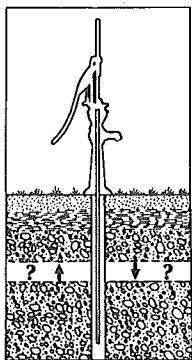


GROUNDWATER LEVELS IN WISCONSIN

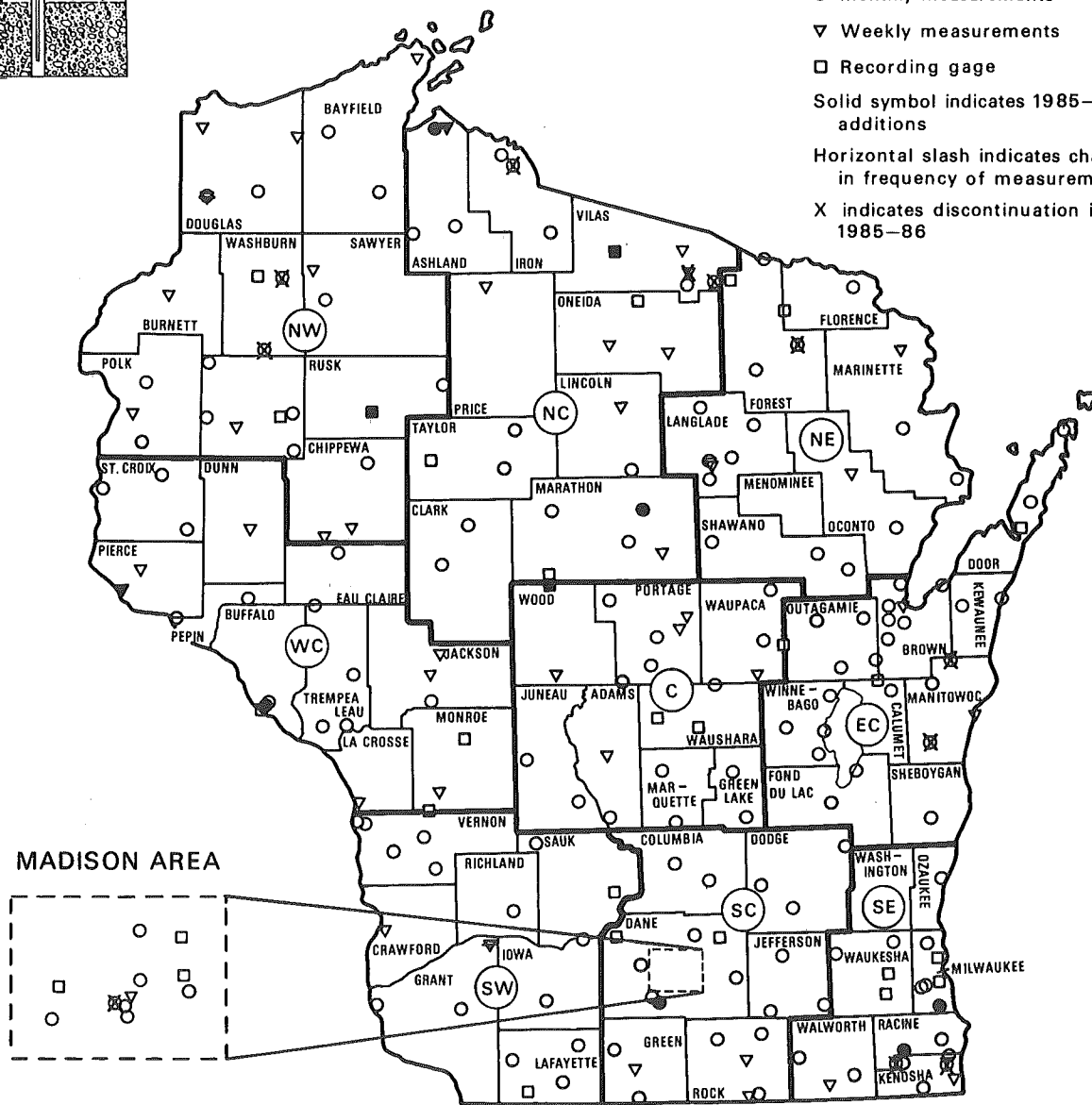
SUMMARY 1985-86

by Alex Zaporozec

(Compilation of data: Paul Gempler and Jay Peterson)



- Monthly measurements
- ▽ Weekly measurements
- Recording gage
- Solid symbol indicates 1985-86 additions
- Horizontal slash indicates change in frequency of measurement
- X indicates discontinuation in 1985-86



LOCATION OF OBSERVATION WELLS IN WISCONSIN, 1986

PREPARED BY

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U.S. DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY

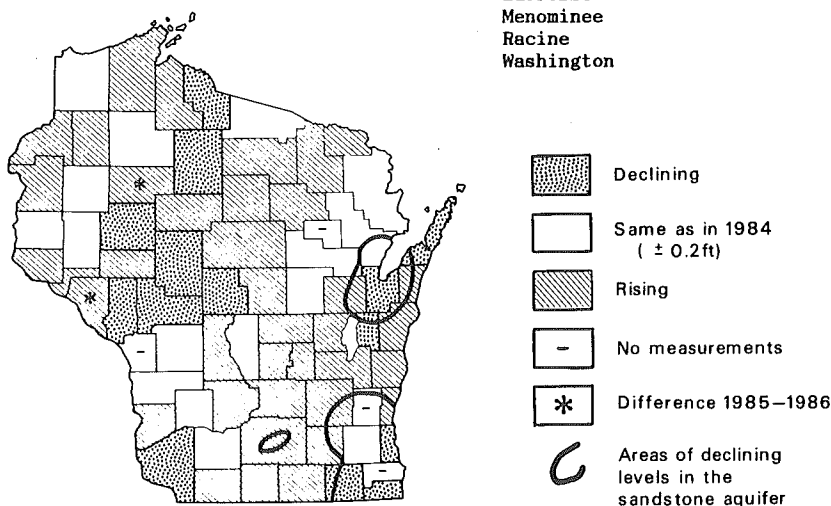
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No summary was published for 1985; this summary covers a 2-year period (1985-86). The revision of the observation network, begun in 1982, is almost complete. Many changes were made during 1985-86, but the total number of wells changed only slightly from 215 in 1984 to 214 in 1986. Locations of observation wells (shown on the front cover) and water-level measurements are available from the USGS or WGNHS.

For the fifth consecutive year, water levels rose in more than half of Wisconsin's observation wells. The map below shows that compared to 1984, water levels rose in 38 counties, declined in 14 counties, and remained approximately the same in 16 counties. Comparison of the remaining 4 counties was not possible. Besides the areas of heavy pumping (Green Bay and southeastern Wisconsin), water levels declined mostly in the west-central and southwestern parts of the state. The levels in many wells reached record highs during 1985-86, surpassing the peaks from 1973-74, especially wells in the western and eastern thirds of the state. The 1973 highs still prevail in the central third, and some wells in east-central Wisconsin peaked in 1979.

With respect to long-term normal levels, water levels remained above normal everywhere except in the metropolitan areas of Green Bay and southeastern Wisconsin, where they continue to decline in the deep sandstone aquifer. Water levels were most above normal in east-central Wisconsin.

County	Difference	Percentage	County	Difference	Percentage	County	Difference	Percentage
<u>Rising levels</u>			<u>Same as 1984</u>			<u>Declining levels</u>		
Ashland	+0.3	106	Adams	+0.1	105	Brown	-2.0	97
Bayfield	+1.1	102	Barron	+0.2	112	Calumet	-0.9	93
Buffalo	+0.4	-	Douglas	-0.2	101	Chippewa	-1.0	108
Burnett	+0.8	106	Dunn	+0.0	109	Clark	-0.4	120
Columbia	+1.3	115	Iowa	+0.0	106	Door	-1.4	107
Crawford	+0.9	106	Marinette	+0.1	105	Grant	-0.4	110
Dane	+0.65	109	Monroe	-0.0	115	Iron	-0.7	-
Dodge	+0.6	108	Oconto	+0.2	99	Jackson	-0.8	102
Eau Claire	+0.4	-	Richland	+0.1	110	Kenosha	-1.0	92
Florence	+0.7	103	St. Croix	+0.1	111	Milwaukee	-2.7	110
Fond du Lac	+2.5	138	Sawyer	-0.1	102	Price	-0.6	99
Forest	+0.5	103	Shawano	-0.1	124	Trempealeau	-1.4	107
Green	+1.3	105	Vernon	+0.2	118	Walworth	-0.6	94
Green Lake	+3.3	140	Vilas	-0.1	106	Wood	-0.4	-
Jefferson	+1.0	114	Waukesha	+0.2	91			
Juneau	+0.3	108	Waupaca	+0.1	119			
Kewaunee	+4.4	96						
Lafayette	+2.1	120						
Langlade	+1.4	112						
Lincoln	+0.8	110						
Manitowoc	+0.9	107						
Marathon	+0.7	131						
Marquette	+0.4	115						
Oneida	+0.6	106						
Outagamie	+0.4	95						
Ozaukee	+1.9	117						
Pepin	+0.3	108						
Pierce	+0.7	111						
Polk	+0.3	109						
Portage	+0.4	114						
Rock	+1.3	110						
Rusk	+1.11	-						
Sauk	+5.9	106						
Sheboygan	+0.5	133						
Taylor	+0.5	107						
Washburn	+0.8	-						
Waushara	+1.6	151						
Winnebago	+0.5	125						



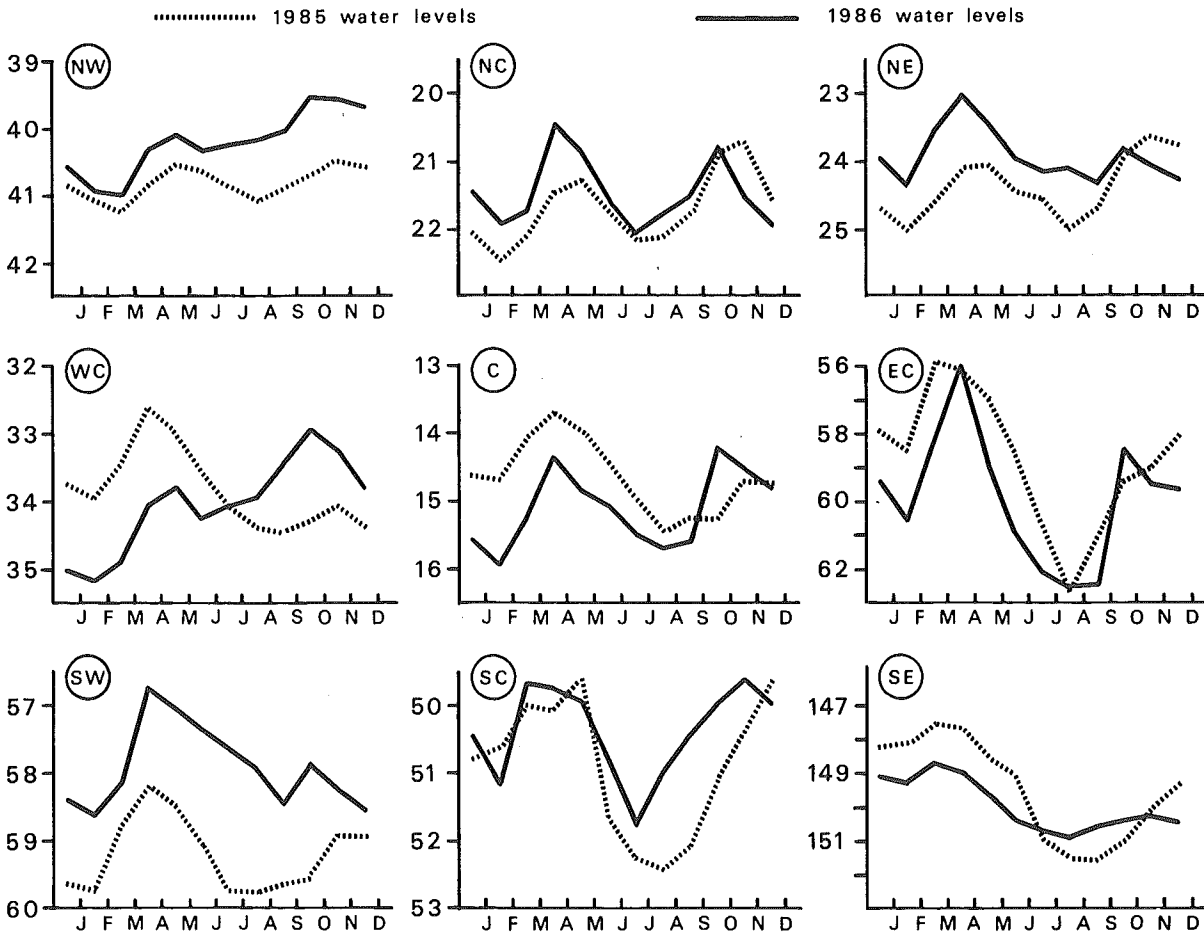
Difference from the 1984 average water levels (+ or -, in feet), and the 1985 percentage of long-term water levels.

The composite monthly mean water levels on the graphs below are not directly comparable to those of previous years because the number of wells varies every year. However, the means for 1985 and 1986 are comparable because they were calculated using the same wells.

Generally, water-level fluctuations followed the traditional pattern in 1985 and 1986. Under natural conditions, water levels usually peak in April and May, decline through the summer months when less water is available for recharge because of high evapotranspiration, reach the lowest stage in late winter (February-March), and do not begin to recover until after the ground thaws in the spring. In 1985 water levels followed this pattern until August. Mild temperatures in March quickly melted the snow cover and thawed the ground, contributing to an early rise of water levels, which peaked in April and May. During the rest of the growing season, water levels gradually declined until August and September, when they were lower than the February lows, except in the northern counties. For the rest of the year the groundwater levels deviated from the traditional pattern, and kept rising until the end of the year because of the heavy late-fall rains.

The 1986 water levels strictly followed the traditional patterns of two peaks and two lows. Both peaks, in April and in October, were strong and well defined. The October peak was especially strong in west-central and central Wisconsin. Water-level declines were recorded in February (the lowest stage of the year) and during July through September; they began their 1987 cycle in December.

COMPOSITE MONTHLY MEAN WATER LEVELS IN 1985-86, BY CLIMATIC REGION, IN FEET BELOW THE LAND SURFACE



Overall, precipitation has been above normal for the past 10 years. Last year's precipitation was 9% above normal; in 1985 it was about 20% above normal, making the year one of the 10 wettest in the last 90 years. The combination of a prolonged period of wet years, and cooler temperatures (resulting in lower evaporation) kept water levels high and caused flooding problems for owners of low lands and lakeshores. The map below shows that in most of Wisconsin, precipitation was above normal for at least four of the last five years. Only in the northernmost parts of central and eastern Wisconsin was precipitation above normal only in three of the last five years. The driest conditions prevailed in Iron and Vilas Counties.

The winter of 1985-86 was remarkable for deep snow cover and low frost penetration. Spring came quickly and the near record-breaking snow melted rapidly in the second half of March. Precipitation from April to early June was below normal for all areas of the state except the northwest; parts of north-central and northeastern Wisconsin even experienced drought conditions. A wet July and timely late June and August rains provided much-needed moisture for crops. The heaviest rainfall came in September, when precipitation was more than 2.5 times greater than normal, pushing the year's total above normal. October and November rainfall averaged below normal. All districts had precipitation above normal in 1986, except the northeastern district (95%). The wettest was the west-central district: 123%.

On the basis of precipitation trends in 1986, we can expect water levels in 1987 to remain generally above normal unless the year is extremely dry.

COMPOSITE PRECIPITATION
FOR CALENDAR YEARS
1982 THROUGH 1986

