



Climate of Rhode Island

Topographic features- Rhode Island, the smallest of states, shares the southeastern corner of New England with a portion of Massachusetts. The State extends for 50 miles in a north-south direction and has an average width of about 30 miles. The total area, including Block Island some 10 miles offshore, is 1,214 square miles.

There are three topographical divisions of the State. A narrow coastal plain lies along the south shore and around Narragansett Bay with an elevation of less than 100 feet. A second division lies to the north and east of the Bay with gently rolling uplands of up to 200 feet elevation. The western two-thirds of Rhode Island consist of predominantly hilly uplands of mostly 200 to 600 feet elevation but rising to a maximum of 800 feet above sea level in the northwest corner of the State.

Narragansett Bay has a very irregular shoreline, indented by numerous small bays or coves and the mouths of the Taunton and Blackstone rivers. The Bay contains several islands of which the one known as Aquidneck, or Rhode Island, is the largest. The shore line facing Long Island Sound is more than 25 miles from the ocean.

The Blackstone River in the northeast is the principal river. A number of smaller rivers or brooks that originate in the western uplands of the State or in southeastern Massachusetts, empty into Narragansett Bay or Long Island Sound.

The chief characteristics of Rhode Island's climate may be summarized as follows: (1) equitable distribution of precipitation among the four seasons; (2) large ranges of temperature both daily and annually; (3) great differences in the same season of different years; and (4) considerable diversity of the weather over short time periods. These characteristics are modified by nearness to the Bay or ocean, elevation and nature of the terrain.

Rhode Island lies in the "prevailing westerlies", the belt of generally eastward air movement which encircles the globe in middle latitudes. Embedded in this circulation are extensive masses of air originating in higher and lower latitudes and interacting to produce storm systems. A large number of these systems and air mass fronts pass near or over Rhode Island in a year.

The procession of contrasting air masses and the relatively frequent passage of “Lows” bring about a roughly twice-weekly alternation from fair to cloudy or stormy weather, usually attended by abrupt changes in temperature, moisture, sunshine, wind direction and speed. There is no regular or persistent rhythm to this sequence, and it is sometimes interrupted by periods of several days, or infrequently of a few weeks with the same weather pattern.

Day-to-day variety rather than monotony is the main feature of Rhode Island’s weather. Changeability is also one of its features on a longer time scale. That is, the same month or season will exhibit varying characteristics over the years, sometimes in close alternation and sometimes arranged in similar groups for successive years. A “normal” month, season, or year is the exception rather than the rule.

As shown, the basic climate does not result from the predominance of any single controlling weather regime. It is composed of a large variety of weather patterns. Hence, weather averages in Rhode Island are not very useful for important planning purposes and should be supplemented by more detailed climate data.

Temperature- The mean annual temperature ranges from 48 degrees Fahrenheit (° F) except near the south shore, Narragansett Bay, and in the large built-up area around Providence, where it is 51 degrees. Southwestern Rhode Island, from four to 10 miles inland, exhibits a coolness not suggested by the nearness to the ocean or the general elevation of 50 to 150 feet. Here the annual mean temperature is not more than 48° F, making the section as cool as the cooler areas of the northwest interior.

The average daily minimum temperature in January and February is 19 to 20 over about two-thirds of the State, increasing to near 25° F in immediate coastal sections. The number of days with minimum temperature of 0° F or below averages one or less per year in the Bay and coastal areas. The number increases to about five per year in most of the interior. In a particularly cold winter month as many as six to eight days with such temperatures are observed in southwestern Rhode Island, a few miles inland from the coast. A maximum temperature of 32° F or lower occurs on an average of 20 to 25 days per year along the shoreline and 30 to 40 days in the remainder of the State.

The greatest numbers of hot days occur in the metropolitan areas and in parts of the northern interior. Here, about eight to 10 days of temperatures of 90° F or higher may be expected each year with a variation from two to five days in cool summers to 20 or more in exceptionally warm summers. Near the immediate coast, the occurrence of 90° F temperatures is limited to one day in an average summer, if it occurs at all. Temperatures of 100° F or higher have been recorded in the northern interior occasionally.

The length of the freeze-free season, as noted by the occurrence of temperatures of 32° F or lower, averages from 155 to 180 days in most of the State. Exceptions are in the southwestern interior with an average length of 130 to 145 days and in the immediate Bay area with 200 days or more. Near the southeastern shore of the Bay the first autumn freezing temperature is considerably delayed compared to the rest of the

State. From year to year there is some variation in the length the freeze period.

Precipitation- The climate of Rhode Island is characterized by the rather even distribution of precipitation throughout the year. Storm centers and their accompanying fronts are the principal year-round producers of precipitation. Storms moving up the Atlantic coast generally yield the heaviest amounts of rain and snow. Bands and patches of thunderstorms or convective showers contribute considerable precipitation in the summer and make up the difference resulting from decreased activity of the storm centers. In comparison with the general storms, these are of brief duration, but they yield the heaviest local rainfall.

Annual precipitation averages 42 to 46 inches over most of the State, with a tendency for decreasing amounts from west to east. It varies from about 40 inches in the immediate southeastern Bay area and on Block Island to 48 inches in the western uplands. Total precipitation in the freeze-free period of April through October shows similar differences over the State with an average of 22 to 24 inches near the Bay and 26 to 28 inches in the western interior. While there are no pronounced wet and dry months as in other climates, the months of May, June and July are relatively dry along the Bay. The average total precipitation for each of these months is 2.5 to three inches. October and February have an average of slightly more than three inches over most of the State. The remaining months each yield from 3.5 to four inches. Measurable precipitation falls on an average of one day in three.

The average annual snowfall in Rhode Island increases from about 20 inches on Block Island and along the southeast shores of Narragansett Bay to 40 to 55 inches in the western third of the State. Areas near the western and northern shores of the Bay, including greater Providence, have an average range from 25 to 30 inches of snow per year. During mild winters these snowfall totals can be significantly less.

Climate and the Economy- The long coastline with numerous beaches and harbors make Rhode Island a strong attraction for bathers, fisherman and sailing enthusiasts. These recreational activities, favored by the climate, contribute greatly to the economy of the State. Rhode Island is primarily an industrial state with agriculture secondary in importance. The agriculture is of an intensive type and about a small percent of the land area is devoted to crop and pasture production. An index of crop production shows that crop yields in Rhode Island are above the national average. Potatoes, alfalfa, hay and pasture are all thriving crops of Rhode Island.

This publication consists of a narrative that describes some of the principal climatic features and a number of climatological summaries for stations in various geographic regions of the State. The detailed information presented should be sufficient for general use; however, some users may require additional information.

The National Climatic Data Center (NCDC) located in Asheville, North Carolina is authorized to perform special

services for other government agencies and for private clients at the expense of the requester. The amount charged in all cases is intended to solely defray the expenses incurred by the government in satisfying such specific requests to the best of its ability. It is essential that requesters furnish the NCDC with a precise statement describing the problem so that a mutual understanding of the specifications is reached.

Unpublished climatological summaries have been prepared for a wide variety of users to fit specific applications. These include wind and temperature studies at airports, heating and cooling degree day information for energy studies, and many others. Tabulations produced as by-products of major products often contain information useful for unrelated special problems.

The Means and Extremes of meteorological variables in the Climatography of the U.S. No.20 series are recorded by observers in the cooperative network. The Normals, Means and Extremes in the Local Climatological Data, annuals are computed from observations taken primarily at airports.

The editor of this publication expresses his thanks to those State Climatologists, who, over the years, have made significant and lasting contributions toward the development of this very useful series.

State and Station Normals are available at:

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