

Chapter 4

CLIMATE

The drainage, vegetation, and wildlife patterns of a region are largely determined by climate interacting with the geology and soils of the region. The most important climatic factors are wind velocity and direction, temperature variations, and precipitation.

Many environmental problems are associated with the atmosphere and climate. Extremes in weather can have disastrous effects — floods, storm damage to vegetation and man-made structures, wildlife destruction, and droughts. Air pollution can also have detrimental effects.

New Jersey is in the same north-south position as Northern California, Salt Lake City (Utah), Boulder (Colorado), Portugal, Southern Italy, Turkey, Mongolia's Gobi Desert, and North Korea. Clearly, climatic conditions in these places are quite different. Latitudinal position, then, is only one of a number of factors that determine the climate of a region. In addition to the angle of the sun's rays and the length of daylight (factors determined by the latitude), an area's altitude and nearness to oceans and mountain ranges have an influence on its climate. Also important are the source and direction of air masses that flow over a region.

New Jersey has a humid continental climate, similar to the midwestern states. A continental climate is characterized by significant variations between the temperatures of summer and winter, specifically, by a range in temperature of 40 degrees or more from the coldest month of the year to the warmest month. This climate also displays relatively large daily and day-to-day temperature fluctuations.

These cold winters and near-tropical summers result from the direction of the seasonal prevailing winds. Our latitudinal position places us within the global wind system known as the Prevailing Westerlies. Due to the influence of these winds, weather in the mid-latitudes generally moves from west to east.

Winter

In wintertime the prevailing winds are from the northwest, subjecting us to the regular invasion of cold air masses moving down from Canada. These outpourings of polar air are warmed slightly in their passage across the Midwest and eastern mountains, but not enough to protect us from bone-chilling temperatures. All weather monitoring stations in the northern part of the state have experienced -15°F (-26°C) or lower.

For the month of January, which is the coldest month, temperatures at the National Weather Service station at Canoe Brook in Millburn Township range from a mean low of 20°F (-7°C) to a mean high of 41°F (5°C). According to the New Jersey Almanac, the record low temperature for that station is -26°F (-32°C). The average annual degree days recorded at Newark Airport are 5,067, with 4,205 of them, or 83%, occurring between November 1 and March 31. Degree days are the measurements for space heating. They are computed by determining for each day the number of degrees that the median temperature falls below 65°F (18°C).

Summer

During the summer, warm tropical air masses move into New Jersey from the Southwest and South. Many of these moist, hot air masses originate over the Gulf of Mexico, flow inland, and then travel over very warm land before reaching New Jersey. At Canoe Brook, the average temperature for July, the warmest month, is 73°F (23°C). July temperatures average higher than 70°F (21°C) throughout the entire state, although shore and mountain areas are colder than inland and northeastern locales. Occasional heat waves elevate the mercury to the nineties and sometimes over 100°F (38°C), especially during July and August. The highest recorded temperature at Canoe Brook is 106°F (41°C).

Of special interest to gardeners is the average length of the frost-free season. For a ten-year period, the mean date of last spring occurrence of a temperature of 32°F (0°C) or below was May 4, and the mean date of the first fall occurrence was October 10, giving, on the average, 159 days free of frost.

Precipitation

New Jersey's precipitation is well above the national average of 20 inches per year. The southeast coast of New Jersey receives about 40 inches, and the north central part of the state receives up to 51 inches. Chatham's average annual precipitation is 49.35 inches.

The number of days a month with measurable precipitation averages 8 for each of the months of September, October, and November and 9 to 12 for the other months of the year. In total, almost 120 days a year have measurable precipitation. Rainfall is well distributed throughout the year, but is heavier during the summer. Average monthly precipitation varies from a low of 3.17 inches in February to a high of 5.25 inches in August.

The snowfall recording station nearest to Chatham is in Morris Plains, which averages about 31 inches a year. Stations at Plainfield, Elizabeth, and Little Falls average a few inches less. New Jersey occasionally experiences snowfalls of 10 or more inches in a single storm. Snow seldom occurs in Northern New Jersey before mid-October or after April 20.

Drought

Not all years are equally wet, however. Yearly rainfall may be 15 inches less than average - 30 inches less than in a wet year. Brief periods of drought during the growing season are not uncommon, but prolonged droughts are relatively rare, occurring, on the average, once in 15 years. The drought of early to mid-1960's was very severe. While Chatham Township residents have had to put up with water use restrictions in such times, they have not suffered as much as towns in the state with a less adequate water supply.

During the 1960's, many towns allowed development to take place on soil that appeared dry and stable only to find, in later years when rainfall returned to normal, that those subdivisions had serious problems with drainage and water-related building characteristics. Such mistakes can be avoided by making use of the Soils Maps prepared by the Soil Conservation Service.

Floods

At the other extreme is the flooding which results from the severe storms which converge on New Jersey from three directions. Polar storms originate in Canada, cross the Great Lakes region, and then move down the St. Lawrence Valley, the southern fringes of these storms have an important influence on the weather of the northern part of the state. Continental disturbances begin over western U.S. land areas and move eastward. Our heaviest rains, however, come from storms of tropical origin. Storm systems may be born in the Gulf of Mexico, the Caribbean, or off the Carolinas, and travel northerly across ocean or land. Some of these storms may be of sufficient strength to be classified as hurricanes, but storm systems of less intensity may still dump considerable rain on our state.

The centers of these tropical disturbances often pass some distance off the coast of New Jersey. Occasionally, though, tropical storms move inland on the southern Atlantic coast and move northward either through or to the west of New Jersey. Finally, a tropical disturbance may decay south of the state, before its center can reach us. Any of these situations may produce very heavy rainfall over all or part of New Jersey.

While most occurrences of very heavy rainfall are associated with tropical disturbances, it is important to realize that cloudburst-type rainfall in a limited area can produce very heavy rainfall also.

From the standpoint of flooding, we have been very fortunate during the last six decades; actual flooding has been far below potential. At any time, we in New Jersey could experience floods of great magnitude. The following table indicates the degree of severity of storms which have hit New Jersey in the past 130 years.

Some Past Heavy Rainfalls in New Jersey

<i>Date</i>	<i>Location Cited</i>	<i>Rainfall</i>	<i>Remarks</i>
Aug. 5,	1843 Newark	15"	
Sept. 21-23,	1882 Paterson and South Orange	11"- 17.9"	Hurricane just touching the southern New Jersey coast
Sept (month)	1882 Paterson	25.98"	Total monthly rain fall
July 30-31,	1889 South Orange	8.40"	Heavy flood damage
Oct 8-9,	1903 Newark, Paterson & Perth Amboy	10+"	Decaying tropical storm off coast
Sept 17-21,	1938 New Jersey	6-11"	Passage of hurricane off New Jersey coast
Aug. 19-20,	1939 Tuckerton	14.81"	Decaying tropical storm
Sept 1,	1940 Clayton	10.52"	Heavy thunderstorm actively along with a tropical storm centered 150 miles east of the New Jersey coast
Aug. 11-16,	1955 Sussex County	8.10"	Hurricane Diane traversed Central New Jersey in a northeasterly direction
Aug. 26-28,	1971 New Jersey Chatham	3.05-11.43" 9.33"	Hurricane Doria
Sept 11-14,	1971 Northeastern New Jersey	4.54"-7.50"	Tropical storm Heidi moving north northeastward, passing well off the New Jersey Coast
Aug. 3-7,	1978 Morristown	8.1"	Four day continuous rainfall
July 26,	1981 Madison	4.0"	
October	1993 Madison	8.0"	High intensity storm
September	1999 Madison	+10.0"	Hurricane Floyd

Source: Floods of August and September, 1971, in New Jersey, New Jersey Department of Environmental Protection with USGS and NJDEP NJGS Daily Precipitation Charts, 1982.

Air Quality

The New York City Metropolitan Area, of which Morris County is a part, is one of the worst air pollution and smog zones in the nation. New York City and Newark invariably appear on lists of the 20 cities with the worst air quality.

This is not to suggest that Chatham does not have vastly superior air quality than its larger, more densely-populated neighbors. Clearly, these highly urbanized areas have greater numbers and concentrations of major air pollution sources: automobiles, industries, electric power plants, and residential and commercial heating units.

Fortunately, the prevailing winds that blow over Chatham come from the northwest or southwest, not from the urbanized east. A concentration of pollution sources to the northwest or southwest of the Township would have an adverse effect on the air that Chatham residents breathe.

Chatham also benefits from the relatively high percentage of tree cover in and around town which helps to cleanse the air of pollution. Multiplying this benefit are the “islands of green” that are found in surrounding areas: the Great Swamp, the Watchung Reservation, the New Jersey American Water Company lands, the Morris County Park System, the East Orange Water Reserve, and the low-lying area north of the Borough between Passaic Avenue and the river known as The Freshet. These natural areas help in diluting and dispersing air pollutants, thus contributing substantially to the quality of life we enjoy.

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