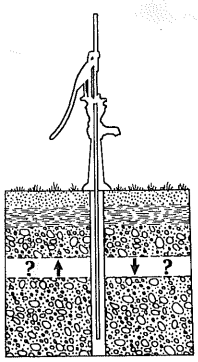
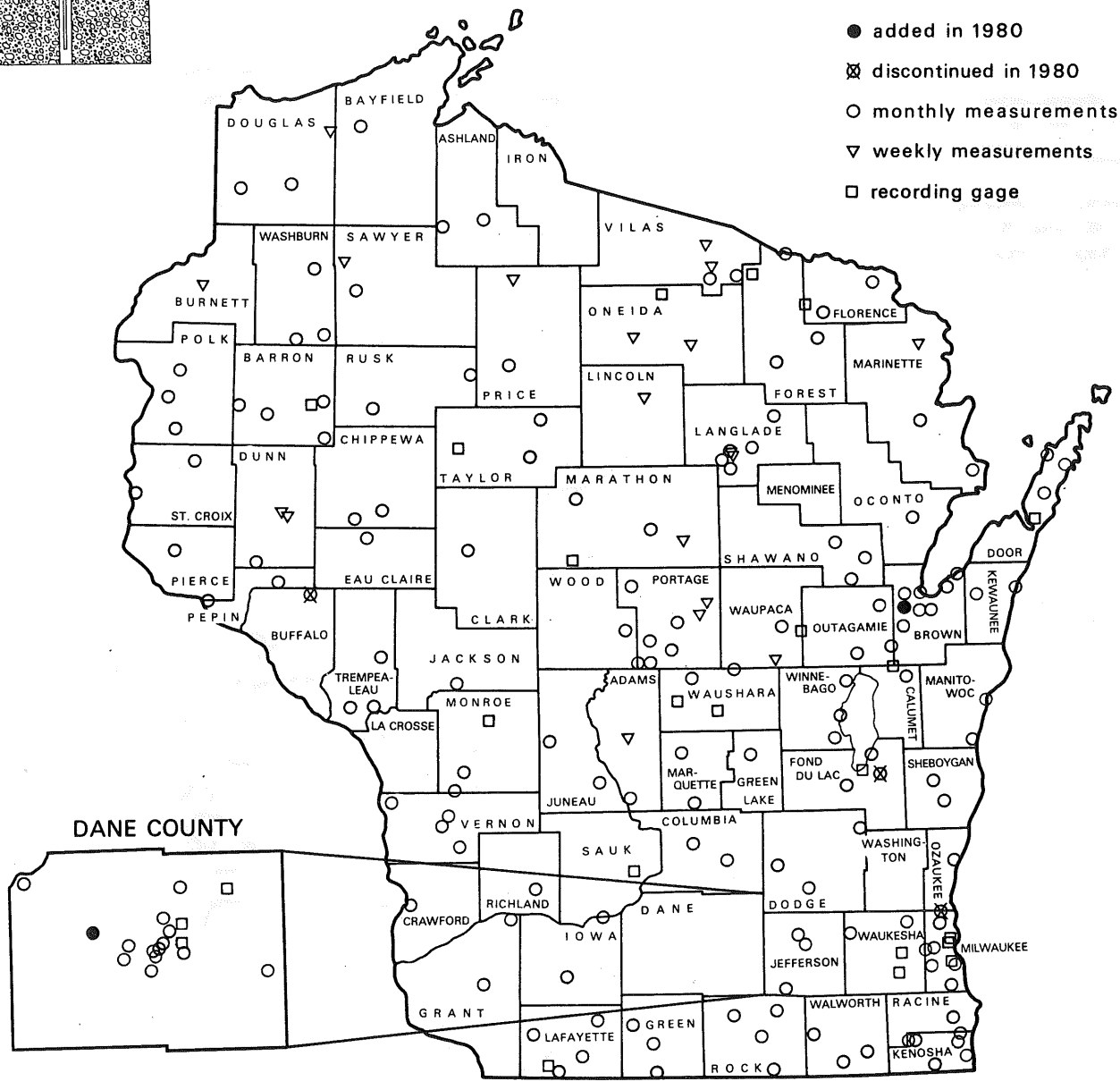



# GROUND-WATER LEVELS IN WISCONSIN

## ANNUAL SUMMARY 1980

by Alex Zaporozec




LOCATION OF OBSERVATION WELLS IN WISCONSIN, 1980

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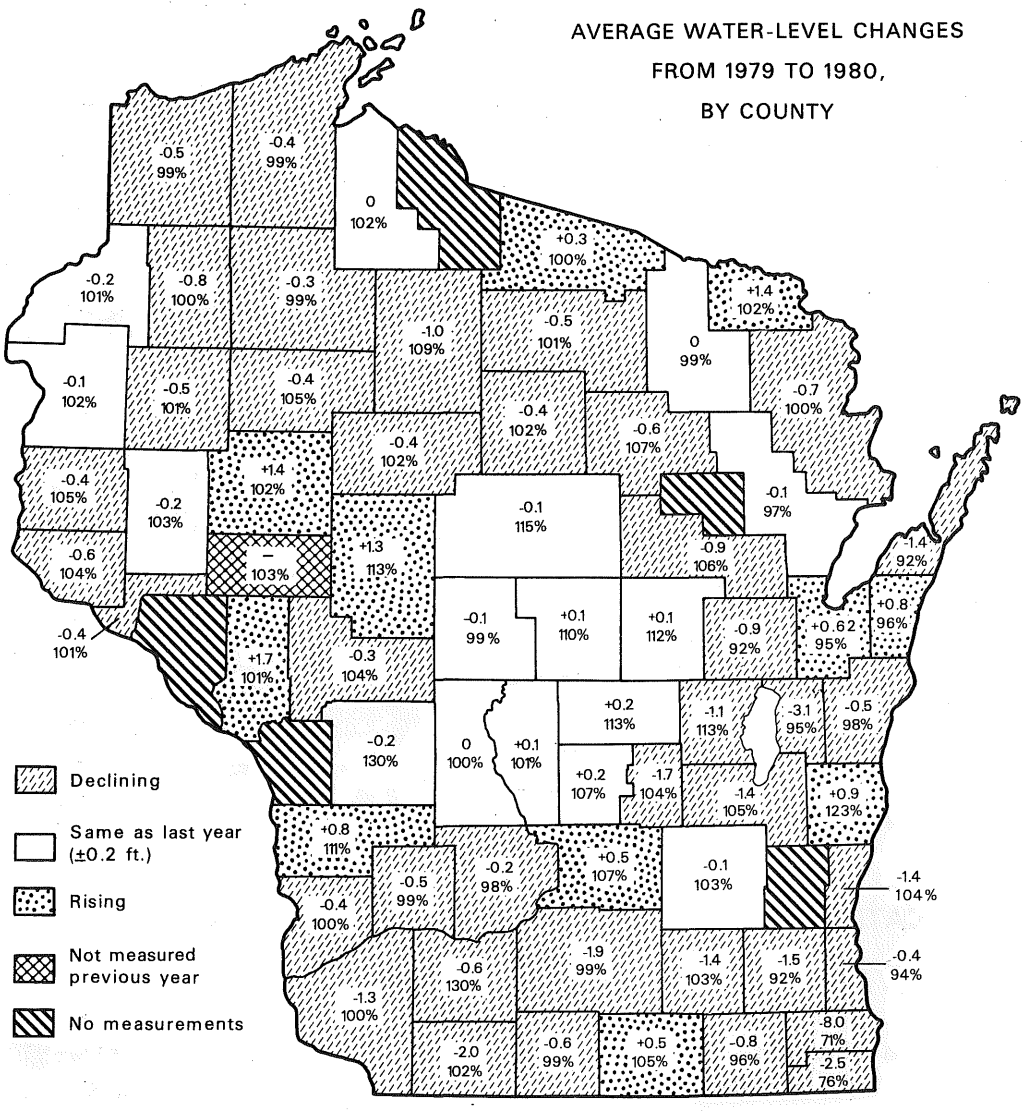
Locations of all observation wells shown on page 1 are available in the files of the U.S. Geological Survey, who operates the network, and the Wisconsin Geological and Natural History Survey. Measurements were made on 202 observation wells as compared to 204 wells measured in 1979. Two wells were added to the program; four wells were discontinued.

Water levels were lower at year's end in most counties of Wisconsin. The declines reflect the below-normal precipitation from February to July when the amount of precipitation was below the drought level (85% of normal). Despite extremely high rainfall in August and September water levels did not completely recover the loss from inadequate spring recharge.

The greatest declines occurred in the southern part of the state (1.3-2.5 feet) and in the heavily-pumped metropolitan areas of Madison, Green Bay, and SE Wisconsin (2.5-8.0 feet). In other areas, water levels declined only slightly (less than 1 foot). The central part of the state experienced little change in water levels; they were approximately the same as in 1979. Water levels rose in only 11 counties; and 6 counties were without measurements.

With respect to long-term averages, trends in water levels were mixed. Levels were generally average or above average in most of Wisconsin. They were below average in parts of NW, NE and SC Wisconsin, and continued to decline in the deep aquifers in the northeast, southeast and Madison area.




Difference from the 1979 water levels (+ or –) in feet and the percentage of long-term water level.

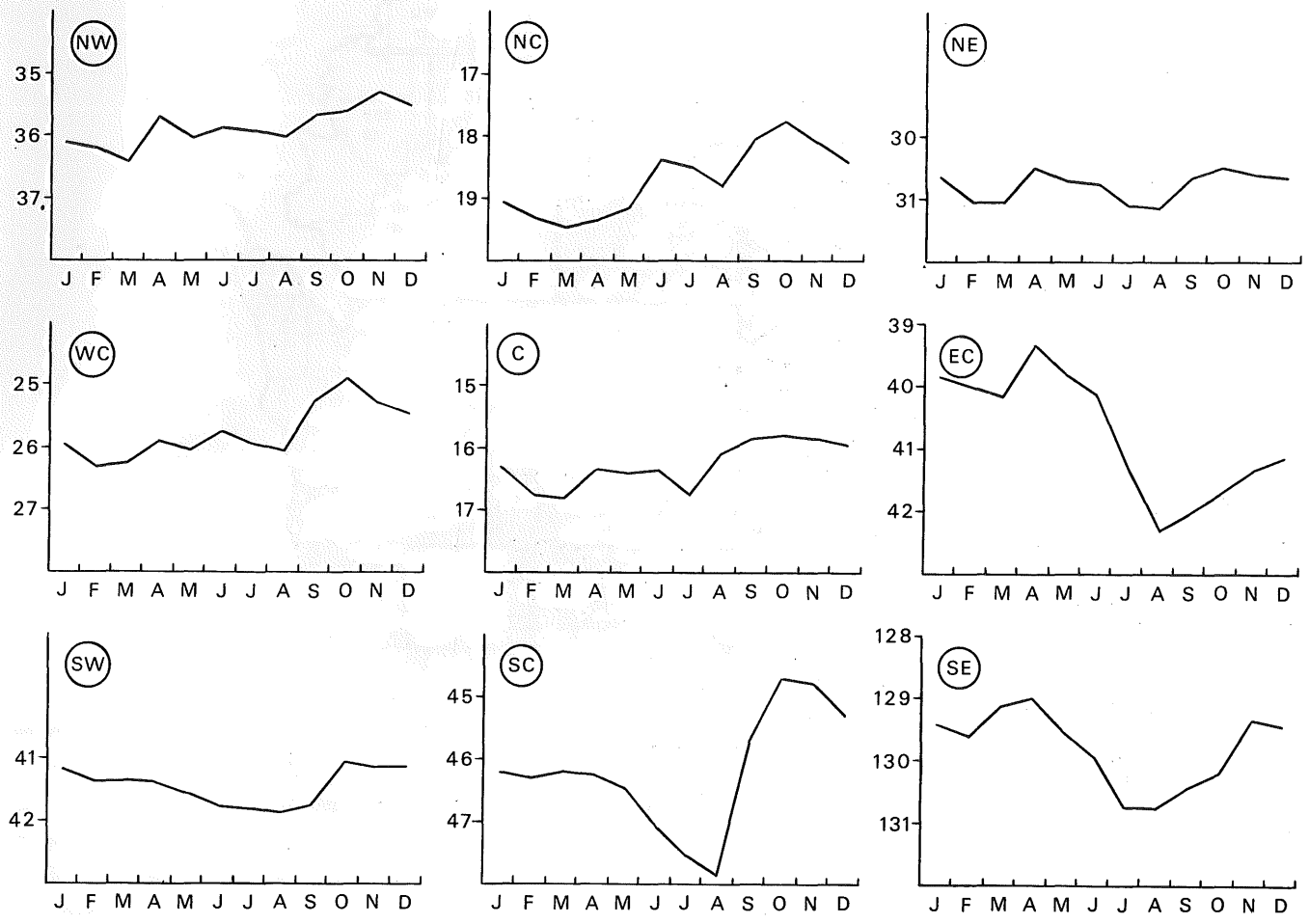
The year 1980 has been very unusual as far as the distribution of water-level fluctuations is concerned. Composite monthly mean levels were calculated to illustrate the pattern of distribution throughout the year. They do not represent average levels in the regions.

In most cases, the water levels did not follow traditional pattern of highest peak in spring, secondary peak in fall, and minimum levels at the end of winter. In 1980, water levels rose only slightly in the spring because there was no snow accumulation and spring rains (approximately 50% of normal) were not sufficient to recharge the ground-water reservoirs. Therefore the water levels extended their winter decline and reached minimum stages in July-August, with temporary respite in June which received slightly above-normal rainfall. The unusually high precipitation in August and September was reflected in the statewide rise of water levels which peaked in September-October with approximately 2-month lag behind precipitation (3 months in NW and SE), and provided badly needed recharge to ground water and replenishment of soil moisture.

The range of fluctuations was small during 1980. The largest difference between minimum and maximum levels was recorded in south central Wisconsin. Water levels in deep aquifers in east central and southeastern Wisconsin continued their downward trend. These declines are attributed to pumping rates which exceed recharge rates.

COMPOSITE MONTHLY WATER LEVELS IN 1980

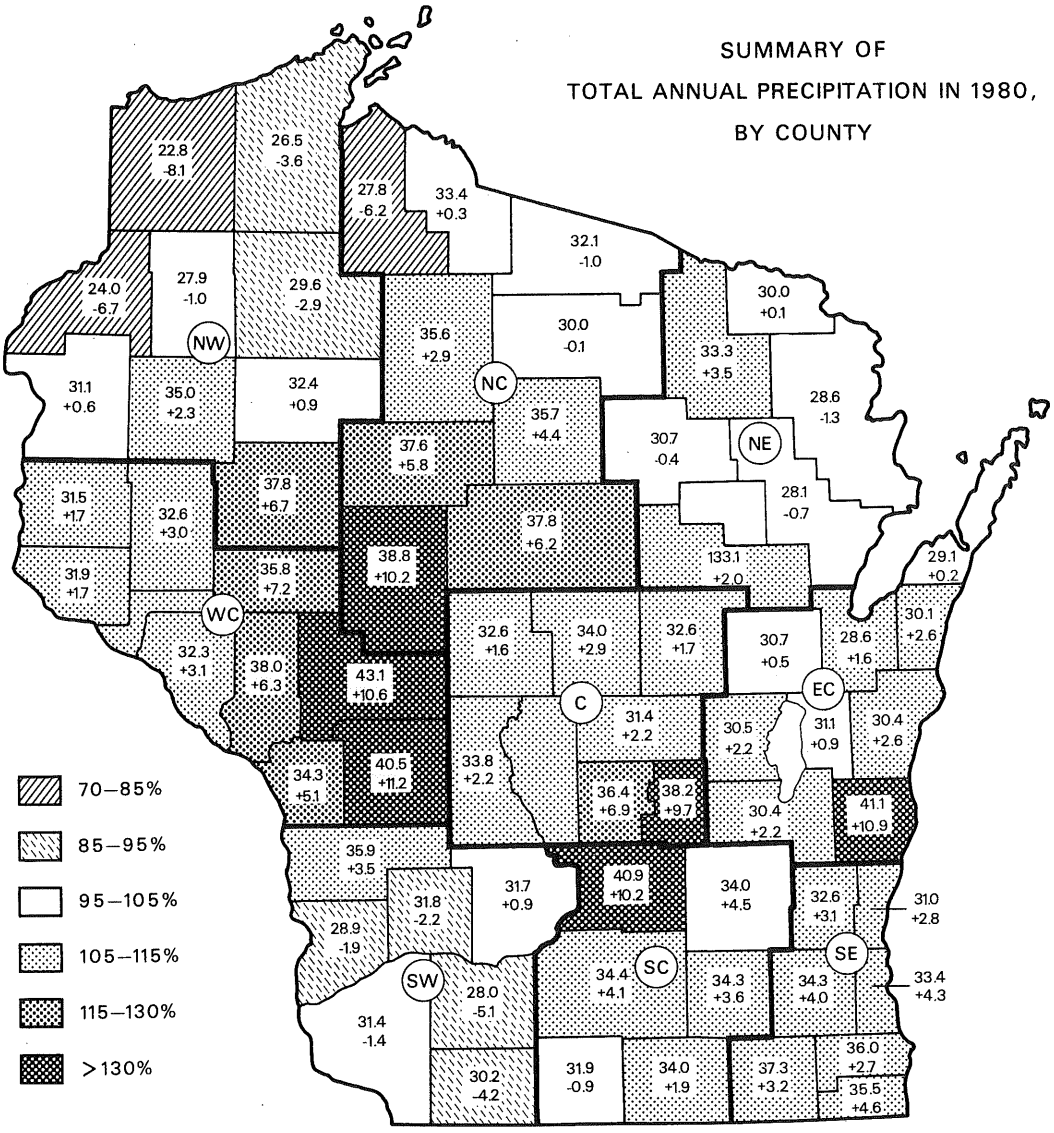
(for climatic regions as shown on page 4)



Almost all recharge to Wisconsin's aquifers comes from precipitation that infiltrates into the ground at or near the point where it falls. The amount and distribution of rainfall received in one year would generally determine ground-water conditions in the following year.

Last year could be characterized as the year which almost became a drought year. Only the abnormal rainfall in August and September prevented it (precipitation without these two months was 84% of normal) and brought the total precipitation nine percent above normal. That does not mean that adequate precipitation occurred statewide. Various parts of the state were affected differently and some counties did have drought (Ashland, Burnett, and Douglas). The northwestern, northeastern and southwestern counties generally received less rainfall than the rest of the state.

Based on precipitation trends in 1980, we can expect that there will be little change in water levels in 1981, and that they will remain generally average in most of Wisconsin. Slight decline will continue in parts of the northwest, northeast, and southwest; and water levels probably will rise in most of west central and central parts of the state. Gradual decline of levels will continue in areas of heavy pumping around Green Bay, Kenosha-Racine, Milwaukee-Waukesha and Madison, and the pumping effects will continue to extend into neighboring counties of Calumet, Kewaunee, Outagamie, Walworth, and Ozaukee.




Average precipitation in inches, departure (+ or –) from normal precipitation in inches and the percentage of normal precipitation.