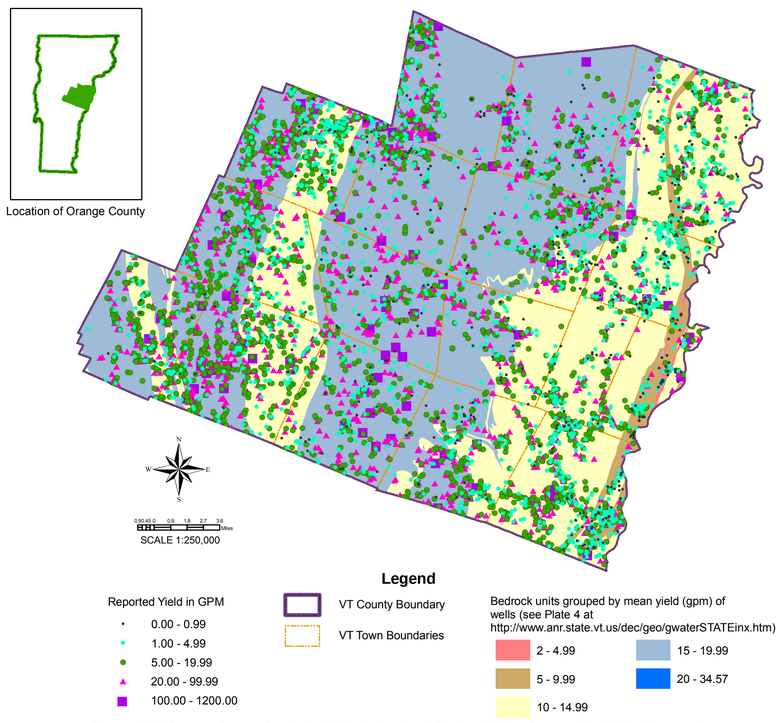

Figure 1. All Orange County Bedrock Wells (points) and Bedrock Units Grouped by Yield. The map is the Orange County portion (wells) of the statewide analyses of 92,315 wells. Map scale is 1:250,000. Refer to the statewide groundwater resource maps on the VGS web site for a discussion of this data and map. Web: http://www.anr.state.vt.us/dec/geo/gwaterSTATEinx.htm

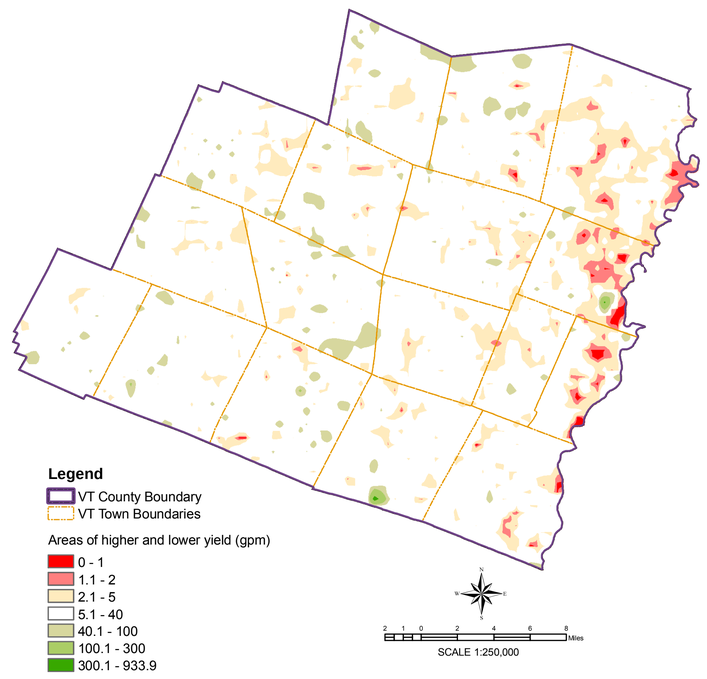

Figure 2. Areas of higher and lower yield based on an inverse distance weighted analysis of 92,315 well points.
See maps at http://www.anr.state.vt.us/dec/geo/gwaterSTATEinx.htm
An inverse distance weighted analysis (IDW) is presented by county. The raster analysis is used to summarize values on the map. The raster statistics summarize attribute values of the well points and assigns a value to each cell in the layer. The IDW raster analysis was set to consider the closest 6 points. The raster shown here may be considered as an approximation of areas for additional study. The raster analysis does not attempt to provide a probabilistic analysis and it is only a presentation of clusters of values. These clusters will change with the addition of more data points.
Errors due to incorrect well locations are less significant at a scale of 1:250,000.

GROUNDWATER RESOURCES BY COUNTY

This county map is part of a map series used to evaluate Vermont's groundwater resources using existing data. The Orange County maps show yield (gallons per minute) data for bedrock wells as reported in the VT DEC Water Supply Division database. A total of 92,315 wells in the State of Vermont were analyzed in the accompanying statewide study. Data were divided into counties for presentation (Figs. 1, 2). Well locations in the database are from well driller descriptions and sketches.

Some wells have been located by GPS or by correlating a well log to an E911 address. In Orange County, 805 out of 5,738 wells or 14% have an E911 or GPS address (Figure 3). The majority of wells, as shown on Figure 1, have suspect locations although errors due to incorrect well locations are less significant at a scale of 1:250,000.

Well yield (gpm) is generally estimated in the field with a bucket and timer. The time period is usually short and measurements are not meant to be precise. Comparisons of the mean and median values for all wells and the mean and median values for wells in Orange County are shown in Table 1.

Wells are grouped into yield categories on the map presented here. Depth and yield vary due to many factors, including non-geologic factors. For example, a homeowner may drill until the desired yield is obtained. The factors are not indicative of capacity. Moore et. al., 2002*, published "Factors Related to Well Yield in the Fractured-Bedrock Aquifer of the New Hampshire" in which they discussed a number of factors correlated positively or negatively to well yield. Among these factors are year drilled, median household income, drilling method, up gradient drainage area, thickness of overburden, depth drilled, proximity to streams/water bodies, type of bedrock, steepness of slope, elevation, fractures, and geologic structures.

The map presented is designed to be used in conjunction with other data and analyses. Groundwater flow in the crystalline bedrock of Vermont is mainly along planar features such as fractures, cleavage, faults, and bedding. These planar features may be interconnected and groundwater flow within this system is complex.

* 1. Moore, R.B., Schwarz, G.E., Clark, S.F., Jr., Walsh, G.J., and Degnan, J. R., 2002, Factors related to well yield in the fractured-bedrock aquifer of New Hampshire: USGS Professional Paper 1660.

TABLE 1

	State of Vermont	Orange County
# of wells	92,315	5,738
# of located wells	15,389	805
Mean yield, GPM	13.76	14
Median yield	6	7
Maximum reported yield	1200	1200
Standard Deviation	23	27
Mean depth, FT	293	285
Median depth, FT	260	250
Maximum reported depth	1,765	1460
Standard deviation	158	142
% wells with yield ≤ mean	70%	3,916/5,738 or 68%
% wells with yield > mean	30%	1,822/5,738 or 32%
% wells with depth ≤ mean	56%	3,339/5,738 or 58%
% wells with depth > mean	44%	2,399/5,738 or 42%

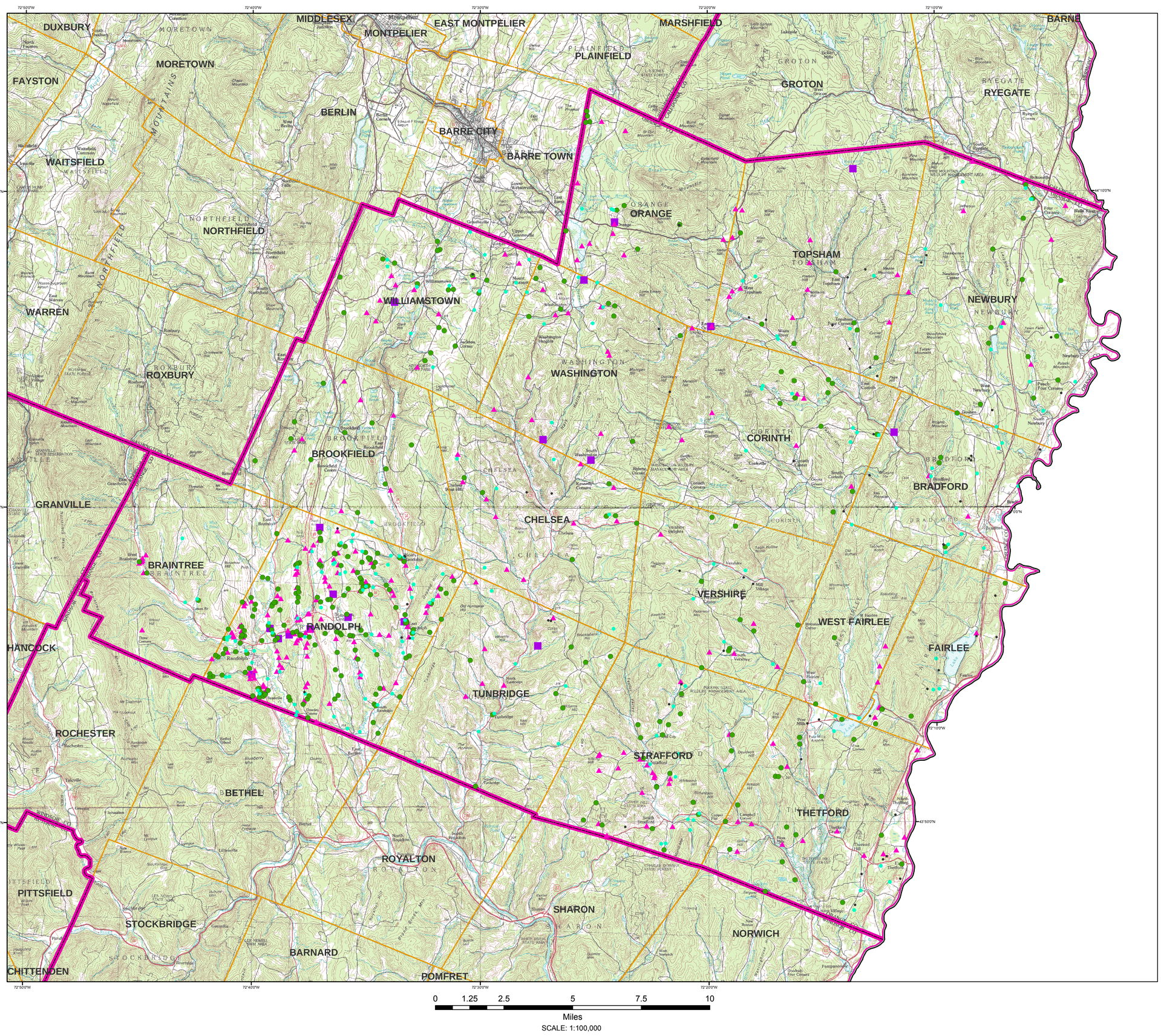

Figure 3. Orange County Bedrock Wells with E911 or GPS Location

Reported Well Yields in Bedrock Wells, Orange County, Vermont

by
Marjorie Gale, George Springston, Ryan Knox and Laurence Becker
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