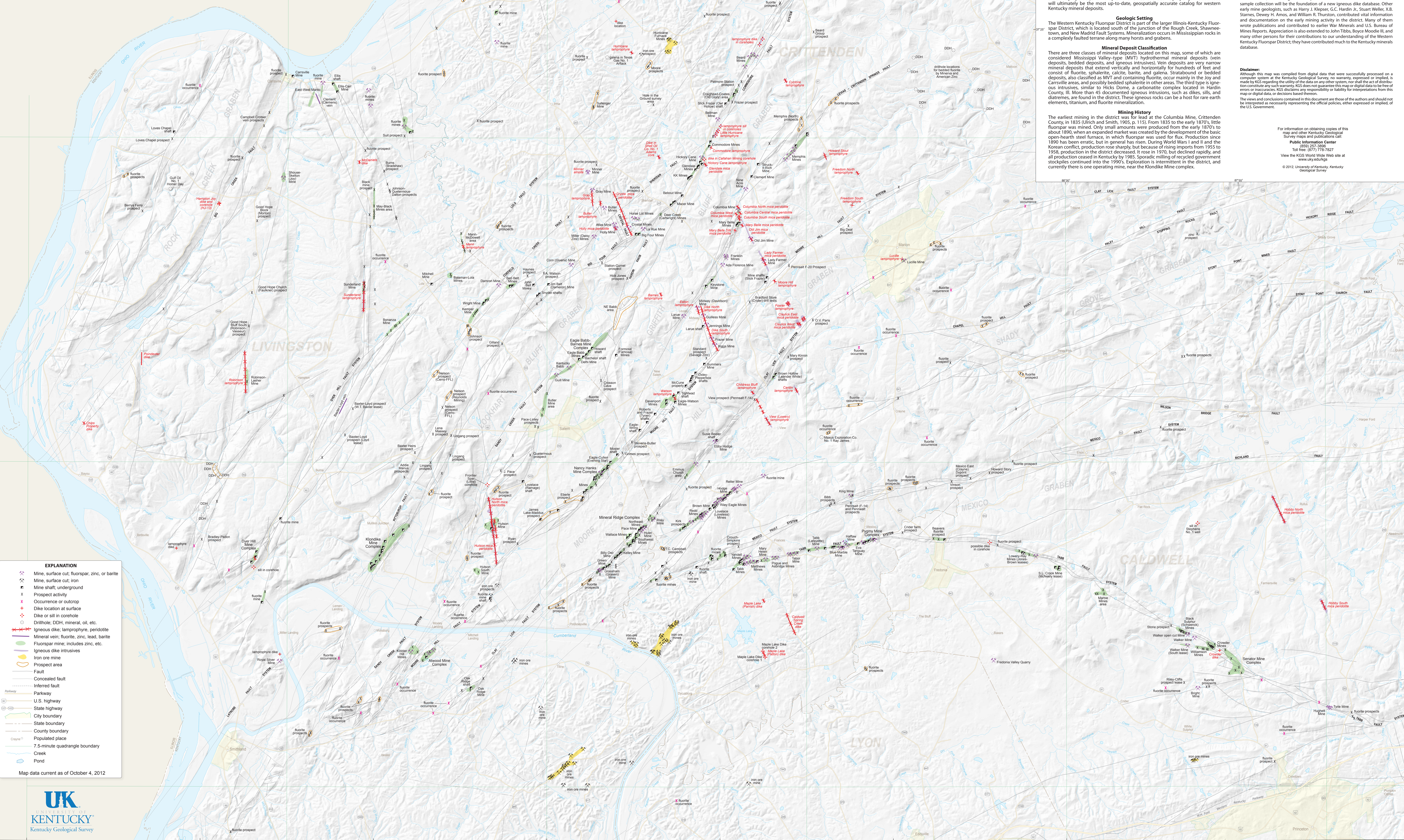
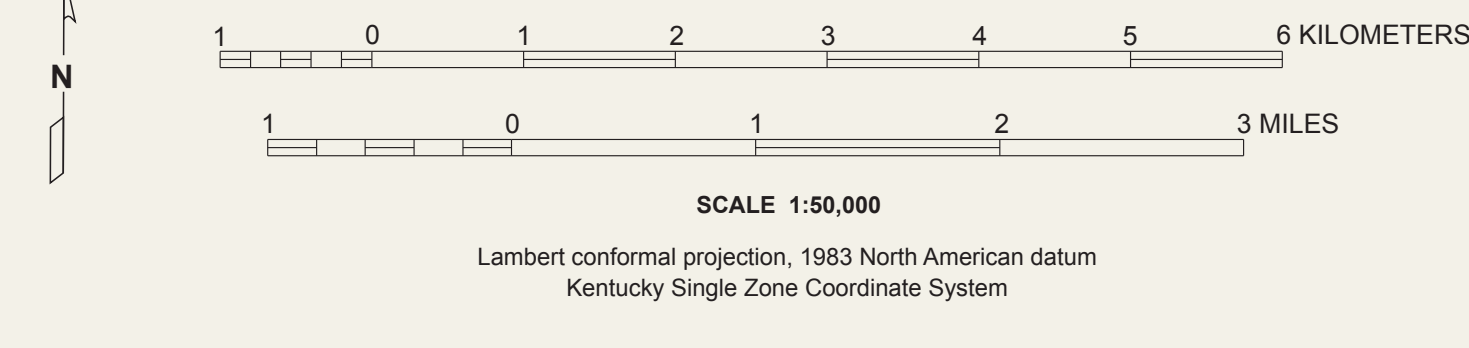
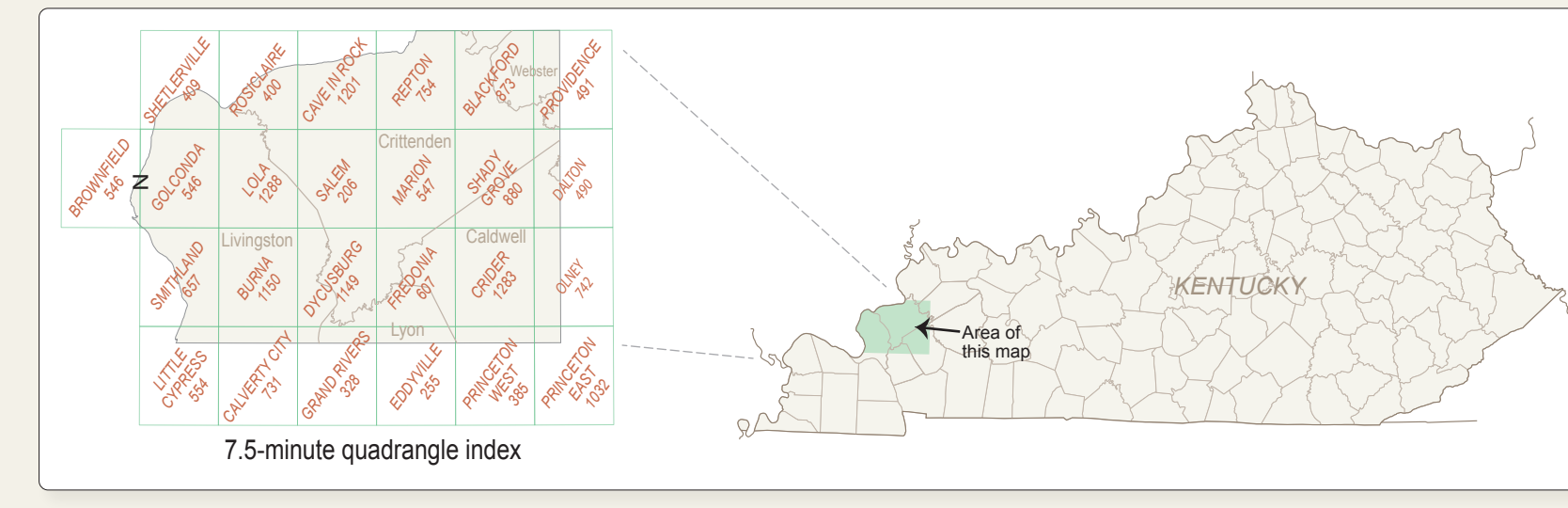


Mines and Minerals of the Western Kentucky Fluorspar District

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MAP AND CHART 201 Series XII, 2012



EXPLANATION

- Mine, surface cut; fluorspar, zinc, or barite
- Mine, surface cut; iron
- Mine shaft; underground
- Prospect activity
- Occurrence or outcrop
- Dike location at surface
- Dike or sill in corehole
- Drillhole; DDH; mineral, oil, etc.
- Igneous dike; lamprophyre, peridotite
- Mineral vein; fluorspar, zinc, lead, barite
- Fluorspar mine; includes zinc, etc.
- Igneous dike intrusives
- Iron ore mine
- Prospect area
- Fault
- Concealed fault
- Inferred fault
- Parkway
- U.S. highway
- State highway
- City boundary
- State boundary
- County boundary
- Populated place
- 7.5-minute quadrangle boundary
- Creek
- Pond

Map data current as of October 4, 2012

Introduction and Purpose
This map shows all the known and identified mines, mineral prospects, and igneous intrusions (dikes or sills) in the Western Kentucky Fluorspar District, compiled from thousands of maps and files, creating an up-to-date, comprehensive catalog for the district. The district has been extensively mined for more than 120 years and was once the largest producer of fluorspar (fluorite) in the United States. Millions of tons of vein ore minerals (fluorite, zinc, lead, and barite) have been produced from these mines, and substantial reserves still remain. New mining and exploration activity has renewed interest in the district, and the industry will benefit from the use of this new map. Historic iron ore mines are also included because of their immediate proximity to this mapped area.

Procedure
The map was compiled from numerous sources, including the U.S. Geological Survey-Kentucky Geological Survey Geologic Mapping Program (1960-78), Strategic and Critical Minerals Program (1983), Continuous United States Mineral Assessment Program (CUMAP; 1987-92), KGS Digital Geologic Mapping Program (1996-2005), and numerous KGS mineral resource investigations (1838-present). Some data were from KGS research, and others were collected and donated from mining geologists, field mappers, mining companies, federal and state geologists, and exploration consultants. Much of the data were in the form of surface and underground mine maps, property maps, field notes, drill logs, cross sections, summary reports, and reserve studies.

Database
This map will also be an introduction to a new database of mines and mineral information, which will soon be available through the Kentucky Geological Survey Web site. This new GIS database provides immediate online access to detailed information about the mines on this map. Some of the larger mines have abundant data, but others have limited information or just a reference to a publication or report. This database also includes information about the igneous dikes in the district, which are important for the exploration of ore deposits and other geologic studies. New analytical data on the dikes and their associated rare earth elements will be added to the database in the near future. Some of the problems with this map and database are: identical mine names for different properties, various spellings of mine names on the same properties, and multiple mine names for the same property. This database will ultimately be the most up-to-date, geospatially accurate catalog for western Kentucky mineral deposits.

Geologic Setting
The Western Kentucky Fluorspar District is part of the larger Illinois-Kentucky Fluorspar District, which is located south of the junction of the Rough Creek, Shawnee, and New Madrid Fault Systems. Mineralization occurs in Mississippian rocks in a complexly faulted terrane along many horsts and grabens.

Mineral Deposit Classification
There are three classes of mineral deposits located on this map, some of which are considered Mississippi Valley-type (MVT) hydrothermal mineral deposits (vein deposits, bedded deposits, and igneous intrusives). Vein deposits are very narrow mineral deposits that extend vertically and horizontally for hundreds of feet and consist of fluorite, sphalerite, calcite, barite, and galena. Stratabound or bedded deposits, also classified as MVT and containing fluorite, occur mainly in the Joy and Carville areas, and possibly bedded sphalerite in other areas. The third type is igneous intrusives, similar to Hicks Dome, a carbonate complex located in Hardin County. More than 45 documented igneous intrusions, such as dikes, sills, and dykes, are found in the district. These igneous rocks can be a host for rare earth elements, titanium, and fluorite mineralization.

Mining History
The earliest mining in the district was for lead at the Columbia Mine, Crittenden County, in 1838 (Ulrich and Smith, 1905, p. 115). From 1835 to the early 1870s, little fluorspar was mined. Only small amounts were produced from the early 1870s to about 1890 when an expanded market was created by the development of the basic open-hearth steel furnace, in which fluorspar was used for flux. Production since 1890 has been erratic, but in general has risen. During World Wars I and II and the Korean conflict, production rose sharply, but because of rising imports from 1955 to 1958, production in the district decreased. It rose in 1970, but declined rapidly, and all production ceased in Kentucky by 1985. Sporadic milling of recycled government stockpiles continued into the 1990s. Exploration is intermittent in the district, and currently there is one operating mine, near the Klondike Mine complex.

References Cited
Anderson, W.H., Trace, R.D., and McGrain, P., 1982, Barite deposits of Kentucky: Kentucky Geological Survey, ser. 11, Bulletin 1, 56 p.
Trace, R.D., and Amos, D.H., 1984, Stratigraphy and structure of the Western Kentucky Fluorspar District: U.S. Geological Survey Professional Paper 1151-D, 41 p.
Ulrich, E.O., and Smith, W.S.T., 1905, Lead, zinc, and fluorspar deposits of western Kentucky: U.S. Geological Survey Professional Paper 36, 218 p.

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