Mapping Buried River Channels Searching For Gold Deposits

HydroGEOHYDRO, Inc. provides a full range of subsurface mineral detection and geological mapping services for the exploration and mining communities. We have decades of experience applying our method to surveying for gold, and other precious metals, for local scale projects totaling tens of acres and regional scale projects covering several sections of land. HGI has a number of geophysical tools which can be deployed to identify and map river gold deposits which include electrical resistivity, electromagnetics, magnetics, and induced polarization.

**Electrical Resistivity**

The Electrical Resistivity method forces electricity through the ground and measures the resistance of subsurface rock and sediments. Our instruments observe a range of contrasting resistances relating to the type of rock or sediment and their depositional environments. This information allows us to accurately target subsurface areas of interest, such as old river channels, known as paleo-channels, where concentrated gold may be located. The illustration above shows results from a two-dimensional (2D) cross-section of mapped superficial soil resistance across a river valley. There was no existence of buried river channels from the surface, but the data show several targets associated with old river channels that can then be confirmed through drilling and sampling.

**Magnetic & Electromagnetic Mapping**

Geophysical grade instruments are extremely sensitive and can be deployed in rugged terrain, and are equally at home in deserts or arctic areas. Data is collected without the instrument having to make contact with the ground, which makes this method fast and cost-effective. Magnetic instruments are sensitive to buried ferrous metals and remnant magnetic fields contained within all rocks. Electromagnetic tools can detect changes in rock and soil properties such as metal content (ferrous and non-ferrous), soil resistance, and conductivity. These technologies are highly effective at mapping buried river channels because these features tend to concentrate metals, gravels/robbles, and have increased soil moisture.

Results of a magnetic survey in support of a gold exploration project to map the locations of paleo channels for placer deposits.

High resolution electromagnetic survey, the cooler colors indicate conductive clayey and/or water deposits and the warmer colors indicate sandy/gravel and/or drier deposits. The survey results revealed a hidden subsurface paleo-channel, where sampling and mining operations could be focused.

**Geophysical Operations Cart - “G.O. Cart”**

HGI has improved survey efficiency and accuracy by integrating both tools on an ATV towed geophysical trailer called the G.O. Cart. The platform is engineered to handle rugged terrain and is constructed of nonmetallic materials which do not interfere with metal mapping surveys. Instruments are coupled with GPS navigation and operated by a single person allowing rapid coverage over very large areas. Survey results can often be examined at the project site and can be used to focus Electrical Resistivity surveys or to direct drilling and sampling efforts.