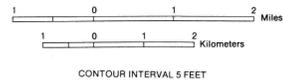


Ground Water Resources of PUTNAM COUNTY

by Donald E. Calhoun III



- County Line
- - - Township Line
- Incorporated City Limit

Well Yields

AREAS IN WHICH YIELDS OF 100 TO 500 GALLONS PER MINUTE MAY BE DEVELOPED

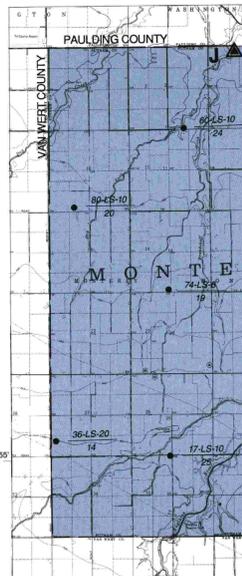
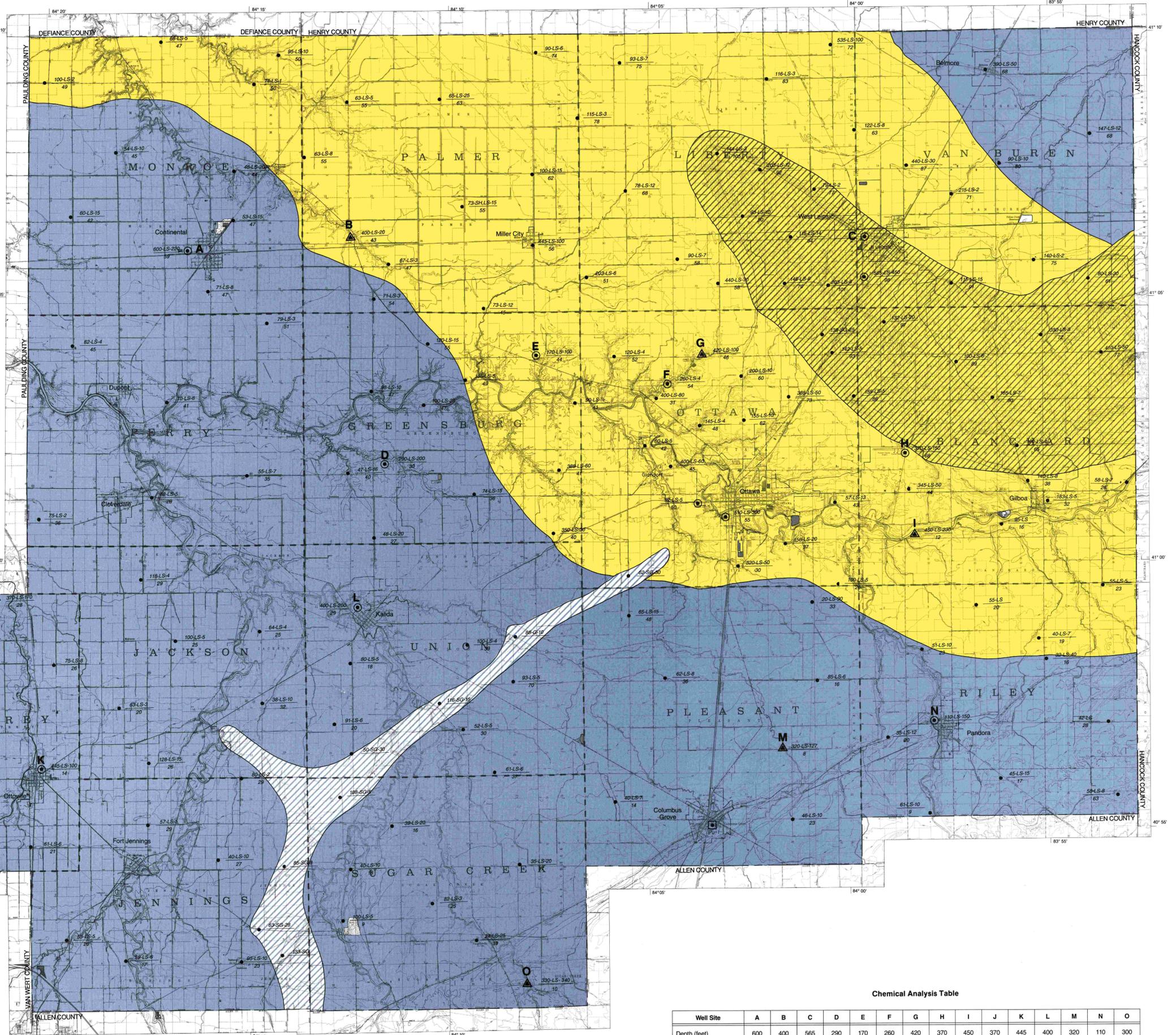
Principal aquifer composed of the Silurian limestones and dolomites. Bedrock overlain by 10 to 70 feet of glacial till. Yields of 100 to 500 gallons per minute frequently can be developed in fractures and solution cavities at depths exceeding 300 feet. Farm and domestic supplies of 7 to 15 gallons per minute can be developed at depths of less than 100 feet. Wells drilled less than 70 feet, in an attempt to obtain ground water free of hydrogen sulfide (H₂S), yield less than 10 gallons per minute.

Ancestral Teays Valley filled with glacial till. Extensive deposits of sand and gravel can be found interbedded with thick deposits of clay. If permeable layers of sand and gravel are encountered, screened wells may yield up to 25 gallons per minute. Test drilling may be necessary to locate coarse deposits for maximum yields. Wells drilled deeper into the underlying limestone bedrock yield satisfactory supplies.

AREAS IN WHICH YIELDS OF 25 TO 100 GALLONS PER MINUTE MAY BE DEVELOPED

Limestone and dolomite aquifers beneath 35 to 85 feet of glacial drift. Domestic wells usually developed at depths of less than 150 feet. Shallow wells often drilled in an attempt to obtain sulfur-free water, but yields of less than 10 gallons per minute are not uncommon. Wells developed at depths exceeding 255 feet may encounter the "white limestone" and produce yields in excess of 50 gallons per minute. High content of hardness, hydrogen sulfide, and sulfates may deter its use.

The Defiance Moraine, where thick layers of well-sorted, coarse, permeable sands and gravels are encountered in the thick glacial till, wells produce domestic supplies. Where permeable deposits are not found, wells should be drilled deeper into the principal aquifer, the underlying limestone bedrock.



Well Site Symbols

WELL INFORMATION (SEE NOTE)

AQUIFER TYPE

Water bearing formation.

DEPTH (ft.)

Total depth of well in feet.

YIELD (gpm)

Amount of water a well produces in gallons per minute.

WELL SITE

Approximate location of a well.

DEPTH TO BEDROCK (ft.)

Depth to bedrock in feet.

Example: 75-SS-20
26

WELL TYPES

- Well Site
- ▲ Well Site H₂S Noted
- Municipal-Industrial Well
- Observation Well**
- △ Test Well*
- ▲ Chemical Analyses

AQUIFER TYPES

- S - Sand
- G - Gravel
- SG - Sand and Gravel
- SS - Sandstone
- SH - Shale
- LS - Limestone



Quarry

Note

The ground water characteristics have been mapped regionally, based upon interpretations of water well records and the area's geology and hydrology. Mapped well sites were selected as typical for the areas shown. Information regarding specific sites may be obtained from the Division of Water.

* Test well sites indicate the location of a test well that was part of a regional ground water study. Detailed lithologic logs, water quality analysis and pumping test information for these wells may be available from ODNR-Division of Water.

** Observation well sites indicate the location of wells used to collect ground water level information. These wells are part of the State observation well network. Hydrographs of the water levels recorded in these and other State observation wells can be obtained through ODNR-Division of Water.

Chemical Analysis Table

Well Site	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Depth (feet)	600	400	565	290	170	260	420	370	450	370	445	400	320	110	300
Iron	0	.44	.04	.08	.03	.05	.38	.08	.23	.85	1.32	.01	.3	.06	.18
Total Hardness	496	1100	278	809	330	302	-	479	501	708	659	503	426	562	
Dissolved Solids	878	1730	601	-	-	-	532	836	642	810	1012	1113	668	753	758
Sulfate	370	1040	28	764	230	293	190	460	180	250	465	400	203	160	258
Chloride	71	19	65	36	57	15	48	8	44	80	36	76	10	21	35
Fluoride	1.88	1.8	2.85	1.41	1.82	1.93	1.7	1.98	1.5	1.8	1.28	1.40	1.9	1.44	1.8
Hydrogen Sulfide	-	2	-	-	-	-	11	-	12	11	-	-	50	-	8.7

Chemical constituents as milligrams per liter (mg/l)