Iowa Science Teachers Journal

Volume 14 | Number 1 Article 9

1977

Drought: A Time to Teach

Owen Primavera
Milford Community High School

DROUGHT: A TIME TO TEACH

Owen Primavera
Science Instructor
Milford Community High School
Milford, Iowa 51351

Introduction

Is there a pattern to weather? Can drought be predicted with any degree of accuracy? These questions have been pondered by climatologists for years and make interesting topics for classroom discussion.

Precipitation, on a national average, has been fairly uniform, over the years, for the United States. Such averages, however, do not reflect local conditions since some areas may experience a very dry year when other areas experience a very wet one. For example, during the dust bowl year of 1934, the Great Plains experienced drought while the eastern part of the United States was having excess rainfall. Close examination of local weather data, however, seems to support the idea that droughts do occur in some regions with cyclic regularity.

Climatologists seem to agree that weather cycles exist. Some climatologists say that the most consistent cycle is the eleven year cycle accompanying sun spot activity, others do not agree. The most recent confirmation of weather cycles has been documented through the study of annual growth rings in trees. Such investigations can shed light on precipitation in local areas over a long period of time. Some studies indicate that an eleven and a twenty-two year cycle may exist and there are indications that an eighty to ninety year cycle may also exist.

Great Lakes Weather

Do such weather cycles exist in the Great Lakes Region of Iowa? Since this region is now experiencing a drought, the idea was posed to students by providing them with a precipitation record of the Iowa Great Lakes Region (Table 1). This record was compiled from data obtained from the U.S. Weather Bureau. The records used were those recorded at Sibley, Spirit Lake, Millers Bay, Lakeside Laboratory and the Okoboji School spanning the years from 1879 to 1976. No records were available for the years 1889, 1890 and 1891. These records were examined to see if there were any cyclic weather patterns.

Study of the Table 1 indicates that the mean annual rainfall for the Lakes Region, as defined by this study, was 26.80 inches. The precipitation for

1976 was 14.33 inches. This is a rainfall deficit of approximately 13 inches for this area. More detailed records indicate that August of 1976 was the driest on record (0.41 inches) and the five month total from April to August (7.41 inches) was the lowest recorded since 1886.

Table 1

Precipitation Record for Iowa Great Lakes and Neighboring Regions [a]

Year	Total	Year	Total	Year	Total
1879	17.88	1914	28.99	1946	26.98
1880	30.36	1915	26.96	1947	28.14
1881	34.02	1916	26.33	1948	24.86
1882	18.50	1917	27.27	1949	25.43
1883	30.74	1918	33.28	1950	24.29
1884	29.20	1919	34.27	1951	36.46
1885	22.56	1920	25.70	1952	19.95
1886	15.55	1921	25.17	1953	26.02
1887	15.43	1922	19.08	1954	34.97
1888	26.55	1923	26.00	1955	18.74
1892	29.89	1924	21.27	1956	23.48
1893	23.67	1925	18.24	1957	30.26
1894	16.07	1926	27.85	1958	12.65
1895	16.53	1927	23.75	1959	30.12
1896	28.85	1928	27.15	1960	34.04
1897	20.39	1929	23.71	1961	26.85
1898	25.64	1930	21.61	1962	33.36
1899	31.78	1931	30.36	1963	18.97
1900	32.87	1932	25.04	1964	33.77
1901	23.91	1933	23.41	1965	28.39
1902	28.56	1934	29.24	1966	23.34
1903	40.15	1935	28.47	1967	20.04
1904	23.30	1936	23.23	1968	32.29
1905	36.77	1937	33.69	1969	32.48
1906	37.17	1938	37.95	1970	29.14
1907	25.29	1939	23.77	1971	26.96
1908	40.74	1940	26.35	1972	31.19
1909	32.11	1941	34.21	1973	29.71
1910	16.03	1942	30.86	1974	18.63
1911	21.43	1943	28.97	1975	32.79
1912	25.12	1944	33.71	1976	14.33
1913	28.02	1945	26.33		

[a]This table was summarized from weather data recorded at Sibley, Iowa (1879-1888 and 1906-1910); Spirit Lake, Iowa (1892-1910); Millers Bay and Okoboji School (1917-1927); and Iowa Lakeside Laboratory (1957-1976).

Short-period, cyclic phenomena were not easily ascertainable from study of Table 1. However, if one plots the years in which the annual rainfall was less than 17 inches per year, an eighty to ninety year cycle is indicated (Fig. 1). It has been about eighty years since a severe drought has occurred in this area. From 1894-1895, a drought occurred that was so severe that many lakes in the region went dry. Pictures have been obtained showing cattle grazing in local lakebeds. At present the water table in the Great Lakes Region is down three feet, most all of the sloughs are dry and the subsoil moisture is at a critical level. Could the Great Lakes Region be entering an eighty-year cycle of drought? Examination of Figure 1 provides evidence that this may be the case.

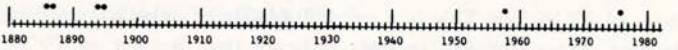

Fig. 1. Years of Annual Rainfall Less Than 17 Inches.

Summary

Past records indicate dramatic fluctuations in Iowa's climate. Core samplings from Lake Okoboji indicate wide fluctuation in the lake level in recent geologic times. Better knowledge of Iowa's weather patterns could help agriculturists implement better farming practices to increase and sustain crop yields, an important factor in a world with marginal food reserves. Possibly planning for government grain reserves would be better accepted by the public if more were known about cyclic weather patterns.

By introducing the study of local weather records, students were made aware of cyclic weather phenomena and were provided a basis for interesting classroom discussions. Precipitation charts for your area can be obtained for a nominal fee by writing the U.S. Weather Bureau, Department of Commerce, Washington, D.C. Now is the time for teaching about drought.

Reference

R. Reynolds. 1976. The almighty rhythm of climate. *The Furrow* 81:2-5.

* * *

NSTA Conference

The NSTA Area Conference will be held in San Francisco on October 13 and 15, 1977. Anyone wishing to participate should contact Diane R. Conradson, Department of Natural Science, San Jose State University, San Jose, California 95192.

* * *

Household Energy Game

A 20-page booklet telling how to compute family energy consumption with a game grid pitting individual versus national consumption is available from Sea Grant, 1800 University Avenue, Madison, Wisconsin 54706. Single copies are free, additional copies cost ten cents each.

* * *

To a mouse, a bat is just an angel.