General Water Quality of Surficial Aquifers - Map 4

Map 4 shows the location of wells with water quality information. For the purpose of this atlas, specific conductance is used as a general indicator of water quality. Specific conductance is a measurement of the ability of water to conduct electrical current and is a general measure of the water's salinity, or the amount of dissolved solids in the water (salts and minerals). Low specific conductance indicates low dissolved solids concentration and would imply good quality water. Higher specific conductance values indicate greater amounts of dissolved solids. In general, the larger the specific conductance, the poorer the quality of water. It is important to understand, however, that specific conductance does not identify individual constituents dissolved in the water; it only indicates the relative abundance of dissolved solids. For example, it is possible for water contaminated with arsenic or lead to have relatively low specific conductance.

Map 4 shows specific conductance values grouped into four classes, blue (Class 1) and green (Class 2) are the best quality water, brown (Class 3) and red (Class 4) the poorest. Water in Class 1 could be used for public and private water supplies, Class 2 is marginally suitable for public and private water supplies but is acceptable for agricultural and stock supply. Most of the water sample points shown on the map came from wells completed in surficial aquifers. Surficial aquifers, as a whole, have very good quality water. This is especially true in western Montana. In the eastern part of the state there is more variability but water quality is, overall, good. Several factors influence the natural quality of ground water including the chemical composition of precipitation and snowmelt water that serves as recharge, chemical reactions occurring at the land surface and in the soil zone, and the mineral composition of sediments and rocks that comprise aquifers and confining beds (Heath, 1987). Another factor that strongly influences the natural water quality in surficial aquifers is their high hydraulic conductivity that allows water to flow relatively fast. As a result, the water does not remain in the surficial aquifers for extensive periods. This means that the water has less time to dissolve soluble salts and other minerals that are present in these aquifers. As a result, the concentration of dissolved solids remains relatively low and the water is "fresh."