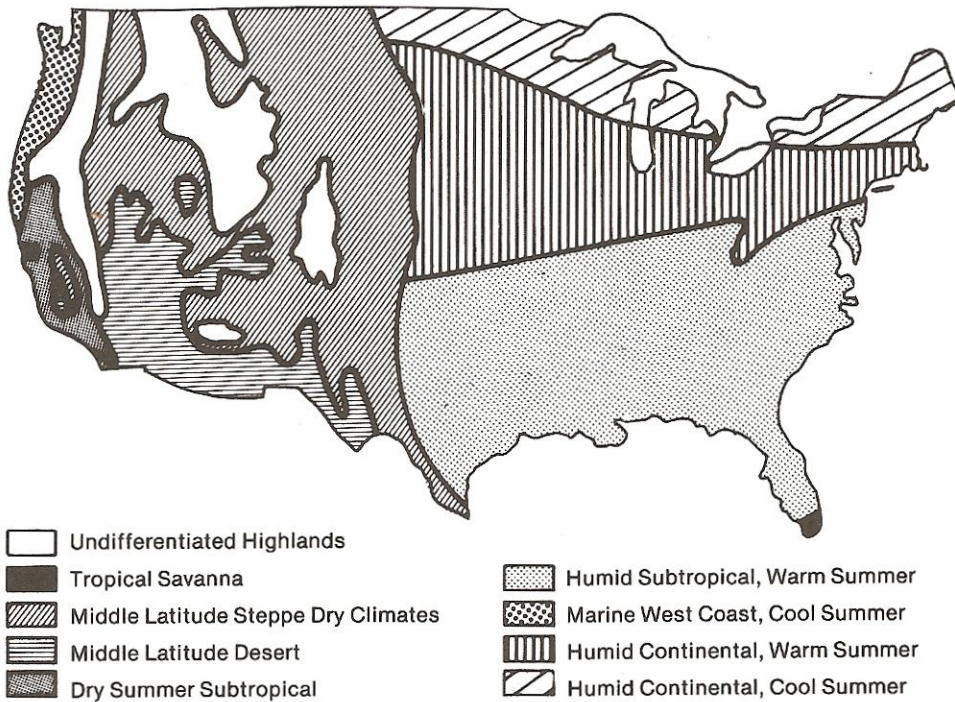


Climate

Climate, the characteristic long-term weather pattern of an area, affects all components of the natural environment and human activities. Temperature, winds, humidity, precipitation, and other climatic factors continually shape land and water resources and their uses.

Dutchess County is located in the north temperate climatic zone. Its climate is humid continental (see Figure 1.1), characterized by strong seasonal contrasts and highly variable weather. Major weather systems that move up the Atlantic Coast or across the continental United States contribute to this variety. Ample year-round precipitation is supplemented in late summer by tropical maritime air masses. Polar air masses from Canada move southeast through the area to dominate the winters.

Climatic Regions



Redrawn and adapted from Trewartha, Elements of Physical Geography, 1957.

Figure 1.1

Continental areas are the source of the predominant air flow, but Dutchess County and the entire Hudson Valley also enjoy the moderating effects of air masses from the Atlantic Ocean. This maritime influence results

in milder winter temperatures and longer freeze-free seasons than those found at the same latitude farther inland. The Catskill Mountains to the west and northwest also partly shield the county from cold polar air.

Moderate temperatures and sufficient precipitation make Dutchess County an excellent location for farming, while seasonal variations help to attract tourists and recreational users. The county's relatively warm summers and cold winters result in substantial heating and cooling costs for homes and businesses.

Temperature

Temperature is a measure of the intensity of heat. The county's average annual temperatures for the four coldest months, December through March, and four warmest months, June through September, are 30.8 and 70.6 degrees Fahrenheit, respectively. The lowest and highest temperatures ever recorded at the Poughkeepsie weather station were 21 degrees below zero in February 1897, and 107 degrees in July 1966. The average annual temperatures of Poughkeepsie (49.1 degrees), and of six major cities within 150 miles of Dutchess County can be compared in Figure 1.2.

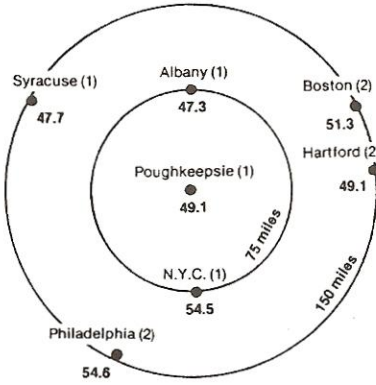
The temperature in Dutchess County usually exceeds 90 degrees between 25 and 30 days a year. Cool summers may have fewer than 15 days of 90 degree temperatures, while hot summers may have more than 40 such days. Brief hot spells with uncomfortably high humidity occur during most summers.

Four to seven days of zero or below zero degree weather usually occur between mid-December and early March. During unusually mild winters, temperatures may fall to zero only once. Temperatures colder than 15 below zero are recorded approximately once in 20 years.

The average monthly temperatures in Dutchess County are shown in Figure 1.3. These temperatures are averages of data collected at the four official weather stations in the county: Glenham, Millbrook, Poughkeepsie, and the Dutchess County Airport (Poughkeepsie FAA Flight Service Station). The actual monthly temperatures at each of these stations, along with the station coordinates and elevations, are listed in the appendix.

County weather information has been gathered only at the four locations listed above, and in Millerton. It is difficult to assess accurately the local micro-climates of areas whose topographic features differ from these locations. It is apparent, however, that fruit orchards

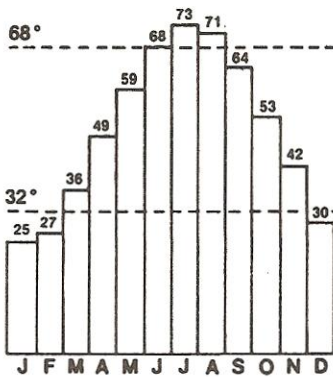
Average Annual Temperatures Major Cities near Poughkeepsie



Source: U.S. Dept of Commerce, NOAA
(1) 1951 - 1980 Data
(2) 1975, 1976, or 1977 Data

Figure 1.2

Normal Temperatures Dutchess County (Degrees Fahrenheit)



Temperatures are averaged for four weather stations in the County. Data from each station are listed in the Appendix.

Source: U.S. Dept. of Commerce, NOAA.

Figure 1.3

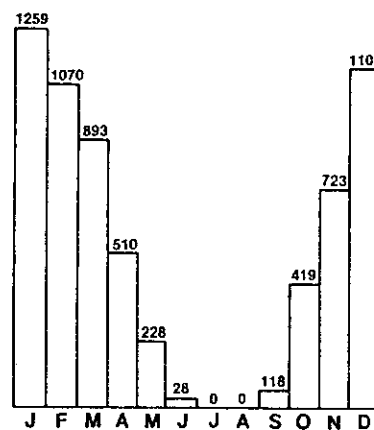
and vineyards thrive in the relatively mild temperatures along both sides of the Hudson River. Cooler temperatures prevail in the higher elevations and the northeastern section of the county. The Harlem Valley is also usually colder than western Dutchess County because of the valley's distance from the moderating influence of the Hudson River and from the leeward protection of the Catskill Mountains.

Heating Degree Days

Heating degree days are a measure of the number of days the average daily temperature is below 65 degrees. This measure is important to homeowners and the heating industry because space heating is normally required at temperatures below this level. A day with an average temperature of 65 degrees or more is said to have zero heating degree days, while a day with an average temperature of 50 degrees has 15 heating degree days (65-50=15 degrees). As the number of heating degree days increases, so does the use of energy to heat homes and businesses.

The number of heating degree days in Dutchess County ranges from 5,000 in the south to 7,000 in the north and northeast. Poughkeepsie has an annual average of 6,366 heating degree days. As shown in Figure 1.4, the summer months of June, July, and August require little or no heat. Each of the months of December, January, and February has more than 1,000 heating degree days.

Heating Degree Days
Poughkeepsie, New York
65° Base



Source: U.S. Dept. of Commerce, NOAA
Based on 1951 - 1980 data.

Figure 1.4

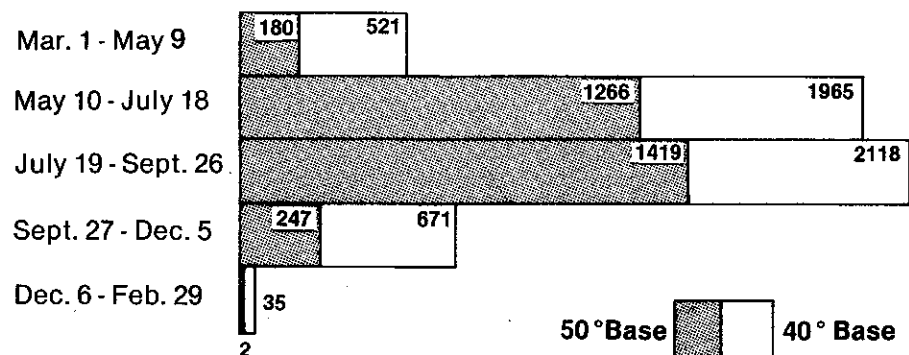
Growing Degree Days

Growing degree days are a measure of the amount of solar energy an area receives, based on temperature accumulations above a selected threshold temperature. They relate plant development and insect emergence to environmental air temperature to indicate which plants may be grown in a particular area. For example, most varieties of peas need 1,200 to 1,800 growing degree days (based on a 40-degree threshold) to reach maturity, so they can usually be grown only in areas that accumulate that many growing degree days or more.



The most common threshold temperatures for measuring growing degree days are 40 degrees and 50 degrees. These are generally accepted as temperatures required for growing economically important plants. Using a 40-degree base, annual growing degree days total approximately 5,300 near the Hudson River and 4,750 in the eastern part of the county. Using a 50-degree base, the total is about 3,100 near the Hudson River and 2,850 to the east. Average weekly growing degree day totals are listed in the appendix and summarized in Figure 1.5.

Growing Degree Days - Poughkeepsie, New York



Source: Dethier and Vittum, "Growing Degree Days in New York State," 1967.

Figure 1.5

Information about growing degree days is useful to farmers, nurseries, research and extension specialists, and home gardeners. It is especially helpful in crop selection and in determining schedules for planting, pesticide application, and harvesting.

Freeze Data

Freeze data include the dates of the latest spring and earliest fall freezing temperatures (32 degrees F), and the period between them, known as the freeze-free season. This information is valuable in determining what types of plants are most suitable for an area and when freeze-sensitive crops can be planted.

The freeze-free season along Dutchess County's Hudson River shoreline is between 163 and 183 days long, and usually begins sometime between mid-April and early May. Farther east of the river, the season is shorter. Generalized maps of first frost and last frost for New York State are shown in Figures 1.6 and 1.7. Table 1.1. gives more specific freeze data for three locations in the county.

Dates of First Frost

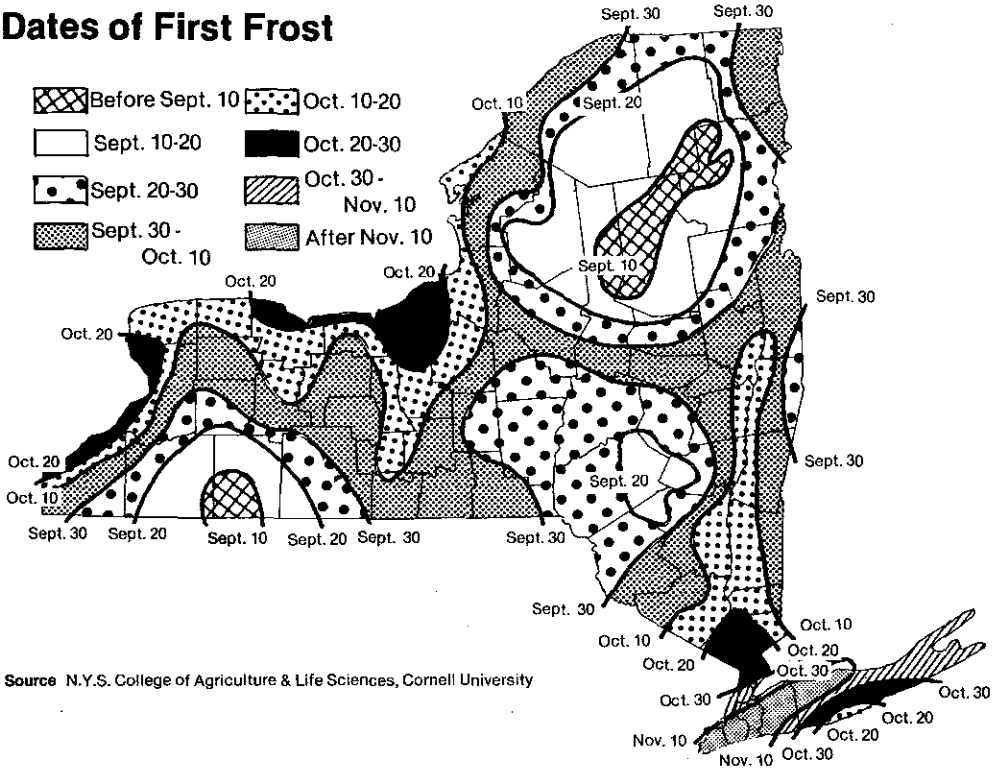


Figure 1.6

Dates of Last Frost

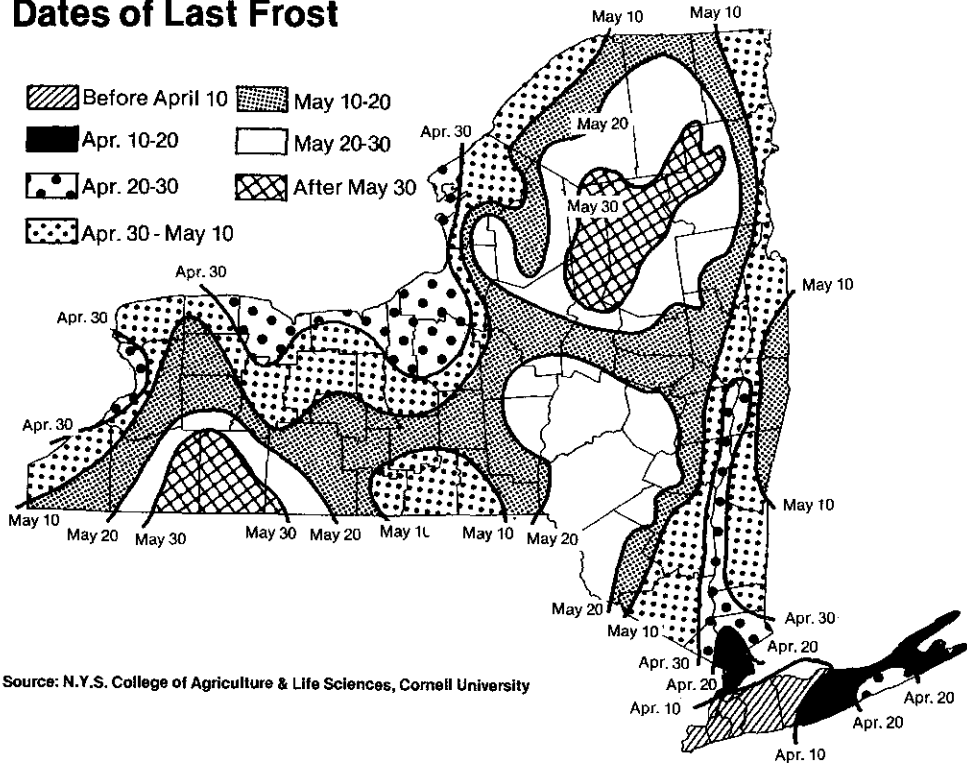


Figure 1.7

Table 1.1 Freeze Data
Dutchess County, New York

Station	Mean Date of Last Frost	Mean Temp.	Mean Date of First Frost	Mean Temp.
Glenham	April 13	27°	Oct. 12	28°
Millbrook	May 19	28°	Sept. 25	30°
Poughkeepsie	May 9	32°	Oct. 11	30°

Source: U.S. Department of Commerce, NOAA

Winds

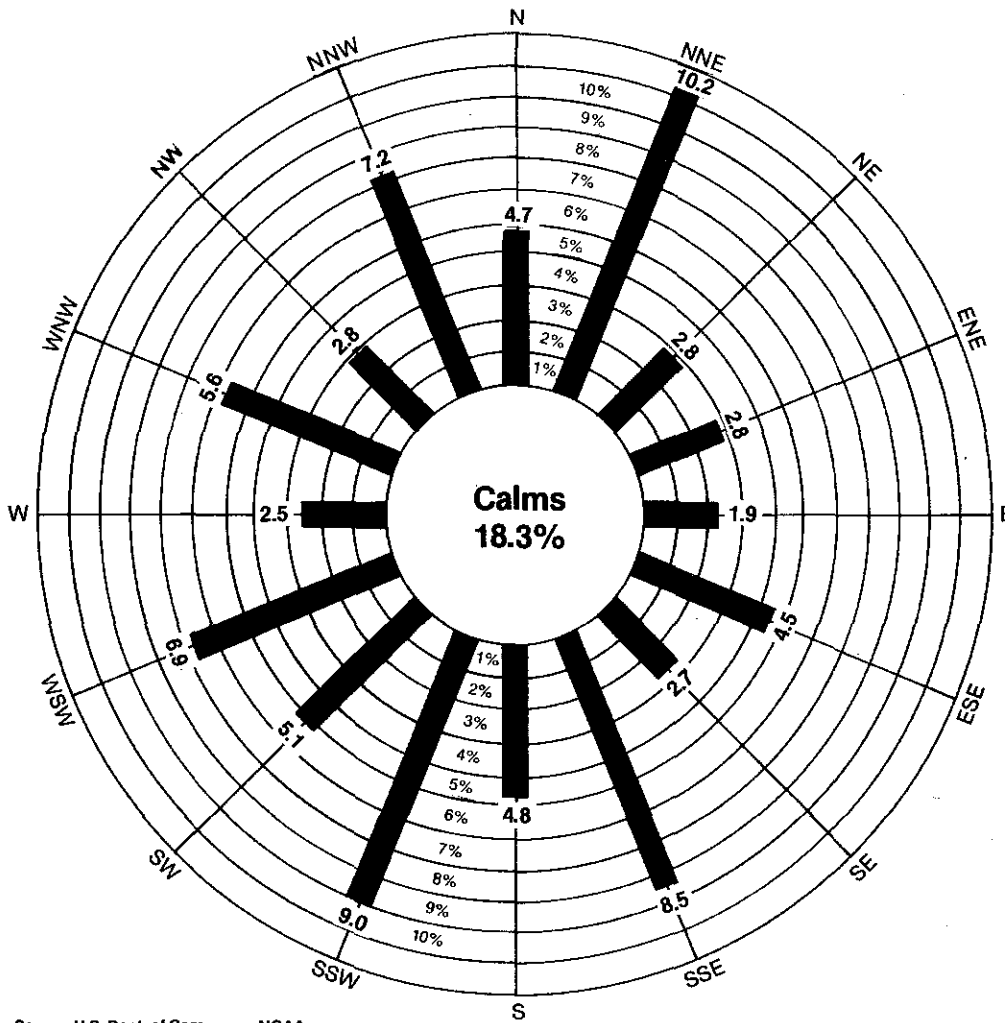
Wind patterns are produced by the rotation and solar heating of the earth and the buoyancy of warm air. Westerly and northerly winds prevail in Dutchess County in the winter and early spring, with average speeds ranging from 9 to 11 miles per hour (mph). Summer winds come from a more southerly direction with average velocities between 5 and 6 mph.

During a five-year testing period that ended in 1954, 70 percent of wind measurements fell in the 1 to 11.5 mph range. Wind speeds greater than 11.5 mph were recorded only 12 percent of the time, while 18 percent of the time the air was calm.

Wind speeds are generally higher during the day, and they begin to decrease as sundown approaches unless a storm system is passing through. Severe winds are not a common hazard in Dutchess County, but they occasionally occur in association with thunderstorms and other storm systems. The strongest winds blow predominantly from the west with speeds ranging from 25 to 30 mph and gusts of 40 to 65 mph or more. Wind speeds exceed 24 mph less than 0.5 percent of the time. Small tornadoes have struck the county, but such occurrences are rare.

The windrose in Figure 1.8 shows the distribution of surface wind directions in Poughkeepsie, as recorded at Dutchess County Airport from 1950 through 1954. The length of each black bar reflects how often wind came from a particular direction during that five-year testing period. For example, wind came from the north-northeast (NNE) 10.2 percent of the time, and from the east (E) only 1.9 percent of the time.

Windrose: Surface Wind Direction Frequencies
Poughkeepsie, New York



Source: U.S. Dept. of Commerce, NOAA

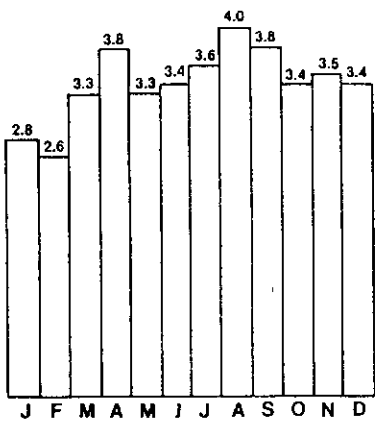
Figure 1.8

Figure 1.8 shows that the most common wind directions are north-northeast, north-northwest, south-southeast, and south-southwest. Winds come from the general direction of the west more frequently than from the east, and from the southwest quarter more than any other. Monthly wind direction and velocity data are included in the appendix.

Precipitation

Precipitation is condensed water vapor that falls to earth as rain, sleet, snow, or hail. Annual precipitation in Dutchess County normally ranges from 36 to 44 inches. Extremes of 27 and 60 inches have been recorded.

**Normal Precipitation
in Dutchess County**
(inches)



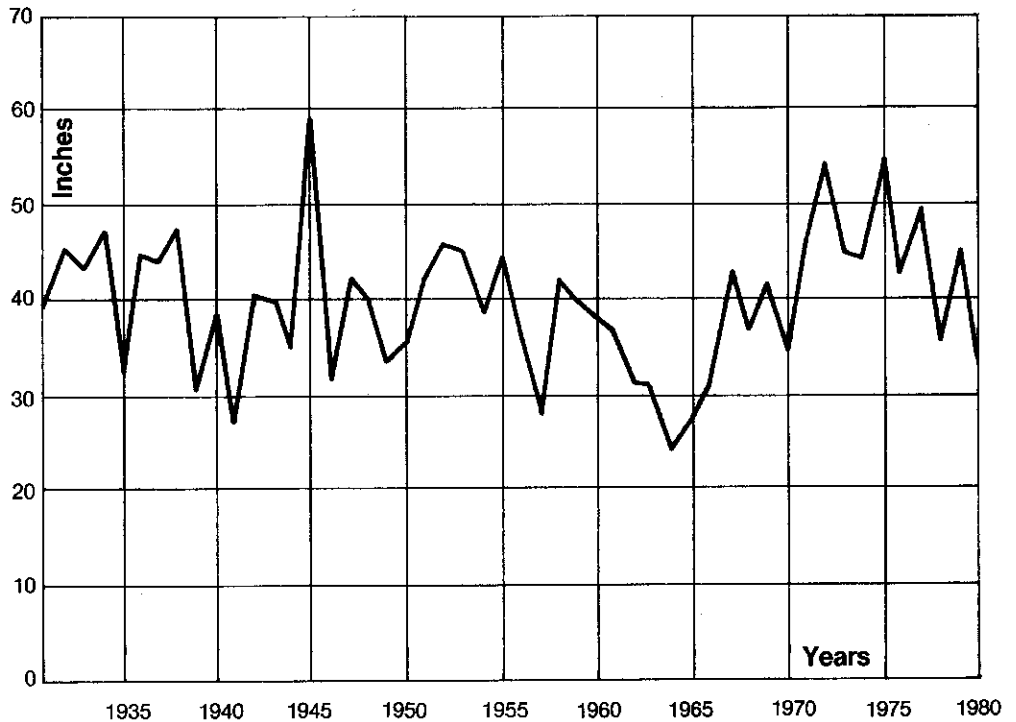
Source: U.S. Dept of Commerce, NOAA
Precipitation is averaged for five weather
stations in the County.

Figure 1.9

During the May to September growing season, total precipitation is usually between 15 and 25 inches, with extremes of 9 and 35 inches recorded. Precipitation during these months is generally sufficient to support crops, home gardens, lawns, flowers, and shrubs. One or more short periods of no rainfall occur during most summers. Total monthly precipitation in the county, calculated by averaging data from five locations, is shown in Figure 1.9. The actual precipitation totals for each of the five weather stations are listed in the appendix.

The graph in Figure 1.10 traces the pattern of annual precipitation in Poughkeepsie since 1931. Precipitation for this period is also listed in the appendix. The graph clearly shows the extended drought that affected the county from 1963 through 1966. This is the only drought in the 50 years shown that persisted for several consecutive growing seasons and reached severe levels before normal rainfall returned.

Annual Precipitation - Poughkeepsie, New York



Source: U.S. Dept. of Commerce, NOAA
1931 to 1959 Data collected in Poughkeepsie, 1960 to 1980 Data collected at the Dutchess County Airport.
1977 and 1978 Data collected in Millbrook.

Figure 1.10