

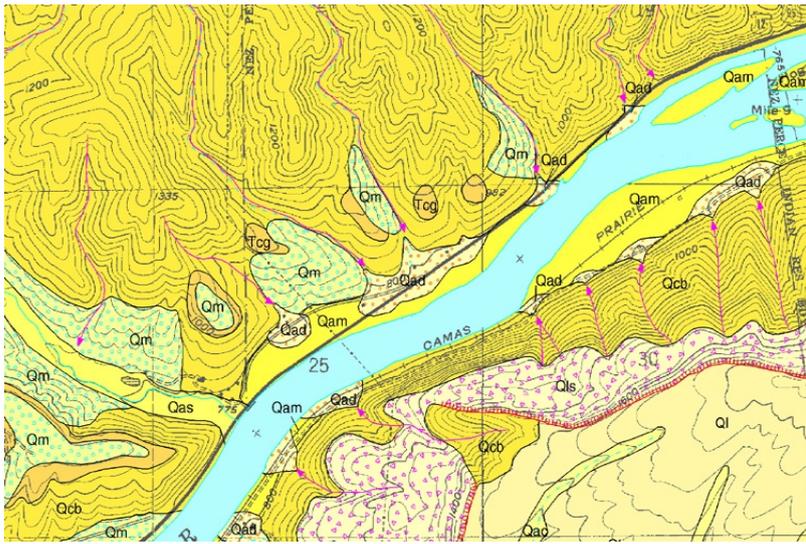
SURFICIAL GEOLOGIC MAPS HELP COUNTIES UNDERSTAND GEOLOGIC HAZARDS IN IDAHO

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Problem:

The Idaho Geological Survey's long-term geologic mapping plan is designed to serve the natural-resource base and the growing population of Idaho. However, utilization of geologic mapping by counties and cities has lagged even as maps have become available. During the 1990s, this underutilization began to change as more counties and cities began to use geographic information system (GIS) databases for their planning and decision making. Since 1999, the Idaho Geological Survey has coordinated new surficial geologic mapping with development of a geologic hazards component of a county's newly implemented GIS. The Idaho Geological Survey cooperated with the commissioners and planning department of Nez Perce County (Figure 1) to identify critical planning issues and priority areas. Because of recurrent landslides, the county came to understand the utility of basic geologic mapping to planning, zoning, and permitting.

Figure 1. Index map of Idaho showing Nez Perce County and location of surficial geologic maps.



The Geologic Map:

Figure 2 is a surficial geologic map in the western part of Nez Perce County near the city of Lewiston, which is located in northern Idaho near the boundary between the Columbia Plateau and the Northern Rocky Mountains. The selected area of the surficial geologic map is representative of the physiography and geology over many miles along the Clearwater River and U.S. Highway 12 corridor. The valley of Clearwater River shown in Figure 2 is steep-sided and large landslides are common. The surficial geologic map shows units and symbols that characterize geomorphic processes and their potential as geologic hazards.

Figure 2. Portion of surficial geologic map used for deriving geotechnical terrain units in Figure 2. Map units and symbols: *Qcb*, colluvium from basalt; *Qls*, landslide deposits and headwalls; *Qad*, alluvial-fan and debris-flow deposits; *Qam*, mainstream alluvium; *Qas*, side-stream alluvium; *Qac*, alluvium and colluvium of drainage ways; *Ql*, loess-mantled basalt; *Tcg*, Clearwater Gravel; *Qm*, Lake Missoula Floods backwater deposits; *red arrows*, debris-flow chutes; and *hachures*, landslide headwall scarps.

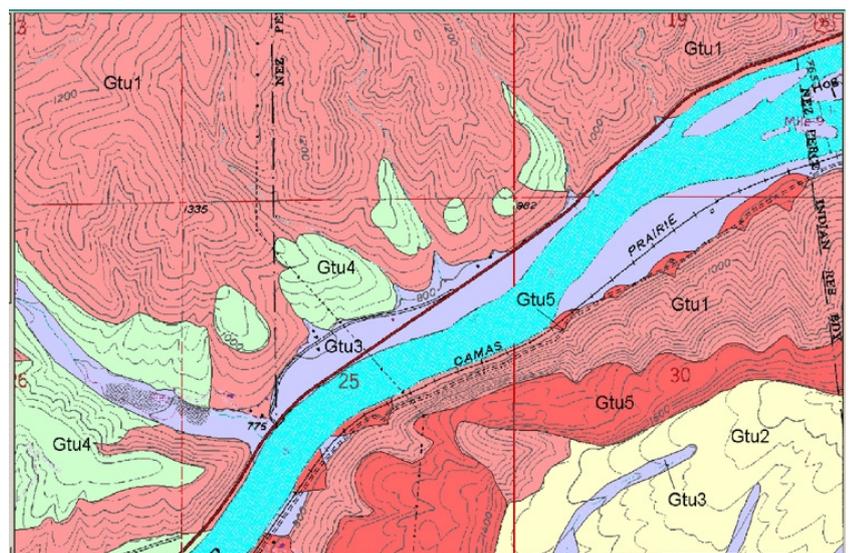
Using the Geologic Map:

This example illustrates the application of geologic mapping to the county's need to delineate geologic-hazard areas that require site-specific geotechnical studies. The surficial geologic map is vital information, however, county decision makers are unable to directly translate the geologic units to practical engineering categories. The county's geotechnical contractor interpreted the engineering properties and material characteristics of the geologic units into "geotechnical terrain units" for the county (Figure 3). Each geotechnical terrain unit (GTU) includes a description of its capabilities for the following categories: Slope, ground water, erosion, soils, earthwork, roadways, foundations, septic systems, and site-specific study.

Conclusion:

Surficial geologic maps are an important foundation for county planning, zoning, and permitting. The successful collaboration between the IGS and Nez Perce County is serving as a model for increased utilization of geologic mapping elsewhere in Idaho.

Figure 3. GTU map derived from surficial geologic map in Figure 2. GTU1, slopes of the Clearwater River (*Qcb* and debris-flow chutes). GTU2, loess (*Ql*). GTU3, flood plains and valley bottoms (*Qam*, *Qas* and *Qac*). GTU4, gravels (*Tcg* and *Qm*). GTU5, landslides, (*Qls*, *Qad*, and landslide headwall scarps).



¹Othberg, K.L., R.M. Breckenridge, and D.W. Weisz, 2003, Surficial geologic map of the Lewiston Orchards North quadrangle and part of the Clarkston quadrangle, Nez Perce County, Idaho: Idaho Geological Survey Digital Web Map 8, scale 1:24,000.