.43	+3.28 to +9.21	+3.60 to +11.05
	Winter	35.53	+1.84 to +4.62	+2.57 to +7.10	+3.14 to +8.64	+3.61 to +10.02
	Spring	56.04	+1.32 to +3.42	+2.15 to +5.71	+2.52 to +8.20	+3.06 to +9.90
	Summer	78.49	+2.05 to +4.40	+2.81 to +6.85	+3.31 to +10.36	+3.77 to +12.68
	Fall	60.12	+2.41 to +5.14	+3.79 to +7.21	+3.67 to +9.99	+4.25 to +12.37
Minimum Temperature	Annual	36.49	+2.27 to +4.60	+3.27 to +6.62	+3.91 to +9.11	+4.24 to +11.21
	Winter	16.01	+2.66 to +5.55	+3.36 to +8.22	+4.44 to +10.17	+4.64 to +11.74
	Spring	34.26	+1.58 to +3.69	+2.60 to +6.09	+2.75 to +7.94	+3.18 to +9.74
	Summer	56.64	+2.34 to +4.37	+3.11 to +6.93	+3.51 to +9.88	+4.15 to +12.20
	Fall	38.68	+2.21 to +5.49	+4.00 to +6.89	+4.03 to +9.56	+4.45 to +11.97

- 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	3.05	+4.10 to +13.36	+6.51 to +24.86	+8.36 to +45.40	+10.33 to +64.16
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.13	+0.02 to +0.61	+0.06 to +0.98	+0.19 to +2.00	+0.15 to +3.23
	Summer	2.77	+3.77 to +11.70	+5.59 to +21.45	+7.14 to +38.49	+9.31 to +52.30
	Fall	0.15	+0.29 to +1.35	+0.47 to +3.23	+0.49 to +6.53	+0.77 to +8.88
Days with Maximum Temperature Over 95°F	Annual	0.12	+0.86 to +3.66	+1.29 to +8.83	+1.69 to +19.54	+2.38 to +33.25
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	-0.02 to +0.12	+0.01 to +0.23	+0.01 to +0.57	+0.02 to +1.01
	Summer	0.12	+0.86 to +3.31	+1.08 to +8.05	+1.65 to +17.80	+2.18 to +29.47
	Fall	0.00	+0.01 to +0.33	+0.02 to +0.60	+0.05 to +1.70	+0.07 to +2.73
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.02 to +0.52	+0.06 to +1.87	+0.08 to +4.62	+0.05 to +10.40
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.02	+0.00 to +0.06	+0.00 to +0.23
	Summer	0.00	+0.01 to +0.39	+0.03 to +1.81	+0.07 to +4.32	+0.05 to +9.73
	Fall	0.00	+0.00 to +0.07	+0.00 to +0.10	+0.00 to +0.30	+0.00 to +0.51

- 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.

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	8.7	-2.54 to -5.13	-3.31 to -5.78	-3.87 to -6.64	-3.69 to -6.77
	Winter	8.48	-2.57 to -5.05	-3.20 to -5.65	-3.71 to -6.24	-3.67 to -6.63
	Spring	0.23	-0.33 to +0.02	-0.02 to -0.30	-0.06 to -0.39	-0.06 to -0.39
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.03	-0.02 to -0.00	-0.02 to -0.00	-0.02 to -0.00	-0.02 to -0.00
Days with Minimum Temperature Below 32°F	Annual	150.63	-9.48 to -27.1	-18.51 to -39.60	-21.45 to -55.40	-23.87 to -67.14
	Winter	84.43	-1.49 to -6.58	-2.62 to -10.14	-3.84 to -18.31	-4.74 to -23.52
	Spring	38.61	-2.96 to -10.71	-6.12 to -16.21	-7.25 to -20.55	-8.31 to -22.20
	Summer	0.00	-0.06 to -0.00	-0.07 to -0.00	-0.09 to -0.00	-0.09 to -0.00
	Fall	27.55	-5.01 to -11.86	-9.09 to -14.79	-8.86 to -18.86	-9.00 to -21.37

- 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.

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	6982.91	-562.17 to -1206.44	-795.58 to -1713.57	-936.48 to -2266.86	-1069.07 to -2658.30
	Winter	3554.28	-193.07 to -475.92	-261.20 to -703.28	-331.21 to -853.35	-387.40 to -992.10
	Spring	1840.31	-121.61 to -296.96	-202.95 to -488.03	-222.03 to -659.00	-278.25 to -777.07
	Summer	131.37	-45.84 to -78.47	-64.96 to -100.53	-68.95 to -114.05	-75.47 to -120.14
	Fall	1452.79	-174.71 to -411.93	-309.43 to -498.21	-288.15 to -687.37	-312.97 to -786.97
Cooling Degree-Days (Base 65°F)	Annual	418.89	+212.48 to +414.84	+282.63 to +707.49	+328.97 to +1109.99	+373.11 to +1457.89
	Winter	nan	nan to nan	nan to nan	nan to nan	nan to nan
	Spring	15.79	+6.85 to +23.94	+13.67 to +50.05	+18.82 to +84.61	+17.7 to +117.43
	Summer	367.5	+157.57 to +322.57	+198.22 to +531.64	+236.61 to +818.68	+278.05 to +1023.75
	Fall	31.67	+30.82 to +85.60	+46.16 to +139.82	+53.14 to +229.01	+75.91 to +311.88
Growing Degree-Days (Base 50°F)	Annual	2277.07	+411.77 to +796.19	+573.96 to +1265.43	+662.44 to +1935.21	+740.00 to +2424.17
	Winter	4.96	-1.80 to +8.93	+0.08 to +11.81	+2.50 to +17.52	+2.09 to +23.26
	Spring	254.47	+57.22 to +131.33	+81.08 to +235.19	+100.46 to +368.41	+104.17 to +470.04
	Summer	1616.61	+207.41 to +396.62	+270.92 to +630.30	+311.89 to +930.43	+362.45 to +1139.62
	Fall	393.29	+122.64 to +304.48	+193.41 to +419.43	+187.56 to +617.72	+238.60 to +779.47

- 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	7.99	+0.13 to +2.39	+0.82 to +3.60	+0.88 to +3.34	+1.30 to +4.50
	Winter	1.66	-0.02 to +0.98	+0.06 to +1.39	+0.14 to +1.67	+0.41 to +2.14
	Spring	1.7	-0.21 to +0.71	+0.02 to +0.82	+0.11 to +1.20	+0.18 to +1.59
	Summer	1.89	-0.25 to +0.84	-0.06 to +1.19	-0.15 to +1.19	-0.34 to +0.92
	Fall	2.7	-0.45 to +0.89	-0.28 to +0.97	-0.41 to +1.04	-0.57 to +1.06
Days with Precipitation Over 2"	Annual	0.89	+0.06 to +0.48	+0.06 to +0.65	+0.19 to +0.70	+0.13 to +0.89
	Winter	0.09	-0.06 to +0.08	-0.04 to +0.12	-0.06 to +0.19	-0.05 to +0.21
	Spring	0.17	-0.05 to +0.14	+0.00 to +0.19	+0.02 to +0.23	+0.03 to +0.37
	Summer	0.31	-0.05 to +0.21	-0.01 to +0.24	-0.04 to +0.29	-0.05 to +0.22
	Fall	0.32	-0.07 to +0.33	-0.09 to +0.34	-0.05 to +0.26	-0.08 to +0.31
Days with Precipitation Over 4"	Annual	0.01	-0.03 to +0.05	-0.02 to +0.08	-0.03 to +0.09	-0.04 to +0.14
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.02	+0.00 to +0.03	+0.00 to +0.03
	Summer	0.01	-0.04 to +0.03	-0.03 to +0.03	-0.03 to +0.04	-0.04 to +0.05
	Fall	0.00	-0.02 to +0.06	-0.02 to +0.06	-0.02 to +0.05	-0.01 to +0.07

- 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.

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	47.44	+0.33 to +5.45	+1.31 to +6.89	+2.68 to +8.56	+1.98 to +9.27
	Winter	11.24	-0.43 to +2.17	+0.25 to +2.96	+0.15 to +3.70	+0.57 to +4.61
	Spring	11.9	-0.23 to +2.06	+0.06 to +2.07	+0.35 to +2.79	+0.37 to +2.84
	Summer	11.61	-0.15 to +1.77	-0.34 to +2.35	-0.58 to +2.69	-1.49 to +2.44
	Fall	12.68	-1.26 to +1.49	-1.43 to +2.14	-1.67 to +2.07	-1.88 to +1.92

- 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%).

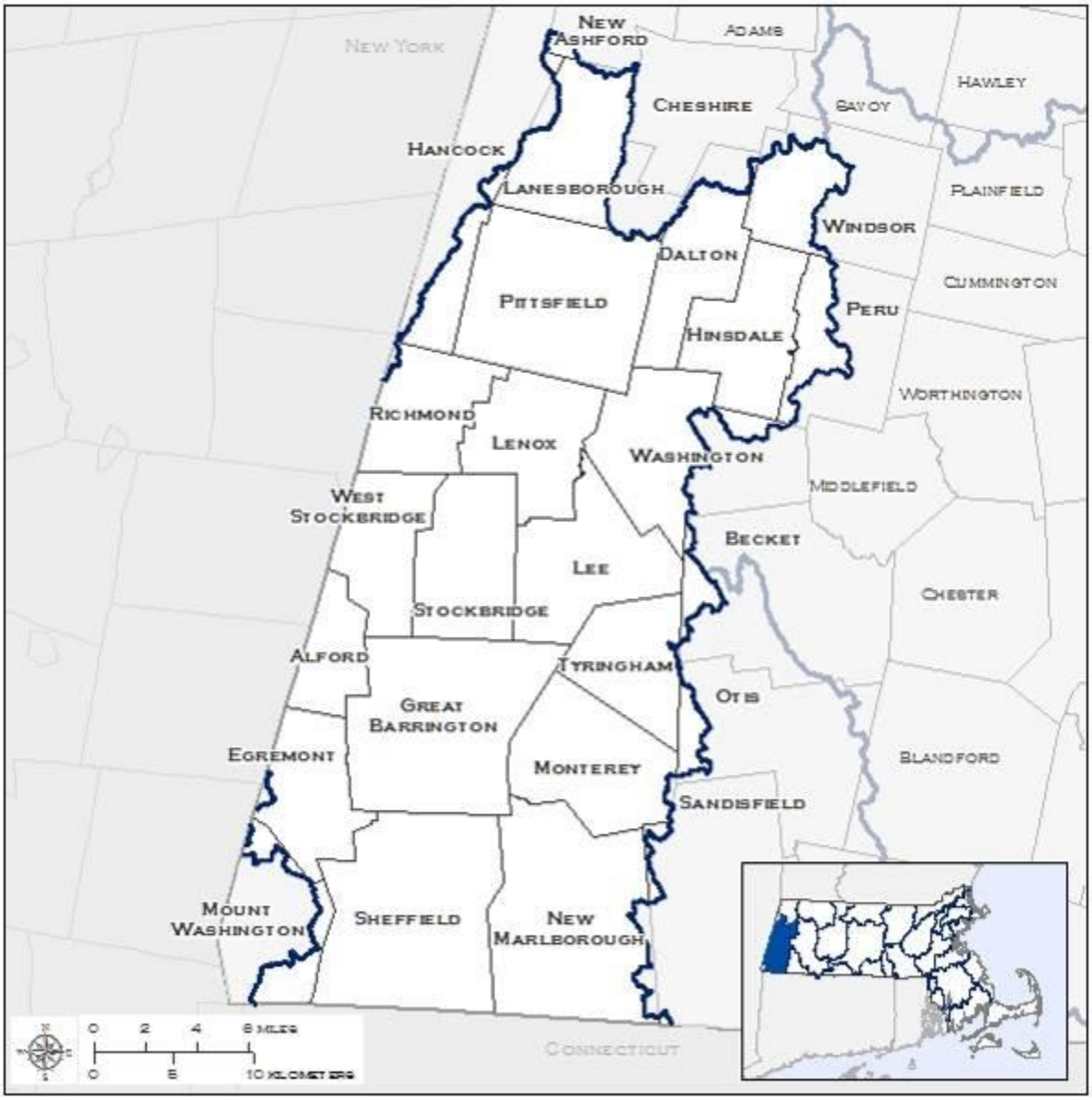
French Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16.82	-0.99 to +1.54	-0.80 to +1.94	-1.20 to +2.38	-0.77 to +2.76
	Winter	11.36	-0.72 to +1.26	-0.65 to +1.44	-0.80 to +1.29	-0.99 to +1.39
	Spring	10.9	-1.15 to +0.50	-1.00 to +0.96	-1.41 to +0.80	-1.16 to +0.87
	Summer	12.09	-1.03 to +1.59	-0.92 to +1.79	-1.47 to +2.32	-1.46 to +2.79
	Fall	11.92	-0.34 to +2.19	-0.57 to +2.53	-1.05 to +2.78	-0.39 to +2.97

- 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	44.32	+2.24 to +4.61	+3.09 to +6.72	+3.69 to +9.29	+4.28 to +11.30
	Winter	22.46	+2.56 to +5.86	+3.29 to +8.82	+4.39 to +10.49	+4.74 to +11.97
	Spring	42.73	+1.77 to +3.42	+2.43 to +5.55	+2.98 to +7.69	+3.54 to +9.50
	Summer	65.08	+2.33 to +4.44	+3.03 to +6.93	+3.53 to +10.02	+4.14 to +12.27
	Fall	46.64	+2.35 to +5.29	+3.81 to +6.94	+3.84 to +9.75	+4.12 to +12.02
Maximum Temperature	Annual	55.41	+2.01 to +4.42	+2.74 to +6.89	+3.27 to +9.52	+3.87 to +11.42
	Winter	32.29	+2.08 to +5.13	+2.82 to +7.86	+3.61 to +9.41	+3.94 to +10.88
	Spring	54.24	+1.53 to +3.43	+2.27 to +5.56	+2.82 to +7.98	+3.47 to +9.59
	Summer	77.04	+2.13 to +4.58	+2.67 to +7.27	+3.37 to +10.49	+3.95 to +12.78
	Fall	57.67	+2.53 to +5.19	+3.51 to +7.38	+3.64 to +10.13	+4.20 to +12.39
Minimum Temperature	Annual	33.23	+2.41 to +4.91	+3.50 to +6.93	+4.15 to +9.13	+4.53 to +11.28
	Winter	12.62	+2.82 to +6.62	+3.87 to +9.59	+5.22 to +11.53	+5.47 to +13.11
	Spring	31.21	+1.91 to +3.71	+2.54 to +6.00	+3.25 to +7.54	+3.70 to +9.22
	Summer	53.11	+2.45 to +4.64	+3.30 to +7.08	+3.75 to +9.69	+4.15 to +11.83
	Fall	35.62	+2.10 to +5.28	+3.58 to +6.77	+3.87 to +9.38	+4.04 to +11.59

- 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	1.33	+2.89 to +10.27	+4.43 to +20.21	+5.59 to +38.75	+7.19 to +56.83
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.04	+0.07 to +0.42	+0.11 to +0.83	+0.19 to +1.82	+0.14 to +3.21
	Summer	1.27	+2.74 to +9.06	+3.83 to +18.05	+4.81 to +32.71	+6.55 to +46.77
	Fall	0.02	+0.16 to +0.91	+0.21 to +1.86	+0.22 to +4.73	+0.24 to +6.84
Days with Maximum Temperature Over 95°F	Annual	0.07	+0.29 to +2.77	+0.49 to +6.45	+0.74 to +14.71	+1.06 to +27.38
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.04	+0.00 to +0.06	+0.00 to +0.34	+0.00 to +0.94
	Summer	0.07	+0.26 to +2.60	+0.45 to +6.16	+0.71 to +13.51	+0.96 to +24.96
	Fall	0.00	+0.00 to +0.23	+0.02 to +0.48	+0.03 to +0.95	+0.00 to +1.62
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.00 to +0.26	+0.01 to +1.03	+0.03 to +3.11	+0.02 to +7.35
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.04	+0.00 to +0.08
	Summer	0.00	+0.00 to +0.23	+0.01 to +1.01	+0.03 to +2.92	+0.02 to +7.10
	Fall	0.00	+0.00 to +0.01	+0.00 to +0.06	+0.00 to +0.19	+0.00 to +0.36

- 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.

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	15.92	-5.49 to -10.12	-7.21 to -11.96	-8.19 to -12.68	-8.52 to -13.56
	Winter	15.01	-5.17 to -9.62	-6.83 to -11.36	-7.67 to -11.98	-7.91 to -12.71
	Spring	0.93	-0.23 to -0.79	-0.27 to -0.78	-0.35 to -0.87	-0.38 to -0.90
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.04 to -0.00	-0.04 to -0.00	-0.04 to -0.00	-0.04 to -0.00
Days with Minimum Temperature Below 32°F	Annual	172.97	-10.88 to -28.16	-19.40 to -38.83	-22.42 to -53.75	-23.77 to -63.13
	Winter	86.9	-0.80 to -6.06	-1.84 to -8.83	-2.92 to -16.06	-3.53 to -19.72
	Spring	48.58	-4.49 to -9.51	-6.03 to -14.89	-7.46 to -19.46	-9.46 to -21.18
	Summer	0.13	-0.02 to -0.21	-0.02 to -0.35	-0.02 to -0.31	-0.02 to -0.31
	Fall	37.34	-4.68 to -13.01	-9.26 to -16.13	-9.18 to -21.42	-9.42 to -24.72

- 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.

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	7822.03	-670.10 to -1372.30	-900.56 to -1924.44	-1057.85 to -2516.06	-1213.52 to -2905.02
	Winter	3849.68	-214.60 to -542.71	-290.64 to -807.49	-388.93 to -951.53	-436.61 to -1099.08
	Spring	2059.3	-149.28 to -297.95	-209.42 to -480.77	-257.38 to -639.14	-309.62 to -765.07
	Summer	223.89	-75.13 to -127.09	-99.65 to -163.79	-120.06 to -192.72	-129.86 to -202.21
	Fall	1689.59	-193.19 to -432.12	-311.38 to -537.87	-309.15 to -743.70	-325.05 to -863.11
Cooling Degree-Days (Base 65°F)	Annual	261.29	+160.30 to +347.99	+222.51 to +603.30	+263.27 to +940.20	+310.17 to +1262.07
	Winter	nan	nan to nan	+0.86 to +4.31	+1.57 to +1.57	+2.35 to +10.65
	Spring	12.03	+6.43 to +18.90	+11.04 to +36.74	+13.95 to +62.62	+12.37 to +97.39
	Summer	231.11	+126.85 to +280.97	+169.14 to +472.65	+199.51 to +730.12	+239.39 to +931.12
	Fall	18.38	+18.32 to +60.49	+28.08 to +98.50	+35.42 to +176.56	+41.87 to +235.21
Growing Degree-Days (Base 50°F)	Annual	1899.77	+386.61 to +743.64	+528.03 to +1186.76	+626.85 to +1776.20	+713.76 to +2238.16
	Winter	3.09	+0.02 to +7.78	+0.88 to +8.08	+0.19 to +14.19	+2.04 to +19.93
	Spring	207.26	+51.95 to +117.64	+83.17 to +202.54	+103.91 to +307.63	+109.22 to +407.29
	Summer	1389.48	+212.76 to +406.04	+276.17 to +635.70	+321.76 to +919.82	+376.08 to +1126.63
	Fall	293.17	+100.86 to +258.98	+154.03 to +362.52	+158.26 to +550.34	+201.11 to +688.38

- 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	6.02	-0.24 to +2.10	+0.37 to +2.84	+0.58 to +2.84	+0.35 to +3.97
	Winter	0.92	-0.04 to +0.53	+0.01 to +0.87	+0.02 to +1.05	+0.11 to +1.19
	Spring	1.35	-0.08 to +0.45	-0.05 to +0.57	-0.02 to +0.93	+0.06 to +1.38
	Summer	2.1	-0.19 to +0.68	-0.20 to +0.93	-0.33 to +0.85	-0.24 to +0.76
	Fall	1.62	-0.36 to +0.78	-0.34 to +0.85	-0.25 to +1.07	-0.26 to +1.22
Days with Precipitation Over 2"	Annual	0.57	-0.16 to +0.37	-0.12 to +0.42	+0.01 to +0.57	+0.04 to +0.73
	Winter	0.02	-0.03 to +0.03	-0.03 to +0.07	-0.02 to +0.08	-0.02 to +0.09
	Spring	0.1	+0.00 to +0.08	-0.01 to +0.11	+0.00 to +0.21	+0.00 to +0.26
	Summer	0.35	-0.10 to +0.19	-0.06 to +0.19	-0.10 to +0.19	-0.11 to +0.23
	Fall	0.1	-0.11 to +0.17	-0.04 to +0.19	-0.03 to +0.20	-0.05 to +0.19
Days with Precipitation Over 4"	Annual	0.01	-0.02 to +0.06	-0.01 to +0.06	-0.01 to +0.09	-0.02 to +0.12
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01
	Summer	0.00	-0.02 to +0.04	-0.02 to +0.03	-0.01 to +0.04	-0.02 to +0.05
	Fall	0.00	-0.02 to +0.05	-0.02 to +0.05	-0.02 to +0.05	-0.02 to +0.05

- 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.

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	47.43	+0.21 to +4.41	+1.09 to +6.42	+1.57 to +6.85	+1.56 to +7.66
	Winter	10.22	-0.50 to +1.81	+0.09 to +2.35	+0.21 to +2.77	+0.81 to +3.51
	Spring	12.07	-0.05 to +1.74	+0.20 to +1.78	+0.38 to +2.41	+0.48 to +2.77
	Summer	13.23	-0.15 to +2.20	-0.13 to +2.15	-0.35 to +1.85	-0.79 to +1.91
	Fall	11.86	-1.35 to +1.40	-1.32 to +1.83	-1.41 to +1.84	-1.69 to +1.67

- 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%).

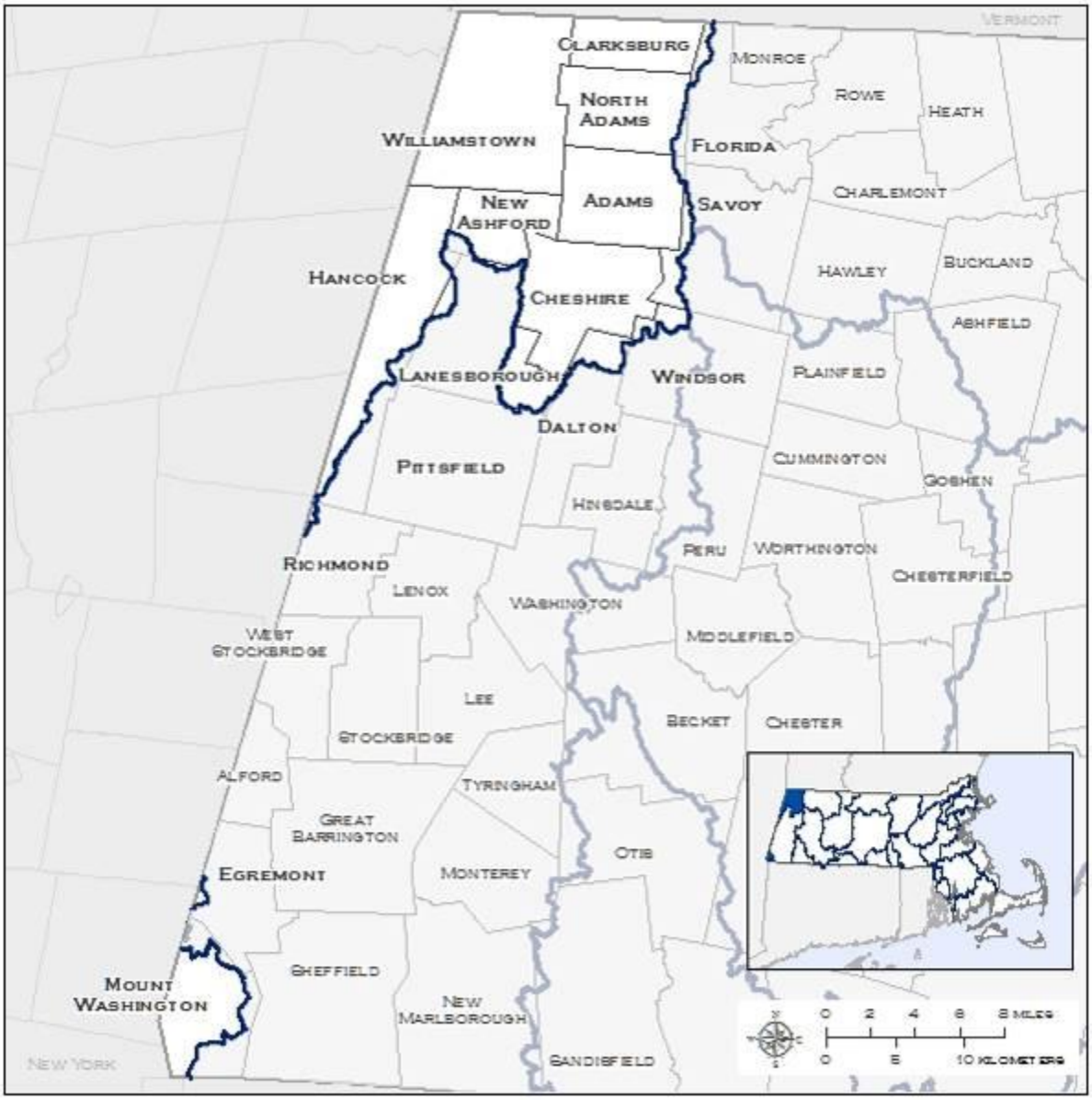
Housatonic Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	15.98	-0.07 to +1.00	-0.06 to +1.94	-0.19 to +1.89	-0.08 to +2.26
	Winter	11.32	-1.03 to +0.67	-0.53 to +0.83	-0.95 to +0.95	-1.23 to +1.25
	Spring	10.84	-1.18 to +0.92	-1.13 to +1.31	-1.42 to +0.94	-1.49 to +0.95
	Summer	10.64	-0.83 to +1.19	-0.46 to +1.04	-0.73 to +1.51	-0.86 to +2.42
	Fall	11.27	-0.07 to +1.78	+0.14 to +2.80	+0.06 to +3.04	+0.19 to +2.79

- 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	43.34	+2.35 to +4.80	+3.27 to +6.96	+3.84 to +9.61	+4.41 to +11.68
	Winter	21.32	+2.60 to +6.11	+3.31 to +9.21	+4.52 to +11.05	+4.87 to +12.63
	Spring	41.65	+2.06 to +4.00	+2.87 to +6.08	+3.42 to +8.32	+4.12 to +10.16
	Summer	64.13	+2.49 to +4.54	+3.27 to +6.95	+3.76 to +9.94	+4.33 to +12.14
	Fall	45.87	+2.23 to +5.18	+3.63 to +6.80	+3.63 to +9.84	+3.90 to +12.23
Maximum Temperature	Annual	53.93	+2.18 to +4.66	+2.94 to +7.08	+3.46 to +9.81	+4.08 to +11.79
	Winter	30.77	+2.21 to +5.44	+2.86 to +8.37	+3.79 to +9.90	+4.30 to +11.36
	Spring	52.54	+1.91 to +3.99	+2.77 to +6.08	+3.29 to +8.72	+4.02 to +10.41
	Summer	75.68	+2.28 to +4.71	+2.98 to +7.31	+3.67 to +10.48	+4.15 to +12.74
	Fall	56.33	+2.41 to +5.13	+3.43 to +7.31	+3.43 to +10.28	+4.01 to +12.56
Minimum Temperature	Annual	32.74	+2.55 to +5.09	+3.65 to +7.13	+4.27 to +9.50	+4.65 to +11.70
	Winter	11.87	+2.88 to +6.74	+3.88 to +9.95	+5.33 to +12.19	+5.52 to +13.73
	Spring	30.76	+2.31 to +4.25	+2.96 to +6.43	+3.73 to +8.00	+4.32 to +9.90
	Summer	52.57	+2.62 to +4.72	+3.48 to +7.09	+3.98 to +9.59	+4.31 to +11.71
	Fall	35.41	+1.92 to +5.14	+3.39 to +6.74	+3.66 to +9.52	+3.77 to +11.79

- 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	0.48	+2.53 to +8.33	+3.87 to +16.78	+4.55 to +33.70	+5.92 to +50.31
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.02 to +0.25	+0.05 to +0.52	+0.08 to +1.49	+0.06 to +2.78
	Summer	0.48	+2.37 to +7.62	+3.59 to +15.28	+4.13 to +28.46	+5.65 to +42.38
	Fall	0.00	+0.08 to +0.66	+0.11 to +1.31	+0.08 to +3.77	+0.08 to +5.34
Days with Maximum Temperature Over 95°F	Annual	0.00	+0.18 to +1.86	+0.30 to +4.90	+0.59 to +10.82	+0.59 to +21.47
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.04	+0.00 to +0.23	+0.00 to +0.74
	Summer	0.00	+0.16 to +1.80	+0.28 to +4.71	+0.52 to +10.04	+0.54 to +19.71
	Fall	0.00	+0.00 to +0.10	+0.00 to +0.31	+0.01 to +0.73	+0.00 to +1.21
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.00 to +0.18	+0.00 to +0.64	+0.00 to +2.32	+0.00 to +4.61
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.07
	Summer	0.00	+0.00 to +0.17	+0.00 to +0.62	+0.00 to +2.24	+0.00 to +4.53
	Fall	0.00	+0.00 to +0.01	+0.00 to +0.04	+0.00 to +0.14	+0.00 to +0.26

- 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.

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	17.72	-6.34 to -11.22	-8.26 to -13.52	-9.70 to -14.48	-9.72 to -15.35
	Winter	16.61	-5.92 to -10.73	-7.84 to -12.87	-8.99 to -13.84	-8.94 to -14.62
	Spring	1.15	-0.27 to -0.88	-0.39 to -0.94	-0.46 to -1.06	-0.48 to -1.11
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.01	-0.04 to +0.01	-0.04 to +0.01	-0.04 to +0.01	-0.04 to -0.00
Days with Minimum Temperature Below 32°F	Annual	173.9	-11.25 to -29.51	-20.25 to -40.65	-23.11 to -56.81	-24.64 to -67.41
	Winter	87.36	-0.55 to -5.29	-1.28 to -8.42	-2.73 to -15.73	-3.13 to -19.67
	Spring	49.1	-5.84 to -11.37	-7.57 to -16.15	-9.07 to -21.05	-10.39 to -23.33
	Summer	0.16	-0.03 to -0.25	-0.03 to -0.41	-0.03 to -0.39	-0.03 to -0.42
	Fall	37.27	-4.02 to -13.04	-8.66 to -16.25	-8.81 to -22.62	-9.42 to -26.20

- 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.

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	8133.98	-716.28 to -1461.82	-976.05 to -2053.30	-1128.99 to -2695.85	-1285.22 to -3112.11
	Winter	3952.77	-220.57 to -568.88	-292.92 to -843.17	-400.53 to -1002.61	-450.07 to -1158.99
	Spring	2155.83	-179.00 to -351.30	-250.97 to -532.38	-299.91 to -701.82	-362.82 to -828.39
	Summer	268.96	-89.21 to -144.60	-115.61 to -191.27	-140.01 to -220.13	-150.69 to -233.32
	Fall	1755.43	-185.09 to -435.38	-301.19 to -552.62	-299.13 to -775.66	-318.18 to -904.00
Cooling Degree-Days (Base 65°F)	Annual	213.75	+160.61 to +330.23	+223.03 to +567.86	+254.23 to +880.36	+290.88 to +1193.65
	Winter	nan	nan to nan	nan to nan	nan to nan	nan to nan
	Spring	9.62	+6.21 to +18.54	+10.80 to +36.87	+14.43 to +60.66	+12.35 to +94.22
	Summer	188.84	+132.58 to +272.86	+176.96 to +448.11	+199.24 to +695.07	+238.32 to +885.85
	Fall	15.38	+12.91 to +48.47	+19.63 to +83.95	+25.00 to +156.03	+31.03 to +214.29
Growing Degree-Days (Base 50°F)	Annual	1760.9	+388.89 to +740.80	+537.63 to +1176.53	+631.54 to +1750.92	+707.29 to +2212.93
	Winter	2.92	-1.13 to +6.77	+0.66 to +7.13	+0.19 to +11.60	+1.67 to +16.15
	Spring	182.33	+58.77 to +126.20	+87.96 to +210.42	+106.70 to +310.14	+114.55 to +411.49
	Summer	1303.62	+227.30 to +414.62	+297.47 to +636.60	+341.51 to +912.79	+392.40 to +1113.58
	Fall	264.85	+89.44 to +232.38	+133.31 to +345.18	+143.54 to +535.40	+181.28 to +673.69

- 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	5.88	-0.12 to +1.70	+0.54 to +2.45	+0.58 to +2.65	+0.63 to +3.55
	Winter	0.74	-0.03 to +0.42	+0.03 to +0.79	+0.02 to +0.99	+0.24 to +1.20
	Spring	1.32	-0.09 to +0.40	+0.02 to +0.58	+0.02 to +0.86	+0.10 to +1.07
	Summer	2.26	-0.24 to +0.73	-0.14 to +1.05	-0.24 to +0.78	-0.21 to +0.78
	Fall	1.54	-0.30 to +0.70	-0.22 to +0.74	-0.29 to +0.95	-0.27 to +1.18
Days with Precipitation Over 2"	Annual	0.57	-0.15 to +0.33	-0.09 to +0.46	-0.04 to +0.51	-0.03 to +0.62
	Winter	0.01	-0.03 to +0.05	-0.02 to +0.07	-0.02 to +0.09	-0.02 to +0.07
	Spring	0.12	-0.04 to +0.08	-0.02 to +0.09	-0.02 to +0.17	+0.00 to +0.22
	Summer	0.35	-0.09 to +0.28	-0.10 to +0.31	-0.08 to +0.22	-0.10 to +0.28
	Fall	0.09	-0.07 to +0.11	-0.08 to +0.14	-0.03 to +0.14	-0.05 to +0.18
Days with Precipitation Over 4"	Annual	0.02	-0.03 to +0.04	-0.02 to +0.03	-0.02 to +0.05	-0.02 to +0.07
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.02	-0.02 to +0.04	-0.02 to +0.03	-0.02 to +0.04	-0.02 to +0.04
	Fall	0.00	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.02	+0.00 to +0.02

- 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.

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	-0.08 to +4.56	+0.83 to +6.54	+1.45 to +6.62	+1.78 to +7.78
	Winter	9.67	-0.33 to +1.64	+0.20 to +2.25	+0.29 to +2.69	+0.86 to +3.51
	Spring	12.22	+0.03 to +1.74	+0.22 to +1.80	+0.41 to +2.24	+0.50 to +2.87
	Summer	14.19	-0.48 to +2.34	-0.31 to +2.64	-0.22 to +1.73	-0.51 to +1.93
	Fall	12.12	-1.29 to +1.44	-1.41 to +1.57	-1.65 to +1.53	-1.70 to +1.40

- 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%).

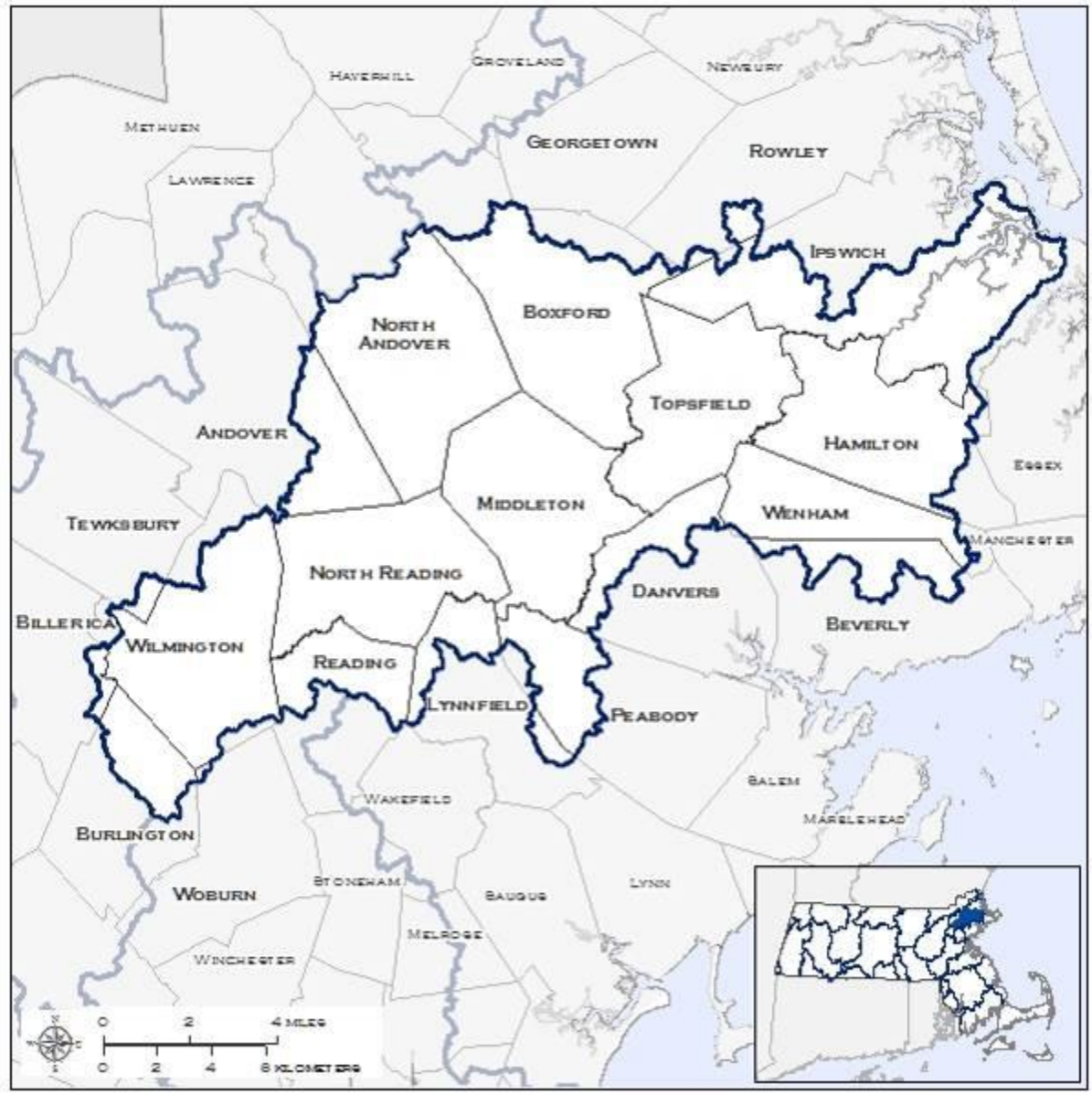
Hudson Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	14.63	-0.42 to +1.56	-0.40 to +1.71	-0.48 to +1.76	-0.31 to +2.30
	Winter	10.61	-0.89 to +0.90	-0.76 to +0.79	-1.15 to +0.83	-1.06 to +0.68
	Spring	10.8	-1.30 to +0.86	-1.48 to +1.09	-1.23 to +1.14	-1.32 to +0.93
	Summer	9.63	-0.41 to +1.53	-0.35 to +1.00	-0.57 to +1.42	-0.64 to +1.71
	Fall	10.56	-0.34 to +2.05	-0.04 to +2.81	-0.21 to +2.89	-0.07 to +3.51

- 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	49.48	+2.09 to +4.25	+2.74 to +6.21	+3.30 to +8.92	+3.59 to +10.76
	Winter	29.02	+2.14 to +4.76	+2.84 to +7.16	+3.56 to +8.99	+3.86 to +10.45
	Spring	46.97	+1.93 to +3.67	+2.61 to +5.51	+2.74 to +7.88	+3.35 to +9.61
	Summer	69.56	+2.07 to +4.22	+2.69 to +6.56	+3.12 to +9.50	+3.71 to +12.03
	Fall	51.99	+1.86 to +4.61	+3.25 to +6.49	+3.04 to +9.42	+3.51 to +11.76
Maximum Temperature	Annual	59.64	+1.99 to +3.98	+2.53 to +5.98	+3.02 to +8.87	+3.27 to +10.65
	Winter	38.33	+1.84 to +4.34	+2.42 to +6.66	+3.06 to +8.29	+3.42 to +9.59
	Spring	57.4	+1.81 to +3.51	+2.32 to +5.52	+2.68 to +8.06	+3.22 to +9.54
	Summer	80.22	+1.84 to +4.29	+2.55 to +6.48	+3.01 to +9.67	+3.51 to +12.17
	Fall	62.19	+1.95 to +4.44	+2.94 to +6.65	+2.94 to +9.62	+3.37 to +12.06
Minimum Temperature	Annual	39.32	+2.18 to +4.56	+2.97 to +6.34	+3.59 to +8.93	+3.92 to +10.86
	Winter	19.7	+2.42 to +5.22	+3.16 to +7.66	+4.12 to +9.68	+4.31 to +11.13
	Spring	36.54	+2.02 to +3.93	+2.87 to +5.83	+2.93 to +7.69	+3.49 to +9.52
	Summer	58.9	+2.18 to +4.28	+2.84 to +6.88	+3.23 to +9.34	+3.88 to +11.90
	Fall	41.79	+1.81 to +4.81	+3.23 to +6.34	+3.14 to +9.33	+3.65 to +11.61

- 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	6.88	+5.55 to +17.30	+8.48 to +30.62	+10.21 to +50.12	+11.88 to +68.93
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.34	+0.23 to +0.75	+0.35 to +1.37	+0.40 to +2.25	+0.24 to +3.83
	Summer	6.23	+4.81 to +15.24	+6.99 to +24.93	+8.69 to +40.55	+10.55 to +54.68
	Fall	0.31	+0.34 to +1.88	+0.70 to +4.75	+0.67 to +8.59	+1.14 to +11.81
Days with Maximum Temperature Over 95°F	Annual	0.62	+1.61 to +6.48	+2.29 to +12.74	+3.01 to +26.29	+4.58 to +40.81
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.02 to +0.19	+0.03 to +0.38	+0.06 to +0.67	+0.06 to +1.37
	Summer	0.62	+1.51 to +5.95	+2.02 to +11.16	+2.85 to +22.65	+4.24 to +35.46
	Fall	0.00	+0.03 to +0.50	+0.05 to +1.41	+0.08 to +3.44	+0.15 to +4.77
Days with Maximum Temperature Over 100°F	Annual	0.05	+0.10 to +1.30	+0.22 to +3.34	+0.31 to +7.52	+0.24 to +14.18
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.03	+0.00 to +0.10	+0.00 to +0.36
	Summer	0.05	+0.10 to +1.25	+0.20 to +3.21	+0.28 to +7.16	+0.24 to +13.11
	Fall	0.00	+0.00 to +0.06	+0.00 to +0.18	+0.00 to +0.51	+0.00 to +1.00

- 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.

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	4.12	-1.03 to -2.71	-1.29 to -3.13	-1.43 to -3.36	-1.42 to -3.46
	Winter	4.06	-1.02 to -2.59	-1.24 to -2.92	-1.38 to -3.27	-1.39 to -3.38
	Spring	0.04	-0.20 to +0.03	-0.00 to -0.23	-0.01 to -0.29	-0.01 to -0.25
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.02	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	129.69	-11.50 to -28.24	-17.60 to -41.81	-21.23 to -55.33	-23.38 to -65.25
	Winter	78.98	-3.33 to -8.87	-4.15 to -15.58	-6.11 to -24.32	-7.88 to -30.84
	Spring	30.97	-4.54 to -10.85	-7.06 to -14.80	-7.84 to -18.42	-8.73 to -20.14
	Summer	0.00	-0.04 to -0.00	-0.04 to -0.00	-0.04 to -0.00	-0.03 to -0.00
	Fall	19.71	-3.66 to -8.72	-6.20 to -11.46	-6.68 to -14.55	-5.80 to -16.33

- 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.

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	6269.22	-514.70 to -1104.48	-689.55 to -1507.20	-829.20 to -2019.14	-925.38 to -2407.09
	Winter	3256.74	-189.28 to -442.05	-248.14 to -659.82	-315.52 to -815.64	-358.00 to -959.71
	Spring	1681.62	-158.49 to -304.79	-215.06 to -457.84	-230.23 to -625.36	-294.57 to -735.28
	Summer	87.73	-31.97 to -55.7	-39.64 to -71.22	-48.25 to -79.85	-51.73 to -82.69
	Fall	1239.97	-124.14 to -332.50	-231.67 to -426.84	-220.85 to -611.72	-241.44 to -700.90
Cooling Degree-Days (Base 65°F)	Annual	590.1	+212.91 to +447.96	+291.57 to +754.03	+342.03 to +1151.97	+398.58 to +1521.14
	Winter	nan	-0.66 to +2.44	-0.43 to +5.63	+0.17 to +3.39	+0.35 to +6.21
	Spring	23.07	+14.42 to +33.62	+22.44 to +57.45	+26.10 to +98.15	+20.27 to +146.59
	Summer	507.15	+154.20 to +335.29	+196.37 to +538.65	+232.59 to +797.31	+280.33 to +1025.47
	Fall	54.37	+31.12 to +93.25	+45.05 to +178.18	+54.35 to +275.58	+78.85 to +357.99
Growing Degree-Days (Base 50°F)	Annual	2628.19	+397.84 to +810.94	+555.57 to +1237.46	+632.10 to +1937.88	+716.22 to +2437.70
	Winter	5.96	+0.08 to +15.21	+2.20 to +18.07	+5.89 to +30.73	+4.55 to +40.02
	Spring	299.31	+82.40 to +158.16	+105.22 to +258.47	+120.04 to +387.06	+129.58 to +502.31
	Summer	1799.53	+190.20 to +388.02	+247.15 to +603.09	+286.26 to +874.19	+340.70 to +1106.56
	Fall	516.06	+96.21 to +288.72	+167.20 to +423.63	+154.45 to +644.57	+209.73 to +814.99

- 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	7.87	+0.10 to +1.81	+0.43 to +2.57	+0.94 to +2.45	+1.06 to +3.20
	Winter	1.96	+0.02 to +0.63	+0.15 to +1.09	+0.20 to +1.45	+0.29 to +1.60
	Spring	1.78	-0.19 to +0.73	-0.03 to +0.89	+0.10 to +1.16	+0.06 to +1.13
	Summer	1.69	-0.16 to +0.45	-0.11 to +0.51	-0.11 to +0.55	-0.13 to +0.51
	Fall	2.45	-0.27 to +0.58	-0.18 to +0.76	-0.42 to +0.60	-0.42 to +0.75
Days with Precipitation Over 2"	Annual	1.05	+0.02 to +0.45	-0.01 to +0.60	+0.09 to +0.69	+0.14 to +0.82
	Winter	0.19	-0.04 to +0.13	+0.00 to +0.15	+0.00 to +0.22	+0.04 to +0.29
	Spring	0.22	-0.06 to +0.18	-0.05 to +0.21	-0.06 to +0.27	+0.00 to +0.33
	Summer	0.27	-0.09 to +0.12	-0.06 to +0.14	-0.04 to +0.14	-0.05 to +0.16
	Fall	0.38	-0.04 to +0.23	-0.02 to +0.22	+0.02 to +0.20	-0.06 to +0.28
Days with Precipitation Over 4"	Annual	0.05	-0.01 to +0.14	+0.00 to +0.15	-0.01 to +0.12	-0.01 to +0.20
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.02
	Spring	0.00	-0.02 to +0.04	+0.00 to +0.04	-0.01 to +0.05	-0.01 to +0.08
	Summer	0.00	-0.01 to +0.04	-0.01 to +0.04	-0.02 to +0.04	-0.02 to +0.05
	Fall	0.00	-0.02 to +0.08	-0.02 to +0.08	-0.02 to +0.09	-0.04 to +0.12

- 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.

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	45.59	-0.11 to +4.29	+0.04 to +5.35	+0.54 to +6.61	+0.73 to +7.00
	Winter	11.56	-0.33 to +1.69	+0.14 to +2.27	+0.20 to +2.96	+0.51 to +3.96
	Spring	11.63	-0.36 to +2.25	-0.05 to +2.12	+0.12 to +2.57	+0.12 to +2.57
	Summer	10.22	-0.36 to +1.26	-0.55 to +1.93	-0.81 to +2.01	-1.64 to +1.80
	Fall	12.24	-1.04 to +0.91	-1.10 to +1.44	-1.80 to +1.60	-1.61 to +1.33

- 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	16.79	-0.27 to +1.72	-0.05 to +2.50	-0.74 to +2.82	-0.15 to +3.09
	Winter	11.72	-0.77 to +1.27	-0.84 to +1.20	-0.96 to +2.25	-1.17 to +2.02
	Spring	11.18	-0.76 to +1.15	-1.20 to +1.17	-1.28 to +1.10	-1.28 to +1.04
	Summer	12.99	-0.65 to +1.83	-0.73 to +1.63	-0.94 to +2.94	-1.12 to +2.34
	Fall	12.3	+0.21 to +1.96	+0.15 to +2.86	-0.10 to +3.51	-0.06 to +3.19

- 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	48.09	+2.24 to +4.44	+2.96 to +6.39	+3.56 to +9.13	+3.90 to +10.94
	Winter	26.83	+2.45 to +5.27	+3.18 to +7.77	+3.99 to +9.50	+4.27 to +10.83
	Spring	46.06	+1.72 to +3.47	+2.55 to +5.37	+2.71 to +7.70	+3.29 to +9.43
	Summer	68.79	+2.08 to +4.33	+2.81 to +6.67	+3.23 to +9.92	+3.75 to +12.47
	Fall	50.3	+2.30 to +5.02	+3.25 to +6.70	+3.52 to +9.57	+4.02 to +11.78
Maximum Temperature	Annual	59.14	+2.14 to +4.20	+2.74 to +6.30	+3.26 to +9.12	+3.58 to +10.87
	Winter	36.74	+2.13 to +4.83	+2.78 to +7.26	+3.42 to +8.80	+3.78 to +9.97
	Spring	57.46	+1.60 to +3.40	+2.21 to +5.48	+2.63 to +7.90	+3.23 to +9.35
	Summer	80.47	+1.85 to +4.36	+2.66 to +6.70	+3.11 to +10.15	+3.62 to +12.75
	Fall	61.48	+2.43 to +4.89	+3.54 to +6.93	+3.43 to +9.85	+3.93 to +12.19
Minimum Temperature	Annual	37.04	+2.33 to +4.76	+3.21 to +6.54	+3.86 to +9.09	+4.23 to +11.02
	Winter	16.93	+2.73 to +5.76	+3.57 to +8.28	+4.62 to +10.21	+4.77 to +11.56
	Spring	34.65	+1.85 to +3.79	+2.73 to +5.70	+2.86 to +7.47	+3.35 to +9.25
	Summer	57.1	+2.19 to +4.47	+2.97 to +7.06	+3.35 to +9.68	+3.96 to +12.18
	Fall	39.13	+2.18 to +5.17	+3.54 to +6.62	+3.61 to +9.38	+4.11 to +11.59

- 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	7.43	+7.35 to +20.01	+10.5 to +33.34	+12.50 to +54.70	+14.93 to +73.79
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.4	+0.16 to +0.81	+0.44 to +1.56	+0.40 to +2.95	+0.26 to +4.65
	Summer	6.71	+6.40 to +16.92	+8.55 to +27.76	+10.9 to +44.02	+12.75 to +58.04
	Fall	0.32	+0.50 to +2.50	+0.78 to +5.27	+0.79 to +9.33	+1.35 to +12.68
Days with Maximum Temperature Over 95°F	Annual	0.68	+2.39 to +8.26	+3.34 to +15.95	+4.33 to +31.40	+5.88 to +48.56
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.03 to +0.27	+0.05 to +0.44	+0.09 to +1.05	+0.07 to +2.07
	Summer	0.67	+2.11 to +7.55	+2.89 to +14.18	+3.76 to +27.12	+5.39 to +41.58
	Fall	0.00	+0.13 to +0.80	+0.22 to +1.91	+0.23 to +4.44	+0.40 to +6.05
Days with Maximum Temperature Over 100°F	Annual	0.04	+0.30 to +2.26	+0.43 to +4.91	+0.77 to +11.36	+0.67 to +21.83
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.02	+0.00 to +0.04	+0.00 to +0.19	+0.00 to +0.61
	Summer	0.04	+0.28 to +2.14	+0.37 to +4.66	+0.69 to +10.41	+0.62 to +19.98
	Fall	0.00	+0.00 to +0.16	+0.01 to +0.37	+0.00 to +0.98	+0.00 to +1.57

- 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.

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	6.82	-1.96 to -4.03	-2.18 to -4.56	-2.53 to -5.04	-2.51 to -5.21
	Winter	6.66	-1.83 to -3.79	-2.09 to -4.27	-2.42 to -4.8	-2.45 to -5.01
	Spring	0.16	-0.34 to +0.02	-0.04 to -0.38	-0.04 to -0.42	-0.04 to -0.39
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.03	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	148.02	-11.77 to -29.91	-19.48 to -42.17	-23.32 to -56.29	-25.48 to -66.09
	Winter	83.44	-2.34 to -7.11	-3.47 to -12.22	-5.12 to -20.48	-6.10 to -25.25
	Spring	37.47	-4.06 to -11.56	-7.16 to -15.46	-7.95 to -19.35	-8.84 to -20.82
	Summer	0.00	-0.09 to -0.00	-0.13 to -0.00	-0.13 to -0.00	-0.10 to -0.00
	Fall	27.08	-4.77 to -11.20	-8.54 to -14.50	-8.73 to -18.31	-8.66 to -20.26

- 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.

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	6692.63	-571.53 to -1185.29	-769.13 to -1620.80	-913.69 to -2135.09	-1031.63 to -2502.63
	Winter	3449.54	-217.49 to -492.24	-281.99 to -714.36	-353.03 to -864.63	-395.32 to -997.11
	Spring	1761.74	-143.65 to -291.13	-213.01 to -449.17	-224.61 to -613.27	-289.89 to -720.43
	Summer	106.18	-34.36 to -62.23	-43.41 to -78.59	-53.81 to -90.09	-54.15 to -92.13
	Fall	1380.99	-160.47 to -374.20	-279.24 to -463.14	-265.99 to -648.86	-284.96 to -735.43
Cooling Degree-Days (Base 65°F)	Annual	525.67	+208.98 to +444.39	+282.60 to +736.76	+340.96 to +1153.77	+398.86 to +1517.97
	Winter	nan	+0.63 to +2.38	+0.24 to +3.63	+1.29 to +4.22	+1.50 to +3.41
	Spring	19.61	+10.42 to +29.56	+18.86 to +51.44	+20.25 to +90.43	+15.98 to +126.25
	Summer	454.57	+156.46 to +337.24	+199.35 to +541.85	+236.07 to +827.70	+278.39 to +1057.10
	Fall	42.93	+31.41 to +93.67	+47.53 to +166.50	+54.92 to +258.13	+77.96 to +334.79
Growing Degree-Days (Base 50°F)	Annual	2465.75	+406.48 to +811.95	+548.63 to +1226.38	+640.53 to +1922.61	+730.40 to +2412.64
	Winter	5.68	-0.54 to +11.38	+1.96 to +14.51	+4.57 to +23.80	+3.40 to +32.10
	Spring	275.92	+63.21 to +136.48	+89.34 to +238.57	+110.31 to +362.33	+116.40 to +471.38
	Summer	1728.52	+191.00 to +398.24	+257.83 to +613.64	+296.73 to +912.00	+344.12 to +1146.51
	Fall	441.6	+108.94 to +295.58	+179.07 to +415.16	+168.86 to +622.47	+214.22 to +778.86

- 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	6.72	+0.19 to +1.61	+0.38 to +2.58	+1.05 to +2.52	+0.95 to +3.51
	Winter	1.58	-0.09 to +0.69	+0.12 to +1.03	+0.19 to +1.33	+0.27 to +1.59
	Spring	1.52	-0.11 to +0.64	-0.05 to +0.92	+0.01 to +1.10	+0.10 to +1.21
	Summer	1.42	-0.12 to +0.46	-0.15 to +0.69	-0.09 to +0.61	-0.14 to +0.52
	Fall	2.19	-0.26 to +0.58	-0.05 to +0.74	-0.15 to +0.78	-0.23 to +0.72
Days with Precipitation Over 2"	Annual	0.76	+0.01 to +0.42	+0.00 to +0.50	+0.11 to +0.61	+0.11 to +0.70
	Winter	0.09	-0.04 to +0.08	-0.02 to +0.08	-0.01 to +0.13	+0.00 to +0.17
	Spring	0.12	-0.05 to +0.15	-0.03 to +0.16	-0.07 to +0.21	+0.00 to +0.23
	Summer	0.18	-0.06 to +0.16	-0.02 to +0.16	-0.03 to +0.14	-0.01 to +0.17
	Fall	0.36	-0.06 to +0.31	-0.08 to +0.22	-0.04 to +0.23	-0.08 to +0.29
Days with Precipitation Over 4"	Annual	0.07	-0.01 to +0.10	-0.02 to +0.10	-0.02 to +0.09	-0.02 to +0.16
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01
	Spring	0.00	-0.01 to +0.02	+0.00 to +0.03	-0.01 to +0.03	-0.01 to +0.04
	Summer	0.02	-0.01 to +0.03	-0.01 to +0.04	-0.01 to +0.02	-0.01 to +0.05
	Fall	0.04	-0.03 to +0.11	-0.02 to +0.06	-0.03 to +0.07	-0.05 to +0.09

- 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.

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	44.21	+0.12 to +4.54	-0.02 to +5.82	+0.89 to +6.93	+0.91 to +7.57
	Winter	10.79	-0.46 to +1.85	-0.03 to +2.41	+0.36 to +3.01	+0.41 to +3.79
	Spring	11.27	-0.13 to +2.24	-0.09 to +2.08	+0.13 to +2.64	+0.24 to +2.54
	Summer	10.32	-0.15 to +1.31	-0.64 to +2.04	-0.75 to +1.83	-1.06 to +1.78
	Fall	11.85	-1.14 to +1.06	-1.14 to +1.49	-1.60 to +1.36	-1.39 to +1.26

- 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	17.41	-0.66 to +1.21	-0.42 to +2.01	-0.88 to +2.42	-0.44 to +2.66
	Winter	12.12	-0.79 to +1.14	-0.63 to +1.57	-0.94 to +1.50	-0.95 to +1.60
	Spring	11.74	-0.94 to +0.68	-1.39 to +1.30	-1.69 to +1.14	-1.29 to +0.81
	Summer	13.32	-0.81 to +1.38	-0.53 to +1.73	-0.90 to +2.39	-1.02 to +2.35
	Fall	12.23	-0.13 to +1.80	-0.48 to +2.47	-0.44 to +3.02	-0.21 to +2.63

- 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	44.72	+2.16 to +4.45	+2.95 to +6.27	+3.48 to +8.87	+3.86 to +10.82
	Winter	22.38	+2.35 to +5.23	+2.94 to +7.62	+3.81 to +9.09	+4.18 to +10.45
	Spring	43.18	+1.50 to +3.39	+2.29 to +5.16	+2.56 to +7.32	+3.00 to +8.92
	Summer	65.96	+2.21 to +4.53	+3.06 to +7.12	+3.38 to +10.47	+3.79 to +12.90
	Fall	46.97	+2.09 to +5.17	+3.62 to +6.54	+3.50 to +9.38	+3.95 to +11.74
Maximum Temperature	Annual	56.56	+1.98 to +4.20	+2.60 to +6.41	+3.06 to +9.06	+3.45 to +11.03
	Winter	33.12	+1.91 to +4.48	+2.46 to +6.73	+3.02 to +7.97	+3.41 to +9.04
	Spring	55.22	+1.31 to +3.23	+2.09 to +5.25	+2.57 to +7.62	+3.05 to +9.18
	Summer	78.66	+1.89 to +4.65	+2.75 to +7.42	+3.19 to +11.00	+3.63 to +13.57
	Fall	58.78	+2.33 to +4.98	+3.54 to +7.00	+3.28 to +9.86	+3.94 to +12.23
Minimum Temperature	Annual	32.89	+2.31 to +4.88	+3.29 to +6.43	+3.79 to +8.75	+4.20 to +10.86
	Winter	11.64	+2.74 to +6.12	+3.52 to +8.41	+4.42 to +10.21	+4.79 to +11.66
	Spring	31.14	+1.59 to +3.76	+2.36 to +5.62	+2.74 to +7.11	+3.07 to +8.76
	Summer	53.27	+2.38 to +4.60	+3.22 to +7.29	+3.57 to +9.93	+3.97 to +12.34
	Fall	35.15	+1.81 to +5.27	+3.38 to +6.56	+3.61 to +9.01	+3.97 to +11.41

- 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	4.35	+5.29 to +16.29	+8.07 to +29.76	+9.54 to +51.07	+11.57 to +69.80
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.27	+0.09 to +0.78	+0.29 to +1.59	+0.30 to +2.83	+0.24 to +4.65
	Summer	3.94	+4.69 to +14.50	+6.99 to +25.60	+8.62 to +42.72	+10.21 to +57.04
	Fall	0.13	+0.26 to +1.25	+0.32 to +2.97	+0.39 to +6.51	+0.66 to +9.38
Days with Maximum Temperature Over 95°F	Annual	0.29	+1.23 to +5.63	+1.66 to +13.16	+2.46 to +28.04	+3.23 to +44.44
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.17	+0.01 to +0.39	+0.03 to +0.95	+0.00 to +1.64
	Summer	0.29	+1.15 to +5.05	+1.54 to +12.07	+2.15 to +25.09	+3.02 to +39.50
	Fall	0.00	+0.00 to +0.44	+0.03 to +0.76	+0.03 to +1.76	+0.06 to +3.05
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.04 to +1.06	+0.09 to +3.27	+0.11 to +9.08	+0.09 to +19.79
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.03	+0.00 to +0.11	+0.00 to +0.32
	Summer	0.00	+0.03 to +0.94	+0.08 to +3.19	+0.11 to +8.58	+0.09 to +18.61
	Fall	0.00	+0.00 to +0.05	+0.00 to +0.13	+0.00 to +0.36	+0.00 to +0.77

- 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.

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	18.79	-5.70 to -10.60	-7.53 to -12.57	-8.81 to -13.69	-8.69 to -14.92
	Winter	17.86	-5.25 to -10.28	-7.08 to -12.10	-8.05 to -13.03	-8.19 to -14.23
	Spring	0.97	-0.20 to -0.73	-0.31 to -0.76	-0.38 to -0.78	-0.37 to -0.89
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.05	-0.06 to -0.00	-0.06 to -0.00	-0.06 to -0.00	-0.07 to -0.00
Days with Minimum Temperature Below 32°F	Annual	176.75	-10.67 to -28.21	-18.77 to -35.08	-21.86 to -49.35	-22.00 to -58.28
	Winter	87.56	-0.58 to -3.64	-1.06 to -5.37	-2.08 to -10.17	-2.33 to -13.23
	Spring	49.34	-3.56 to -10.22	-5.99 to -14.61	-6.79 to -18.63	-8.55 to -21.33
	Summer	0.14	-0.03 to -0.41	-0.04 to -0.84	-0.04 to -0.77	-0.04 to -0.62
	Fall	39.7	-4.97 to -13.93	-9.57 to -16.58	-9.01 to -22.47	-9.58 to -25.78

- 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.

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	7741.38	-610.29 to -1278.14	-824.25 to -1741.67	-970.13 to -2302.67	-1075.62 to -2685.21
	Winter	3856.96	-199.87 to -485.87	-259.02 to -702.15	-340.89 to -825.99	-386.72 to -963.36
	Spring	2019.38	-126.13 to -293.44	-196.10 to -445.65	-215.88 to -594.62	-267.77 to -699.74
	Summer	200.71	-64.62 to -113.38	-88.45 to -145.21	-95.52 to -165.79	-102.84 to -175.82
	Fall	1665.5	-170.32 to -423.42	-303.76 to -510.21	-284.09 to -715.93	-303.99 to -838.98
Cooling Degree-Days (Base 65°F)	Annual	327.31	+171.07 to +367.45	+233.43 to +646.93	+266.31 to +1016.23	+307.93 to +1348.64
	Winter	nan	nan to nan	nan to nan	nan to nan	nan to nan
	Spring	12.74	+8.23 to +21.94	+11.51 to +42.83	+16.82 to +72.68	+13.54 to +102.29
	Summer	289.31	+142.12 to +302.44	+177.37 to +511.21	+204.57 to +795.69	+232.29 to +1014.36
	Fall	22.77	+17.29 to +60.37	+26.15 to +100.06	+32.14 to +172.16	+43.58 to +236.34
Growing Degree-Days (Base 50°F)	Annual	2002.2	+361.79 to +745.86	+487.19 to +1188.76	+588.76 to +1777.29	+666.50 to +2253.25
	Winter	2.13	-3.22 to +6.15	-1.82 to +6.52	-0.64 to +8.87	+1.07 to +9.68
	Spring	215.17	+54.93 to +114.02	+78.42 to +201.80	+97.84 to +306.95	+97.04 to +401.27
	Summer	1470.91	+201.90 to +414.64	+277.06 to +653.56	+307.78 to +960.77	+345.17 to +1184.43
	Fall	304.68	+93.21 to +248.96	+142.12 to +349.65	+138.87 to +540.88	+184.25 to +676.90

- 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	5.94	-0.03 to +1.69	+0.37 to +2.49	+0.89 to +2.58	+0.69 to +3.39
	Winter	1.07	-0.07 to +0.51	+0.03 to +0.67	+0.10 to +1.16	+0.19 to +1.43
	Spring	1.32	-0.16 to +0.57	-0.10 to +0.69	+0.01 to +0.95	+0.05 to +1.28
	Summer	1.73	-0.25 to +0.51	-0.19 to +0.78	-0.19 to +0.70	-0.18 to +0.61
	Fall	1.8	-0.31 to +0.60	-0.10 to +0.76	-0.27 to +0.85	-0.37 to +1.04
Days with Precipitation Over 2"	Annual	0.41	-0.05 to +0.30	-0.01 to +0.34	-0.02 to +0.38	+0.03 to +0.42
	Winter	0.02	-0.02 to +0.06	-0.01 to +0.07	-0.02 to +0.07	-0.02 to +0.07
	Spring	0.08	-0.03 to +0.06	-0.02 to +0.07	-0.02 to +0.11	+0.00 to +0.15
	Summer	0.17	-0.07 to +0.14	-0.06 to +0.18	-0.04 to +0.14	-0.04 to +0.20
	Fall	0.13	-0.05 to +0.16	-0.03 to +0.18	-0.04 to +0.17	-0.05 to +0.19
Days with Precipitation Over 4"	Annual	0.00	-0.01 to +0.03	-0.01 to +0.04	-0.01 to +0.03	-0.02 to +0.05
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.00	+0.00 to +0.01	-0.01 to +0.02	-0.03 to +0.01	-0.01 to +0.02
	Fall	0.00	-0.02 to +0.03	-0.01 to +0.03	+0.00 to +0.03	-0.01 to +0.04

- 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.

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	45.58	-0.23 to +4.55	+1.01 to +5.93	+1.40 to +6.97	+1.31 to +7.41
	Winter	10.42	-0.40 to +1.83	+0.10 to +2.15	+0.40 to +2.69	+0.67 to +3.70
	Spring	11.5	-0.17 to +2.08	+0.04 to +1.80	+0.33 to +2.50	+0.03 to +2.65
	Summer	11.99	-0.34 to +1.47	-0.16 to +2.05	-0.29 to +1.68	-0.78 to +1.88
	Fall	11.66	-1.19 to +1.40	-1.15 to +1.48	-1.53 to +1.63	-1.65 to +1.42

- 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	16.38	-0.06 to +1.54	-0.67 to +1.66	-0.82 to +2.07	-0.48 to +2.14
	Winter	10.73	-0.77 to +0.83	-0.65 to +1.53	-1.19 to +1.32	-1.19 to +1.09
	Spring	11.41	-1.17 to +0.50	-1.21 to +1.04	-1.46 to +1.27	-1.28 to +0.83
	Summer	11.53	-0.83 to +1.30	-0.64 to +1.23	-0.81 to +1.79	-1.30 to +1.80
	Fall	11.53	-0.10 to +1.93	-0.38 to +2.46	-0.33 to +2.73	-0.23 to +3.15

- 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	50.46	+2.07 to +3.81	+2.71 to +6.04	+3.21 to +8.67	+3.49 to +10.61
	Winter	30.58	+2.30 to +4.59	+3.02 to +6.99	+3.62 to +9.07	+4.07 to +10.45
	Spring	47.94	+1.77 to +3.52	+2.51 to +5.63	+2.68 to +7.74	+3.15 to +9.41
	Summer	70.21	+1.63 to +3.82	+2.16 to +6.20	+2.75 to +9.53	+3.34 to +11.58
	Fall	52.78	+2.08 to +4.52	+3.44 to +6.40	+3.27 to +9.07	+3.72 to +11.20
Maximum Temperature	Annual	60.34	+1.94 to +3.78	+2.53 to +6.00	+2.95 to +8.69	+3.19 to +10.51
	Winter	39.47	+2.00 to +4.48	+2.69 to +6.53	+3.21 to +8.49	+3.65 to +9.79
	Spring	58.11	+1.57 to +3.44	+2.16 to +5.44	+2.65 to +7.83	+3.06 to +9.18
	Summer	80.61	+1.56 to +3.71	+2.04 to +6.13	+2.67 to +9.65	+3.12 to +11.59
	Fall	62.78	+2.11 to +4.42	+3.29 to +6.43	+3.16 to +8.99	+3.52 to +11.34
Minimum Temperature	Annual	40.59	+2.18 to +3.88	+2.91 to +6.17	+3.48 to +8.66	+3.80 to +10.65
	Winter	21.68	+2.67 to +4.82	+3.34 to +7.44	+4.10 to +9.60	+4.51 to +11.02
	Spring	37.78	+1.92 to +3.63	+2.82 to +5.89	+2.74 to +7.68	+3.26 to +9.37
	Summer	59.81	+1.74 to +3.84	+2.29 to +6.26	+2.83 to +9.36	+3.56 to +11.41
	Fall	42.79	+2.04 to +4.62	+3.45 to +6.37	+3.31 to +9.01	+3.93 to +11.08

- 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)	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	7.08	+4.89 to +13.51	+7.18 to +28.94	+8.93 to +50.87	+11.52 to +66.23
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.51	+0.05 to +0.57	+0.13 to +0.87	+0.13 to +1.54	+0.15 to +2.76
	Summer	6.24	+4.23 to +11.69	+6.02 to +24.90	+7.91 to +42.75	+10.30 to +54.00
	Fall	0.33	+0.44 to +1.65	+0.72 to +3.90	+0.73 to +7.24	+1.14 to +9.81
Days with Maximum Temperature Over 95°F	Annual	0.96	+1.28 to +4.34	+1.86 to +9.85	+2.50 to +24.05	+3.46 to +37.67
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.04	+0.00 to +0.21	+0.01 to +0.27	+0.03 to +0.47	+0.01 to +0.86
	Summer	0.89	+1.16 to +3.83	+1.71 to +8.82	+2.35 to +21.68	+3.07 to +34.02
	Fall	0.03	+0.02 to +0.54	+0.05 to +0.96	+0.12 to +2.40	+0.19 to +3.24
Days with Maximum Temperature Over 100°F	Annual	0.07	+0.11 to +0.73	+0.20 to +2.48	+0.30 to +5.86	+0.29 to +12.33
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.02	+0.00 to +0.05	+0.00 to +0.11	+0.00 to +0.18
	Summer	0.07	+0.09 to +0.69	+0.17 to +2.39	+0.29 to +5.44	+0.30 to +11.33
	Fall	0.00	+0.00 to +0.08	+0.00 to +0.18	+0.00 to +0.33	+0.00 to +0.84

- 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.

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	1.98	-0.46 to -1.00	-0.50 to -1.21	-0.62 to -1.23	-0.53 to -1.24
	Winter	1.97	-0.46 to -1.02	-0.53 to -1.21	-0.64 to -1.23	-0.54 to -1.24
	Spring	0.01	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00	-0.01 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	120.51	-14.39 to -28.92	-19.61 to -45.66	-24.28 to -58.55	-25.86 to -68.72
	Winter	76.43	-4.93 to -11.50	-6.81 to -19.79	-9.47 to -29.03	-10.53 to -36.42
	Spring	26.92	-4.86 to -10.83	-7.32 to -15.11	-7.92 to -18.40	-9.03 to -19.81
	Summer	0.00	-0.02 to -0.00	-0.02 to -0.00	-0.02 to -0.00	-0.03 to -0.00
	Fall	17.13	-4.35 to -8.72	-7.06 to -10.6	-7.50 to -13.10	-7.17 to -14.74

- 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.

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	5947.54	-520.66 to -1014.09	-718.70 to -1490.26	-829.78 to -1955.26	-914.73 to -2319.93
	Winter	3115.57	-212.77 to -423.50	-269.78 to -637.84	-323.62 to -821.09	-370.43 to -962.47
	Spring	1589.54	-144.15 to -298.09	-209.39 to -468.77	-228.28 to -622.56	-283.86 to -725.61
	Summer	67.81	-22.86 to -40.8	-30.66 to -51.86	-35.41 to -60.32	-36.71 to -64.75
	Fall	1173.48	-138.90 to -316.55	-245.31 to -412.32	-223.07 to -579.92	-246.38 to -661.50
Cooling Degree-Days (Base 65°F)	Annual	634.61	+207.13 to +432.54	+266.05 to +734.02	+315.26 to +1165.85	+376.09 to +1489.12
	Winter	nan	+0.30 to +4.24	+0.48 to +5.08	+0.46 to +3.90	+1.13 to +5.74
	Spring	21.14	+11.35 to +29.16	+18.26 to +55.96	+19.91 to +91.12	+20.26 to +121.03
	Summer	547.16	+126.20 to +311.65	+165.29 to +519.99	+215.00 to +818.10	+263.34 to +1003.77
	Fall	62.06	+39.12 to +97.45	+55.88 to +176.18	+66.59 to +267.17	+97.47 to +347.67
Growing Degree-Days (Base 50°F)	Annual	2741.84	+387.12 to +775.75	+515.49 to +1223.62	+592.10 to +1939.21	+679.51 to +2423.53
	Winter	6.6	+1.28 to +18.76	+2.85 to +21.96	+8.06 to +39.27	+8.22 to +58.34
	Spring	316.41	+74.92 to +146.85	+100.63 to +255.16	+105.37 to +391.21	+112.45 to +506.34
	Summer	1859.36	+150.23 to +351.79	+198.88 to +569.91	+252.53 to +876.61	+307.36 to +1064.90
	Fall	551.92	+105.89 to +283.50	+189.53 to +422.37	+180.33 to +617.58	+233.21 to +783.33

- 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	7.5	+0.38 to +1.94	+0.82 to +2.92	+0.79 to +3.32	+1.29 to +4.31
	Winter	1.83	+0.05 to +0.79	+0.28 to +1.11	+0.22 to +1.39	+0.32 to +1.97
	Spring	1.69	+0.05 to +0.77	+0.19 to +0.98	+0.38 to +1.27	+0.37 to +1.37
	Summer	1.84	-0.17 to +0.42	-0.21 to +0.71	-0.03 to +0.66	-0.36 to +0.56
	Fall	2.13	-0.18 to +0.56	-0.17 to +0.96	-0.23 to +0.84	-0.29 to +1.11
Days with Precipitation Over 2”	Annual	0.77	+0.05 to +0.49	+0.11 to +0.75	+0.09 to +0.86	+0.15 to +1.00
	Winter	0.12	-0.02 to +0.13	-0.02 to +0.23	-0.02 to +0.26	-0.01 to +0.42
	Spring	0.11	-0.02 to +0.13	+0.00 to +0.19	+0.01 to +0.26	+0.02 to +0.35
	Summer	0.34	-0.06 to +0.14	-0.01 to +0.23	-0.07 to +0.23	-0.14 to +0.24
	Fall	0.2	+0.00 to +0.29	+0.02 to +0.27	+0.04 to +0.34	-0.02 to +0.47
Days with Precipitation Over 4”	Annual	0.02	-0.01 to +0.07	-0.01 to +0.08	-0.02 to +0.09	-0.01 to +0.14
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01
	Spring	0.01	-0.01 to +0.02	-0.01 to +0.02	-0.01 to +0.02	+0.00 to +0.03
	Summer	0.02	-0.01 to +0.04	+0.00 to +0.04	-0.01 to +0.06	-0.01 to +0.07
	Fall	0.00	-0.01 to +0.04	-0.01 to +0.03	-0.01 to +0.05	-0.02 to +0.07

- 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.

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	46.69	-0.12 to +4.17	+0.65 to +5.87	+1.37 to +7.03	+0.77 to +8.06
	Winter	11.86	-0.29 to +1.75	+0.02 to +2.22	+0.20 to +2.84	+0.05 to +4.03
	Spring	11.88	-0.06 to +1.88	+0.22 to +2.13	+0.23 to +2.49	+0.32 to +2.99
	Summer	10.95	-0.68 to +1.31	-0.74 to +1.90	-1.56 to +2.24	-1.73 to +2.02
	Fall	11.99	-0.70 to +1.03	-0.82 to +1.60	-1.44 to +1.66	-1.66 to +1.57

- 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%).

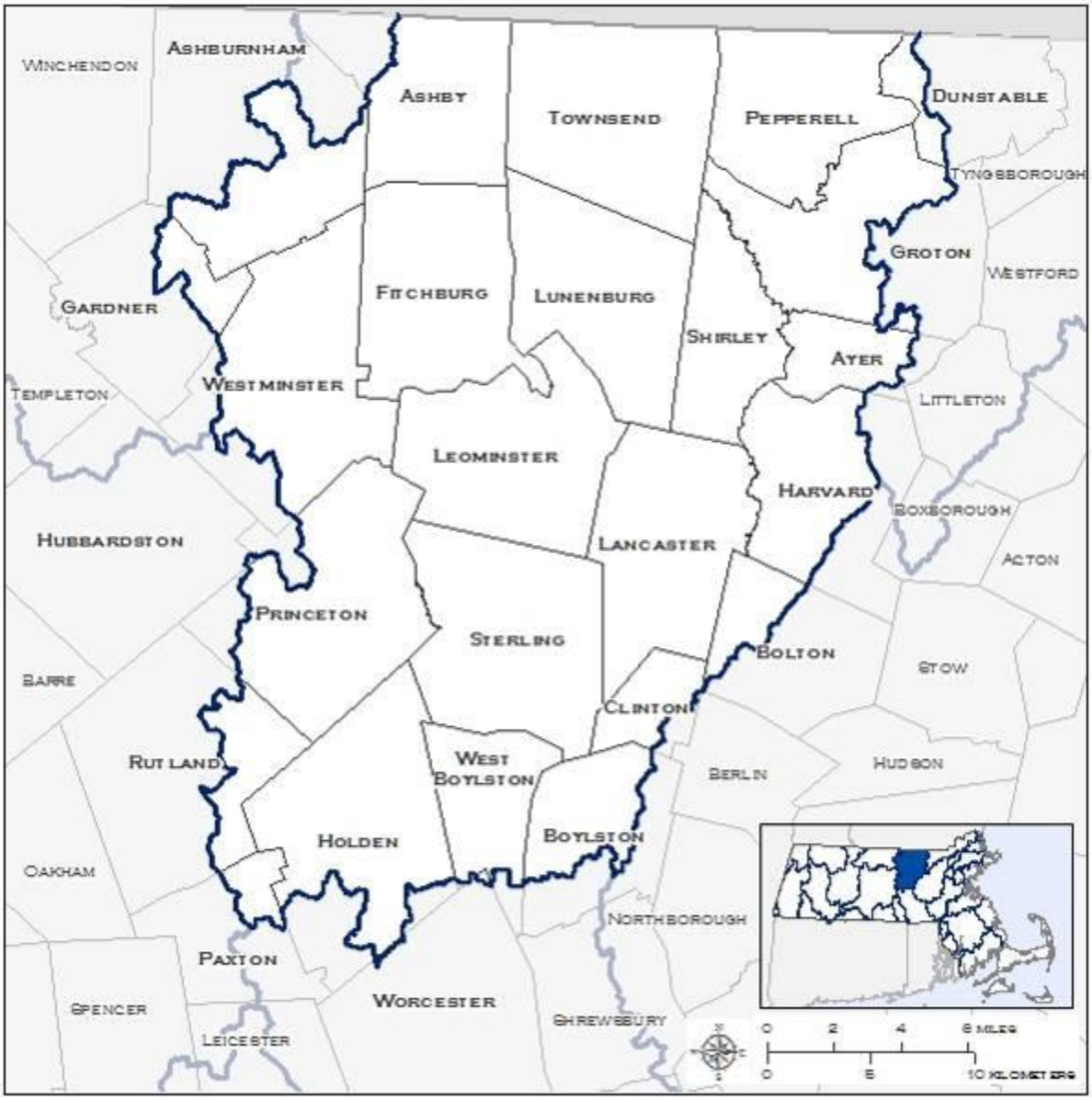
Narragansett Bay & Mt. Hope Bay Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17.27	+0.05 to +1.84	-0.02 to +2.38	-1.29 to +3.19	-0.97 to +3.92
	Winter	10.48	-0.72 to +1.82	-1.01 to +1.78	-0.51 to +2.07	-0.97 to +2.26
	Spring	11.13	-1.13 to +0.55	-0.79 to +1.08	-1.09 to +1.04	-1.17 to +1.22
	Summer	12.84	-1.07 to +1.82	-0.83 to +1.83	-1.32 to +2.69	-1.17 to +3.24
	Fall	13.2	-0.13 to +2.17	-0.35 to +2.45	-0.65 to +2.76	-0.51 to +3.25

- 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	46.78	+2.20 to +4.44	+2.99 to +6.39	+3.54 to +9.02	+3.90 to +10.95
	Winter	25.2	+2.20 to +5.10	+2.81 to +7.60	+3.65 to +9.22	+3.94 to +10.58
	Spring	44.94	+1.64 to +3.47	+2.51 to +5.53	+2.72 to +7.71	+3.25 to +9.45
	Summer	67.56	+2.24 to +4.55	+3.14 to +7.02	+3.53 to +10.13	+3.98 to +12.60
	Fall	49.01	+2.18 to +5.10	+3.71 to +6.64	+3.58 to +9.54	+4.05 to +11.79
Maximum Temperature	Annual	57.77	+2.06 to +4.26	+2.73 to +6.47	+3.23 to +9.09	+3.55 to +10.95
	Winter	35.13	+1.84 to +4.62	+2.44 to +7.05	+3.02 to +8.41	+3.43 to +9.60
	Spring	56.16	+1.52 to +3.43	+2.35 to +5.51	+2.67 to +7.91	+3.25 to +9.55
	Summer	79.16	+1.97 to +4.68	+2.98 to +7.23	+3.42 to +10.45	+3.87 to +12.93
	Fall	60.19	+2.34 to +4.92	+3.56 to +6.97	+3.45 to +9.79	+3.96 to +12.25
Minimum Temperature	Annual	35.78	+2.33 to +4.78	+3.26 to +6.47	+3.80 to +8.94	+4.24 to +11.00
	Winter	15.26	+2.49 to +5.62	+3.27 to +8.10	+4.23 to +10.02	+4.41 to +11.40
	Spring	33.72	+1.77 to +3.82	+2.66 to +5.92	+2.83 to +7.51	+3.25 to +9.31
	Summer	55.97	+2.46 to +4.60	+3.23 to +7.16	+3.65 to +9.81	+4.12 to +12.27
	Fall	37.83	+1.99 to +5.23	+3.62 to +6.59	+3.68 to +9.27	+4.11 to +11.62

- 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	4.37	+5.83 to +17.04	+8.93 to +29.98	+10.40 to +49.93	+12.50 to +69.88
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.24	-0.00 to +0.65	+0.20 to +1.28	+0.21 to +2.51	+0.19 to +4.28
	Summer	3.94	+5.20 to +14.96	+7.81 to +25.88	+9.57 to +42.15	+11.08 to +56.44
	Fall	0.19	+0.32 to +1.41	+0.47 to +3.46	+0.42 to +7.15	+0.67 to +9.96
Days with Maximum Temperature Over 95°F	Annual	0.23	+1.39 to +6.21	+2.17 to +13.14	+2.81 to +26.83	+3.52 to +42.01
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.14	+0.00 to +0.28	+0.00 to +0.72	+0.00 to +1.42
	Summer	0.21	+1.28 to +5.58	+2.00 to +12.11	+2.49 to +23.90	+3.32 to +36.89
	Fall	0.01	+0.03 to +0.43	+0.02 to +0.77	+0.04 to +2.16	+0.07 to +3.48
Days with Maximum Temperature Over 100°F	Annual	0.01	+0.10 to +1.12	+0.18 to +3.25	+0.24 to +8.55	+0.17 to +17.37
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.02	+0.00 to +0.10	+0.00 to +0.27
	Summer	0.01	+0.10 to +1.08	+0.15 to +3.17	+0.22 to +8.08	+0.17 to +16.25
	Fall	0.00	+0.00 to +0.06	+0.00 to +0.14	+0.00 to +0.36	+0.00 to +0.84

- 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.

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	9.32	-2.91	to	-5.69	-3.75	to	-6.66	-4.25	to	-7.21	-4.24	to	-7.76
	Winter	9.03	-2.78	to	-5.54	-3.51	to	-6.46	-4.02	to	-6.94	-4.09	to	-7.47
	Spring	0.3	-0.05	to	-0.38	-0.09	to	-0.39	-0.10	to	-0.43	-0.10	to	-0.43
	Summer	0.00	-0.00	to	-0.00	-0.00	to	-0.00	-0.00	to	-0.00	-0.00	to	-0.00
	Fall	0.02	-0.01	to	-0.00	-0.02	to	-0.00	-0.02	to	-0.00	-0.02	to	-0.00
Days with Minimum Temperature Below 32°F	Annual	156.4	-10.61	to	-28.20	-18.80	to	-38.26	-21.68	to	-53.63	-22.97	to	-63.67
	Winter	85.3	-1.24	to	-5.2	-2.10	to	-8.23	-3.27	to	-16.04	-3.66	to	-20.34
	Spring	40.46	-3.90	to	-11.63	-6.35	to	-15.66	-8.04	to	-20.12	-9.00	to	-21.62
	Summer	0.04	-0.15	to	-0.00	-0.00	to	-0.19	-0.00	to	-0.16	-0.00	to	-0.13
	Fall	30.54	-5.14	to	-12.23	-9.02	to	-14.91	-8.88	to	-18.95	-9.01	to	-22.04

- 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.

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	7091.79	-574.29	to	-1223.22	-805.57	to	-1700.61	-937.13	to	-2246.51	-1053.84	to	-2622.98
	Winter	3601.55	-187.35	to	-476.29	-247.70	to	-697.10	-322.63	to	-837.51	-365.72	to	-974.31
	Spring	1861.47	-138.32	to	-302.13	-215.35	to	-473.28	-230.00	to	-622.45	-289.72	to	-736.02
	Summer	140.64	-48.96	to	-83.63	-64.24	to	-106.39	-72.51	to	-119.59	-74.89	to	-123.87
	Fall	1488.15	-169.43	to	-399.86	-295.39	to	-489.23	-275.83	to	-683.30	-296.08	to	-784.01
Cooling Degree-Days (Base 65°F)	Annual	432.47	+201.09	to	+421.21	+270.66	to	+711.61	+324.82	to	+1091.32	+372.55	to	+1458.24
	Winter	nan	-1.75	to	-1.75	+1.46	to	+2.51	-0.95	to	+0.57	-0.89	to	+0.24
	Spring	17.23	+9.26	to	+23.64	+15.28	to	+48.01	+18.93	to	+84.62	+15.21	to	+117.63
	Summer	376.56	+163.10	to	+334.53	+208.02	to	+544.69	+241.40	to	+817.45	+275.68	to	+1038.01
	Fall	32.88	+23.17	to	+77.67	+36.85	to	+131.04	+43.60	to	+216.44	+62.31	to	+296.90
Growing Degree-Days (Base 50°F)	Annual	2270.01	+392.88	to	+799.66	+533.36	to	+1235.75	+647.26	to	+1889.26	+730.02	to	+2366.80
	Winter	4.47	-1.32	to	+7.50	-0.30	to	+10.40	+0.84	to	+14.27	+1.85	to	+18.63
	Spring	253.78	+58.70	to	+127.26	+84.43	to	+227.02	+101.03	to	+345.92	+106.94	to	+452.93
	Summer	1616.56	+206.04	to	+417.43	+287.04	to	+644.86	+323.12	to	+931.16	+364.44	to	+1158.27
	Fall	384.19	+108.96	to	+283.49	+167.87	to	+394.57	+159.46	to	+593.10	+206.63	to	+750.08

- 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	7.34	+0.25 to +1.96	+0.54 to +3.32	+1.14 to +3.09	+1.05 to +4.00
	Winter	1.76	-0.10 to +0.73	+0.11 to +1.06	+0.23 to +1.55	+0.36 to +1.98
	Spring	1.54	-0.12 to +0.64	-0.16 to +0.88	-0.07 to +1.16	+0.03 to +1.41
	Summer	1.69	-0.21 to +0.51	-0.06 to +0.71	-0.16 to +0.63	-0.24 to +0.72
	Fall	2.33	-0.35 to +0.80	-0.15 to +1.01	-0.21 to +0.92	-0.38 to +1.06
Days with Precipitation Over 2"	Annual	0.7	-0.04 to +0.45	+0.07 to +0.44	+0.10 to +0.55	+0.12 to +0.64
	Winter	0.05	-0.04 to +0.07	-0.04 to +0.09	-0.04 to +0.13	-0.04 to +0.16
	Spring	0.19	-0.04 to +0.12	-0.01 to +0.17	+0.01 to +0.21	+0.02 to +0.31
	Summer	0.16	-0.03 to +0.13	-0.02 to +0.13	-0.06 to +0.13	-0.06 to +0.14
	Fall	0.3	-0.05 to +0.27	-0.03 to +0.27	-0.01 to +0.23	-0.07 to +0.24
Days with Precipitation Over 4"	Annual	0.02	-0.02 to +0.05	-0.03 to +0.06	-0.02 to +0.05	-0.03 to +0.09
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.01	-0.00 to +0.01	+0.00 to +0.02
	Summer	0.02	-0.01 to +0.03	-0.01 to +0.03	-0.02 to +0.02	-0.02 to +0.03
	Fall	0.00	-0.03 to +0.05	-0.03 to +0.03	-0.03 to +0.04	-0.03 to +0.04

- 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.

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	45.89	+0.43 to +4.88	+1.15 to +6.29	+2.26 to +7.87	+1.25 to +8.38
	Winter	10.98	-0.30 to +1.90	+0.17 to +2.47	+0.39 to +3.34	+0.63 to +4.29
	Spring	11.82	-0.02 to +2.18	+0.05 to +2.03	+0.47 to +2.98	+0.13 to +2.91
	Summer	11.27	-0.28 to +1.51	-0.34 to +2.20	-0.57 to +2.22	-1.13 to +2.16
	Fall	11.83	-1.11 to +1.13	-1.18 to +1.77	-1.61 to +1.71	-1.44 to +1.52

- 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	16.21	-0.41 to +1.65	-0.79 to +1.71	-0.75 to +2.13	-0.64 to +2.82
	Winter	11.14	-0.91 to +1.00	-0.63 to +1.42	-1.10 to +1.39	-0.92 to +1.54
	Spring	10.62	-1.04 to +0.74	-1.21 to +1.31	-1.42 to +0.97	-1.55 to +0.75
	Summer	11.6	-1.05 to +1.55	-0.64 to +1.62	-1.12 to +2.53	-1.41 to +2.60
	Fall	11.9	-0.05 to +1.72	-0.13 to +2.55	-0.35 to +3.13	-0.45 to +3.20

- 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	49.69	+2.11 to +4.21	+2.71 to +6.19	+3.23 to +8.93	+3.51 to +10.78
	Winter	29.52	+2.12 to +4.66	+2.79 to +6.99	+3.50 to +8.90	+3.85 to +10.35
	Spring	47.04	+2.02 to +3.77	+2.68 to +5.67	+2.80 to +8.12	+3.38 to +9.87
	Summer	69.56	+1.94 to +4.11	+2.48 to +6.40	+2.91 to +9.46	+3.51 to +12.06
	Fall	52.28	+1.96 to +4.55	+3.25 to +6.45	+3.01 to +9.24	+3.53 to +11.61
Maximum Temperature	Annual	59.15	+1.99 to +3.99	+2.54 to +5.98	+2.98 to +8.89	+3.24 to +10.68
	Winter	38.13	+1.83 to +4.25	+2.39 to +6.55	+3.06 to +8.27	+3.44 to +9.56
	Spring	56.76	+1.87 to +3.66	+2.40 to +5.65	+2.78 to +8.30	+3.31 to +9.82
	Summer	79.63	+1.77 to +4.20	+2.39 to +6.31	+2.83 to +9.61	+3.31 to +12.17
	Fall	61.67	+1.99 to +4.44	+2.97 to +6.56	+2.93 to +9.50	+3.38 to +11.87
Minimum Temperature	Annual	40.24	+2.18 to +4.45	+2.90 to +6.35	+3.49 to +8.98	+3.80 to +10.88
	Winter	20.91	+2.40 to +5.05	+3.13 to +7.43	+3.99 to +9.51	+4.28 to +10.92
	Spring	37.32	+2.09 to +3.96	+2.94 to +5.93	+2.96 to +7.94	+3.51 to +9.84
	Summer	59.49	+2.03 to +4.08	+2.59 to +6.71	+3.01 to +9.32	+3.68 to +11.95
	Fall	42.9	+1.93 to +4.69	+3.31 to +6.31	+3.13 to +9.22	+3.71 to +11.40

- 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	7.69	+4.95 to +15.28	+6.87 to +26.29	+8.40 to +44.55	+9.99 to +62.44
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.44	+0.20 to +0.69	+0.27 to +1.27	+0.35 to +2.06	+0.26 to +3.65
	Summer	6.96	+4.33 to +13.36	+5.72 to +21.92	+7.32 to +36.60	+9.04 to +50.06
	Fall	0.29	+0.27 to +1.52	+0.55 to +4.02	+0.61 to +7.35	+0.88 to +10.12
Days with Maximum Temperature Over 95°F	Annual	0.88	+1.31 to +5.65	+1.79 to +11.11	+2.58 to +22.84	+3.79 to +36.76
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.02 to +0.18	+0.00 to +0.37	+0.06 to +0.68	+0.06 to +1.38
	Summer	0.87	+1.22 to +5.17	+1.61 to +10.05	+2.53 to +19.81	+3.30 to +31.92
	Fall	0.01	+0.01 to +0.39	+0.02 to +1.16	+0.07 to +2.87	+0.11 to +3.84
Days with Maximum Temperature Over 100°F	Annual	0.04	+0.09 to +1.16	+0.16 to +3.10	+0.29 to +6.74	+0.24 to +12.53
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.02	+0.00 to +0.04	+0.00 to +0.10	+0.00 to +0.33
	Summer	0.04	+0.09 to +1.11	+0.15 to +2.94	+0.27 to +6.41	+0.23 to +11.39
	Fall	0.00	+0.00 to +0.04	+0.00 to +0.17	+0.00 to +0.46	+0.00 to +0.77

- 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.

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	2.95	-0.74 to -2.06	-0.90 to -2.38	-1.07 to -2.45	-1.00 to -2.52
	Winter	2.93	-0.69 to -1.89	-0.87 to -2.25	-1.02 to -2.36	-0.97 to -2.43
	Spring	0.01	-0.11 to +0.02	-0.01 to -0.11	-0.01 to -0.15	-0.01 to -0.13
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.01	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	120.82	-12.22 to -28.83	-17.84 to -43.56	-21.65 to -55.88	-23.01 to -65.50
	Winter	76.8	-4.10 to -10.67	-4.91 to -18.32	-7.40 to -26.65	-8.57 to -34.00
	Spring	27.42	-4.91 to -10.9	-7.06 to -14.96	-7.59 to -18.49	-8.66 to -20.08
	Summer	0.00	-0.01 to -0.00	-0.02 to -0.00	-0.01 to -0.00	-0.01 to -0.00
	Fall	16.57	-3.98 to -8.1	-5.50 to -10.35	-6.53 to -12.47	-5.68 to -14.22

- 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.

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	6193.81	-528.62 to -1102.64	-692.10 to -1516.82	-830.38 to -2018.81	-929.00 to -2400.79
	Winter	3212	-188.00 to -430.36	-243.05 to -645.03	-310.20 to -807.53	-354.54 to -950.14
	Spring	1675.26	-165.76 to -316.19	-222.17 to -473.13	-238.63 to -649.81	-302.20 to -763.26
	Summer	87.94	-33.00 to -56.47	-40.33 to -71.25	-47.31 to -80.73	-51.48 to -83.01
	Fall	1214.54	-134.08 to -331.01	-239.49 to -425.01	-227.88 to -603.93	-248.95 to -687.75
Cooling Degree-Days (Base 65°F)	Annual	590.17	+204.10 to +434.37	+275.87 to +731.01	+319.84 to +1139.47	+371.06 to +1509.14
	Winter	nan	+0.34 to +4.99	+0.29 to +5.52	+0.08 to +4.76	-0.10 to +6.13
	Spring	23.9	+13.34 to +33.09	+22.55 to +56.81	+24.43 to +94.09	+19.24 to +142.13
	Summer	507.43	+141.60 to +326.05	+182.27 to +522.95	+217.01 to +790.27	+263.52 to +1025.40
	Fall	55.69	+30.02 to +89.23	+44.23 to +176.78	+53.38 to +271.87	+76.15 to +353.84
Growing Degree-Days (Base 50°F)	Annual	2634.57	+387.11 to +794.67	+539.35 to +1228.18	+609.84 to +1941.74	+689.17 to +2448.70
	Winter	5.96	+0.84 to +15.31	+2.52 to +18.15	+6.35 to +32.73	+5.45 to +41.95
	Spring	296.04	+84.41 to +160.60	+107.65 to +261.80	+118.20 to +395.84	+129.35 to +513.56
	Summer	1799.58	+178.50 to +377.86	+227.86 to +588.47	+267.34 to +870.20	+322.00 to +1109.17
	Fall	527.84	+100.32 to +282.53	+170.51 to +427.24	+159.56 to +645.24	+213.63 to +810.83

- 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	7.96	+0.22 to +1.91	+0.48 to +2.83	+0.99 to +2.70	+1.09 to +3.58
	Winter	2.03	+0.02 to +0.77	+0.15 to +1.24	+0.21 to +1.58	+0.31 to +1.73
	Spring	1.85	-0.13 to +0.77	-0.03 to +1.02	+0.09 to +1.28	+0.14 to +1.18
	Summer	1.66	-0.14 to +0.51	-0.14 to +0.53	-0.14 to +0.57	-0.18 to +0.51
	Fall	2.42	-0.29 to +0.61	-0.18 to +0.80	-0.40 to +0.62	-0.34 to +0.89
Days with Precipitation Over 2"	Annual	1.1	+0.01 to +0.51	-0.02 to +0.65	+0.10 to +0.66	+0.12 to +0.88
	Winter	0.19	-0.04 to +0.14	+0.01 to +0.17	-0.01 to +0.24	+0.03 to +0.34
	Spring	0.23	-0.04 to +0.16	-0.06 to +0.25	-0.05 to +0.26	+0.00 to +0.37
	Summer	0.31	-0.06 to +0.12	-0.04 to +0.14	-0.04 to +0.11	-0.05 to +0.16
	Fall	0.38	-0.06 to +0.24	-0.02 to +0.25	+0.00 to +0.24	-0.08 to +0.35
Days with Precipitation Over 4"	Annual	0.07	-0.01 to +0.12	+0.00 to +0.12	+0.00 to +0.12	-0.01 to +0.21
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.01
	Spring	0.00	-0.01 to +0.04	+0.00 to +0.05	-0.01 to +0.05	-0.01 to +0.06
	Summer	0.01	-0.01 to +0.04	-0.01 to +0.05	-0.01 to +0.04	-0.01 to +0.06
	Fall	0.05	-0.02 to +0.07	-0.02 to +0.07	-0.02 to +0.09	-0.03 to +0.11

- 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.

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	45.31	+0.02 to +4.41	+0.03 to +5.52	+0.72 to +6.70	+0.76 to +7.17
	Winter	11.67	-0.32 to +1.77	+0.17 to +2.39	+0.30 to +3.12	+0.52 to +4.08
	Spring	11.54	-0.22 to +2.15	-0.05 to +2.11	+0.08 to +2.57	+0.10 to +2.70
	Summer	10.05	-0.34 to +1.41	-0.57 to +1.94	-0.97 to +2.10	-1.67 to +1.78
	Fall	12.12	-1.07 to +0.89	-1.12 to +1.36	-1.88 to +1.54	-1.75 to +1.23

- 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%).

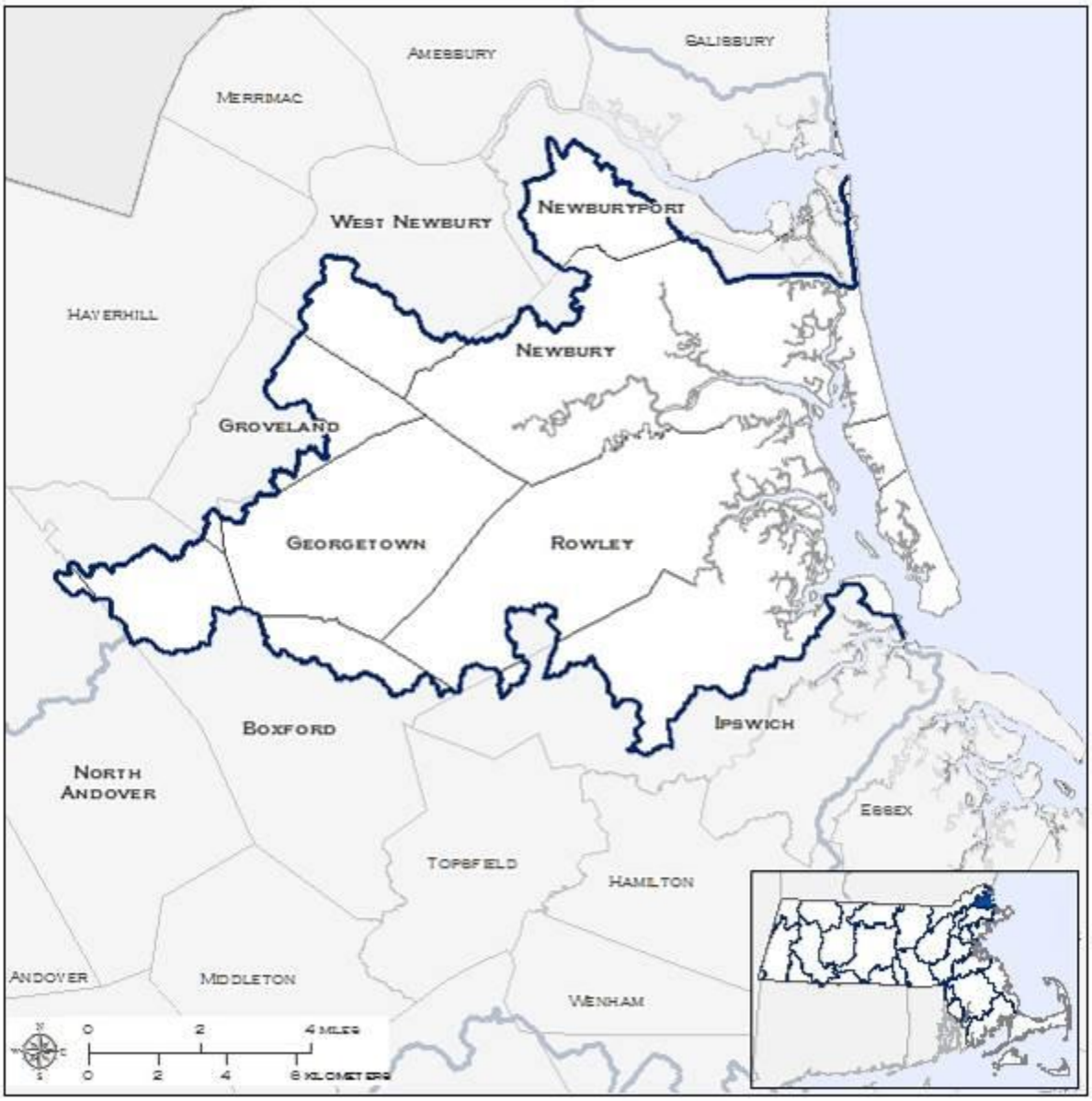
North Coastal Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17.01	-0.32 to +1.58	-0.15 to +2.57	-1.11 to +2.81	-0.20 to +2.74
	Winter	11.35	-0.89 to +1.29	-0.71 to +1.40	-0.98 to +2.18	-1.12 to +1.93
	Spring	11.21	-1.14 to +1.05	-1.10 to +1.08	-1.20 to +1.13	-1.34 to +0.95
	Summer	13.22	-0.79 to +1.49	-0.69 to +1.63	-1.12 to +2.79	-1.04 to +2.50
	Fall	12.25	-0.10 to +2.25	-0.12 to +3.05	-0.61 to +3.65	-0.12 to +3.14

- 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	49.16	+2.20 to +4.31	+2.87 to +6.26	+3.38 to +9.02	+3.70 to +10.90
	Winter	28.49	+2.34 to +5.00	+3.10 to +7.48	+3.81 to +9.44	+4.11 to +10.95
	Spring	46.77	+2.00 to +3.78	+2.75 to +5.63	+2.87 to +8.04	+3.47 to +9.81
	Summer	69.44	+1.94 to +4.06	+2.58 to +6.24	+3.02 to +9.24	+3.62 to +11.77
	Fall	51.56	+1.98 to +4.70	+3.33 to +6.56	+3.16 to +9.49	+3.62 to +11.85
Maximum Temperature	Annual	59.44	+2.07 to +4.08	+2.69 to +6.08	+3.12 to +9.00	+3.43 to +10.82
	Winter	37.78	+2.04 to +4.65	+2.67 to +7.02	+3.36 to +8.81	+3.74 to +10.18
	Spring	57.37	+1.84 to +3.62	+2.47 to +5.66	+2.84 to +8.23	+3.35 to +9.73
	Summer	80.37	+1.78 to +4.15	+2.48 to +6.14	+2.91 to +9.41	+3.45 to +11.95
	Fall	61.83	+2.04 to +4.58	+3.14 to +6.73	+3.06 to +9.74	+3.47 to +12.17
Minimum Temperature	Annual	38.88	+2.29 to +4.58	+3.09 to +6.39	+3.66 to +9.04	+4.00 to +10.98
	Winter	19.21	+2.64 to +5.42	+3.47 to +7.95	+4.32 to +10.06	+4.57 to +11.58
	Spring	36.16	+2.08 to +3.99	+3.01 to +5.87	+3.01 to +7.85	+3.58 to +9.75
	Summer	58.52	+2.02 to +4.12	+2.67 to +6.64	+3.14 to +9.07	+3.77 to +11.59
	Fall	41.29	+1.92 to +4.84	+3.27 to +6.41	+3.26 to +9.40	+3.79 to +11.68

- 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	7.84	+5.69 to +17.05	+8.85 to +29.76	+11.06 to +49.13	+12.68 to +67.40
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.41	+0.22 to +0.85	+0.45 to +1.45	+0.42 to +2.53	+0.26 to +4.40
	Summer	7.09	+4.75 to +14.70	+7.27 to +23.60	+9.31 to +39.60	+11.08 to +53.05
	Fall	0.35	+0.45 to +2.09	+0.70 to +4.74	+0.75 to +8.45	+0.99 to +11.87
Days with Maximum Temperature Over 95°F	Annual	0.89	+1.96 to +6.74	+2.43 to +12.44	+3.36 to +26.24	+5.03 to +40.88
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.03 to +0.27	+0.05 to +0.49	+0.07 to +0.88	+0.09 to +1.62
	Summer	0.89	+1.75 to +6.27	+2.09 to +10.86	+2.93 to +22.67	+4.62 to +35.02
	Fall	0.00	+0.06 to +0.59	+0.08 to +1.62	+0.12 to +3.73	+0.23 to +5.13
Days with Maximum Temperature Over 100°F	Annual	0.05	+0.14 to +1.53	+0.30 to +3.67	+0.45 to +8.10	+0.33 to +15.16
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.03	+0.00 to +0.07	+0.00 to +0.15	+0.00 to +0.44
	Summer	0.05	+0.14 to +1.47	+0.26 to +3.49	+0.38 to +7.65	+0.32 to +13.87
	Fall	0.00	+0.00 to +0.09	+0.00 to +0.21	+0.00 to +0.65	+0.00 to +1.22

- 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.

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	4.39	-1.08 to -2.72	-1.27 to -3.07	-1.44 to -3.13	-1.37 to -3.24
	Winter	4.29	-1.01 to -2.41	-1.21 to -2.71	-1.38 to -2.97	-1.31 to -3.12
	Spring	0.07	-0.23 to +0.00	-0.02 to -0.23	-0.02 to -0.26	-0.02 to -0.26
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.02	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	132.6	-12.17 to -29.34	-18.89 to -43.84	-22.50 to -57.61	-24.14 to -68.12
	Winter	79.76	-3.42 to -8.85	-4.57 to -15.94	-6.55 to -24.71	-7.91 to -31.49
	Spring	31.9	-4.84 to -11.32	-7.36 to -15.38	-8.33 to -18.80	-8.61 to -20.50
	Summer	0.00	-0.09 to -0.00	-0.10 to -0.00	-0.12 to -0.00	-0.11 to -0.00
	Fall	20.89	-3.99 to -9.99	-6.52 to -12.42	-6.99 to -15.27	-6.41 to -17.10

- 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.

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	6360.53	-551.73	to	-1138.92	-728.11	to	-1557.70	-871.53	to	-2081.32	-972.78	to	-2478.35
	Winter	3300.37	-206.50	to	-464.88	-270.66	to	-689.72	-338.70	to	-857.20	-381.47	to	-1005.52
	Spring	1700.34	-164.68	to	-315.16	-227.39	to	-463.78	-241.86	to	-638.66	-304.78	to	-751.54
	Summer	89.98	-29.94	to	-54.81	-39.26	to	-68.98	-46.99	to	-79.25	-49.09	to	-79.76
	Fall	1274.42	-135.10	to	-342.22	-242.88	to	-434.91	-227.44	to	-624.07	-250.64	to	-717.01
Cooling Degree-Days (Base 65°F)	Annual	582.98	+206.58	to	+433.24	+283.59	to	+719.18	+338.43	to	+1123.48	+397.58	to	+1488.76
	Winter	nan	+1.75	to	+3.07	+0.55	to	+5.29	+1.62	to	+4.95	+1.01	to	+4.25
	Spring	22.75	+14.59	to	+34.40	+21.90	to	+57.00	+25.08	to	+96.54	+19.85	to	+143.89
	Summer	498.57	+143.61	to	+317.95	+190.99	to	+508.51	+226.44	to	+772.28	+275.06	to	+1001.15
	Fall	52.4	+32.16	to	+91.95	+46.92	to	+176.07	+55.64	to	+272.10	+82.86	to	+354.20
Growing Degree-Days (Base 50°F)	Annual	2598.8	+391.13	to	+795.02	+558.65	to	+1205.02	+629.66	to	+1913.49	+716.77	to	+2417.98
	Winter	5.46	+0.51	to	+14.97	+2.56	to	+17.71	+5.30	to	+31.64	+4.50	to	+40.02
	Spring	292.03	+81.36	to	+158.42	+107.29	to	+261.20	+121.94	to	+391.11	+131.69	to	+508.17
	Summer	1788.7	+178.46	to	+373.38	+236.50	to	+574.17	+277.73	to	+849.97	+332.65	to	+1082.21
	Fall	498.06	+97.94	to	+287.36	+173.32	to	+421.83	+158.69	to	+641.84	+214.71	to	+810.58

- 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	7.8	+0.13 to +1.89	+0.47 to +2.74	+0.85 to +2.55	+0.87 to +3.22
	Winter	2	-0.12 to +0.70	+0.20 to +1.17	+0.24 to +1.45	+0.29 to +1.77
	Spring	1.83	-0.22 to +0.68	-0.08 to +0.88	+0.01 to +1.15	+0.07 to +1.13
	Summer	1.57	-0.13 to +0.48	-0.16 to +0.64	-0.17 to +0.53	-0.16 to +0.52
	Fall	2.41	-0.38 to +0.60	-0.12 to +0.70	-0.32 to +0.70	-0.30 to +0.81
Days with Precipitation Over 2"	Annual	0.99	+0.02 to +0.45	+0.02 to +0.48	+0.13 to +0.66	+0.10 to +0.85
	Winter	0.12	-0.03 to +0.11	-0.01 to +0.10	+0.00 to +0.16	-0.01 to +0.25
	Spring	0.24	-0.04 to +0.17	-0.03 to +0.18	-0.05 to +0.29	+0.00 to +0.31
	Summer	0.18	-0.05 to +0.11	-0.03 to +0.11	-0.05 to +0.08	-0.05 to +0.11
	Fall	0.45	-0.09 to +0.29	-0.03 to +0.21	-0.03 to +0.23	-0.07 to +0.32
Days with Precipitation Over 4"	Annual	0.08	-0.01 to +0.14	-0.01 to +0.13	-0.03 to +0.13	-0.03 to +0.21
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.02
	Spring	0.00	-0.02 to +0.05	-0.01 to +0.05	-0.02 to +0.07	-0.01 to +0.10
	Summer	0.02	-0.01 to +0.03	-0.01 to +0.03	-0.02 to +0.02	-0.02 to +0.05
	Fall	0.06	-0.04 to +0.10	-0.03 to +0.07	-0.03 to +0.09	-0.05 to +0.10

- 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.

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	-0.17 to +4.33	+0.20 to +5.63	+0.55 to +6.78	+0.81 to +7.55
	Winter	11.48	-0.31 to +1.80	+0.16 to +2.50	+0.52 to +3.24	+0.45 to +3.94
	Spring	11.64	-0.11 to +2.36	-0.06 to +2.22	+0.17 to +2.64	+0.18 to +2.67
	Summer	10.07	-0.25 to +1.10	-0.68 to +1.64	-0.83 to +1.61	-1.46 to +1.57
	Fall	12.26	-1.18 to +1.16	-1.17 to +1.44	-1.60 to +1.58	-1.45 to +1.45

- 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	16.49	-0.53 to +1.47	-0.58 to +2.45	-0.99 to +2.84	-0.43 to +2.76
	Winter	12.02	-0.94 to +1.21	-0.75 to +1.47	-1.17 to +1.74	-0.88 to +1.61
	Spring	11.44	-1.09 to +0.85	-1.17 to +1.58	-1.66 to +1.57	-1.34 to +1.45
	Summer	12.84	-0.72 to +1.45	-0.61 to +1.91	-1.04 to +2.68	-0.88 to +2.34
	Fall	12.02	-0.22 to +1.90	-0.15 to +2.86	-0.49 to +3.10	-0.14 to +2.94

- 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	46.86	+2.17 to +4.32	+2.98 to +6.37	+3.57 to +9.03	+3.92 to +11.07
	Winter	25.4	+2.25 to +5.01	+2.92 to +7.55	+3.66 to +9.27	+4.19 to +10.66
	Spring	45.02	+1.39 to +3.34	+2.30 to +5.65	+2.55 to +7.81	+3.02 to +9.57
	Summer	67.46	+2.28 to +4.42	+3.05 to +7.07	+3.48 to +10.28	+4.02 to +12.59
	Fall	49.17	+2.32 to +5.40	+4.10 to +6.90	+3.89 to +9.60	+4.34 to +11.73
Maximum Temperature	Annual	57.82	+2.05 to +4.14	+2.74 to +6.40	+3.23 to +9.10	+3.57 to +10.94
	Winter	35.52	+1.76 to +4.58	+2.53 to +6.89	+3.04 to +8.47	+3.46 to +9.84
	Spring	56.31	+1.26 to +3.33	+2.08 to +5.55	+2.48 to +7.90	+3.00 to +9.59
	Summer	78.79	+2.07 to +4.51	+2.87 to +7.11	+3.37 to +10.50	+3.81 to +12.91
	Fall	60.26	+2.39 to +5.15	+3.89 to +7.02	+3.71 to +9.81	+4.26 to +12.06
Minimum Temperature	Annual	35.9	+2.29 to +4.58	+3.30 to +6.59	+3.91 to +9.00	+4.28 to +11.08
	Winter	15.29	+2.63 to +5.57	+3.33 to +8.12	+4.37 to +10.04	+4.76 to +11.59
	Spring	33.72	+1.51 to +3.59	+2.50 to +6.02	+2.65 to +7.84	+3.11 to +9.45
	Summer	56.13	+2.35 to +4.48	+3.22 to +7.13	+3.59 to +10.05	+4.24 to +12.33
	Fall	38.08	+2.18 to +5.48	+3.97 to +6.80	+4.04 to +9.39	+4.40 to +11.63

- 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	3.28	+4.45 to +13.91	+7.24 to +26.64	+9.13 to +46.88	+10.86 to +65.64
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.2	+0.00 to +0.55	+0.04 to +0.98	+0.17 to +1.98	+0.13 to +3.21
	Summer	2.87	+3.94 to +12.15	+6.28 to +23.39	+7.95 to +40.04	+9.81 to +53.84
	Fall	0.21	+0.29 to +1.29	+0.47 to +2.97	+0.44 to +6.51	+0.75 to +8.81
Days with Maximum Temperature Over 95°F	Annual	0.14	+0.83 to +4.24	+1.38 to +10.23	+1.87 to +21.73	+2.75 to +35.64
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	-0.03 to +0.11	-0.01 to +0.20	+0.00 to +0.55	+0.00 to +0.96
	Summer	0.14	+0.84 to +3.78	+1.21 to +9.54	+1.72 to +19.77	+2.58 to +32.45
	Fall	0.00	-0.01 to +0.30	+0.01 to +0.57	+0.04 to +1.48	+0.05 to +2.58
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.03 to +0.64	+0.07 to +2.12	+0.10 to +5.62	+0.07 to +12.37
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.02	+0.00 to +0.07	+0.00 to +0.22
	Summer	0.00	+0.03 to +0.53	+0.05 to +2.08	+0.08 to +5.29	+0.07 to +11.75
	Fall	0.00	+0.00 to +0.07	+0.00 to +0.09	+0.00 to +0.28	+0.00 to +0.52

- 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.

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	10.37	-3.17 to -5.85	-3.98 to -6.78	-4.53 to -7.56	-4.26 to -7.76
	Winter	10.07	-3.14 to -5.54	-3.87 to -6.6	-4.30 to -7.3	-4.17 to -7.55
	Spring	0.31	-0.01 to -0.41	-0.04 to -0.35	-0.05 to -0.44	-0.05 to -0.48
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.03	-0.03 to -0.00	-0.03 to -0.00	-0.03 to -0.00	-0.03 to -0.00
Days with Minimum Temperature Below 32°F	Annual	155.47	-9.93 to -26.23	-18.79 to -38.37	-21.14 to -53.74	-24.17 to -65.02
	Winter	85.06	-1.35 to -5.91	-2.35 to -8.55	-3.15 to -16.33	-4.08 to -20.71
	Spring	40.44	-2.75 to -10	-5.79 to -15.74	-6.94 to -20.49	-8.23 to -21.80
	Summer	0.00	-0.11 to -0.00	-0.17 to -0.00	-0.15 to -0.00	-0.15 to -0.00
	Fall	29.91	-5.34 to -12.65	-9.24 to -15.55	-9.36 to -19.52	-9.37 to -22.56

- 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.

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	7051.66	-562.90 to -1196.41	-801.48 to -1701.05	-931.07 to -2249.59	-1072.20 to -2634.36
	Winter	3586.92	-192.09 to -465.90	-258.66 to -691.11	-324.18 to -840.67	-383.55 to -979.67
	Spring	1853.55	-115.56 to -290.38	-196.45 to -483.98	-218.21 to -640.25	-271.00 to -757.64
	Summer	136.76	-46.44 to -82.21	-68.51 to -104.81	-72.24 to -119.66	-80.43 to -126.42
	Fall	1473	-178.24 to -416.19	-317.05 to -500.02	-295.25 to -683.24	-314.25 to -781.69
Cooling Degree-Days (Base 65°F)	Annual	416.64	+209.27 to +410.82	+278.31 to +714.53	+324.21 to +1097.31	+370.70 to +1442.42
	Winter	nan	nan to nan	nan to nan	nan to nan	nan to nan
	Spring	15.7	+6.03 to +23.19	+12.32 to +46.61	+16.57 to +77.56	+16.2 to +109.43
	Summer	363.25	+157.61 to +328.19	+202.47 to +546.17	+239.20 to +828.87	+279.91 to +1037.18
	Fall	32.16	+26.92 to +77.46	+42.18 to +127.45	+51.11 to +215.86	+70.84 to +295.77
Growing Degree-Days (Base 50°F)	Annual	2266.47	+410.24 to +783.29	+561.94 to +1258.10	+657.10 to +1909.03	+734.53 to +2395.67
	Winter	4.81	-0.80 to +9.27	+0.11 to +11.03	+0.62 to +15.39	+0.86 to +21.95
	Spring	256.07	+52.35 to +125.44	+76.61 to +227.32	+91.53 to +350.81	+94.95 to +449.17
	Summer	1607.1	+209.34 to +406.29	+278.77 to +649.48	+318.87 to +944.85	+367.79 to +1157.81
	Fall	387.92	+118.38 to +296.63	+190.13 to +407.55	+183.10 to +596.82	+234.32 to +752.47

- 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	7.85	-0.04 to +2.19	+0.58 to +3.43	+0.76 to +3.17	+0.75 to +4.39
	Winter	1.61	-0.08 to +0.77	-0.06 to +1.25	+0.11 to +1.74	+0.31 to +2.05
	Spring	1.72	-0.15 to +0.70	-0.10 to +0.82	-0.02 to +1.15	+0.12 to +1.56
	Summer	1.79	-0.23 to +0.85	-0.11 to +1.06	-0.23 to +1.05	-0.38 to +0.98
	Fall	2.69	-0.47 to +0.74	-0.47 to +0.92	-0.46 to +0.92	-0.72 to +1.05
Days with Precipitation Over 2"	Annual	0.79	-0.02 to +0.41	-0.03 to +0.53	+0.06 to +0.56	+0.09 to +0.71
	Winter	0.04	-0.04 to +0.09	-0.04 to +0.09	-0.06 to +0.12	-0.06 to +0.14
	Spring	0.18	-0.05 to +0.11	-0.03 to +0.17	-0.01 to +0.19	-0.01 to +0.26
	Summer	0.32	-0.12 to +0.23	-0.07 to +0.20	-0.08 to +0.19	-0.09 to +0.25
	Fall	0.25	-0.07 to +0.26	-0.08 to +0.33	-0.04 to +0.26	-0.09 to +0.34
Days with Precipitation Over 4"	Annual	0.00	-0.03 to +0.05	-0.02 to +0.06	-0.04 to +0.08	-0.03 to +0.10
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.00	-0.03 to +0.04	-0.03 to +0.04	-0.03 to +0.04	-0.03 to +0.05
	Fall	0.00	-0.02 to +0.04	-0.02 to +0.06	-0.01 to +0.04	-0.00 to +0.06

- 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.

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	48.56	+0.03 to +4.98	+1.19 to +6.55	+1.96 to +7.74	+1.74 to +8.90
	Winter	11.54	-0.52 to +2.11	+0.05 to +2.95	+0.17 to +3.50	+0.52 to +4.40
	Spring	12.19	-0.23 to +2.14	+0.11 to +1.91	+0.32 to +2.66	+0.22 to +2.86
	Summer	11.82	-0.13 to +1.70	-0.30 to +2.18	-0.65 to +2.65	-1.39 to +2.67
	Fall	13	-1.34 to +1.50	-1.59 to +2.04	-1.76 to +1.99	-1.99 to +1.78

- 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%).

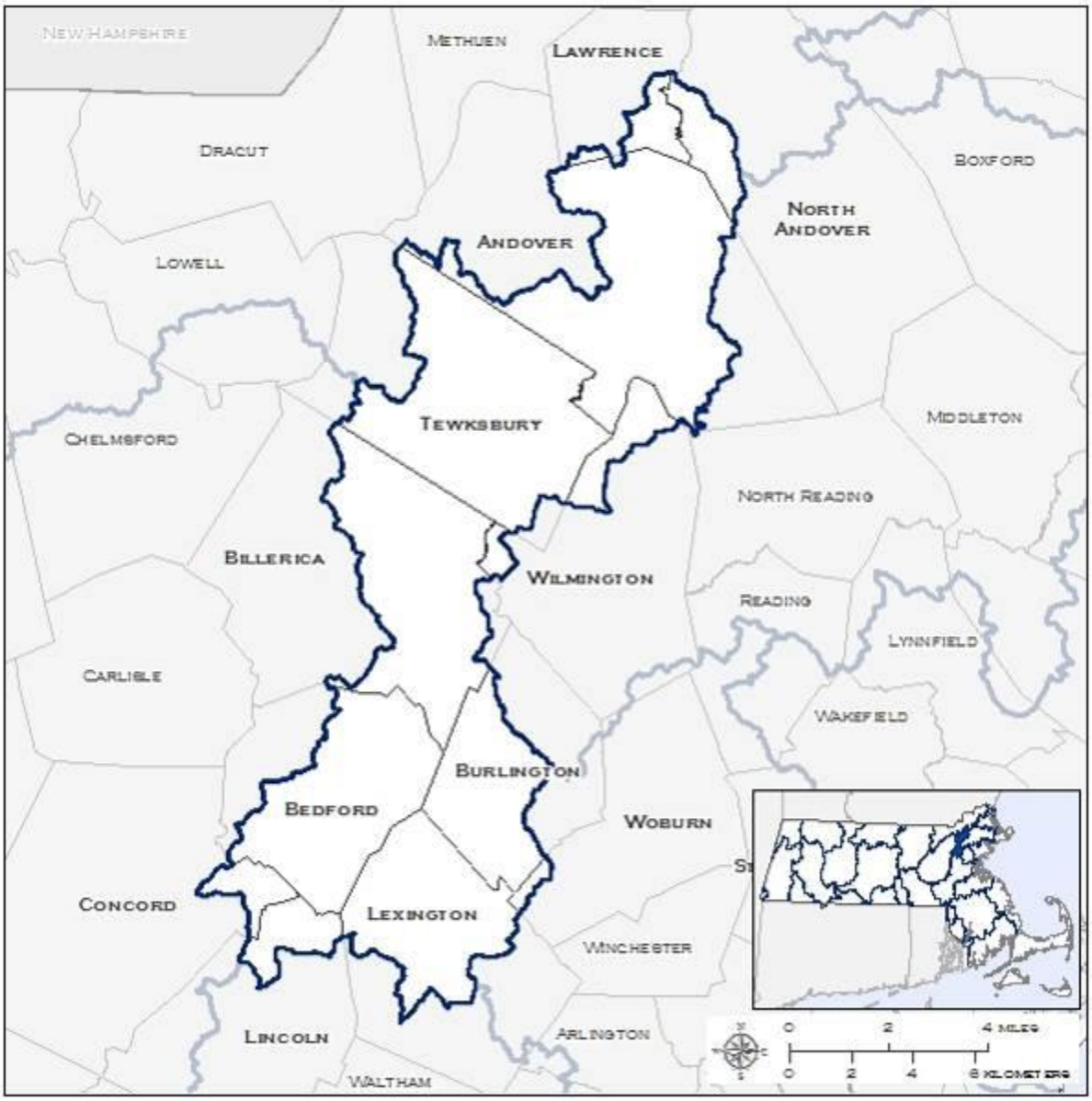
Quinebaug Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16.11	-0.76 to +1.25	-0.88 to +1.91	-1.38 to +1.92	-0.64 to +2.53
	Winter	10.96	-1.19 to +1.38	-1.03 to +1.28	-1.07 to +1.14	-1.00 to +1.59
	Spring	10.76	-1.35 to +0.66	-1.22 to +0.89	-1.55 to +1.00	-1.18 to +1.00
	Summer	11.76	-0.90 to +1.62	-0.93 to +2.00	-1.23 to +2.18	-1.39 to +2.53
	Fall	12.09	-0.32 to +1.79	-0.66 to +2.59	-0.79 to +2.74	-0.25 to +2.89

- 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	48.85	+2.27 to +4.43	+2.94 to +6.36	+3.49 to +9.14	+3.80 to +11.03
	Winter	28.07	+2.36 to +5.04	+3.02 to +7.52	+3.77 to +9.36	+4.06 to +10.81
	Spring	46.8	+1.85 to +3.59	+2.62 to +5.48	+2.76 to +7.90	+3.40 to +9.69
	Summer	69.15	+2.16 to +4.39	+2.82 to +6.68	+3.23 to +9.84	+3.80 to +12.26
	Fall	51	+2.28 to +4.99	+3.68 to +6.79	+3.47 to +9.69	+3.95 to +12.08
Maximum Temperature	Annual	59.46	+2.13 to +4.15	+2.73 to +6.22	+3.21 to +9.15	+3.46 to +10.95
	Winter	37.65	+2.03 to +4.58	+2.64 to +7.02	+3.19 to +8.66	+3.59 to +10.04
	Spring	57.78	+1.69 to +3.49	+2.32 to +5.56	+2.70 to +8.13	+3.26 to +9.64
	Summer	80.26	+2.02 to +4.45	+2.74 to +6.61	+3.13 to +10.04	+3.60 to +12.44
	Fall	61.73	+2.40 to +4.87	+3.44 to +6.95	+3.37 to +9.99	+3.86 to +12.40
Minimum Temperature	Annual	38.25	+2.36 to +4.76	+3.20 to +6.49	+3.80 to +9.09	+4.15 to +11.10
	Winter	18.49	+2.64 to +5.50	+3.40 to +8.02	+4.37 to +10.05	+4.51 to +11.58
	Spring	35.81	+1.99 to +3.92	+2.86 to +5.79	+2.94 to +7.66	+3.53 to +9.55
	Summer	58.05	+2.30 to +4.42	+2.97 to +7.08	+3.32 to +9.63	+3.97 to +12.08
	Fall	40.28	+2.17 to +5.15	+3.56 to +6.70	+3.56 to +9.62	+4.06 to +11.80

- 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	6.86	+7.12 to +19.09	+9.97 to +32.49	+11.78 to +54.36	+14.06 to +71.94
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.46	+0.19 to +0.80	+0.37 to +1.67	+0.44 to +2.83	+0.31 to +4.68
	Summer	6.09	+6.10 to +16.64	+8.27 to +27.05	+10.16 to +43.63	+12.29 to +56.36
	Fall	0.31	+0.51 to +2.48	+0.87 to +5.25	+0.85 to +9.31	+1.35 to +12.70
Days with Maximum Temperature Over 95°F	Annual	0.44	+2.21 to +7.69	+2.81 to +14.87	+3.96 to +29.90	+5.67 to +45.80
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.04 to +0.25	+0.03 to +0.42	+0.10 to +0.88	+0.07 to +1.85
	Summer	0.44	+1.93 to +7.09	+2.42 to +13.33	+3.43 to +26.26	+5.15 to +39.40
	Fall	0.00	+0.09 to +0.77	+0.15 to +1.85	+0.18 to +4.18	+0.42 to +5.83
Days with Maximum Temperature Over 100°F	Annual	0.03	+0.27 to +1.85	+0.34 to +4.38	+0.57 to +9.66	+0.68 to +18.80
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.03	+0.00 to +0.05	+0.00 to +0.21	+0.00 to +0.52
	Summer	0.03	+0.25 to +1.74	+0.27 to +4.15	+0.55 to +9.00	+0.64 to +17.12
	Fall	0.00	+0.00 to +0.12	+0.00 to +0.37	+0.00 to +0.93	+0.01 to +1.43

- 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.

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	5.13	-1.42 to -3.32	-1.68 to -3.72	-1.90 to -3.97	-1.93 to -4.07
	Winter	5.05	-1.35 to -3.03	-1.67 to -3.54	-1.88 to -3.83	-1.91 to -3.92
	Spring	0.05	-0.26 to +0.02	-0.01 to -0.28	-0.01 to -0.33	-0.01 to -0.29
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.03	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	139.15	-12.22 to -30.06	-18.88 to -42.27	-22.01 to -56.63	-25.03 to -67.51
	Winter	81.49	-2.91 to -7.88	-3.86 to -13.86	-5.44 to -22.83	-6.91 to -29.08
	Spring	33.69	-4.29 to -11.03	-7.17 to -15.08	-7.86 to -19.41	-8.86 to -20.97
	Summer	0.00	-0.07 to -0.00	-0.07 to -0.00	-0.07 to -0.00	-0.06 to -0.00
	Fall	23.93	-5.02 to -10.54	-7.89 to -13.62	-8.10 to -17.02	-7.46 to -18.84

- 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.

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	6457.27	-556.59 to -1157.37	-744.96 to -1578.96	-881.68 to -2104.05	-988.55 to -2493.48
	Winter	3341.25	-205.49 to -468.50	-268.38 to -687.75	-334.19 to -850.20	-375.33 to -994.01
	Spring	1696.91	-152.06 to -296.50	-214.82 to -450.18	-230.44 to -622.13	-297.82 to -732.12
	Summer	96.04	-34.42 to -58.95	-43.83 to -75.20	-52.54 to -85.37	-54.50 to -88.05
	Fall	1320.96	-157.39 to -362.74	-269.46 to -457.50	-256.40 to -646.06	-274.44 to -732.46
Cooling Degree-Days (Base 65°F)	Annual	553.74	+221.45 to +463.80	+297.69 to +760.97	+354.17 to +1182.91	+408.70 to +1536.06
	Winter	nan	+0.29 to +1.40	+0.21 to +4.11	+0.59 to +2.98	+0.84 to +4.11
	Spring	22.21	+14.12 to +33.56	+23.25 to +58.93	+25.76 to +101.49	+19.98 to +143.71
	Summer	478.25	+165.00 to +346.62	+205.73 to +544.78	+237.90 to +825.47	+285.55 to +1042.92
	Fall	46.51	+34.32 to +99.41	+52.73 to +178.08	+60.58 to +273.71	+86.88 to +353.61
Growing Degree-Days (Base 50°F)	Annual	2547.15	+425.51 to +829.02	+579.35 to +1257.57	+659.53 to +1979.30	+740.10 to +2479.76
	Winter	5.61	-0.03 to +13.65	+2.12 to +18.15	+5.46 to +29.22	+4.87 to +38.12
	Spring	299.4	+75.52 to +153.54	+101.19 to +257.20	+117.99 to +388.21	+130.73 to +507.39
	Summer	1762.28	+198.83 to +403.50	+258.88 to +614.39	+296.18 to +904.61	+348.82 to +1127.82
	Fall	470.48	+114.48 to +302.52	+188.90 to +433.24	+176.93 to +651.82	+229.10 to +816.40

- 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	8.4	+0.15 to +2.14	+0.55 to +3.00	+1.07 to +2.99	+1.12 to +3.98
	Winter	2.13	-0.17 to +0.79	+0.07 to +1.15	+0.14 to +1.45	+0.30 to +1.87
	Spring	1.93	-0.11 to +0.74	+0.06 to +1.13	+0.17 to +1.26	+0.11 to +1.42
	Summer	1.75	-0.14 to +0.57	-0.08 to +0.75	+0.00 to +0.77	-0.16 to +0.65
	Fall	2.59	-0.31 to +0.65	-0.15 to +0.89	-0.33 to +0.80	-0.35 to +0.96
Days with Precipitation Over 2"	Annual	1.08	-0.06 to +0.64	+0.03 to +0.71	+0.09 to +0.77	+0.15 to +0.96
	Winter	0.13	-0.03 to +0.13	-0.05 to +0.19	-0.04 to +0.25	-0.01 to +0.28
	Spring	0.18	-0.07 to +0.20	-0.01 to +0.33	-0.05 to +0.31	+0.01 to +0.40
	Summer	0.37	-0.12 to +0.19	-0.04 to +0.26	-0.05 to +0.23	-0.08 to +0.23
	Fall	0.4	-0.09 to +0.38	-0.05 to +0.32	-0.01 to +0.31	-0.07 to +0.38
Days with Precipitation Over 4"	Annual	0.11	-0.04 to +0.12	-0.01 to +0.12	-0.04 to +0.13	-0.05 to +0.21
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01
	Spring	0.00	-0.01 to +0.04	-0.01 to +0.04	-0.01 to +0.06	-0.01 to +0.09
	Summer	0.06	-0.04 to +0.06	-0.02 to +0.06	-0.02 to +0.06	-0.04 to +0.11
	Fall	0.05	-0.04 to +0.11	-0.03 to +0.09	-0.03 to +0.08	-0.06 to +0.11

- 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.

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	45.01	+0.31 to +4.84	+0.23 to +6.51	+1.15 to +7.90	+1.20 to +8.27
	Winter	11.15	-0.57 to +1.89	+0.04 to +2.31	+0.25 to +2.90	+0.19 to +4.04
	Spring	11.42	-0.15 to +2.46	+0.08 to +2.19	+0.18 to +2.85	+0.31 to +2.78
	Summer	10.48	-0.14 to +1.44	-0.48 to +2.13	-0.49 to +2.70	-1.29 to +2.36
	Fall	11.99	-1.11 to +1.30	-1.17 to +1.67	-1.88 to +1.54	-1.56 to +1.29

- 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	-0.66 to +1.99	-0.57 to +2.30	-0.48 to +2.79	-0.26 to +2.93
	Winter	11.77	-0.61 to +1.61	-0.45 to +1.30	-0.77 to +2.20	-0.79 to +1.89
	Spring	11.06	-1.15 to +0.89	-1.24 to +1.14	-1.31 to +0.93	-1.12 to +0.82
	Summer	13.19	-0.99 to +1.45	-0.91 to +2.09	-1.05 to +2.77	-1.16 to +2.21
	Fall	12.43	-0.12 to +2.04	+0.04 to +2.92	-0.34 to +3.85	-0.12 to +4.00

- 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	48.73	+2.18 to +4.37	+2.88 to +6.32	+3.47 to +9.03	+3.76 to +10.94
	Winter	27.35	+2.23 to +4.90	+2.83 to +7.25	+3.57 to +8.89	+4.01 to +10.23
	Spring	46.84	+1.67 to +3.46	+2.49 to +5.67	+2.66 to +7.92	+3.23 to +9.63
	Summer	69.51	+2.09 to +4.40	+2.74 to +6.91	+3.20 to +10.16	+3.73 to +12.69
	Fall	50.81	+2.21 to +5.02	+3.66 to +6.59	+3.47 to +9.49	+3.97 to +11.74
Maximum Temperature	Annual	59.59	+2.02 to +4.11	+2.66 to +6.28	+3.16 to +9.08	+3.42 to +10.87
	Winter	37.25	+1.85 to +4.42	+2.46 to +6.73	+2.97 to +8.13	+3.37 to +9.36
	Spring	57.9	+1.58 to +3.43	+2.26 to +5.59	+2.59 to +8.04	+3.17 to +9.71
	Summer	80.73	+1.90 to +4.46	+2.62 to +7.06	+3.10 to +10.46	+3.57 to +12.97
	Fall	62.05	+2.37 to +4.79	+3.56 to +6.83	+3.32 to +9.62	+3.81 to +12.13
Minimum Temperature	Annual	37.86	+2.27 to +4.64	+3.13 to +6.41	+3.77 to +8.96	+4.10 to +11.01
	Winter	17.45	+2.49 to +5.47	+3.25 to +7.76	+4.12 to +9.62	+4.55 to +10.91
	Spring	35.79	+1.76 to +3.71	+2.66 to +6.02	+2.81 to +7.74	+3.29 to +9.51
	Summer	58.28	+2.11 to +4.49	+2.86 to +7.18	+3.30 to +9.86	+3.91 to +12.40
	Fall	39.56	+2.11 to +5.16	+3.60 to +6.56	+3.62 to +9.26	+4.14 to +11.62

- 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	8.07	+7.24 to +20.03	+10.13 to +35.14	+12.20 to +56.37	+14.48 to +76.25
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.5	+0.05 to +0.77	+0.28 to +1.74	+0.35 to +2.97	+0.23 to +5.00
	Summer	7.21	+6.54 to +17.38	+8.50 to +29.80	+10.77 to +45.90	+12.66 to +59.87
	Fall	0.36	+0.42 to +2.15	+0.79 to +4.79	+0.58 to +8.98	+1.10 to +12.13
Days with Maximum Temperature Over 95°F	Annual	0.75	+2.02 to +8.21	+3.06 to +16.75	+3.91 to +31.59	+5.51 to +48.44
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.03	+0.03 to +0.24	+0.02 to +0.47	+0.05 to +1.08	+0.06 to +1.95
	Summer	0.71	+1.86 to +7.70	+2.75 to +15.30	+3.44 to +28.30	+5.16 to +42.21
	Fall	0.01	+0.07 to +0.61	+0.09 to +1.24	+0.14 to +3.25	+0.24 to +4.72
Days with Maximum Temperature Over 100°F	Annual	0.02	+0.20 to +2.03	+0.32 to +4.87	+0.58 to +11.71	+0.60 to +21.91
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.02	+0.00 to +0.04	+0.00 to +0.20	+0.00 to +0.45
	Summer	0.02	+0.21 to +1.91	+0.29 to +4.70	+0.52 to +10.99	+0.60 to +20.34
	Fall	0.00	+0.00 to +0.08	+0.00 to +0.21	+0.00 to +0.55	+0.00 to +1.01

- 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.

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	5.96	-1.61 to -3.54	-2.03 to -4.25	-2.23 to -4.57	-2.25 to -4.73
	Winter	5.93	-1.63 to -3.34	-2.00 to -4.05	-2.22 to -4.42	-2.23 to -4.57
	Spring	0.03	-0.26 to +0.03	-0.01 to -0.27	-0.01 to -0.32	-0.01 to -0.29
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	143.36	-11.90 to -27.94	-19.26 to -39.80	-22.36 to -55.02	-24.35 to -64.94
	Winter	83.01	-2.19 to -6.66	-3.27 to -11.19	-4.93 to -19.68	-5.77 to -24.53
	Spring	33.93	-3.32 to -11.44	-6.76 to -14.98	-8.06 to -19.33	-8.67 to -20.34
	Summer	0.00	-0.04 to -0.00	-0.04 to -0.00	-0.05 to -0.00	-0.05 to -0.00
	Fall	26.38	-5.23 to -11.1	-8.40 to -13.61	-8.58 to -17.66	-8.19 to -19.77

- 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.

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	6534.66	-543.72 to -1137.18	-749.60 to -1586.93	-872.65 to -2093.75	-983.52 to -2459.88
	Winter	3406.17	-193.54 to -454.48	-250.62 to -669.31	-316.34 to -807.48	-368.77 to -941.56
	Spring	1694.75	-136.54 to -293.20	-206.58 to -473.07	-225.41 to -619.25	-284.35 to -726.21
	Summer	90.35	-29.17 to -55.74	-40.30 to -72.21	-47.07 to -80.96	-48.42 to -83.98
	Fall	1340.41	-166.26 to -374.01	-279.18 to -460.66	-262.08 to -639.19	-276.44 to -731.23
Cooling Degree-Days (Base 65°F)	Annual	585.03	+216.39 to +456.32	+284.68 to +771.17	+342.54 to +1196.87	+397.57 to +1581.57
	Winter	nan	-0.64 to +2.13	+0.04 to +2.24	+0.81 to +3.49	+1.52 to +3.80
	Spring	25.38	+12.29 to +31.14	+20.23 to +61.91	+23.71 to +105.36	+22.14 to +143.39
	Summer	505.04	+158.00 to +349.52	+197.02 to +569.20	+238.23 to +859.80	+281.63 to +1086.27
	Fall	49.33	+29.98 to +95.36	+43.76 to +159.37	+51.78 to +253.82	+77.28 to +341.21
Growing Degree-Days (Base 50°F)	Annual	2592.31	+407.83 to +821.76	+546.41 to +1274.32	+642.32 to +1976.40	+729.06 to +2475.28
	Winter	6.27	-0.58 to +10.51	+0.41 to +14.62	+4.00 to +22.78	+3.32 to +28.60
	Spring	314.11	+66.08 to +145.31	+91.86 to +251.45	+108.38 to +398.05	+120.48 to +500.08
	Summer	1794.81	+192.32 to +404.30	+251.12 to +635.57	+293.25 to +934.43	+342.08 to +1166.70
	Fall	469.32	+113.10 to +302.42	+180.27 to +412.20	+170.27 to +621.20	+217.49 to +791.63

- 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	6.84	+0.23 to +1.99	+0.64 to +3.35	+1.29 to +2.88	+1.15 to +4.16
	Winter	1.55	-0.08 to +0.85	+0.19 to +1.18	+0.30 to +1.53	+0.40 to +1.83
	Spring	1.49	-0.08 to +0.72	-0.03 to +0.95	+0.11 to +1.17	+0.13 to +1.33
	Summer	1.59	-0.13 to +0.56	-0.02 to +0.92	-0.10 to +0.79	-0.20 to +0.71
	Fall	2.22	-0.25 to +0.76	-0.13 to +0.96	-0.27 to +0.78	-0.38 to +0.96
Days with Precipitation Over 2"	Annual	0.61	-0.05 to +0.41	+0.07 to +0.52	+0.04 to +0.49	+0.09 to +0.64
	Winter	0.05	-0.02 to +0.07	-0.02 to +0.08	-0.01 to +0.09	-0.01 to +0.13
	Spring	0.04	-0.02 to +0.12	+0.01 to +0.15	-0.02 to +0.17	-0.01 to +0.29
	Summer	0.27	-0.08 to +0.15	-0.03 to +0.22	-0.08 to +0.17	-0.06 to +0.22
	Fall	0.25	-0.09 to +0.27	-0.07 to +0.26	-0.04 to +0.21	-0.10 to +0.24
Days with Precipitation Over 4"	Annual	0.04	-0.03 to +0.07	-0.02 to +0.07	-0.04 to +0.07	-0.04 to +0.15
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.00	+0.00 to +0.01
	Summer	0.01	-0.02 to +0.04	-0.01 to +0.04	-0.01 to +0.05	-0.02 to +0.06
	Fall	0.02	-0.03 to +0.07	-0.03 to +0.05	-0.03 to +0.05	-0.03 to +0.09

- 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.

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	45.44	+0.16 to +4.84	+0.56 to +6.06	+1.53 to +7.79	+1.23 to +8.01
	Winter	11.15	-0.38 to +2.08	+0.07 to +2.56	+0.45 to +3.20	+0.38 to +4.05
	Spring	11.57	-0.14 to +2.36	+0.02 to +2.08	+0.28 to +2.58	+0.22 to +2.55
	Summer	10.76	-0.18 to +1.53	-0.47 to +2.20	-0.64 to +2.40	-1.13 to +2.15
	Fall	11.97	-1.19 to +1.08	-1.27 to +1.70	-1.78 to +1.57	-1.54 to +1.35

- 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	16.83	-0.55 to +1.41	-0.40 to +1.98	-0.88 to +2.26	-0.72 to +2.5
	Winter	11.64	-0.90 to +1.21	-0.74 to +1.39	-1.05 to +1.70	-1.13 to +1.70
	Spring	11.04	-1.16 to +0.81	-1.20 to +0.96	-1.46 to +1.09	-1.17 to +0.83
	Summer	12.34	-0.81 to +1.60	-0.74 to +2.42	-1.26 to +2.73	-0.99 to +2.06
	Fall	12.22	-0.01 to +1.94	-0.19 to +2.65	-0.27 to +3.05	-0.03 to +3.13

- 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	49.72	+1.88 to +3.66	+2.57 to +5.78	+2.90 to +8.50	+3.16 to +10.33
	Winter	30.29	+1.92 to +4.05	+2.56 to +6.25	+3.17 to +8.31	+3.48 to +9.77
	Spring	46.72	+1.81 to +3.47	+2.40 to +5.55	+2.65 to +7.78	+3.15 to +9.48
	Summer	69.12	+1.47 to +3.67	+2.02 to +6.08	+2.56 to +9.19	+3.16 to +11.43
	Fall	52.39	+1.95 to +4.23	+3.28 to +6.18	+3.03 to +8.83	+3.56 to +10.92
Maximum Temperature	Annual	59.47	+1.78 to +3.57	+2.37 to +5.67	+2.60 to +8.49	+2.92 to +10.18
	Winter	62.22	+1.90 to +4.26	+3.10 to +6.26	+2.93 to +8.81	+3.29 to +11.04
	Spring	56.69	+1.69 to +3.42	+2.10 to +5.36	+2.59 to +7.92	+3.04 to +9.40
	Summer	79.1	+1.39 to +3.53	+1.94 to +5.99	+2.46 to +9.25	+2.92 to +11.39
	Fall	62.22	+1.90 to +4.26	+3.10 to +6.26	+2.93 to +8.81	+3.29 to +11.04
Minimum Temperature	Annual	39.97	+2.01 to +3.76	+2.78 to +5.91	+3.20 to +8.50	+3.46 to +10.46
	Winter	21.05	+2.18 to +4.37	+2.98 to +6.73	+3.69 to +8.95	+3.99 to +10.51
	Spring	36.76	+1.81 to +3.56	+2.68 to +5.83	+2.72 to +7.64	+3.27 to +9.41
	Summer	59.14	+1.61 to +3.75	+2.15 to +6.27	+2.67 to +9.10	+3.39 to +11.33
	Fall	42.57	+2.01 to +4.47	+3.37 to +6.13	+3.16 to +8.81	+3.84 to +10.94

- 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	5.43	+3.75 to +10.95	+5.03 to +23.10	+6.67 to +41.44	+8.63 to +57.61
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.26	+0.15 to +0.62	+0.25 to +0.94	+0.30 to +1.75	+0.28 to +2.86
	Summer	4.99	+3.14 to +9.50	+4.18 to +19.99	+5.85 to +34.78	+7.70 to +47.28
	Fall	0.19	+0.36 to +1.35	+0.50 to +3.16	+0.55 to +5.81	+0.68 to +8.01
Days with Maximum Temperature Over 95°F	Annual	0.72	+1.21 to +4.33	+1.39 to +8.61	+2.10 to +18.40	+3.09 to +30.54
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.17	+0.03 to +0.31	+0.05 to +0.55	+0.07 to +1.02
	Summer	0.72	+1.00 to +3.90	+1.28 to +7.89	+1.91 to +16.43	+2.64 to +27.24
	Fall	0.00	+0.02 to +0.42	+0.06 to +0.78	+0.08 to +1.94	+0.14 to +2.72
Days with Maximum Temperature Over 100°F	Annual	0.02	+0.18 to +0.90	+0.23 to +2.50	+0.27 to +5.21	+0.33 to +9.83
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.06	+0.00 to +0.12	+0.00 to +0.21
	Summer	0.02	+0.17 to +0.87	+0.22 to +2.40	+0.26 to +4.85	+0.33 to +9.09
	Fall	0.00	+0.00 to +0.06	+0.00 to +0.13	+0.00 to +0.33	+0.00 to +0.55

- 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.

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	2.42	-0.47 to -1.17	-0.59 to -1.43	-0.77 to -1.39	-0.72 to -1.46
	Winter	2.42	-0.49 to -1.14	-0.57 to -1.4	-0.79 to -1.38	-0.70 to -1.42
	Spring	0.00	-0.05 to +0.01	-0.05 to -0.00	-0.04 to -0.00	-0.05 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	125.34	-12.59 to -26.93	-17.33 to -42.08	-21.49 to -54.87	-21.70 to -66.37
	Winter	77.24	-4.01 to -8.95	-4.63 to -15.92	-7.03 to -25.11	-7.92 to -33.38
	Spring	30.01	-4.15 to -11.02	-6.85 to -14.71	-7.60 to -18.77	-8.87 to -20.07
	Summer	0.00	-0.09 to -0.00	-0.10 to -0.00	-0.10 to -0.00	-0.11 to -0.00
	Fall	18.05	-4.37 to -8.29	-6.05 to -10.41	-6.80 to -13.26	-6.84 to -15.01

- 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.

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	6147.06	-492.18 to -968.19	-681.79 to -1437.60	-791.76 to -1940.25	-856.64 to -2311.04
	Winter	3145.99	-173.57 to -373.69	-222.91 to -570.81	-286.48 to -753.46	-316.43 to -891.25
	Spring	1697.4	-151.05 to -293.67	-200.64 to -463.06	-226.39 to -632.69	-282.89 to -741.09
	Summer	94.05	-29.43 to -54.35	-40.47 to -69.22	-42.26 to -79.75	-49.93 to -84.71
	Fall	1200.7	-136.28 to -306.03	-242.08 to -408.03	-226.51 to -583.94	-249.28 to -665.98
Cooling Degree-Days (Base 65°F)	Annual	542.74	+180.49 to +378.82	+238.71 to +673.74	+282.82 to +1080.21	+334.42 to +1400.01
	Winter	nan	-1.30 to +2.58	-1.66 to +7.12	-0.56 to +3.19	-0.95 to +6.52
	Spring	16.54	+12.56 to +27.30	+16.39 to +51.27	+19.31 to +82.64	+18.83 to +116.36
	Summer	473.13	+107.21 to +286.86	+145.58 to +492.86	+190.80 to +765.21	+237.41 to +968.91
	Fall	51.86	+30.52 to +85.32	+49.65 to +159.78	+57.58 to +245.59	+81.77 to +323.55
Growing Degree-Days (Base 50°F)	Annual	2558.52	+364.00 to +745.43	+482.58 to +1165.35	+545.34 to +1860.29	+631.09 to +2337.36
	Winter	7.23	+0.64 to +14.27	+1.87 to +17.18	+5.88 to +32.28	+5.91 to +45.53
	Spring	270.02	+73.40 to +145.16	+91.89 to +245.67	+102.48 to +375.66	+107.50 to +486.58
	Summer	1759.16	+135.39 to +337.37	+185.57 to +558.43	+235.15 to +845.03	+289.60 to +1051.34
	Fall	521.74	+98.97 to +265.94	+177.94 to +404.85	+171.26 to +606.24	+221.91 to +760.06

- 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	8.65	+0.18 to +2.09	+0.56 to +2.56	+0.86 to +2.94	+1.01 to +3.55
	Winter	2.14	-0.06 to +0.79	+0.19 to +0.94	+0.14 to +1.37	+0.26 to +1.62
	Spring	2.04	-0.04 to +0.72	+0.02 to +0.96	+0.26 to +1.05	+0.20 to +1.21
	Summer	1.76	-0.17 to +0.51	+0.01 to +0.58	-0.18 to +0.54	-0.34 to +0.61
	Fall	2.7	-0.37 to +0.66	-0.21 to +0.94	-0.39 to +0.84	-0.49 to +1.04
Days with Precipitation Over 2”	Annual	1.06	-0.02 to +0.54	+0.12 to +0.68	+0.18 to +0.71	+0.23 to +0.97
	Winter	0.28	-0.03 to +0.17	-0.01 to +0.18	+0.00 to +0.21	-0.02 to +0.32
	Spring	0.19	-0.07 to +0.22	+0.00 to +0.25	+0.02 to +0.30	+0.06 to +0.41
	Summer	0.29	-0.10 to +0.16	-0.03 to +0.17	-0.11 to +0.16	-0.07 to +0.12
	Fall	0.3	-0.02 to +0.26	+0.00 to +0.24	+0.01 to +0.29	-0.04 to +0.40
Days with Precipitation Over 4”	Annual	0.04	-0.01 to +0.06	+0.00 to +0.06	+0.00 to +0.09	-0.01 to +0.13
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.01
	Spring	0.00	+0.00 to +0.03	+0.00 to +0.03	+0.00 to +0.04	+0.00 to +0.05
	Summer	0.00	-0.02 to +0.03	-0.02 to +0.04	-0.02 to +0.04	-0.02 to +0.05
	Fall	0.04	-0.01 to +0.04	-0.01 to +0.04	-0.01 to +0.04	-0.01 to +0.07

- 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.

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	47.47	-0.21 to +3.88	+0.02 to +5.03	+0.32 to +6.18	-0.17 to +6.42
	Winter	12.52	-0.30 to +1.46	+0.05 to +1.91	+0.10 to +2.80	+0.05 to +3.73
	Spring	12.09	-0.10 to +1.80	-0.11 to +2.19	+0.11 to +2.37	+0.10 to +2.76
	Summer	10.36	-0.74 to +1.18	-0.71 to +1.79	-1.54 to +2.42	-2.05 to +2.25
	Fall	12.51	-0.92 to +1.13	-1.08 to +1.38	-1.72 to +1.70	-1.83 to +1.11

- 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	16.85	-0.63 to +1.63	-0.27 to +2.68	-0.66 to +3.43	-0.44 to +4.08
	Winter	10.29	-0.45 to +1.70	-0.56 to +1.85	-0.60 to +1.86	-1.01 to +2.22
	Spring	11.49	-0.95 to +0.74	-1.06 to +1.47	-1.08 to +1.42	-1.44 to +1.63
	Summer	13.54	-1.28 to +1.70	-0.85 to +2.11	-0.77 to +3.19	-0.63 to +3.51
	Fall	12.75	+0.03 to +2.52	+0.01 to +2.74	-0.10 to +3.07	-0.25 to +3.01

- 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	49.85	+2.03 to +3.77	+2.68 to +5.94	+3.12 to +8.62	+3.43 to +10.49
	Winter	30.01	+2.17 to +4.37	+2.88 to +6.74	+3.48 to +8.76	+3.91 to +10.07
	Spring	47.34	+1.67 to +3.35	+2.35 to +5.44	+2.57 to +7.54	+3.05 to +9.16
	Summer	69.57	+1.72 to +3.92	+2.22 to +6.31	+2.76 to +9.56	+3.39 to +11.62
	Fall	52.14	+2.06 to +4.51	+3.42 to +6.31	+3.18 to +9.04	+3.70 to +11.18
Maximum Temperature	Annual	60.27	+1.90 to +3.71	+2.47 to +5.89	+2.82 to +8.62	+3.14 to +10.37
	Winter	39.49	+1.83 to +4.23	+2.48 to +6.22	+3.02 to +8.13	+3.44 to +9.37
	Spring	58	+1.48 to +3.35	+1.99 to +5.24	+2.52 to +7.62	+2.97 to +9.00
	Summer	80.51	+1.63 to +3.84	+2.10 to +6.22	+2.65 to +9.68	+3.14 to +11.64
	Fall	62.7	+2.07 to +4.39	+3.30 to +6.41	+3.10 to +8.95	+3.43 to +11.30
Minimum Temperature	Annual	39.44	+2.14 to +3.91	+2.89 to +6.08	+3.42 to +8.61	+3.76 to +10.56
	Winter	20.53	+2.48 to +4.71	+3.24 to +7.25	+4.05 to +9.38	+4.41 to +10.75
	Spring	36.67	+1.76 to +3.50	+2.70 to +5.74	+2.68 to +7.42	+3.17 to +9.12
	Summer	58.62	+1.81 to +3.91	+2.35 to +6.48	+2.88 to +9.39	+3.64 to +11.48
	Fall	41.58	+2.05 to +4.68	+3.46 to +6.26	+3.25 to +8.98	+3.97 to +11.11

- 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	7.43	+5.38 to +14.58	+7.20 to +29.31	+9.27 to +49.91	+11.88 to +65.46
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.5	+0.08 to +0.59	+0.14 to +0.90	+0.22 to +1.66	+0.16 to +2.75
	Summer	6.65	+4.60 to +12.68	+5.95 to +25.39	+8.16 to +41.97	+10.69 to +53.27
	Fall	0.29	+0.48 to +1.74	+0.72 to +4.05	+0.77 to +7.20	+1.10 to +9.85
Days with Maximum Temperature Over 95°F	Annual	1.05	+1.45 to +4.80	+1.80 to +10.78	+2.66 to +24.73	+3.82 to +37.92
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.03	+0.00 to +0.18	+0.01 to +0.26	+0.04 to +0.47	+0.02 to +0.98
	Summer	0.99	+1.40 to +4.39	+1.62 to +9.65	+2.49 to +22.30	+3.42 to +34.12
	Fall	0.02	+0.02 to +0.51	+0.06 to +1.05	+0.14 to +2.56	+0.20 to +3.52
Days with Maximum Temperature Over 100°F	Annual	0.04	+0.16 to +0.91	+0.23 to +2.85	+0.38 to +6.38	+0.46 to +13.14
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.05	+0.00 to +0.11	+0.00 to +0.18
	Summer	0.04	+0.14 to +0.86	+0.22 to +2.63	+0.35 to +5.95	+0.45 to +12.21
	Fall	0.00	+0.00 to +0.08	+0.01 to +0.18	+0.01 to +0.40	+0.01 to +0.86

- 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.

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	2.97	-0.67 to -1.57	-0.83 to -1.91	-0.99 to -1.96	-0.91 to -2.02
	Winter	2.94	-0.64 to -1.52	-0.83 to -1.84	-0.98 to -1.9	-0.89 to -1.96
	Spring	0.03	-0.05 to +0.01	-0.06 to -0.00	-0.07 to -0.00	-0.07 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	129.76	-13.27 to -27.89	-18.99 to -43.59	-23.07 to -57.04	-24.79 to -67.94
	Winter	78.46	-4.10 to -9.05	-4.96 to -15.90	-7.23 to -24.69	-8.17 to -31.31
	Spring	30.49	-3.99 to -10.99	-6.92 to -15.66	-7.62 to -19.25	-8.84 to -20.72
	Summer	0.00	-0.11 to -0.00	-0.16 to -0.00	-0.00 to -0.17	-0.00 to -0.19
	Fall	20.81	-4.58 to -9.73	-7.61 to -12.10	-7.81 to -15.52	-7.62 to -17.16

- 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.

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	6129.97	-509.59 to -1000.68	-709.84 to -1478.68	-824.84 to -1957.15	-907.40 to -2325.08
	Winter	3168.77	-199.51 to -403.47	-255.08 to -615.73	-313.95 to -793.76	-355.39 to -930.92
	Spring	1643.71	-136.60 to -290.21	-197.75 to -457.98	-218.77 to -611.86	-274.56 to -716.78
	Summer	84.57	-29.47 to -51.16	-38.36 to -66.24	-42.76 to -75.53	-47.92 to -81.98
	Fall	1226.25	-141.08 to -320.09	-251.55 to -421.63	-229.03 to -596.23	-253.18 to -681.44
Cooling Degree-Days (Base 65°F)	Annual	579.75	+202.68 to +410.96	+260.05 to +705.82	+302.62 to +1122.55	+364.92 to +1439.19
	Winter	nan	-1.06 to +3.81	-0.05 to +5.73	-0.25 to +3.49	-0.49 to +6.46
	Spring	19.54	+9.85 to +25.56	+15.65 to +49.01	+18.24 to +81.08	+17.48 to +107.55
	Summer	504.68	+126.25 to +312.20	+164.21 to +517.51	+208.86 to +803.65	+258.53 to +992.98
	Fall	55.2	+34.22 to +90.14	+51.79 to +163.12	+60.84 to +250.25	+89.23 to +328.03
Growing Degree-Days (Base 50°F)	Annual	2622.13	+378.46 to +759.10	+505.77 to +1189.90	+575.59 to +1888.82	+664.73 to +2361.92
	Winter	6.31	+0.88 to +15.65	+1.77 to +18.49	+6.74 to +32.88	+6.92 to +47.19
	Spring	296.75	+66.62 to +132.13	+88.51 to +232.09	+95.78 to +361.40	+101.14 to +471.67
	Summer	1800.14	+157.84 to +360.48	+204.28 to +580.35	+253.67 to +879.28	+311.39 to +1068.82
	Fall	517.95	+103.90 to +272.03	+181.65 to +406.18	+172.90 to +604.10	+225.98 to +766.07

- 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	8.23	+0.41 to +1.97	+0.75 to +2.81	+0.91 to +2.97	+1.21 to +3.84
	Winter	1.99	+0.09 to +0.76	+0.25 to +0.97	+0.19 to +1.29	+0.35 to +1.83
	Spring	1.78	+0.01 to +0.68	+0.04 to +1.03	+0.28 to +1.23	+0.28 to +1.33
	Summer	2.02	-0.19 to +0.43	-0.11 to +0.71	-0.09 to +0.56	-0.24 to +0.50
	Fall	2.44	-0.25 to +0.65	-0.10 to +0.95	-0.29 to +0.94	-0.36 to +1.03
Days with Precipitation Over 2"	Annual	0.9	+0.00 to +0.49	+0.09 to +0.64	+0.08 to +0.74	+0.16 to +0.95
	Winter	0.21	-0.04 to +0.14	+0.01 to +0.19	+0.01 to +0.20	+0.00 to +0.34
	Spring	0.13	-0.05 to +0.13	+0.01 to +0.18	-0.01 to +0.23	+0.00 to +0.29
	Summer	0.33	-0.09 to +0.17	-0.05 to +0.26	-0.05 to +0.17	-0.08 to +0.17
	Fall	0.22	-0.01 to +0.27	+0.03 to +0.26	+0.03 to +0.30	-0.05 to +0.44
Days with Precipitation Over 4"	Annual	0.03	-0.01 to +0.05	+0.01 to +0.06	+0.00 to +0.10	-0.02 to +0.14
	Winter	0.00	+0.00 to +0.01	+0.00 to +0.02	+0.00 to +0.01	+0.00 to +0.02
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.01
	Summer	0.02	-0.01 to +0.03	-0.01 to +0.05	-0.01 to +0.04	-0.01 to +0.06
	Fall	0.01	-0.01 to +0.04	-0.01 to +0.04	+0.00 to +0.04	-0.01 to +0.07

- 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.

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	47.48	-0.05 to +4.11	+0.33 to +5.35	+0.90 to +6.61	+0.38 to +7.34
	Winter	12.12	-0.28 to +1.52	+0.04 to +1.97	+0.20 to +2.69	+0.13 to +3.84
	Spring	11.94	-0.11 to +1.84	+0.04 to +2.02	+0.07 to +2.41	+0.17 to +2.60
	Summer	10.99	-0.59 to +1.12	-0.67 to +1.74	-1.69 to +2.35	-1.87 to +2.11
	Fall	12.42	-0.80 to +1.13	-0.87 to +1.49	-1.49 to +1.74	-1.72 to +1.36

- 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%).

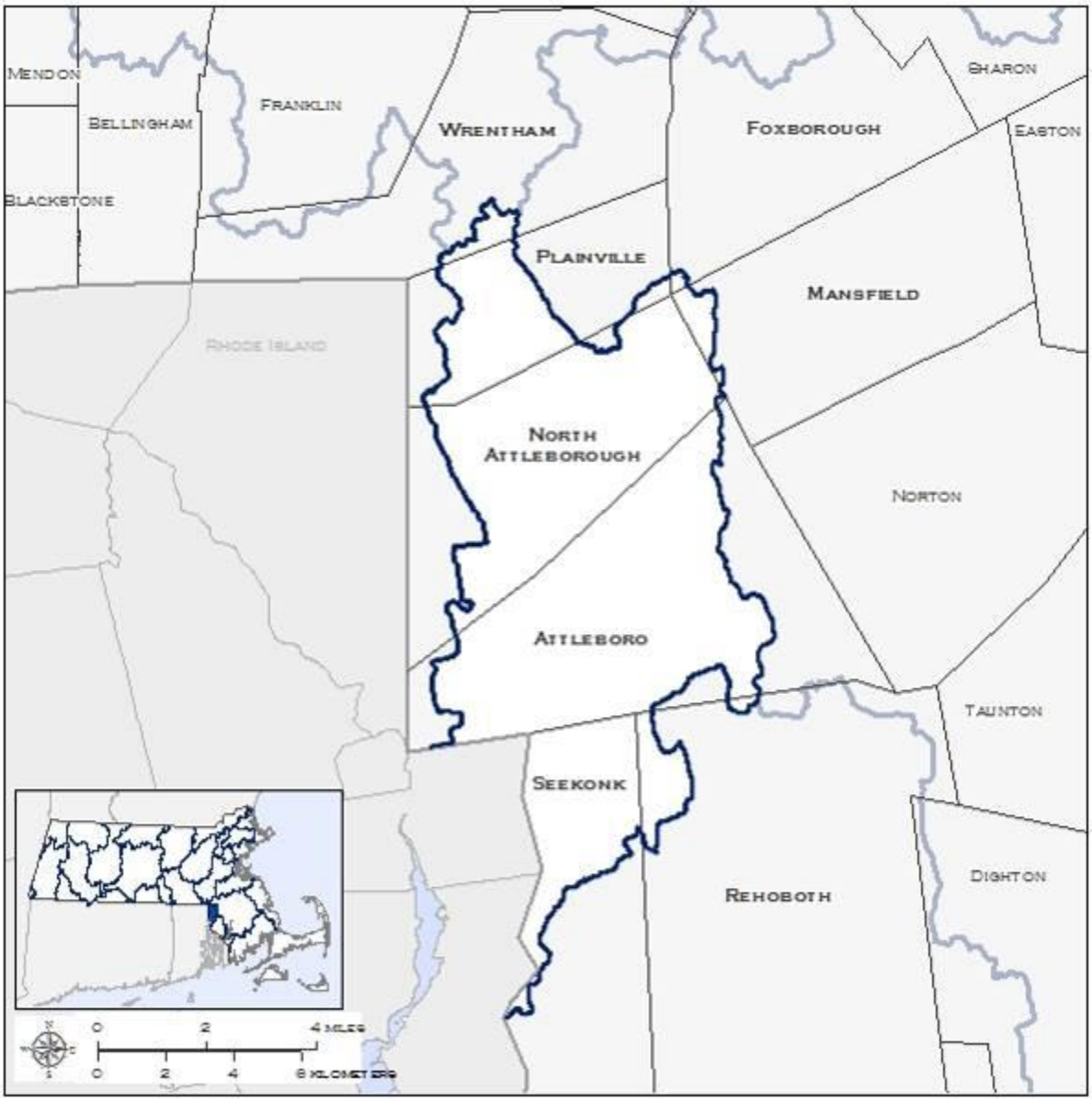
Taunton Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	17.33	-0.23 to +1.29	-0.07 to +2.52	-0.90 to +2.80	-0.34 to +3.65
	Winter	10.66	-0.70 to +1.67	-0.66 to +1.73	-0.61 to +1.95	-0.98 to +2.22
	Spring	11.68	-0.75 to +0.62	-0.84 to +1.22	-0.96 to +1.14	-1.13 to +1.41
	Summer	13.62	-0.94 to +1.22	-0.92 to +1.80	-1.14 to +2.49	-0.99 to +3.00
	Fall	12.85	+0.15 to +2.27	+0.03 to +2.66	-0.25 to +2.72	-0.43 to +2.94

- 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	49.45	+2.08 to +3.81	+2.72 to +5.98	+3.23 to +8.66	+3.48 to +10.62
	Winter	29.19	+2.07 to +4.33	+2.72 to +6.72	+3.35 to +8.70	+3.78 to +10.09
	Spring	47.25	+1.65 to +3.36	+2.37 to +5.41	+2.51 to +7.70	+2.99 to +9.41
	Summer	69.47	+1.87 to +4.02	+2.45 to +6.43	+2.98 to +9.67	+3.58 to +11.86
	Fall	51.52	+2.11 to +4.72	+3.60 to +6.58	+3.38 to +9.34	+3.89 to +11.54
Maximum Temperature	Annual	60.28	+1.91 to +3.69	+2.50 to +5.93	+2.94 to +8.69	+3.14 to +10.50
	Winter	38.94	+1.70 to +4.18	+2.28 to +6.17	+2.84 to +8.00	+3.20 to +9.24
	Spring	58.38	+1.44 to +3.24	+2.01 to +5.31	+2.49 to +7.81	+2.92 to +9.09
	Summer	80.87	+1.80 to +3.92	+2.32 to +6.33	+2.90 to +9.87	+3.37 to +11.98
	Fall	62.54	+2.18 to +4.53	+3.38 to +6.65	+3.31 to +9.30	+3.70 to +11.74
Minimum Temperature	Annual	38.62	+2.20 to +4.06	+2.94 to +6.18	+3.53 to +8.63	+3.83 to +10.66
	Winter	19.44	+2.37 to +4.71	+3.10 to +7.25	+3.95 to +9.34	+4.24 to +10.74
	Spring	36.12	+1.74 to +3.47	+2.69 to +5.76	+2.65 to +7.53	+3.15 to +9.31
	Summer	58.07	+1.97 to +4.00	+2.59 to +6.60	+3.06 to +9.48	+3.74 to +11.71
	Fall	40.5	+2.04 to +4.88	+3.56 to +6.51	+3.44 to +9.20	+4.11 to +11.45

- 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	7.37	+6.50 to +16.15	+9.36 to +32.24	+11.43 to +54.37	+13.85 to +71.01
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.52	+0.07 to +0.62	+0.17 to +1.13	+0.25 to +2.07	+0.21 to +3.53
	Summer	6.52	+5.47 to +13.81	+7.86 to +27.25	+9.90 to +44.37	+12.48 to +56.13
	Fall	0.33	+0.48 to +2.29	+0.84 to +5.15	+0.99 to +8.72	+1.38 to +11.57
Days with Maximum Temperature Over 95°F	Annual	1.08	+1.81 to +5.58	+2.26 to +12.16	+3.08 to +27.97	+4.43 to +42.76
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.04	+0.00 to +0.24	+0.01 to +0.35	+0.05 to +0.55	+0.01 to +1.24
	Summer	1.01	+1.67 to +5.00	+2.03 to +10.61	+2.85 to +24.96	+3.93 to +37.58
	Fall	0.03	+0.02 to +0.72	+0.10 to +1.47	+0.18 to +3.33	+0.26 to +4.91
Days with Maximum Temperature Over 100°F	Annual	0.08	+0.17 to +0.89	+0.28 to +3.10	+0.42 to +7.39	+0.32 to +14.96
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.06	+0.00 to +0.10	+0.00 to +0.26
	Summer	0.08	+0.16 to +0.78	+0.25 to +2.95	+0.40 to +6.67	+0.35 to +13.44
	Fall	0.00	+0.00 to +0.12	+0.00 to +0.28	+0.01 to +0.67	+0.00 to +1.35

- 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.

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	4.18	-1.04	to	-2.37	-1.18	to	-2.95	-1.41	to	-3.19	-1.35	to	-3.36
	Winter	4.12	-1.01	to	-2.28	-1.11	to	-2.81	-1.43	to	-3.08	-1.32	to	-3.25
	Spring	0.06	-0.15	to	+0.03	-0.17	to	+0.03	-0.17	to	0.01	-0.17	to	-0.00
	Summer	0.00	-0.00	to	-0.00	-0.00	to	-0.00	-0.00	to	-0.00	-0.00	to	-0.00
	Fall	0.00	-0.00	to	-0.00	-0.00	to	-0.00	-0.00	to	-0.00	-0.00	to	-0.00
Days with Minimum Temperature Below 32°F	Annual	136.35	-11.66	to	-26.99	-18.24	to	-41.83	-22.01	to	-55.77	-23.61	to	-67.64
	Winter	80.43	-2.78	to	-7.79	-3.86	to	-13.60	-5.49	to	-21.96	-7.02	to	-28.18
	Spring	32.51	-3.64	to	-10.66	-6.67	to	-15.53	-7.29	to	-19.56	-8.20	to	-20.77
	Summer	0.00	-0.10	to	-0.00	-0.17	to	-0.00	-0.16	to	-0.00	-0.19	to	-0.00
	Fall	23.41	-4.26	to	-10.15	-7.87	to	-13.00	-7.86	to	-16.95	-8.32	to	-18.74

- 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.

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	6262.14	-505.57	to	-1009.43	-693.80	to	-1481.83	-813.04	to	-1955.67	-899.76	to	-2340.60
	Winter	3242.52	-186.78	to	-400.82	-238.05	to	-615.18	-298.74	to	-787.61	-346.28	to	-927.07
	Spring	1652.01	-133.89	to	-285.26	-196.39	to	-451.49	-211.26	to	-613.37	-267.57	to	-720.67
	Summer	86.68	-31.67	to	-52.56	-40.74	to	-69.94	-47.29	to	-78.89	-51.08	to	-85.55
	Fall	1277.14	-149.81	to	-339.56	-259.60	to	-432.22	-238.04	to	-613.16	-260.95	to	-699.15
Cooling Degree-Days (Base 65°F)	Annual	571	+213.46	to	+428.05	+278.26	to	+734.24	+326.59	to	+1150.77	+380.10	to	+1481.03
	Winter	nan	-0.55	to	+4.39	+0.06	to	+6.05	+0.52	to	+4.44	+0.52	to	+5.02
	Spring	19.99	+11.12	to	+27.88	+18.69	to	+54.08	+23.14	to	+90.70	+19.88	to	+120.54
	Summer	498.15	+139.44	to	+320.57	+180.38	to	+525.68	+223.86	to	+812.43	+270.83	to	+1012.51
	Fall	50.42	+37.71	to	+95.56	+56.57	to	+172.67	+66.95	to	+263.63	+97.38	to	+341.13
Growing Degree-Days (Base 50°F)	Annual	2592.9	+402.22	to	+776.13	+538.71	to	+1219.78	+610.02	to	+1926.71	+691.99	to	+2411.72
	Winter	6.23	+0.25	to	+15.29	+1.80	to	+17.80	+5.97	to	+28.74	+4.88	to	+40.17
	Spring	300.78	+71.48	to	+140.41	+93.94	to	+248.53	+99.88	to	+380.86	+108.75	to	+493.93
	Summer	1791.52	+172.37	to	+369.76	+225.43	to	+591.51	+273.27	to	+889.92	+329.23	to	+1090.56
	Fall	490	+108.81	to	+290.02	+192.67	to	+419.90	+184.08	to	+619.28	+233.83	to	+783.96

- 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	7.49	+0.35 to +1.89	+0.77 to +2.84	+0.97 to +3.15	+1.03 to +4.23
	Winter	1.77	+0.12 to +0.96	+0.26 to +1.36	+0.37 to +1.61	+0.31 to +2.02
	Spring	1.52	-0.10 to +0.68	+0.03 to +0.90	+0.02 to +1.06	+0.07 to +1.28
	Summer	1.89	-0.20 to +0.56	-0.11 to +0.81	-0.06 to +0.79	-0.16 to +0.70
	Fall	2.31	-0.28 to +0.70	-0.16 to +0.94	-0.30 to +0.82	-0.40 to +0.94
Days with Precipitation Over 2"	Annual	0.67	-0.05 to +0.45	+0.02 to +0.46	+0.01 to +0.49	+0.08 to +0.67
	Winter	0.07	-0.05 to +0.10	-0.03 to +0.12	-0.03 to +0.18	-0.04 to +0.22
	Spring	0.07	-0.03 to +0.07	-0.03 to +0.09	-0.02 to +0.16	-0.02 to +0.26
	Summer	0.34	-0.07 to +0.23	-0.02 to +0.29	-0.05 to +0.22	-0.02 to +0.20
	Fall	0.18	-0.13 to +0.26	-0.06 to +0.28	-0.12 to +0.23	-0.11 to +0.34
Days with Precipitation Over 4"	Annual	0.03	-0.03 to +0.07	-0.01 to +0.08	-0.02 to +0.13	-0.02 to +0.12
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.00
	Summer	0.03	-0.03 to +0.04	-0.02 to +0.07	-0.01 to +0.07	-0.03 to +0.07
	Fall	0.00	-0.03 to +0.07	-0.03 to +0.03	-0.02 to +0.05	-0.02 to +0.05

- 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.

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	47.76	+0.03 to +4.69	+0.54 to +6.59	+1.33 to +7.25	+0.90 to +8.27
	Winter	11.78	-0.47 to +1.72	+0.10 to +2.25	+0.26 to +2.88	+0.20 to +3.90
	Spring	12.05	-0.08 to +1.87	-0.18 to +1.99	+0.14 to +2.37	+0.09 to +2.35
	Summer	11.32	-0.40 to +1.53	-0.48 to +2.12	-1.08 to +2.71	-1.66 to +2.23
	Fall	12.6	-1.05 to +1.26	-1.29 to +1.72	-1.47 to +1.64	-2.00 to +1.40

- 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%).

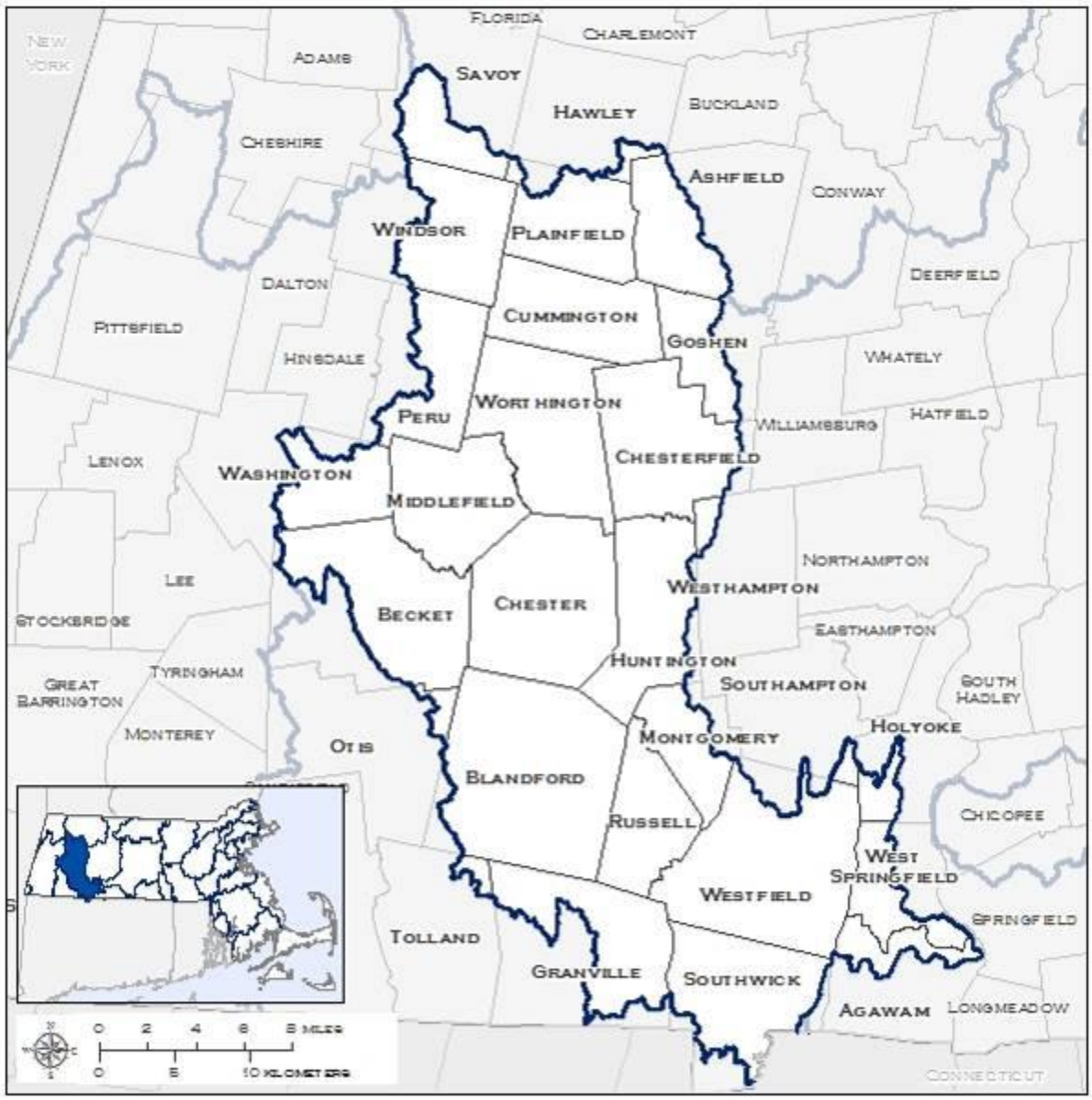
Ten Mile Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16.68	-0.19 to +1.50	+0.26 to +2.45	-0.80 to +2.71	-0.69 to +2.82
	Winter	11.26	-0.61 to +1.30	-0.45 to +1.65	-0.94 to +1.72	-1.27 to +2.07
	Spring	11.69	-1.26 to +0.63	-0.95 to +0.95	-1.07 to +1.15	-1.34 to +1.20
	Summer	12.2	-0.45 to +1.64	-0.58 to +2.03	-0.73 to +2.57	-0.70 to +2.29
	Fall	12.52	-0.22 to +2.05	-0.36 to +3.00	-0.57 to +3.01	-0.45 to +2.99

- 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	45.01	+2.27 to +4.55	+3.08 to +6.63	+3.64 to +9.18	+4.16 to +11.18
	Winter	23.26	+2.47 to +5.51	+3.15 to +8.27	+4.14 to +9.86	+4.52 to +11.16
	Spring	43.22	+1.76 to +3.57	+2.52 to +5.68	+3.11 to +7.70	+3.56 to +9.42
	Summer	65.74	+2.28 to +4.48	+3.04 to +7.06	+3.48 to +10.15	+4.00 to +12.47
	Fall	47.44	+2.31 to +5.29	+3.84 to +6.94	+3.80 to +9.86	+4.20 to +12.10
Maximum Temperature	Annual	55.82	+2.09 to +4.40	+2.80 to +6.73	+3.30 to +9.32	+3.81 to +11.25
	Winter	32.88	+2.04 to +4.88	+2.77 to +7.43	+3.44 to +8.90	+3.79 to +10.01
	Spring	54.38	+1.69 to +3.52	+2.40 to +5.58	+2.98 to +8.01	+3.56 to +9.65
	Summer	77.31	+2.06 to +4.65	+2.78 to +7.33	+3.34 to +10.63	+3.87 to +13.00
	Fall	58.28	+2.47 to +5.20	+3.62 to +7.30	+3.59 to +10.18	+4.20 to +12.47
Minimum Temperature	Annual	34.21	+2.38 to +4.83	+3.42 to +6.77	+4.05 to +9.04	+4.49 to +11.13
	Winter	13.64	+2.71 to +6.20	+3.65 to +8.93	+4.82 to +10.78	+5.19 to +12.01
	Spring	32.05	+1.87 to +3.78	+2.63 to +6.03	+3.32 to +7.57	+3.70 to +9.18
	Summer	54.18	+2.45 to +4.58	+3.25 to +7.13	+3.62 to +9.78	+4.14 to +12.02
	Fall	36.61	+2.04 to +5.30	+3.68 to +6.78	+3.93 to +9.54	+4.16 to +11.77

- 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	2.75	+3.90 to +12.64	+5.70 to +24.05	+7.18 to +42.37	+8.76 to +59.56
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.12	+0.06 to +0.45	+0.18 to +1.01	+0.21 to +1.97	+0.14 to +3.41
	Summer	2.5	+3.58 to +11.44	+4.95 to +21.07	+6.13 to +35.60	+7.90 to +48.94
	Fall	0.13	+0.27 to +1.22	+0.27 to +2.45	+0.32 to +5.64	+0.54 to +7.89
Days with Maximum Temperature Over 95°F	Annual	0.19	+0.85 to +4.13	+1.20 to +9.18	+1.58 to +19.67	+2.23 to +33.05
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.09	+0.00 to +0.16	+0.01 to +0.48	+0.00 to +1.07
	Summer	0.17	+0.84 to +3.63	+1.08 to +8.63	+1.35 to +17.83	+2.06 to +29.63
	Fall	0.01	+0.02 to +0.34	+0.06 to +0.70	+0.07 to +1.47	+0.08 to +2.36
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.05 to +0.72	+0.11 to +2.07	+0.18 to +5.27	+0.17 to +11.36
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.01	+0.00 to +0.01	+0.00 to +0.08	+0.00 to +0.21
	Summer	0.00	+0.05 to +0.60	+0.10 to +1.98	+0.17 to +4.87	+0.16 to +10.72
	Fall	0.00	+0.00 to +0.06	+0.00 to +0.15	+0.00 to +0.35	+0.00 to +0.58

- 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.

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	13.19	-5.08 to -8.62	-6.55 to -10.32	-7.11 to -11.14	-7.82 to -11.80
	Winter	12.49	-4.80 to -8.27	-6.19 to -9.89	-6.62 to -10.65	-7.36 to -11.23
	Spring	0.72	-0.20 to -0.57	-0.26 to -0.64	-0.32 to -0.70	-0.31 to -0.70
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.01	-0.02 to -0.00	-0.03 to -0.00	-0.03 to -0.00	-0.03 to -0.00
Days with Minimum Temperature Below 32°F	Annual	166.59	-10.89 to -27.83	-20.14 to -38.37	-22.41 to -52.99	-24.19 to -62.18
	Winter	86.46	-0.88 to -5.27	-1.81 to -7.5	-2.86 to -13.97	-3.35 to -17.46
	Spring	45.71	-4.60 to -10.05	-6.28 to -15.13	-7.72 to -19.87	-9.44 to -21.53
	Summer	0.05	-0.02 to -0.21	-0.02 to -0.33	-0.02 to -0.32	-0.02 to -0.30
	Fall	34.31	-5.03 to -13.42	-9.73 to -15.91	-9.73 to -21.50	-10.06 to -24.48

- 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.

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	7619.51	-658.04 to -1334.74	-901.22 to -1866.10	-1030.84 to -2442.42	-1186.18 to -2820.73
	Winter	3775.41	-206.65 to -512.20	-279.06 to -758.39	-365.72 to -896.53	-417.18 to -1026.92
	Spring	2017.33	-150.53 to -313.36	-216.75 to -490.67	-269.03 to -635.56	-317.46 to -752.99
	Summer	206.21	-68.64 to -120.12	-92.91 to -153.52	-108.87 to -177.63	-119.59 to -188.95
	Fall	1621.29	-186.50 to -430.65	-313.10 to -535.07	-304.53 to -743.17	-327.66 to -853.44
Cooling Degree-Days (Base 65°F)	Annual	317.03	+175.98 to +362.47	+231.26 to +630.76	+271.22 to +978.35	+314.00 to +1311.08
	Winter	nan	-1.24 to +3.08	+0.89 to +7.36	-0.10 to +3.56	+0.28 to +10.74
	Spring	15.22	+6.46 to +20.18	+11.56 to +39.42	+14.76 to +67.64	+15.08 to +99.36
	Summer	274.66	+138.66 to +299.47	+175.53 to +493.47	+204.41 to +755.39	+241.26 to +960.60
	Fall	24.93	+19.00 to +62.74	+28.22 to +104.35	+35.08 to +183.98	+44.95 to +251.18
Growing Degree-Days (Base 50°F)	Annual	2012.93	+382.45 to +764.30	+516.64 to +1203.60	+619.76 to +1806.63	+702.01 to +2283.12
	Winter	3.25	-0.57 to +7.16	+0.79 to +7.71	+0.43 to +12.24	+1.66 to +18.29
	Spring	222.84	+54.24 to +118.00	+79.53 to +206.89	+102.16 to +306.81	+102.02 to +409.27
	Summer	1450.7	+208.57 to +410.05	+276.24 to +646.89	+316.49 to +931.10	+363.54 to +1144.49
	Fall	326.35	+102.29 to +261.40	+154.76 to +374.15	+157.74 to +569.69	+203.91 to +710.15

- 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	8.18	+0.08 to +2.45	+0.68 to +3.53	+1.04 to +3.38	+0.79 to +4.73
	Winter	1.39	-0.05 to +0.72	+0.14 to +1.13	+0.12 to +1.33	+0.33 to +1.62
	Spring	2.07	-0.07 to +0.63	+0.01 to +0.81	+0.19 to +1.45	+0.25 to +1.71
	Summer	2.39	-0.26 to +0.73	-0.16 to +1.05	-0.26 to +0.75	-0.29 to +0.80
	Fall	2.31	-0.34 to +0.78	-0.22 to +1.09	-0.26 to +1.11	-0.32 to +1.24
Days with Precipitation Over 2"	Annual	1.06	-0.11 to +0.54	-0.07 to +0.65	+0.05 to +0.79	+0.08 to +0.96
	Winter	0.08	-0.05 to +0.07	-0.05 to +0.13	-0.04 to +0.13	-0.03 to +0.16
	Spring	0.24	+0.00 to +0.15	-0.01 to +0.19	+0.02 to +0.33	+0.03 to +0.39
	Summer	0.48	-0.08 to +0.20	-0.04 to +0.22	-0.12 to +0.23	-0.11 to +0.25
	Fall	0.26	-0.08 to +0.25	-0.09 to +0.29	-0.07 to +0.28	-0.07 to +0.32
Days with Precipitation Over 4"	Annual	0.02	-0.03 to +0.05	-0.02 to +0.07	-0.03 to +0.10	-0.02 to +0.15
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.01	-0.01 to +0.01	-0.01 to +0.01	+0.00 to +0.03	-0.01 to +0.05
	Summer	0.01	-0.02 to +0.03	-0.02 to +0.04	-0.02 to +0.04	-0.03 to +0.05
	Fall	0.01	-0.03 to +0.03	-0.02 to +0.05	-0.03 to +0.05	-0.02 to +0.05

- 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.

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	-0.24 to +5.11	+1.18 to +6.85	+2.04 to +8.06	+2.08 to +9.10
	Winter	11.2	-0.41 to +2.25	+0.19 to +2.78	+0.31 to +3.18	+0.81 to +4.08
	Spring	13.41	+0.01 to +2.19	+0.33 to +2.21	+0.65 to +2.96	+0.71 to +3.14
	Summer	13.23	-0.12 to +1.98	-0.07 to +2.14	-0.10 to +2.05	-0.62 to +2.03
	Fall	12.87	-1.39 to +1.68	-1.35 to +1.97	-1.72 to +1.97	-2.09 to +1.71

- 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%).

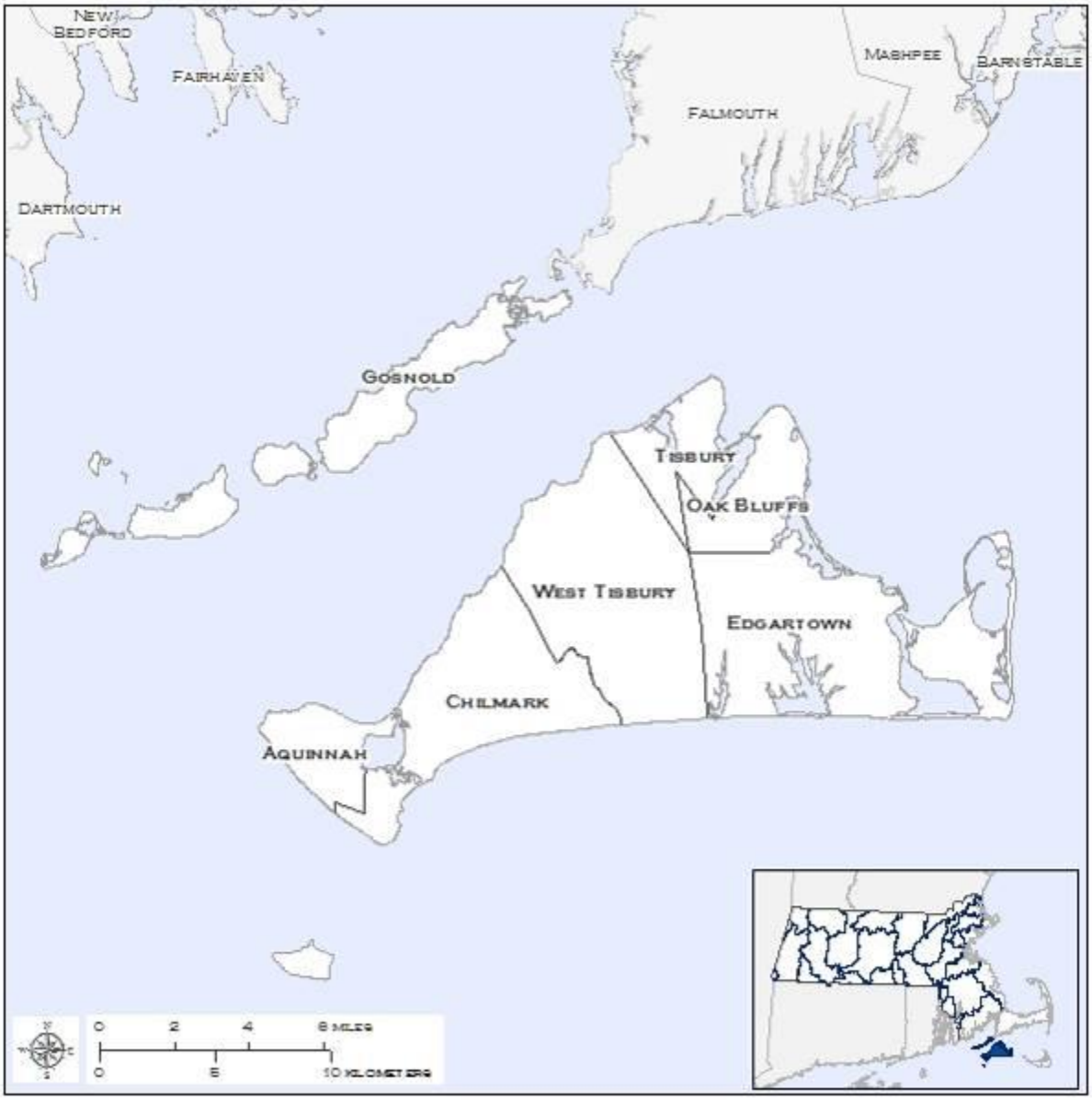
Westfield Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16.8	-0.26 to +1.40	-0.28 to +2.17	-0.65 to +2.27	-0.47 to +2.64
	Winter	11.66	-0.81 to +0.96	-0.62 to +1.01	-0.68 to +1.35	-1.01 to +1.38
	Spring	11.67	-1.00 to +0.70	-0.86 to +1.16	-1.22 to +1.05	-1.39 to +0.78
	Summer	11.33	-0.81 to +1.43	-0.44 to +0.99	-0.91 to +1.65	-1.55 to +1.95
	Fall	11.82	-0.08 to +1.62	-0.06 to +2.37	-0.30 to +2.51	-0.03 to +3.07

- 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	50.57	+1.78 to +3.34	+2.36 to +5.15	+2.73 to +7.40	+3.03 to +9.05
	Winter	32.43	+1.67 to +3.50	+2.36 to +5.17	+2.71 to +7.14	+3.00 to +8.68
	Spring	46.63	+1.50 to +3.02	+1.93 to +4.88	+2.29 to +6.62	+2.57 to +7.24
	Summer	68.8	+1.77 to +4.04	+2.64 to +5.83	+3.11 to +8.48	+3.63 to +9.86
	Fall	54.13	+1.83 to +3.62	+2.86 to +5.52	+2.75 to +7.94	+3.12 to +9.68
Maximum Temperature	Annual	58.82	+1.68 to +3.38	+2.21 to +5.11	+2.45 to +7.37	+2.77 to +8.91
	Winter	40.56	+1.45 to +3.47	+1.98 to +4.71	+2.40 to +6.84	+2.70 to +8.22
	Spring	54.9	+1.35 to +2.87	+1.72 to +4.61	+2.02 to +6.38	+2.21 to +7.11
	Summer	77.06	+1.66 to +4.02	+2.49 to +5.82	+3.02 to +8.37	+3.41 to +9.58
	Fall	62.48	+1.75 to +3.50	+2.70 to +5.51	+2.69 to +7.73	+2.91 to +9.69
Minimum Temperature	Annual	42.31	+1.89 to +3.41	+2.60 to +5.32	+3.01 to +7.44	+3.30 to +9.14
	Winter	24.3	+1.94 to +3.62	+2.71 to +5.61	+3.12 to +7.76	+3.47 to +9.19
	Spring	38.35	+1.52 to +3.21	+2.24 to +5.16	+2.40 to +6.85	+2.75 to +7.38
	Summer	60.53	+1.92 to +4.06	+2.80 to +5.87	+3.16 to +8.52	+3.84 to +9.96
	Fall	45.78	+1.86 to +3.70	+2.95 to +5.60	+2.81 to +8.08	+3.33 to +9.89

- 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	0.8	+1.36 to +4.92	+2.49 to +10.00	+3.20 to +20.83	+4.46 to +30.90
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.01	-0.03 to +0.06	-0.01 to +0.11	-0.01 to +0.14	+0.00 to +0.25
	Summer	0.78	+1.22 to +4.54	+2.41 to +9.61	+3.04 to +19.97	+4.24 to +29.47
	Fall	0.00	+0.03 to +0.25	+0.06 to +0.40	+0.08 to +0.78	+0.12 to +1.55
Days with Maximum Temperature Over 95°F	Annual	0.02	+0.10 to +0.76	+0.33 to +1.67	+0.41 to +4.04	+0.58 to +7.52
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.04	+0.00 to +0.09
	Summer	0.02	+0.08 to +0.74	+0.33 to +1.64	+0.41 to +3.94	+0.52 to +7.27
	Fall	0.00	+0.00 to +0.03	+0.00 to +0.04	+0.00 to +0.09	+0.00 to +0.23
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.00 to +0.07	+0.00 to +0.21	+0.00 to +0.58	+0.00 to +1.15
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.00	+0.00 to +0.07	+0.00 to +0.20	+0.00 to +0.58	+0.00 to +1.15
	Fall	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01

- 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.

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	0.47	-0.00 to -0.31	-0.06 to -0.32	-0.07 to -0.41	-0.09 to -0.34
	Winter	0.47	-0.00 to -0.31	-0.06 to -0.32	-0.07 to -0.41	-0.09 to -0.34
	Spring	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	104.63	-13.11 to -24.93	-19.34 to -38.71	-21.27 to -50.91	-22.53 to -63.42
	Winter	70.57	-4.39 to -10.57	-6.75 to -17.26	-8.38 to -26.69	-10.00 to -35.51
	Spring	23.91	-4.44 to -10.62	-6.75 to -15.10	-7.58 to -16.90	-9.68 to -18.55
	Summer	0.00	-0.03 to -0.00	-0.03 to -0.00	-0.03 to -0.00	-0.03 to -0.00
	Fall	10.04	-3.41 to -5.39	-4.64 to -7.02	-5.00 to -9.01	-5.33 to -9.98

- 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.

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	5772.08	-432.01	to	-846.80	-656.35	to	-1290.98	-731.25	to	-1747.25	-768.72	to	-2069.21
	Winter	2950.14	-148.65	to	-321.07	-211.22	to	-473.25	-244.01	to	-642.99	-281.63	to	-788.18
	Spring	1695.64	-135.30	to	-273.07	-173.73	to	-434.52	-204.06	to	-576.51	-237.19	to	-623.61
	Summer	76.68	-28.16	to	-53.78	-42.87	to	-66.01	-42.50	to	-75.27	-43.66	to	-78.81
	Fall	1044.5	-128.19	to	-256.36	-214.31	to	-378.31	-208.02	to	-529.80	-228.58	to	-603.72
Cooling Degree-Days (Base 65°F)	Annual	485.77	+170.56	to	+398.79	+267.22	to	+589.42	+279.55	to	+940.78	+362.30	to	+1142.37
	Winter	nan	nan	to	nan	+2.86	to	+2.86	nan	to	nan	+3.55	to	+3.55
	Spring	7.88	+0.87	to	+7.14	+2.20	to	+15.87	+2.84	to	+28.98	+5.02	to	+39.78
	Summer	425.88	+138.07	to	+327.08	+197.26	to	+475.68	+234.61	to	+697.21	+282.09	to	+829.21
	Fall	54.11	+26.85	to	+73.46	+41.89	to	+123.07	+44.77	to	+207.10	+63.96	to	+279.22
Growing Degree-Days (Base 50°F)	Annual	2553.43	+366.00	to	+703.29	+492.53	to	+1069.15	+540.11	to	+1626.41	+647.88	to	+2020.61
	Winter	5.18	-0.86	to	+9.47	-0.05	to	+16.21	+1.81	to	+26.21	+4.41	to	+37.58
	Spring	221.69	+39.04	to	+97.22	+51.22	to	+186.23	+62.27	to	+274.92	+64.11	to	+314.57
	Summer	1729.23	+162.99	to	+371.51	+242.60	to	+535.87	+285.38	to	+780.31	+333.07	to	+906.81
	Fall	597.87	+98.62	to	+229.29	+167.80	to	+378.91	+162.09	to	+556.42	+201.06	to	+699.88

- 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	6.65	+0.31 to +1.75	+0.55 to +2.90	+0.50 to +3.12	+0.78 to +3.36
	Winter	1.22	-0.13 to +0.55	-0.05 to +0.62	-0.02 to +0.99	-0.04 to +1.18
	Spring	1.72	+0.22 to +0.61	+0.12 to +0.93	+0.34 to +1.04	+0.36 to +1.06
	Summer	1.82	-0.32 to +0.58	-0.04 to +0.76	-0.26 to +0.68	-0.41 to +0.68
	Fall	1.89	-0.26 to +0.75	-0.14 to +0.99	-0.17 to +0.86	-0.19 to +1.27
Days with Precipitation Over 2"	Annual	0.52	-0.01 to +0.37	+0.03 to +0.34	+0.05 to +0.45	+0.07 to +0.57
	Winter	0.08	-0.06 to +0.13	-0.05 to +0.14	-0.03 to +0.14	-0.02 to +0.24
	Spring	0.03	-0.01 to +0.10	-0.01 to +0.13	+0.00 to +0.12	-0.01 to +0.17
	Summer	0.25	-0.04 to +0.09	-0.01 to +0.12	-0.01 to +0.11	-0.02 to +0.17
	Fall	0.16	-0.03 to +0.14	-0.02 to +0.13	-0.01 to +0.16	-0.03 to +0.27
Days with Precipitation Over 4"	Annual	0.03	+0.00 to +0.02	-0.03 to +0.04	-0.03 to +0.06	-0.03 to +0.08
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.00	+0.00 to +0.02	+0.00 to +0.03	+0.00 to +0.02	+0.00 to +0.03
	Fall	0.03	-0.03 to +0.01	-0.03 to +0.03	-0.03 to +0.03	-0.03 to +0.07

- 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.

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	46.02	-1.04 to 2.45	-1.01 to +3.78	-0.91 to +5.09	-0.69 to +4.87
	Winter	11.85	-0.47 to +1.30	-0.42 to +1.61	-0.18 to +2.04	-0.16 to +2.84
	Spring	12.12	-0.22 to +1.51	-0.51 to +1.76	+0.10 to +2.00	-0.19 to +2.16
	Summer	10.38	-0.81 to +0.88	-1.06 to +1.53	-1.53 to +1.64	-1.86 to +1.57
	Fall	11.71	-1.00 to +0.67	-1.15 to +0.91	-1.03 to +1.38	-1.91 to +1.21

- 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	17.68	-0.89 to +1.72	-0.25 to +2.39	+0.00 to +3.05	-0.54 to +3.87
	Winter	10.41	-0.50 to +1.30	-0.36 to +1.62	-0.47 to +1.80	-0.62 to +1.99
	Spring	10.26	-1.11 to +0.95	-0.90 to +1.13	-0.76 to +0.85	-1.62 to +1.16
	Summer	14.65	-0.87 to +1.93	-0.59 to +2.39	-0.63 to +3.13	-0.47 to +4.18
	Fall	13.1	-0.42 to +2.05	+0.08 to +2.40	-0.20 to +3.32	-0.11 to +3.29

- 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	50.12	+1.77 to +3.50	+2.48 to +5.36	+2.86 to +7.58	+3.22 to +9.22
	Winter	33	+1.79 to +3.62	+2.40 to +5.52	+3.02 to +7.43	+3.26 to +8.85
	Spring	45.71	+1.83 to +3.53	+2.43 to +5.38	+2.75 to +7.22	+3.18 to +8.12
	Summer	67.48	+1.57 to +3.92	+2.61 to +5.90	+2.92 to +8.66	+3.48 to +10.04
	Fall	54.05	+1.60 to +3.51	+2.70 to +5.47	+2.67 to +7.86	+3.15 to +9.54
Maximum Temperature	Annual	57.4	+1.61 to +3.46	+2.32 to +5.25	+2.57 to +7.53	+2.95 to +9.11
	Winter	40.34	+1.53 to +3.60	+2.05 to +5.05	+2.62 to +7.07	+2.91 to +8.40
	Spring	52.93	+1.63 to +3.42	+2.15 to +5.17	+2.53 to +7.07	+2.84 to +7.93
	Summer	74.68	+1.57 to +3.91	+2.55 to +5.89	+2.78 to +8.51	+3.18 to +9.83
	Fall	61.4	+1.53 to +3.43	+2.52 to +5.42	+2.51 to +7.60	+2.88 to +9.40
Minimum Temperature	Annual	42.84	+1.97 to +3.62	+2.76 to +5.56	+3.15 to +7.68	+3.53 to +9.31
	Winter	25.66	+2.05 to +3.88	+2.76 to +5.98	+3.42 to +8.12	+3.67 to +9.53
	Spring	38.49	+1.84 to +3.74	+2.72 to +5.59	+2.89 to +7.36	+3.43 to +8.35
	Summer	60.27	+1.58 to +4.02	+2.74 to +5.90	+3.08 to +8.68	+3.66 to +10.23
	Fall	46.71	+1.67 to +3.76	+2.87 to +5.52	+2.82 to +8.11	+3.42 to +9.67

- 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	0.38	+0.32 to +1.79	+0.94 to +3.53	+0.91 to +8.55	+1.44 to +17.49
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.03	+0.00 to +0.08	+0.00 to +0.07	+0.00 to +0.13
	Summer	0.38	+0.30 to +1.66	+0.91 to +3.32	+0.88 to +8.19	+1.36 to +16.57
	Fall	0.00	+0.00 to +0.07	+0.01 to +0.17	+0.01 to +0.35	+0.01 to +0.75
Days with Maximum Temperature Over 95°F	Annual	0.09	+0.00 to +0.19	+0.05 to +0.52	+0.08 to +1.12	+0.13 to +3.01
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.03	+0.00 to +0.05
	Summer	0.09	+0.00 to +0.19	+0.05 to +0.49	+0.08 to +1.11	+0.13 to +2.88
	Fall	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.12
Days with Maximum Temperature Over 100°F	Annual	0.00	+0.00 to +0.04	+0.00 to +0.07	+0.00 to +0.11	+0.00 to +0.47
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Spring	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00
	Summer	0.00	+0.00 to +0.04	+0.00 to +0.07	+0.00 to +0.11	+0.00 to +0.47
	Fall	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.00

- 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.

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	0.06	-0.12 to +0.03	-0.13 to -0.00	-0.13 to -0.00	-0.13 to -0.00
	Winter	0.06	-0.12 to +0.03	-0.13 to -0.00	-0.13 to -0.00	-0.13 to -0.00
	Spring	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Summer	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
	Fall	0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00	-0.00 to -0.00
Days with Minimum Temperature Below 32°F	Annual	96.58	-14.83 to -28.15	-20.37 to -42.64	-24.81 to -56.01	-27.57 to -67.76
	Winter	67.02	-7.65 to -15.40	-8.41 to -24.42	-12.24 to -34.07	-14.50 to -42.79
	Spring	21.85	-5.82 to -10.81	-6.86 to -13.90	-9.46 to -17.23	-11.07 to -18.98
	Summer	0.00	-0.02 to -0.00	-0.02 to -0.00	-0.02 to -0.00	-0.02 to -0.00
	Fall	7.58	-2.50 to -4.32	-3.29 to -5.34	-3.26 to -6.39	-3.48 to -6.73

- 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.

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	5823.1	-477.55 to -936.02	-715.46 to -1399.84	-787.29 to -1873.01	-875.94 to -2178.77
	Winter	2894.01	-162.16 to -333.12	-214.38 to -500.12	-273.85 to -675.08	-295.20 to -804.22
	Spring	1777.12	-165.27 to -315.07	-215.83 to -477.38	-247.37 to -632.50	-291.11 to -706.28
	Summer	106.93	-41.48 to -77.53	-60.28 to -93.85	-63.99 to -113.79	-66.98 to -120.19
	Fall	1039.59	-108.04 to -250.06	-200.70 to -365.54	-193.57 to -516.71	-224.58 to -580.84
Cooling Degree-Days (Base 65°F)	Annual	381.61	+136.38 to +376.02	+243.38 to +570.79	+262.59 to +928.02	+323.57 to +1138.99
	Winter	nan	nan to nan	-0.48 to -0.48	nan to nan	+0.56 to +0.56
	Spring	6.24	+1.73 to +7.74	+3.43 to +18.85	+5.07 to +30.97	+3.92 to +43.22
	Summer	334.73	+106.19 to +299.42	+174.99 to +453.56	+207.11 to +673.69	+240.73 to +801.48
	Fall	43.71	+27.82 to +73.83	+43.57 to +126.61	+43.49 to +214.13	+68.70 to +283.65
Growing Degree-Days (Base 50°F)	Annual	2359.7	+346.33 to +716.84	+509.17 to +1095.47	+568.95 to +1654.66	+674.29 to +2052.72
	Winter	4.84	-0.92 to +7.70	-0.66 to +16.97	+1.36 to +28.10	+4.36 to +42.06
	Spring	169.31	+52.00 to +117.81	+75.70 to +215.41	+88.99 to +300.75	+92.04 to +362.85
	Summer	1607.88	+143.95 to +360.06	+238.99 to +542.08	+268.13 to +795.43	+318.48 to +922.84
	Fall	579.77	+105.06 to +232.51	+169.68 to +382.21	+158.33 to +559.21	+207.69 to +695.03

- 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	4.97	+0.35 to +1.51	+0.41 to +2.38	+0.58 to +2.82	+0.53 to +3.19
	Winter	0.87	-0.22 to +0.51	-0.18 to +0.67	-0.03 to +0.84	+0.00 to +1.27
	Spring	1.1	-0.01 to +0.60	+0.01 to +0.87	+0.30 to +1.15	+0.18 to +1.11
	Summer	1.37	-0.14 to +0.51	-0.01 to +0.76	-0.23 to +0.73	-0.36 to +0.57
	Fall	1.62	-0.14 to +0.45	-0.16 to +0.79	-0.32 to +0.95	-0.27 to +1.19
Days with Precipitation Over 2"	Annual	0.39	-0.12 to +0.39	-0.02 to +0.66	+0.02 to +0.78	+0.04 to +0.88
	Winter	0.05	-0.02 to +0.13	-0.06 to +0.14	+0.00 to +0.20	+0.00 to +0.27
	Spring	0.00	-0.05 to +0.13	-0.04 to +0.19	-0.05 to +0.22	-0.06 to +0.22
	Summer	0.2	-0.10 to +0.23	-0.04 to +0.36	-0.05 to +0.38	-0.10 to +0.35
	Fall	0.14	-0.09 to +0.12	-0.07 to +0.19	-0.06 to +0.28	-0.08 to +0.32
Days with Precipitation Over 4"	Annual	0.04	-0.10 to +0.08	-0.07 to +0.09	-0.06 to +0.12	-0.07 to +0.16
	Winter	0.00	+0.00 to +0.00	+0.00 to +0.00	+0.00 to +0.01	+0.00 to +0.00
	Spring	0.00	-0.03 to +0.03	-0.03 to +0.04	-0.03 to +0.05	-0.03 to +0.05
	Summer	0.01	-0.07 to +0.06	-0.05 to +0.08	-0.06 to +0.06	-0.06 to +0.08
	Fall	0.03	-0.03 to +0.03	-0.03 to +0.02	-0.03 to +0.05	-0.03 to +0.07

- 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.

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	37.68	-0.60 to 3.04	+0.24 to +4.71	+0.03 to +5.48	+0.05 to +5.83
	Winter	9.58	-0.15 to +1.19	-0.32 to +1.33	+0.06 to +1.97	-0.39 to +2.83
	Spring	9.69	-0.05 to +1.42	-0.15 to +1.83	+0.24 to +2.33	+0.32 to +2.31
	Summer	8.7	-0.74 to +1.18	-0.79 to +1.73	-1.30 to +1.86	-1.94 to +1.59
	Fall	9.72	-1.21 to +0.91	-0.87 to +1.35	-1.02 to +1.70	-1.35 to +1.94

- 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	19.8	-0.72 to +1.94	-1.08 to +3.03	-1.02 to +4.22	-0.87 to +5.23
	Winter	10.83	-0.46 to +1.66	-0.36 to +1.71	-0.56 to +2.17	-1.16 to +2.22
	Spring	11.4	-0.85 to +1.28	-1.01 to +1.34	-0.65 to +1.77	-1.18 to +1.85
	Summer	16.98	-1.11 to +2.26	-1.19 to +2.51	-0.62 to +4.30	-1.01 to +6.00
	Fall	12.87	-0.90 to +2.57	-0.62 to +2.38	-0.26 to +2.73	+0.09 to +3.58

- 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.

Sea Level Rise Projections

Future sea-level projections are provided for the Massachusetts coastline at established tide gauge locations at Boston Harbor, Buzzards Bay, Nantucket, Newport, RI, Sandwich, Seavey Island, NH, and Woods Hole. The methodology for developing these projections closely follows the approach applied to Boston Harbor for *Climate Ready Boston,*[12] and a recent analysis for the State of California.[13] The analysis consists of a probabilistic assessment of future sea level at each tide gauge location and following two possible future greenhouse gas emissions scenarios: medium (RCP4.5) and high (RCP8.5).[14] Relative Sea Level (RSL) is the local difference in elevation between the sea surface and land surface. A multi-year reference time period for RSL was used to minimize biases caused by tidal, seasonal, and interannual climate variability, following the common practice of using a 19-year tidal datum epoch[15] centered on 2000 as the 'zero' reference for changes in RSL.[16] Estimates of relative sea-level at site-specific locations and at individual years requires the consideration of processes not explicitly considered in the analysis.

Collectively, these sea level rise projections provide the background sea level estimates that can be used for detailed, site specific hydrodynamical modeling[17] to map storm surge impacts, and influences of localized processes along the coast. For the MVP program, while not sight-specific or projections of mean higher high water levels, these projections provide insight into 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.

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,

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[12] 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.

[13] 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.

[14] 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.

[15] 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).

[16] e.g., 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.

[17] 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.

land and shoreland 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 less than a foot can produce significant new risks for development and infrastructure like the electrical grid and storm and waste water systems near the shore.

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.

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 neighrborhoods 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.

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: Sea level rise projections at the Boston tide gauge. Projections are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000.

BOSTON		Median (50th percentile) 50% probability SLR exceeds	Likely Range (17th-83rd percentiles) 66% probability that SLR is between…	99.9th Percentile Value Exceptionally unlikely that SLR will exceed
Emissions Scenarios: Medium (RCP 4.5); High (RCP 8.5)		Feet (relative to Mean Sea Level in 2000)		
2030	Med	0.6	0.5-0.8	1.2
	High	0.7	0.4-0.9	1.3
2050	Med	1.1	0.8-1.4	2.4
	High	1.2	0.8-1.5	2.7
2070	Med	1.6	1.1-2.1	4.5
	High	1.9	1.3-2.4	5.0
2100	Med	2.3	1.5-3.1	8.2
	High	3.0	2.0-4.0	9.7

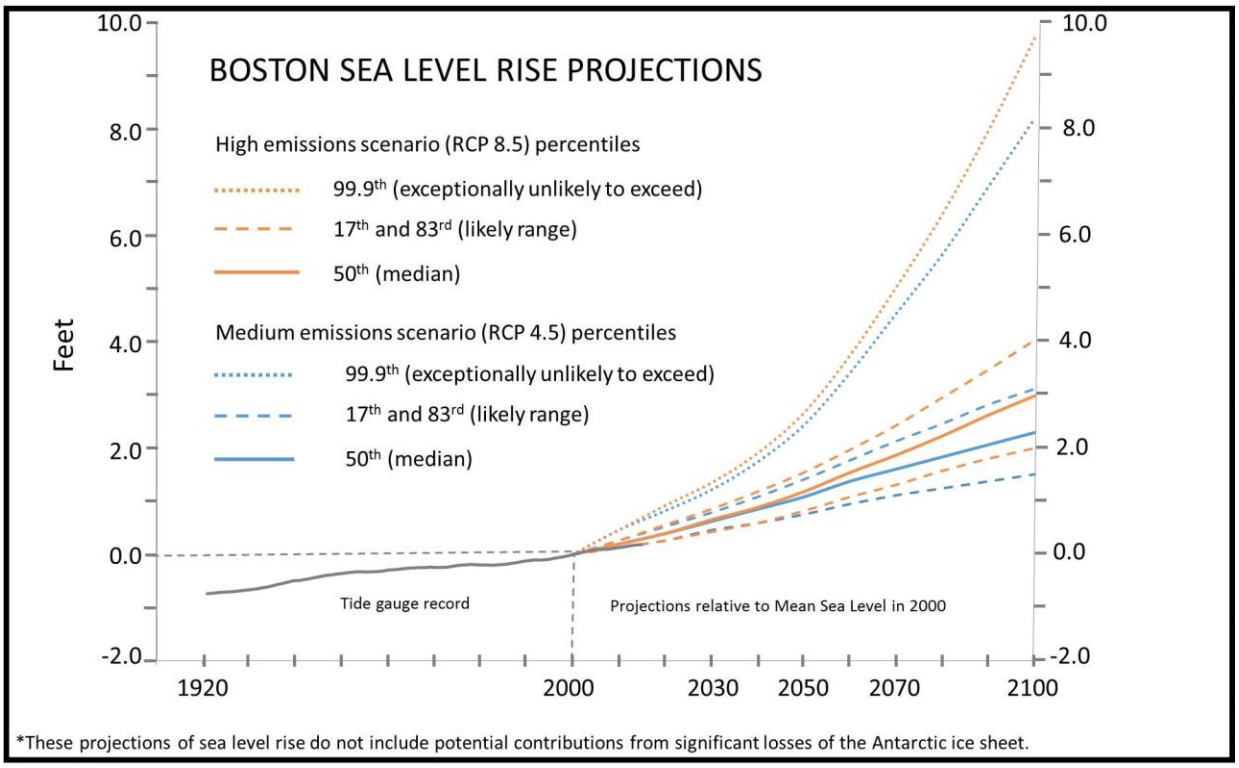

Figure 1: Sea level rise projections at the Boston tide gauge. Projection curves are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000. These projections of sea level rise do not include potential contributions from significant losses of the Antarctic ice sheet.

Table 8: Sea level rise projections at the Nantucket tide gauge. Projections are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000.

NANTUCKET		Median (50th percentile) 50% probability SLR exceeds	Likely Range (17th-83rd percentiles) 66% probability that SLR is between…	99.9th Percentile Value Exceptionally unlikely that SLR will exceed
Emissions Scenarios: Medium (RCP 4.5); High (RCP 8.5)		Feet (relative to Mean Sea Level in 2000)		
2030	Med	0.7	0.5-0.9	1.3
	High	0.7	0.5-0.9	1.4
2050	Med	1.2	0.9-1.5	2.6
	High	1.3	1.0-1.7	2.8
2070	Med	1.8	1.3-2.3	4.7
	High	2.0	1.4-2.6	5.2
2100	Med	2.5	1.7-3.3	8.5
	High	3.2	2.2-4.3	10.1

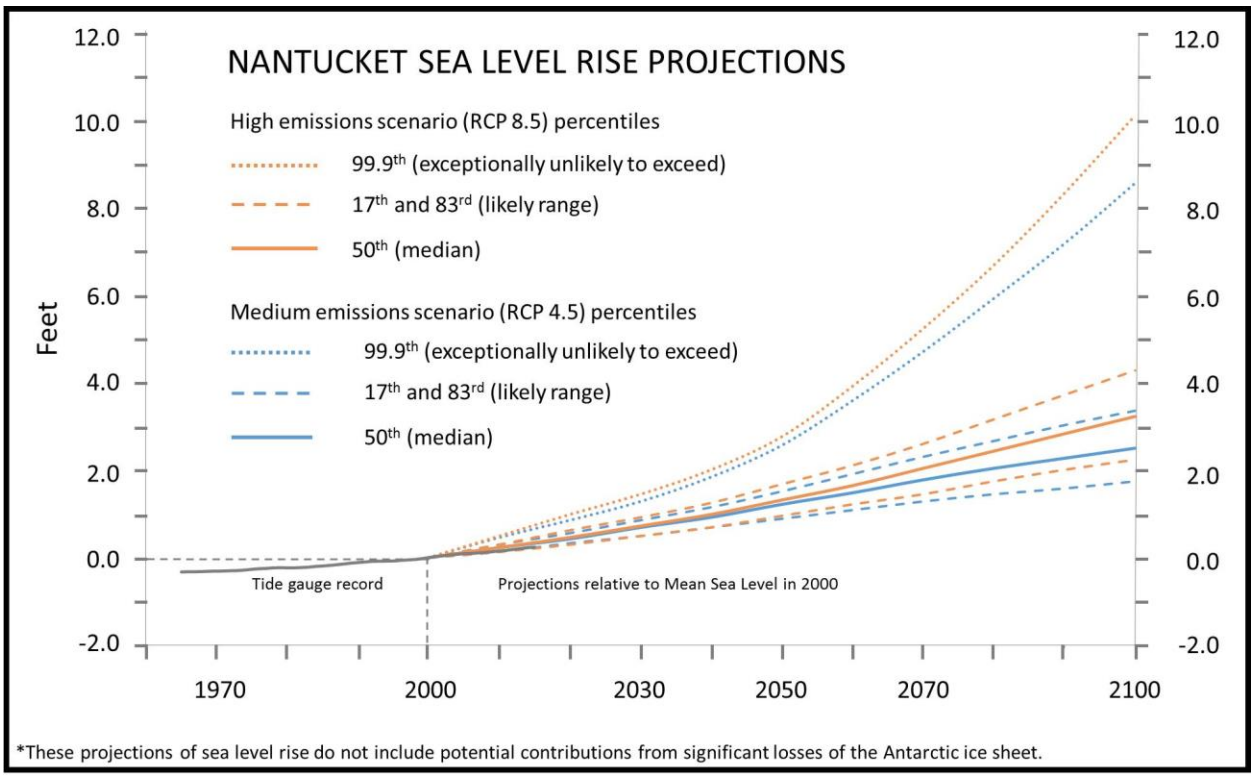

Figure 2: Sea level rise projections at the Nantucket tide gauge. Projection curves are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000. These projections of sea level rise do not include potential contributions from significant losses of the Antarctic ice sheet.

Table 9: Sea level rise projections at the Woods Hole tide gauge. Projections are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000.

WOODS HOLE		Median (50th percentile) 50% probability SLR exceeds	Likely Range (17th-83rd percentiles) 66% probability that SLR is between…	99.9th Percentile Value Exceptionally unlikely that SLR will exceed
Emissions Scenarios: Medium (RCP 4.5); High (RCP 8.5)		Feet (relative to Mean Sea Level in 2000)		
2030	Med	0.7	0.5-0.8	1.2
	High	0.7	0.4-0.9	1.5
2050	Med	1.1	0.8-1.5	2.5
	High	1.2	0.9-1.6	2.7
2070	Med	1.7	1.2-2.2	4.6
	High	1.9	1.4-2.5	5.2
2100	Med	2.4	1.6-3.2	8.3
	High	3.1	2.1-4.1	9.9

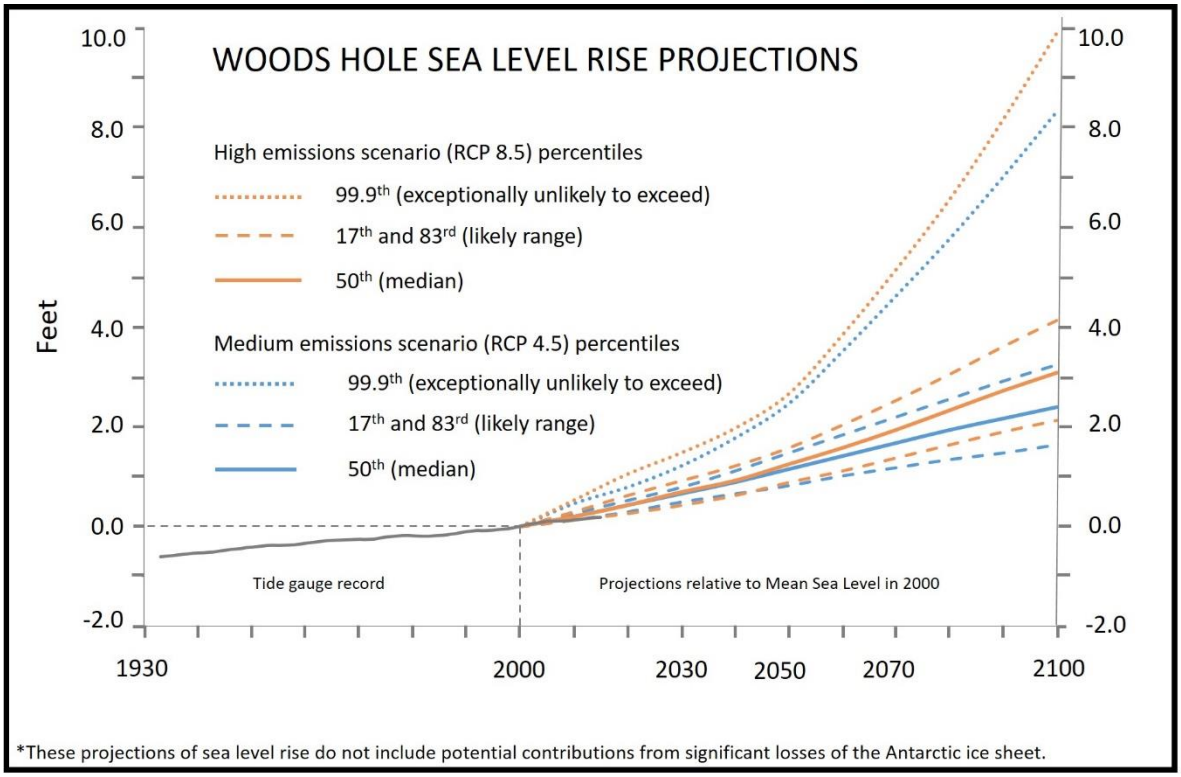

Figure 3: Sea level rise projections at the Woods Hole tide gauge. Projection curves are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000. These projections of sea level rise do not include potential contributions from significant losses of the Antarctic ice sheet.

Table 10: Sea level rise projections at the Buzzards Bay tide gauge. Projections are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000.

BUZZARDS BAY		Median (50th percentile) 50% probability SLR exceeds	Likely Range (17th-83rd percentiles) 66% probability that SLR is between…	99.9th Percentile Value Exceptionally unlikely that SLR will exceed
Emissions Scenarios: Medium (RCP 4.5); High (RCP 8.5)		Feet (relative to Mean Sea Level in 2000)		
2030	Med	0.6	0.5-0.8	1.2
	High	0.7	0.4-0.9	1.4
2050	Med	1.1	0.8-1.4	2.5
	High	1.2	0.9-1.6	2.7
2070	Med	1.6	1.1-2.2	4.6
	High	1.9	1.3-2.5	5.1
2100	Med	2.3	1.5-3.2	8.3
	High	3.1	2.0-4.1	9.8

Table 11: Sea level rise projections at the Sandwich Marina tide gauge. Projections are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000.

SANDWICH MARINA		Median (50th percentile) 50% probability SLR exceeds	Likely Range (17th-83rd percentiles) 66% probability that SLR is between…	99.9th Percentile Value Exceptionally unlikely that SLR will exceed
Emissions Scenarios: Medium (RCP 4.5); High (RCP 8.5)		Feet (relative to Mean Sea Level in 2000)		
2030	Med	0.6	0.5-0.8	1.2
	High	0.7	0.4-0.9	1.4
2050	Med	1.1	0.8-1.4	2.5
	High	1.2	0.9-1.6	2.7
2070	Med	1.7	1.1-2.2	4.6
	High	1.9	1.3-2.5	5.1
2100	Med	2.3	1.6-3.2	8.3
	High	3.1	2.1-4.1	9.8

Table 12: Sea level rise projections at the Seavey Island, ME tide gauge. Projections are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000.

SEAVEY ISLAND		Median (50th percentile) 50% probability SLR exceeds	Likely Range (17th-83rd percentiles) 66% probability that SLR is between…	99.9th Percentile Value Exceptionally unlikely that SLR will exceed
Emissions Scenarios: Medium (RCP 4.5); High (RCP 8.5)		Feet (relative to Mean Sea Level in 2000)		
2030	Med	0.5	0.3-0.7	1.1
	High	0.6	0.3-0.8	1.3
2050	Med	0.9	0.6-1.2	2.3
	High	1.0	0.7-1.4	2.5
2070	Med	1.4	0.9-1.9	4.3
	High	1.6	1.1-2.2	4.8
2100	Med	1.9	1.2-2.8	7.9
	High	2.6	1.7-3.7	9.3

Table 13: Sea level rise projections at the Newport, RI tide gauge. Projections are given for the medium (RCP 4.5) and high (RCP 8.5) emissions scenarios, at multiple levels of likelihood, in feet relative to mean sea level in 2000.

NEWPORT		Median (50th percentile) 50% probability SLR exceeds	Likely Range (17th-83rd percentiles) 66% probability that SLR is between…	99.9th Percentile Value Exceptionally unlikely that SLR will exceed
Emissions Scenarios: Medium (RCP 4.5); High (RCP 8.5)		Feet (relative to Mean Sea Level in 2000)		
2030	Med	0.6	0.5-0.8	1.2
	High	0.7	0.4-0.9	1.5
2050	Med	1.1	0.8-1.4	2.4
	High	1.2	0.9-1.6	2.6
2070	Med	1.7	1.2-2.2	4.6
	High	1.9	1.3-2.5	5.1
2100	Med	2.4	1.6-3.2	8.3
	High	3.1	2.1-4.1	9.8