Iowa's Climate

THE COCORAHS 'STATE CLIMATES' SERIES

The Precipitation Climatology of Iowa

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Iowa's climate, because of its latitude and interior continental location, is characterized by marked seasonal variations. During the six warmer months of the year, the prevailing moist southerly flow from the Gulf of Mexico produces a summer rainfall maximum. The prevailing northwesterly flow of dry Canadian air in the winter causes this season to be cold and relatively dry. At intervals throughout the year, air masses from the Pacific Ocean moving across the western United States reach Iowa, producing comparatively mild and dry weather. The autumnal 'Indian Summers' are a result of the dominance of these modified Pacific air masses. Hot dry winds, originating in the desert southwest, occasionally reach into Iowa during the summer, producing unusually high temperatures and desiccating crops.

TEMPERATURE – The average annual temperature ranges from 45°F in the extreme north to 52°F in the southeastern corner of the state. In July, the hottest month, daily temperatures range from morning lows of around 61°F and afternoon highs of 82°F in the northeast corner of the state up to lows of 65°F and highs of 87°F in the southwest. In January, the coldest month, temperatures range from morning lows of 4°F and afternoon highs of 22°F in the northwest corner of Iowa up to lows of 15°F and highs of 32°F in the southeast. Extreme temperatures have varied from 117°F at Atlantic and Logan on July 25, 1936 to -47°F at Washta on January 12, 1912 and again at Elkader on February 3, 1996. The average number of days with maximum temperatures of 90°F or higher ranges from only 5 days in extreme northeast Iowa up to 36 days in the southwest corner of the state. The number of days with 0°F or lower minimum temperatures ranges from about 28 days along the Minnesota border to around 12 days along the Missouri border.

PRECIPITATION – Precipitation averages around 34 inches per year for the state, ranging from 26 inches in the extreme northwest to as much as 38 inches in the southeast. However, annual totals vary widely from year to year and locality to locality. Annual totals have varied from as little as 12.11 inches at Clear Lake in 1910 and Cherokee in 1958 to as much as 74.50 inches at Muscatine in 1851. For Iowa during the period of reliable statewide records (since 1873), the year 1993 was the wettest (48.22 inches) and 1910 the driest (19.93 inches). The idea that 'rain makes grain', while generally true, is not an absolute. Persistent cloudiness, late planting owing to excessive wetness, flooding, and cool temperatures made 1993 one of the worst crop years of recent decades. Meanwhile, 1910, though easily recording the least rain in the historical record, brought record-high corn yields for that era as rains were timely and summer temperatures were mild. Nearly three-fourths of the annual precipitation is received during the April-through-September growing season. Measurable precipitation occurs on about 100 days per year. The number of rainfalls exceeding one-half inch per day varies from about 15 days in the northwest to 25 days in the southeast. The heaviest official one-day rainfall of record is 13.18 inches at Atlantic on June 14, 1998. However, unofficial daily rain totals reached 21.7 inches at Boyden in northwest Iowa on September 18, 1926!

SNOWFALL – Seasonal snowfall averages 32 inches across Iowa and varies from around 40 inches in northeast Iowa to about 20 inches in the extreme southeast corner of the state. The snow season normally extends from late October through mid-April, but significant snows have fallen as early as September 16 (1881) to as late as May 28 (1947). The average number of days per season with snow cover one inch or deeper varies from about 40 days along the Missouri border to around 85 days along the Minnesota border. In about half of all winters, a daily snowfall of 5 to 6 inches or more is recorded in southern Iowa and 7 to 8

inches or more in northern Iowa. December, January and February are normally the snowiest months, averaging about 7 inches each. However, late winter storms in March and April have produced as much as 27 inches of snow in a single storm, and 24-hour amounts have reached 24 inches. The snowiest winter of record (since 1887-1888) was in 1961-1962 with a statewide average of 59.0 inches while the lowest state average — with only 11.9 inches— was recorded in the winter of 1965-1966. Seasonal snowfall totals have varied from 2.4 inches at Keokuk in 1965-1966 up to 93.1 inches at Elkader in the winter of 1950-1951.

OTHER CLIMATIC FEATURES – Around 85 percent of the 45 to 65 thunderstorms per year occur from April through September, with the peak frequency coming in June. At times these thunderstorms become severe, producing hail, high winds, torrential rains and an occasional tornado. Tornado occurrences average about 46 per year spread over 16 days, with May and June being the peak months of tornado occurrence. Hail occurs most frequently in May; however, nearly half of the crop-hail damage comes in July when crops are more susceptible to yield-reducing damage. In the average year hail destroys about 1.4% of Iowa's corn crop and 4.5% of its soybean crop. Hail losses are greatest in the northwest where hailstorms are typically more severe and also somewhat more frequent than in the southeast. In any one location hail will occur on about two to four days per year.

Floods are most frequent in June, which has the highest average rainfall of any month (4.64 inches). Mid-March through early April is another favored time for flood occurrence when snowmelt, combined with rain and frozen soils, can produce significant flooding on the major rivers. Ice jams, caused when river ice begins to break up in the spring, can also contribute to flooding. Flash flooding from heavy thunderstorm rainfall is most frequent in the overnight hours from June through September. Flooding in mid-winter is very rare owing to low precipitation totals (January averages only 0.95 inch) and a high percentage of precipitation falling as snow.

Drought occurs periodically in Iowa, with the most severe in historical times occurring in the 1930s. Other major droughts, usually characterized by deficient rainfall combined with unusually high summer temperatures, occurred in 1886, 1893-94, 1901, 1954-56, 1976-77 and 1988-89. Although droughts are not the spectacular weather events that floods, blizzards or tornadoes can be, historically they produce more economic damage to the state than all other weather events combined.

Overall, Iowa's climate, combined with its rich soils, is nearly ideal for the production of grain crops such as corn and soybeans. Rainfall is greatest during the growing season, when it is needed most. Summer temperatures are high enough for optimal corn and soybean growth, but yet not usually so high as to cause severe crop stress. Much of the summer rains come in the form of fairly brief thunderstorms, which are most frequent at night, thus allowing ample sunshine during the daylight hours. Furthermore, the fall months are normally relatively dry, thus allowing optimal dry-down of the crops and ready access to the fields for harvesting. The cold winters usually result in the soils being frozen from early December through late March. The freezing of the soils also benefits annual crops in that the freeze-thaw process acts to 'stir' the soil and reduce soil compaction. Finally, although Iowa's spring and summer thunderstorms do occasionally become severe, the benefits of the rainfall these storms generate far outweigh the damage caused by their high winds and hail.

For more information on Iowa's Climate, please visit the Iowa Climate Office website at: http://www.iowaagriculture.gov/climatology.asp