## Evaluation of Groundwater Resources in the Town of Craftsbury, Northeastern Vermont Using Bedrock, Surficial, and Topographic Maps Kim, Jonathan<sup>1</sup>, Springston, George<sup>2</sup>, and Gale, Marjorie<sup>1</sup>

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The Town of Craftsbury straddles the Richardson Memorial Contact (RMC a regional lithotectonic boundary that separates metamorphic rocks of the Green Mountain Belt (GMB) to the west from those of the Connecticut Valley Belt (CVB) to the east. The RMC is a Silurian unconformity that is locally coincident with a Devonian fault(s). The GMB is composed of pre-Silurian phyllites and phyllitic quartzites of the Moretown and Cram Hill fms. whereas Silurian-Devonian siliceous marbles, phyllites and isolated granites comprise the CVB. The marble-rich lithologies directly to the east of the RMC have been ero to form a broad depression in which the Black River and a number of elongate N lakes are found. Uplands composed of pre-Silurian and Silurian-Devonian metamorphic rocks are located to the west and east, respectively, of the Black River Valley lowlands. Uplands are primarily underlain by dense silt- and fine-sand-matrix glacial till. Till is thin ( $<20^{\circ}$ ) on hilltops and bedrock outcrops are abundant. Striations and grooves indicate ice motion of ~170-195°. Scattered ice-contact sand and gravel deposits overlie till in places. Glaciolacustrine deposits are common below  $\sim 1120^{\circ}$ . Probable delta deposits are found at  $\sim 1120^{\circ}$ . There are 221 accurately located groundwater wells in Craftsbury and 100% (n=221) were completed in bedrock. Wells in Silurian-Devonian bedrock have slightly higher average yields and total depths (13 gpm; 267') than those in pre-Silurian bedrock (10 gpm; 259'). Surficial wells (n=13) have average yields of 40 gpm. Preliminary analysis suggests that the elevated yields of some bedrock wells may be related to the presence of thick, saturated, and porous surficial deposits that overlie the bedrock Further analysis seeks to correlate well yields with other factors such as fracture domains, topographic slope, proximity to water bodies or lineaments, and **Figure 1- Bedrock Geologic Context** 

Figure 2- Surficial Geologic Context

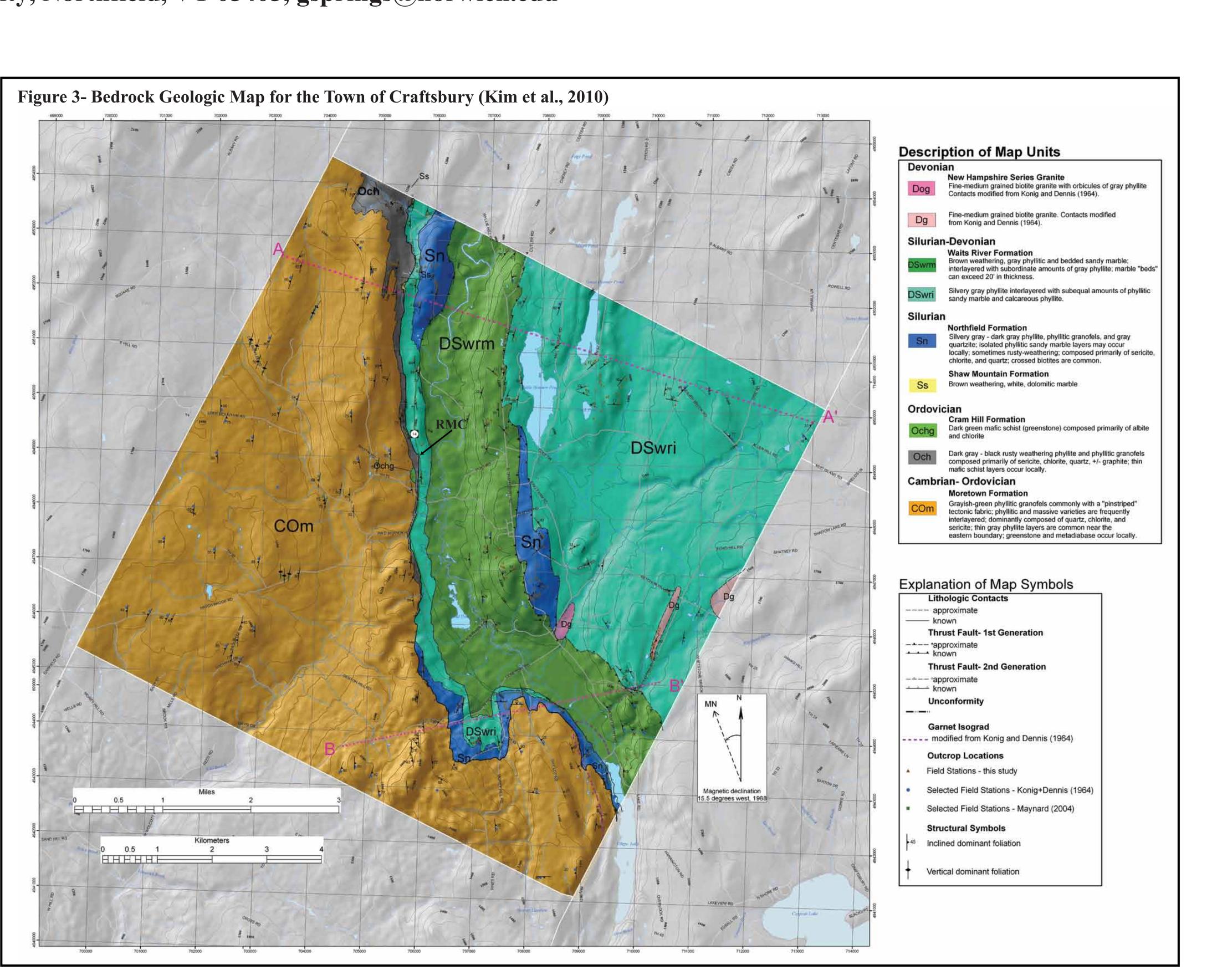
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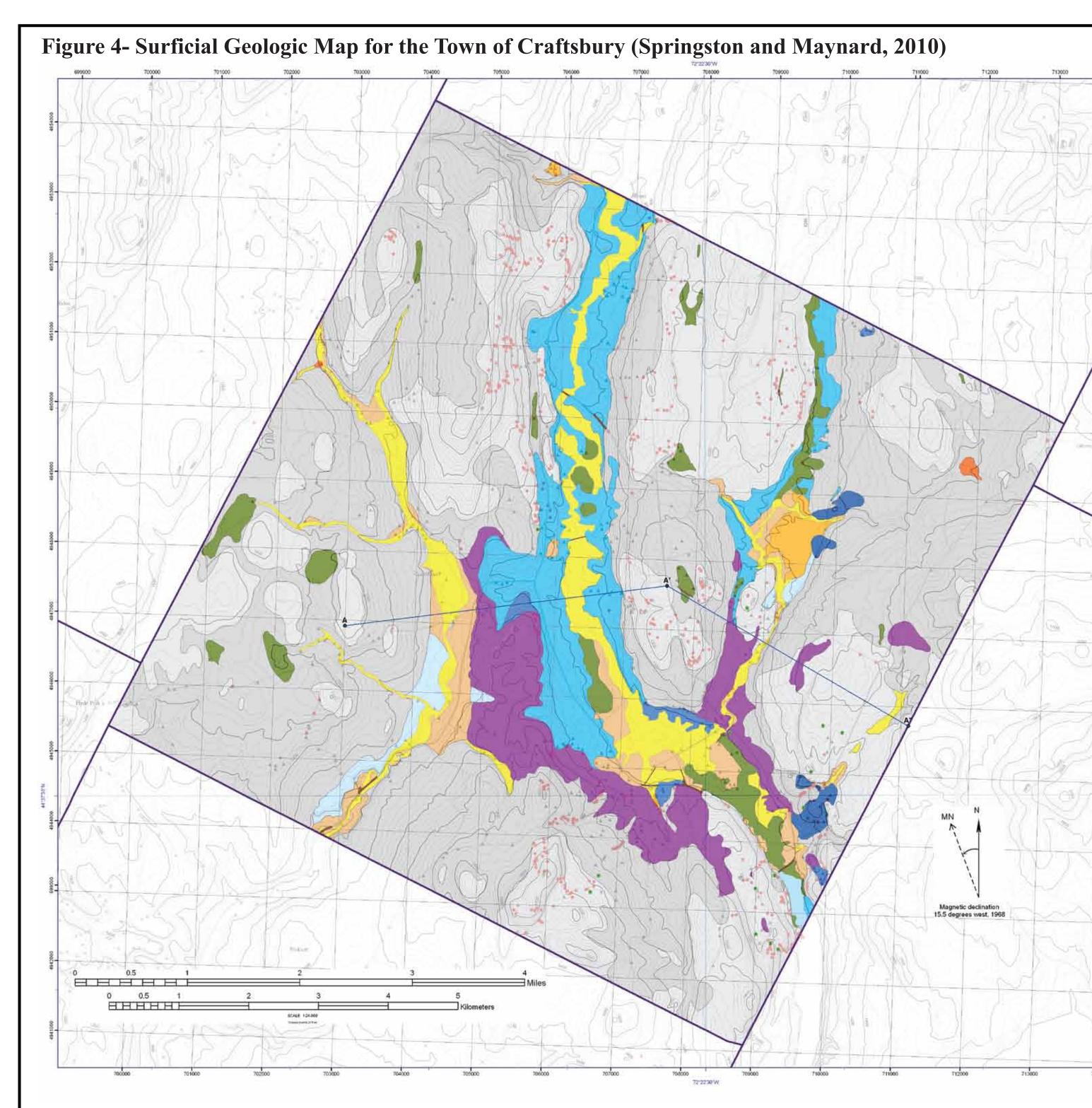
Craftsbury field area shown on surficial geologic map of Stewart and MacLintock

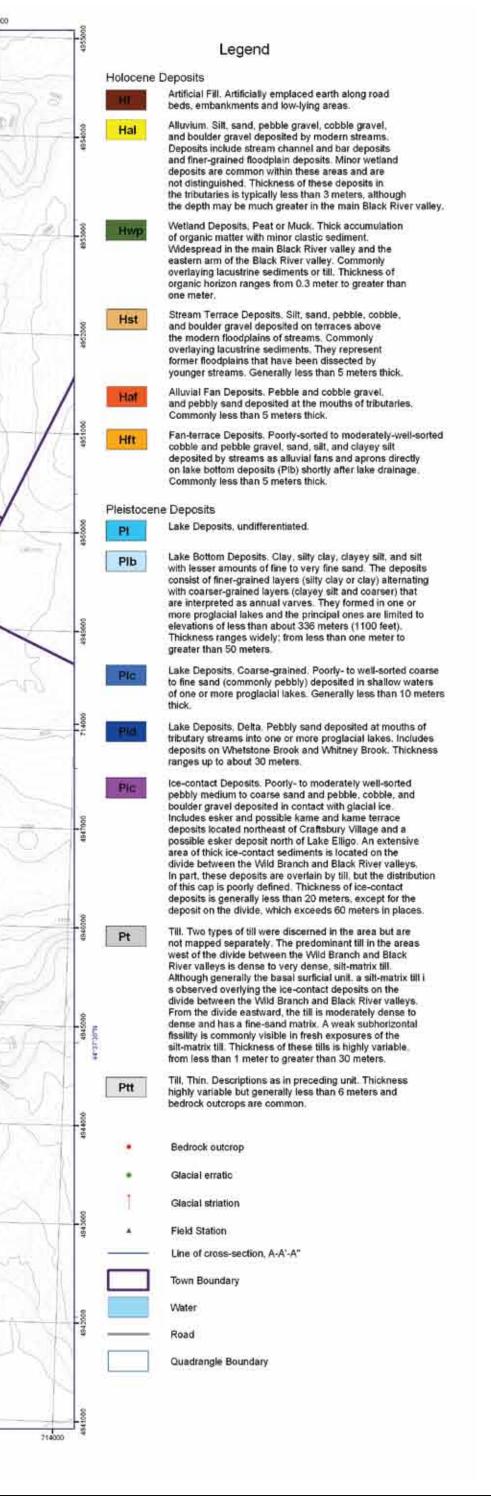
(1970). Craftsbury straddles the Black River Valley which was once filled with a

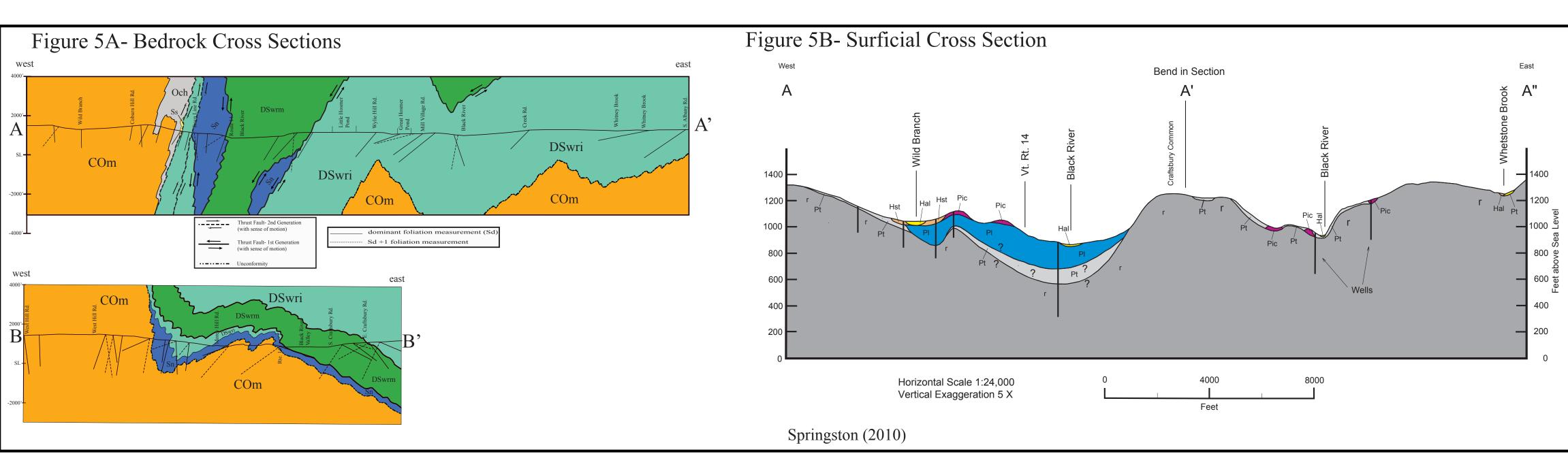
Kilometers 0 5 10 20 30 40

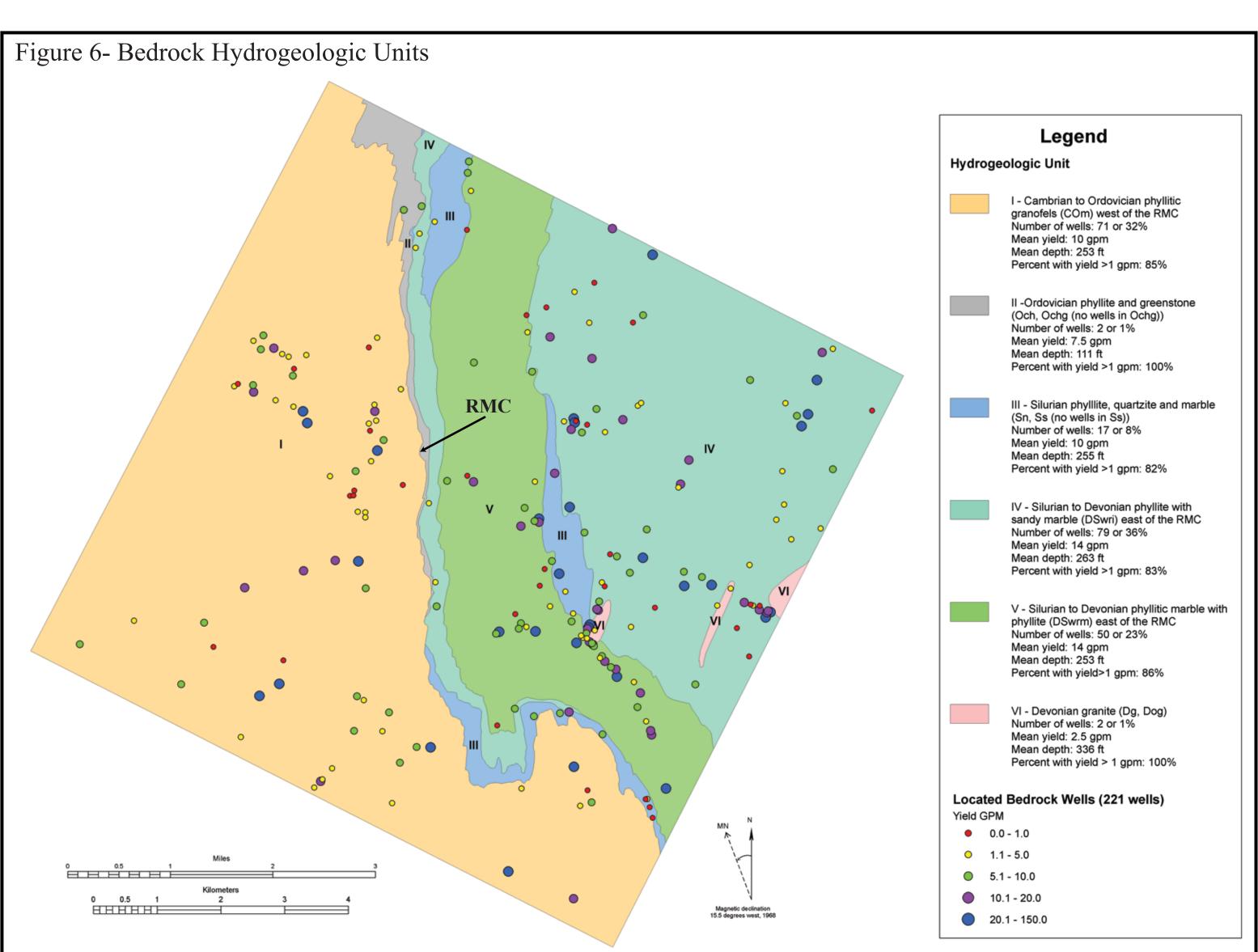
Craftsbury field area shown on bedrock geologic map of Doll (1961) with overlay of



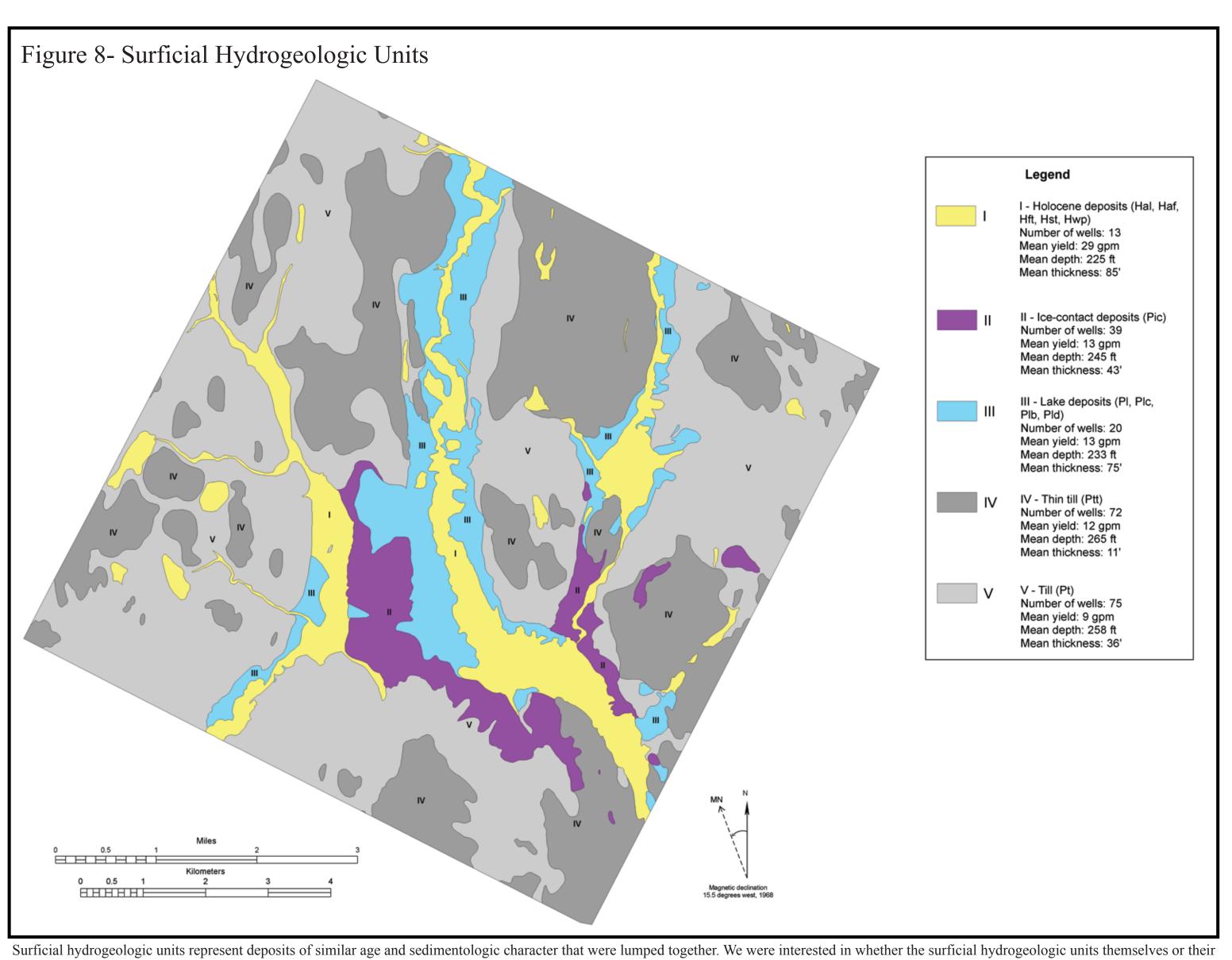




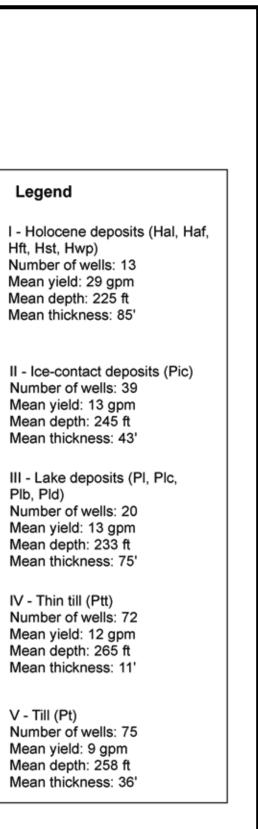


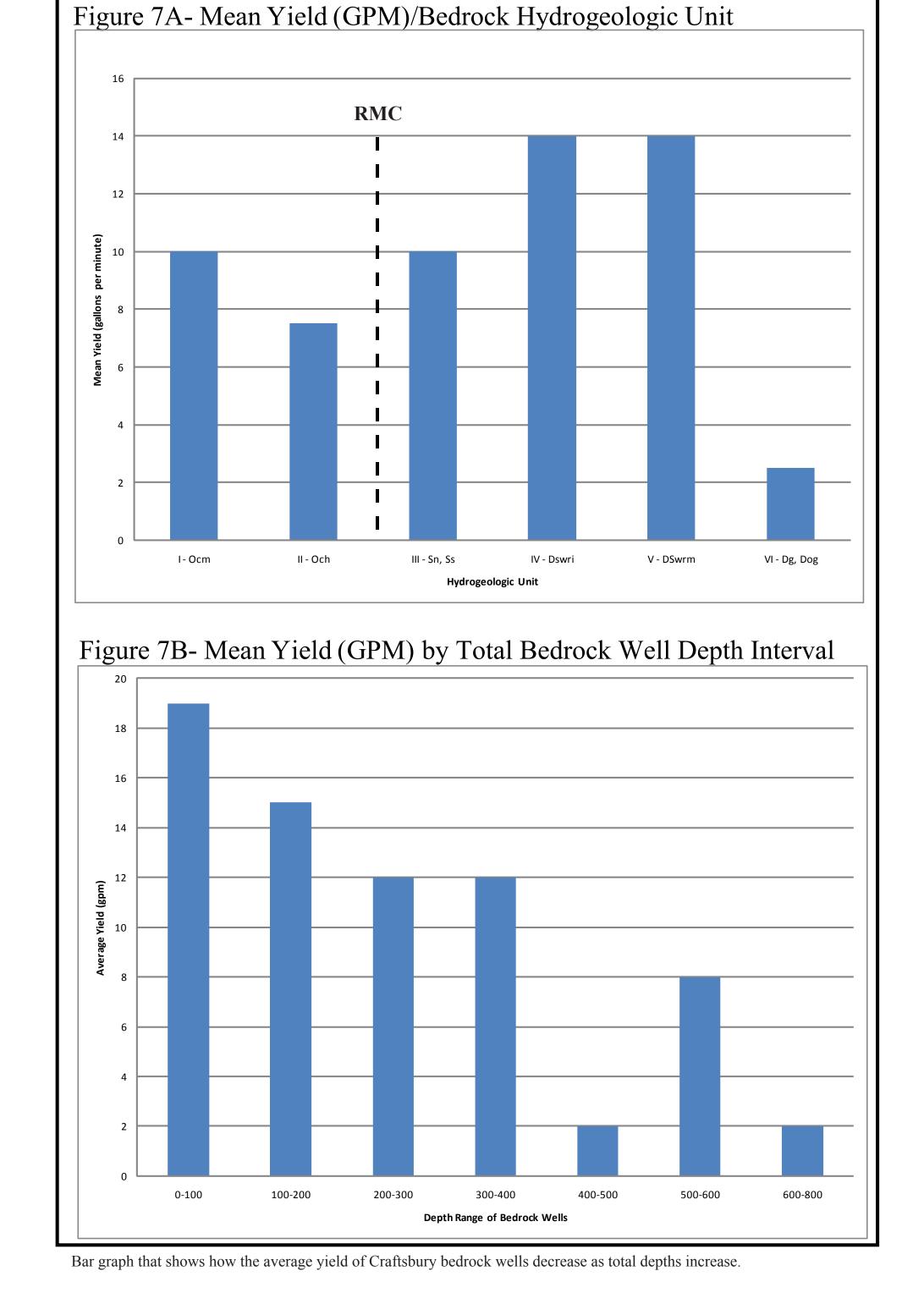


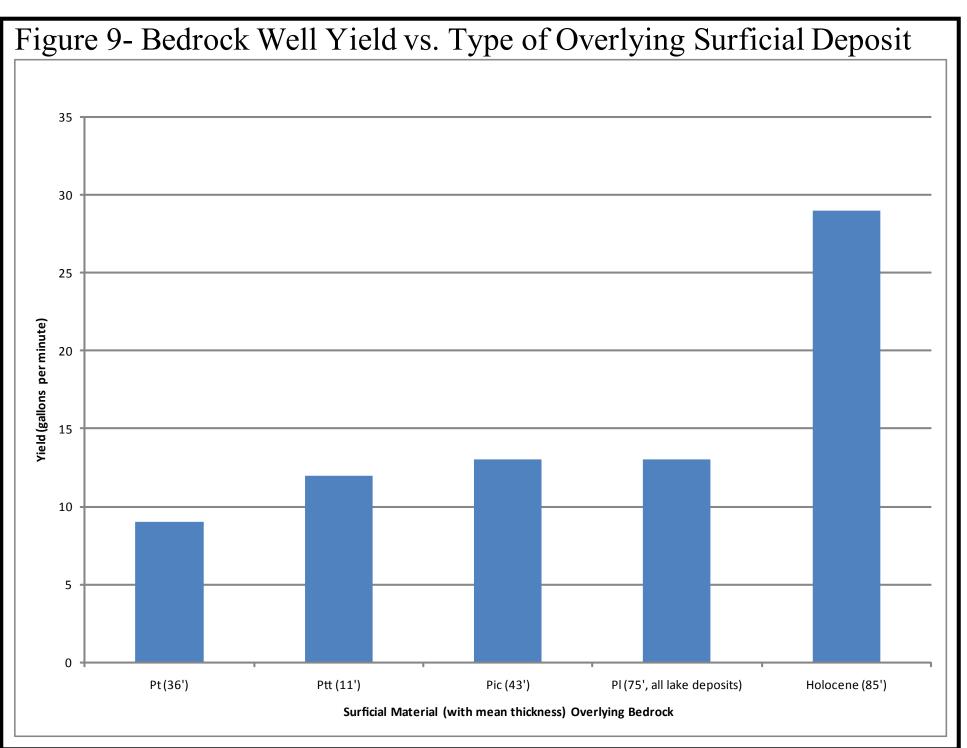
For this map, bedrock hydrogeologic units basically correspond with formations. The yields of accurately located (GPS, E-911) bedrock wells are shown as scaled and colored circles (n=221). Mean yields, wells depths, and % of wells with yields > 1 gpm are shown for each unit in the legend. Figure 7A shows a bar graph of yields by bedrock hydrogeologic unter the shown for each unit in the legend.

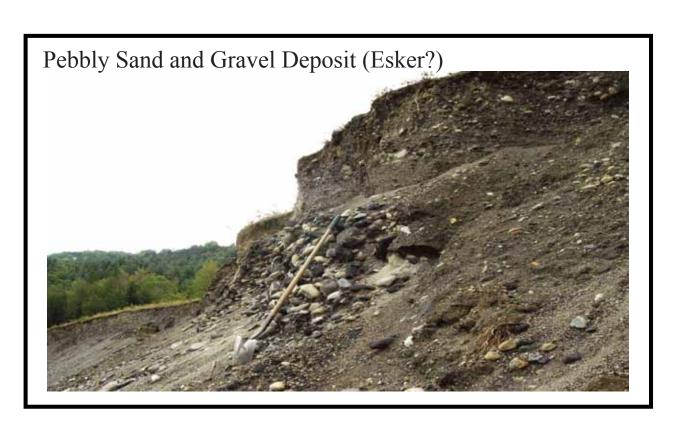


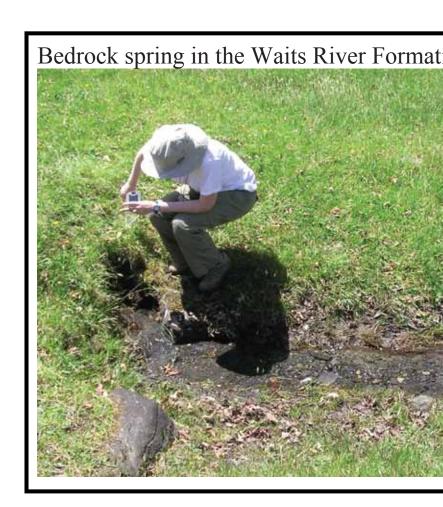
thicknesses influenced the yields of bedrock wells. Figure 9 shows that the mean yields for bedrock wells completed through each surficial hydrogeologic unit are similar, with those completed below the Holocene units having the highest mean yield.

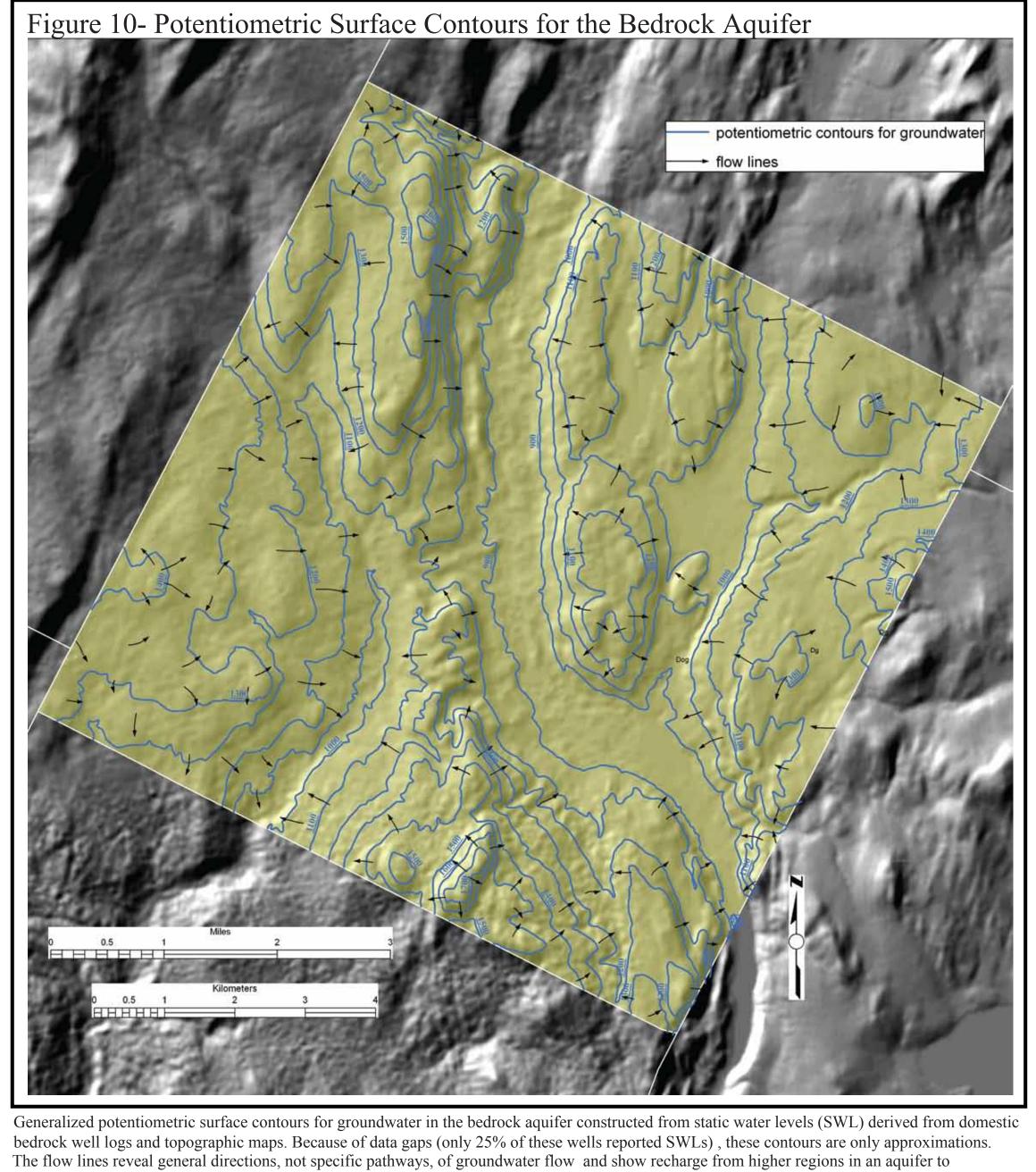


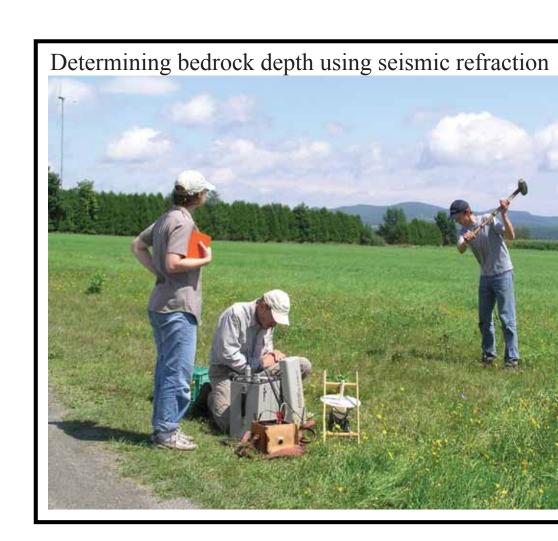


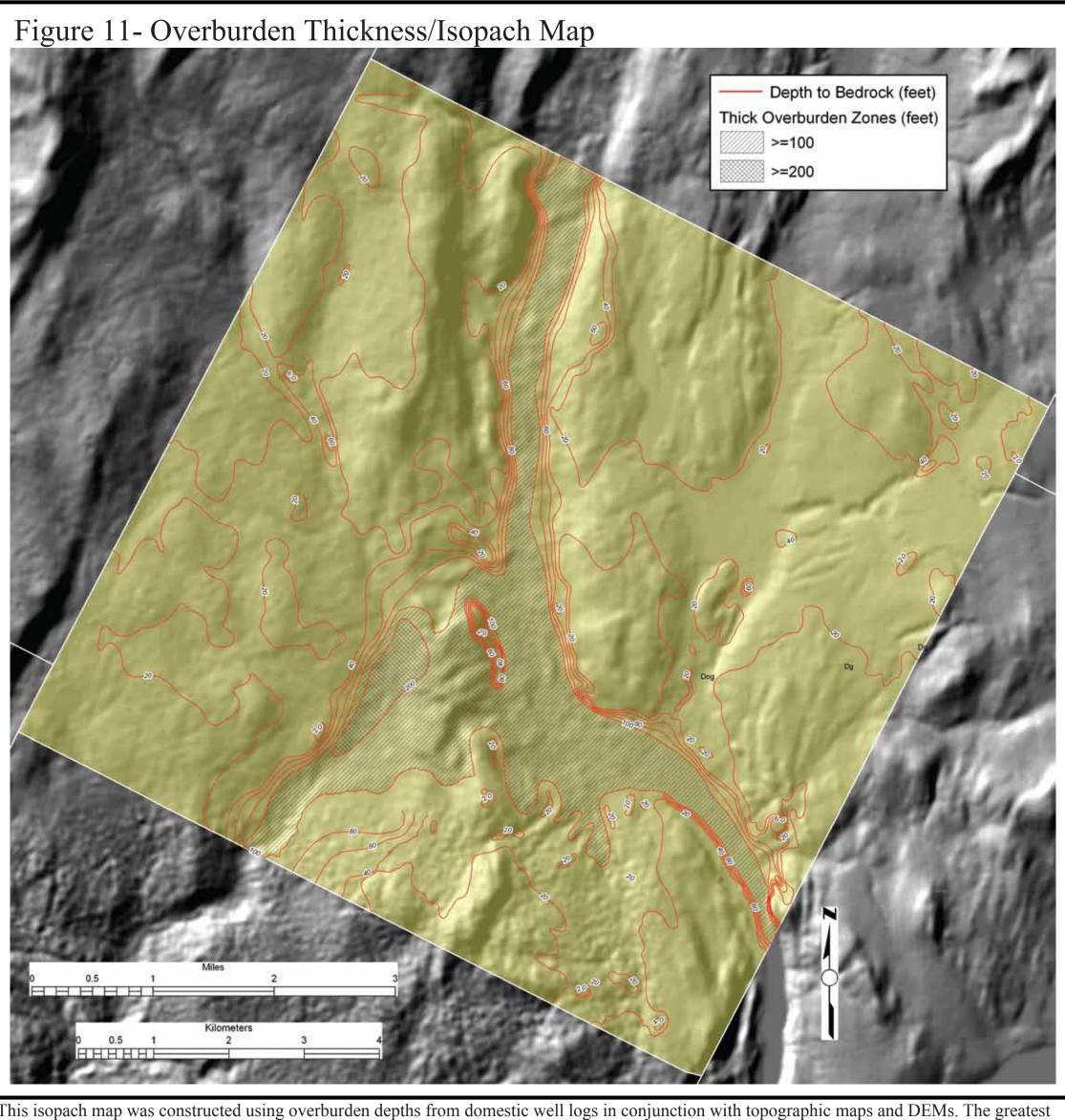










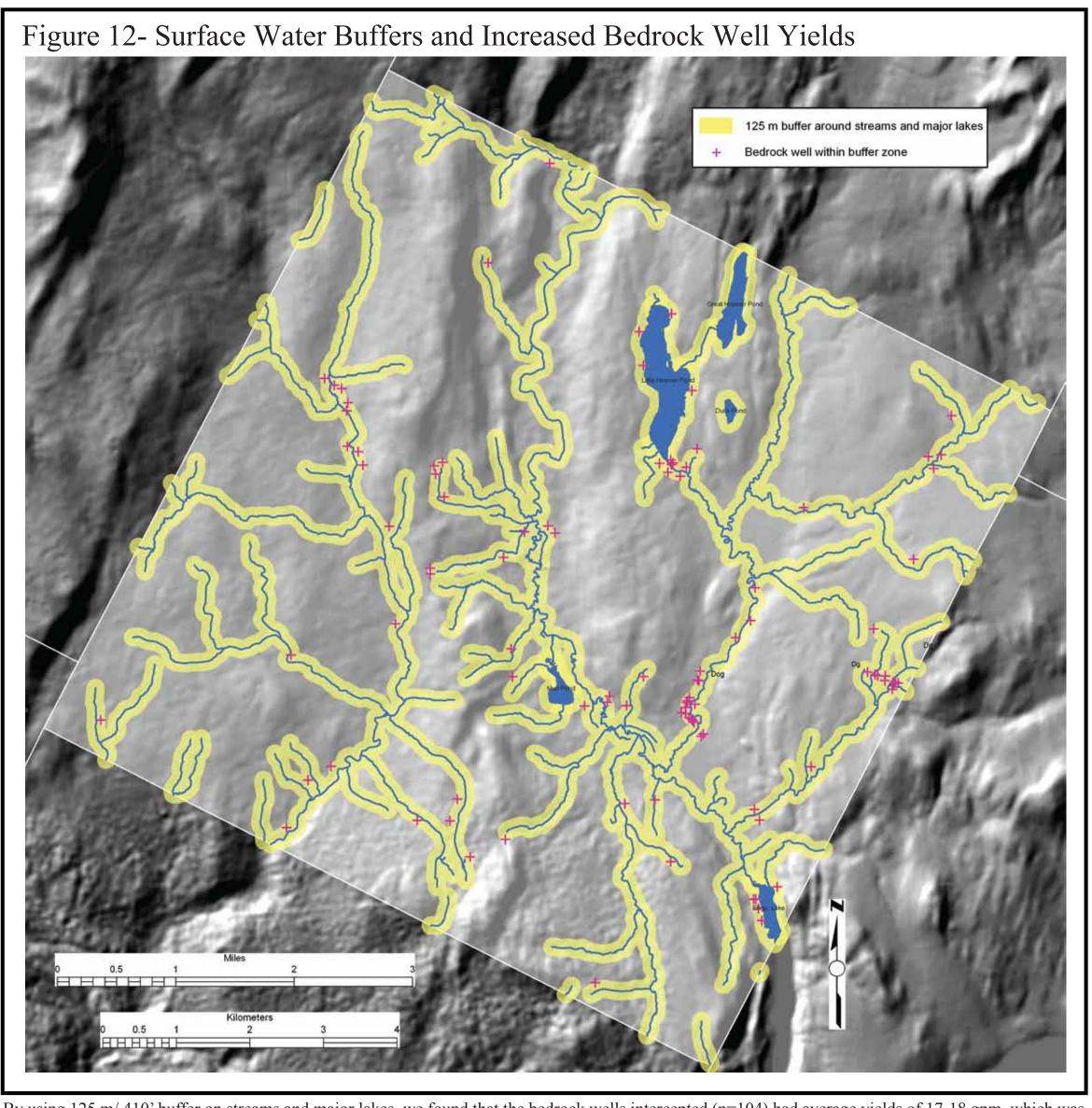


overburden depths are found in the Black River Valley and in a southwest trending bedrock channel.

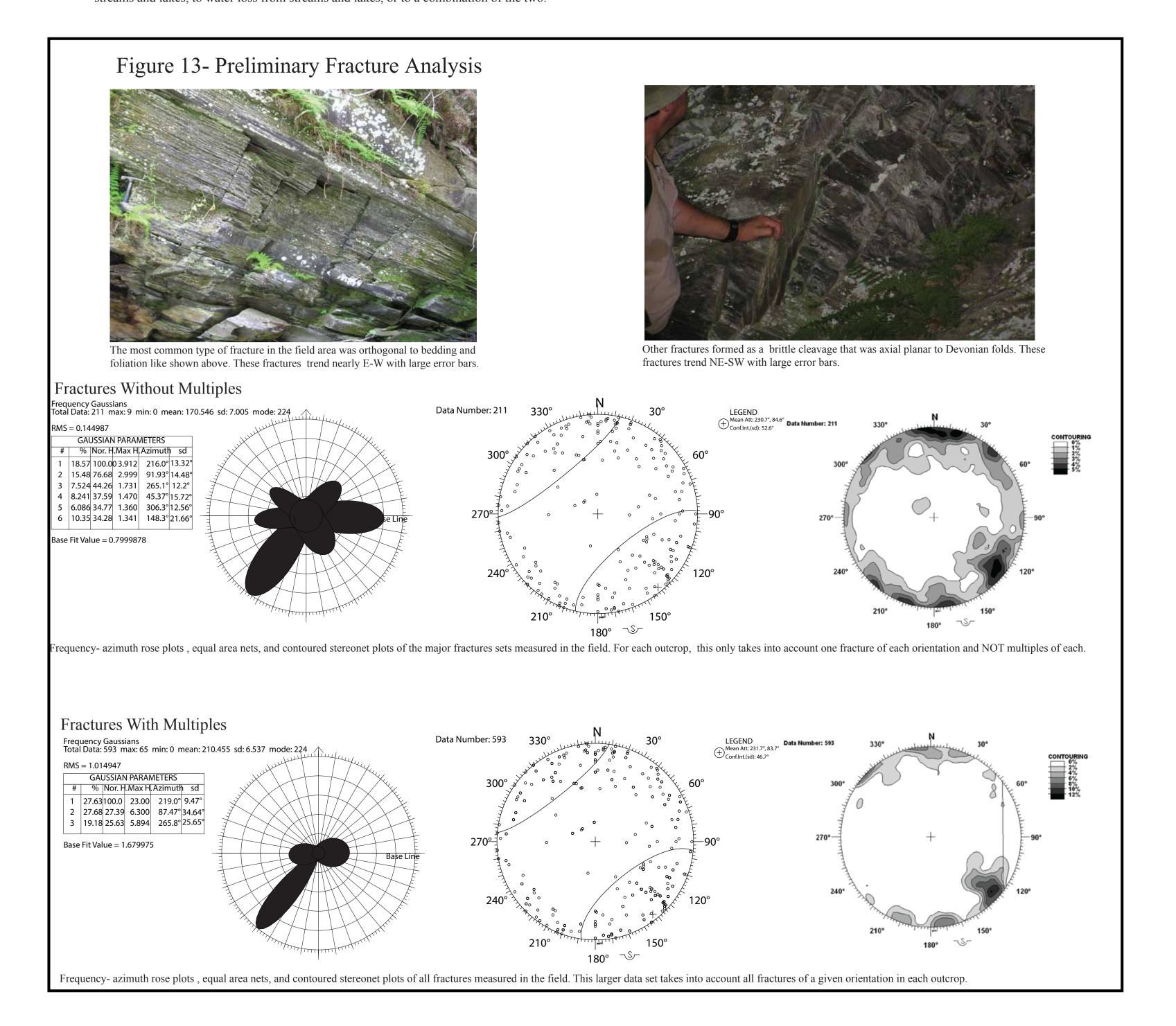


regions of discharge in lower portions of an aquifer. Flow lines commonly follow the topography.





By using 125 m/ 410' buffer on streams and major lakes, we found that the bedrock wells intercepted (n=104) had average yields of 17-18 gpm, which was significantly higher than the yields reported for any individual rock formation. This increase could be due to the concentration of groundwater flow towards streams and lakes, to water loss from streams and lakes, or to a combination of the two.



						1.5.5
Carrier My	CRAFTSBURY	All wells	RMC West	RMC East	Statewide	Sec. 1
Pe and	Number of Wells	221	73	148	92315	
	Yield (gallons per minute)					VELICE I
	Minimum	0	0	0	0	
	Maximum	150	100	150	1200	
	Median	6	5	7	• 6	
	Mean	12	10	14	<b>1</b> 4	
		Test T			6 53	
	Depth (feet)			- All and		
	Maximum	705	575	705	1765	
-	Median	223	223	223	260	
	Mean	256	249	259	293	
			A TANK A REAL OF			