Barbara Spring

AN UPDATE ON THE SURFICIAL WATER RESOURCES IN THE LOS ALAMOS AREA, NEW MEXICO

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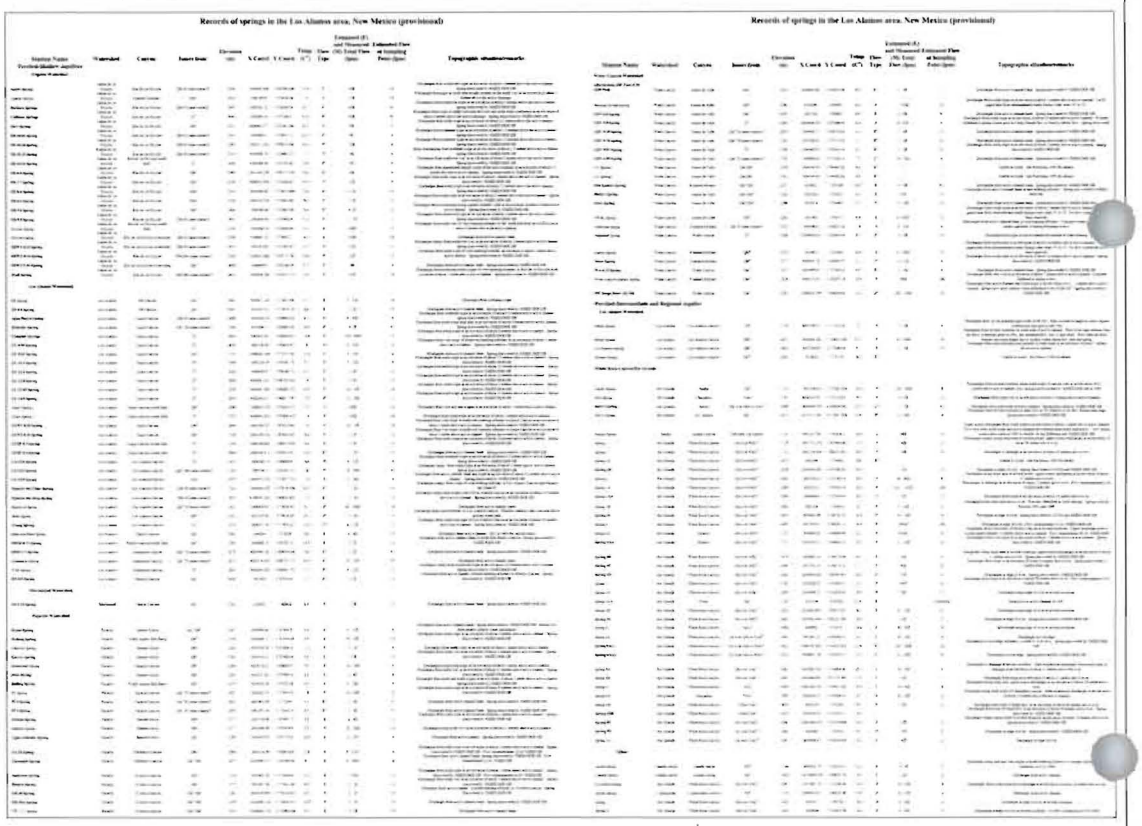
A more complete and accurate understanding of the hydrologic conditions in the Los Alamos area is critical to the management and protection of water. During the mid 1990's, New Mexico Environment Department's Department of Energy Oversight Bureau (the Bureau) recognized that there was not an adequate inventory and characterization of local springs and surface water returns in or the Los Alamos area. To fill the information gap, the Bureau identified surface water resources within the area extending from Guaje Canyon to Frijoles Canyon, an area of about 365 square kilometers. The Bureau fulfilled its objective by performing field reconnaissance activities during the period 1996 through 2000. The survey resulted in the discovery of 89 previously undocumented perennial and ephemeral springs. Perennial surface-water flow from both newly discovered and previously identified springs was documented and monitored during the study to determine changes in flow rates and stream conditions (e.g., length of flows) in response to wet and dry periods. The Bureau collected information and data on these water sources including digitally corrected location coordinates via GPS, measured and measured flow rates, geologic discharge rates, field parameters such as pH, specific conductance, and in some cases major and minor hydrochemical constituents, stable and radiogenic isotopes/tracers such as tritium and nitrate, and measured and the stable isotopes ^{18}O and ^{2}H. Springs in the study area discharge from shallow, intermediate and deep regional aquifers, composed of sedimentary and volcanic rock units. The shallow perched springs (permanent/ephemeral) occur as the various portions of the Pajarito Plateau and the Sierra de los Valles, and tend to be Na-Ca-HCO_3 and Ca-Mg-Na-HCO_3 type waters with total dissolved solids ranging from approximately 90 to 250 mg/L, depending on the amount or presence of iron-reduced constituents. Spring discharge from intermediate and regional-depth aquifers tend to be Ca-Na-HCO_3 and Na-Ca-HCO_3-type water and range from approximately 70 to 250 mg/L in total dissolved solids. Second-water spots vary within each aquifer, however, the combined 1-90 series waters tend to be shallower versus older waters occurring at greater depths. Estimated recharge to area of precipitation (elevation, as indicated by stable isotope data for the shallow perched and intermediate/regional springs range from about 2,100 to 2,900 m and 2,100 to 2,400 m, respectively. It is estimated that the combined flow of all identified permanently flowing shallow perched springs supply 1,125-4 cubic meters per year of discharge, while the intermediate and regional springs release about 1,940-4 cubic meters per year.



Records of springs in the Los Alamos area, New Mexico (provisional)

Station Name Perched-shallow aquifer (Upper 50 meters)	Watershed	Canyon	Issues from	Elevation (m)	X Coord	Y Coord	Temp (°C)	Flow Type	Estimated (E) and Measured (M) Total Flow (lpm)	Estimated Flow at Sampling Point (lpm)	Topographic situation/remarks
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Los Alamos Watershed											
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Pajarito Watershed											
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Water Canyon Watershed											
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Los Alamos Watershed											
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Pajarito Intermediate and Regional aquifer											
Los Alamos Watershed											
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pajarito Watershed											
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Other											
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