

GEOCHEMICAL MAPPING IN THE UNITED STATES; METHODS, RESULTS, AND IMPLICATIONS

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The USGS has completed a series of topical geochemical studies across the United States ranging widely in geologic setting, sampling philosophy, sampling density, and scale in order to establish geologic (pre-mining, pre-industry, pre-agriculture, and pre-urbanization) solid-phase concentrations, focusing particularly on the chemical elements in the periodic table that are potentially harmful to human health. Issues addressed by these studies range from baseline and background values for chemical elements with known environmental impacts, to guiding mineral exploration activities. Coupled with adjunct data (for example, water chemistry, agricultural chemical use, population statistics and trends, industrial mineral consumption trends), the nature and magnitude of environmental impacts of identified mineral resources on the environment can be evaluated. Methods, results, and implications of a suite of geochemical studies are presented and include: 1) a comparative study of South Carolina's Coastal Plain Province by use of 550 soil and 520 stream-sediment samples, 2) a study of the geochemical landscape of the Municipality of Tallahassee, Florida and vicinity by use of 600 soil and 30 stream sediment samples, 3) a regional study of the southern United States using of 8,250 stream sediment and 2,149 soil samples, and 4) an example of the success of regional geochemical data in predicting important concentrations of industrial minerals.