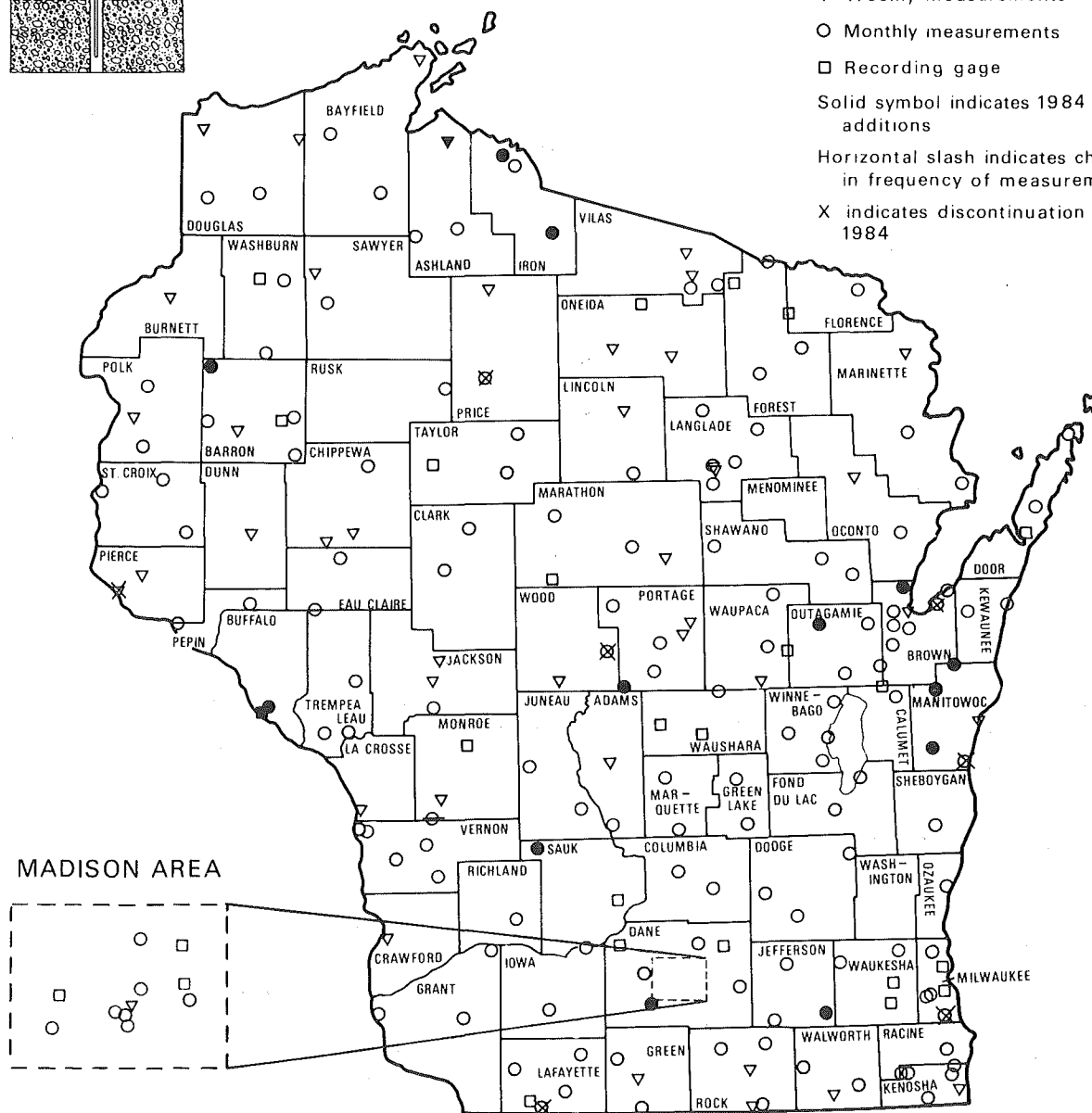


# GROUND-WATER LEVELS IN WISCONSIN

## ANNUAL SUMMARY 1984

by Alex Zaporozec  
(Compilation of data: Paul Gempler)

- ▽ Weekly measurements
- Monthly measurements
- Recording gage
- Solid symbol indicates 1984 additions
- Horizontal slash indicates change in frequency of measurement
- X indicates discontinuation in 1984



LOCATION OF OBSERVATION WELLS IN WISCONSIN, 1984

### PREPARED BY

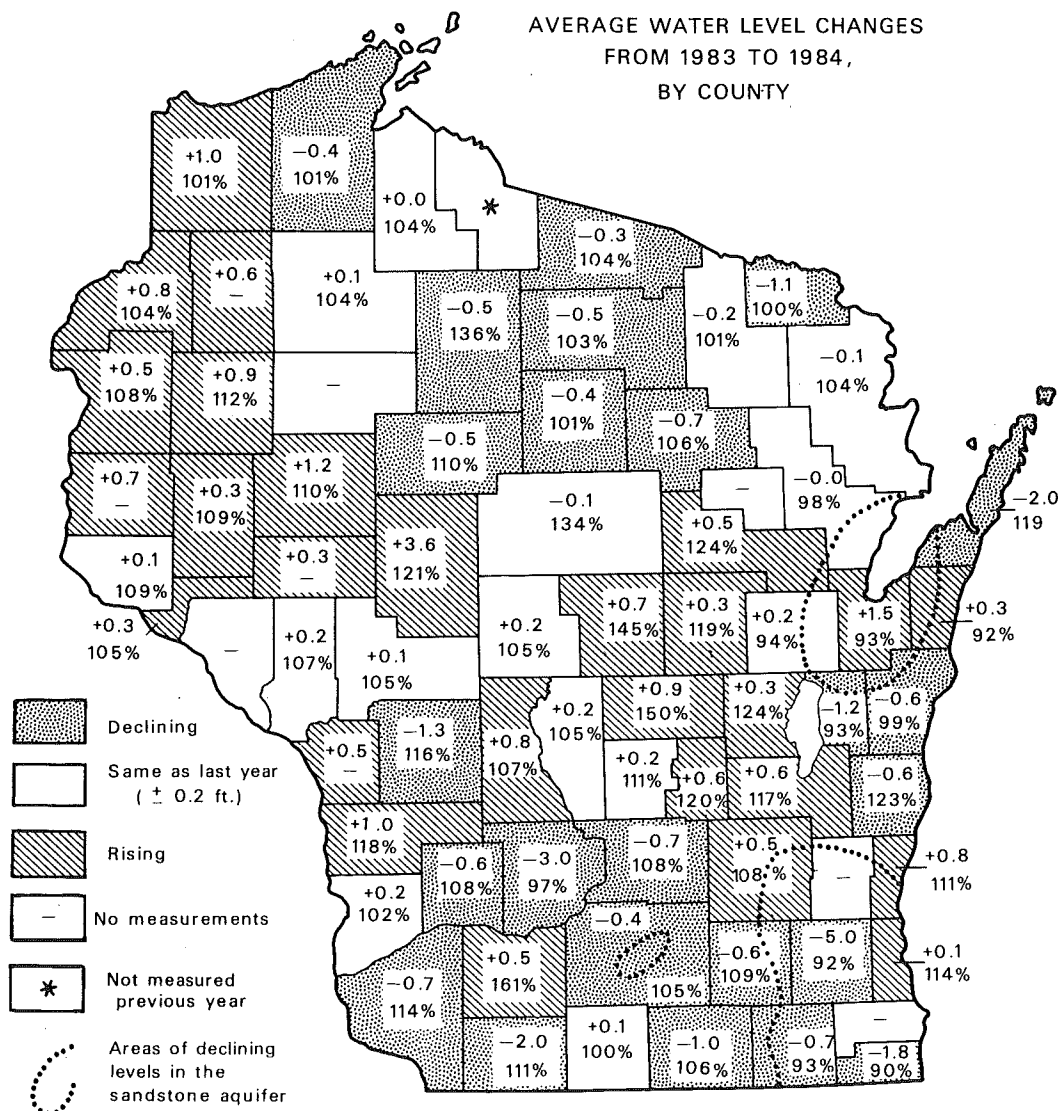
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In 1984, measurements were made on 215 wells as compared to 209 wells in 1983. A temporary increase in the number of observation wells continues due to continuing revision of the observation network initiated in 1982. The wells recommended for discontinuation will be phased out after the new wells have a firmly established record. Fifteen wells were added to the program; seven wells were discontinued. Locations of observation wells shown on page 1 are available on request from the USGS or WGNHS.

Virtually all of Wisconsin is entering 1985 with ample ground-water supplies. Ground-water levels were above average everywhere except in the extreme northeast and around the heavily pumped metropolitan areas of Green Bay and southeastern Wisconsin (see map below). Water levels were not much different from 1983; they rose or declined, on the average, less than 1 foot. However, an increasing number of wells with declining water levels indicates that the water levels probably reached peak in 1983. Water levels primarily declined in north central and southern Wisconsin; declines greater than 2 feet were recorded in Door, Lafayette, and Sauk counties. Nevertheless, water levels at year's end were higher in 58% of observation wells, and continue to rise primarily in the northwestern, west central, and central parts of the state. The greatest rise (more than 2 feet) occurred in Clark and Vernon counties.

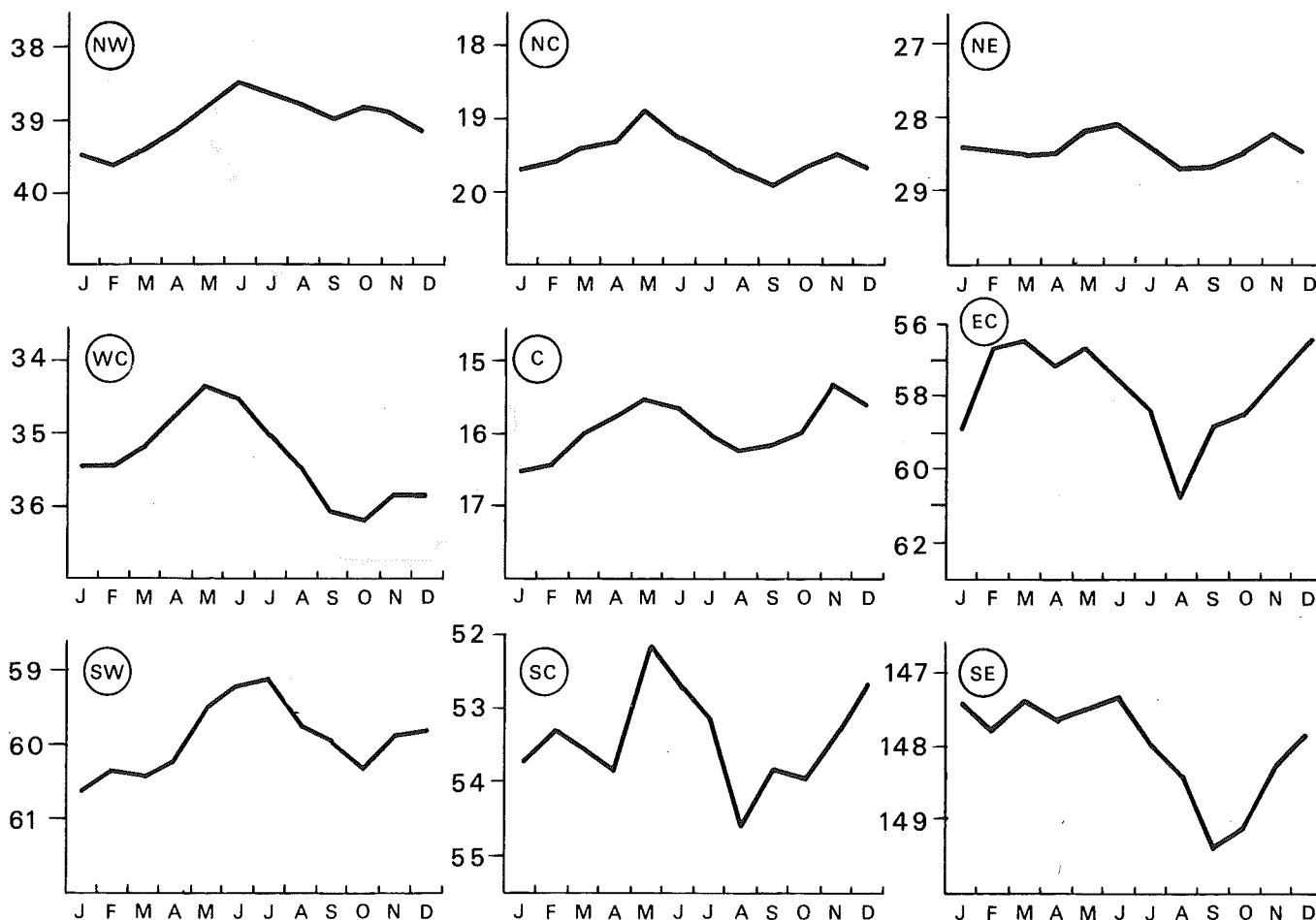


Composite monthly mean ground-water levels on the graph below are not directly compatible with the means for previous years because the number of wells varies every year. However, they show representative patterns of fluctuations within climatic districts shown on page 4.

In most cases water levels returned to the traditional pattern of fluctuations (high in spring, low in late summer). However, late frost penetration in March and the heavy rains that fell frequently during late April and early May and June helped push the spring recharge period well into summer (May through July). A dry spell in the summer months resulted in summer recession of water levels in most of Wisconsin, except in the north where no significant summer depletion occurred. Water levels dropped during August through October lower than during winter recession because they were generally higher than usual at the beginning of the year. Heavy October and December rains provided moisture for substantial replenishment of ground-water levels, which in most of Wisconsin kept rising until year's end.

On the average, annual fluctuations under natural conditions were smallest in the three northern climatic districts underlain by glacial deposits: 1.5 to 1.9 feet. The largest average fluctuation was in south central Wisconsin, 3.4 feet. Fluctuations on individual wells generally ranged from 0.5 to 6 feet, and exceeded 10 feet in the confined sandstone aquifer in the east and in the fractured dolomite of Door County.

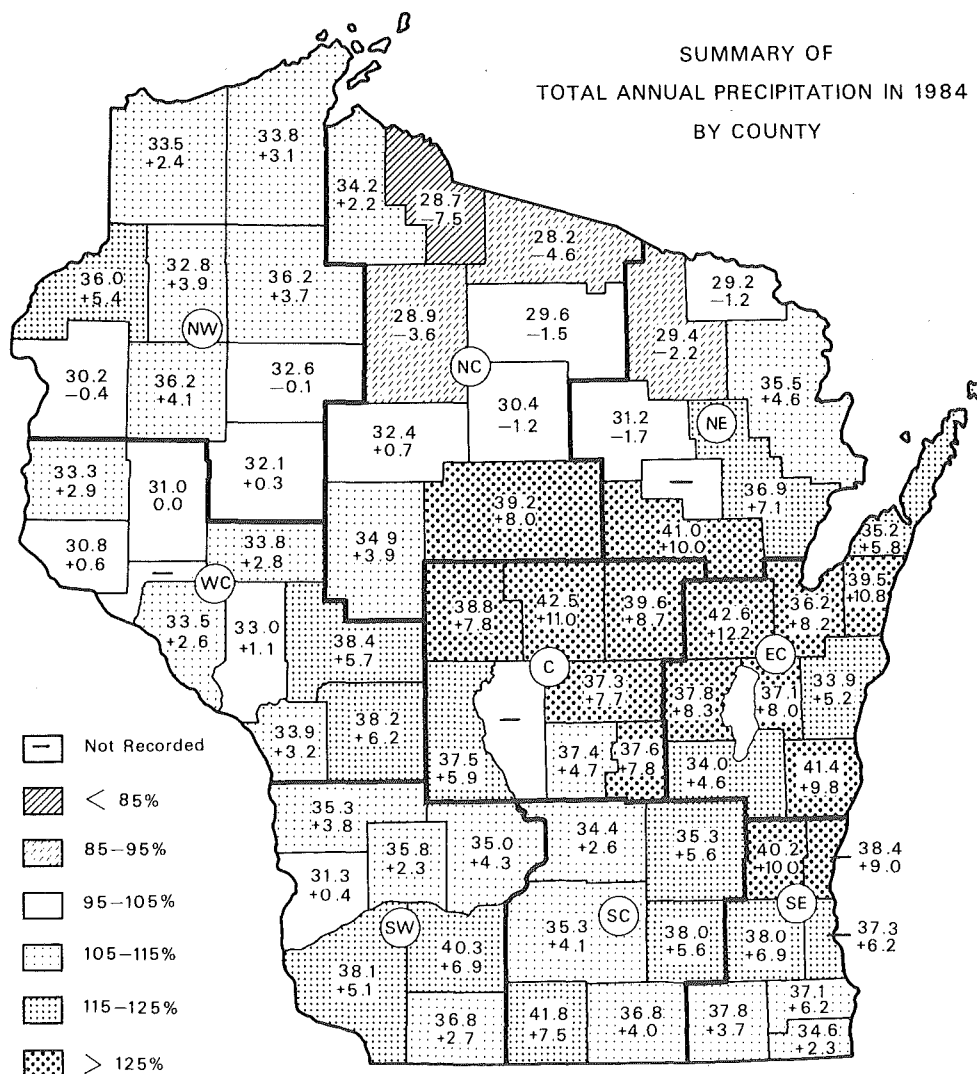
COMPOSITE MONTHLY MEAN WATER LEVELS IN 1984  
IN FEET BELOW THE LAND SURFACE  
(for climatic regions shown on page 4)



We are seeing one of the wettest periods on record, stretching now for eight years. Since the 1976 drought year, state average annual precipitation has been at least 5% above normal (1% in 1981), with the last three years averaging 15% above normal. This prolonged period of wet years has had a cumulative effect on ground-water levels, which remain high in most of Wisconsin forcing lake levels to rise and causing flooding of low-lying areas.

The year 1984 had about normal precipitation until October when heavy rains of from 1.5 to 3 times normal descended on Wisconsin and brought rainfall accumulations to well above normal. November and December rains kept the state total precipitation 16% above normal. The map below shows that, on the average, precipitation was heaviest in the east central district (28% above normal) and lightest in the north central district (1% below normal). Several stations in Iron and Vilas counties were even below drought level (85% of normal).

The late-fall rains substantially recharged the ground water and water levels kept rising even at the beginning of 1985. We can expect that ground-water levels in 1985 will generally remain above average unless the summer is extremely dry. The potential for below average water levels exists especially in northern Wisconsin, where the precipitation was below normal and water levels began falling in 1984. Water levels in the sandstone aquifer around the metropolitan pumping centers will remain below average and will resume their gradual declines interrupted by temporary reversal in 1982 and 1983.



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