

MINING AND ASSOCIATED SUBSIDENCE IN ST. LOUIS AND ST. LOUIS COUNTY, MO

INTRODUCTION

Saint Louis County and City are home to a multitude of quarries and mines. The products of these clay, coal, and limestone mines literally built St. Louis from the ground up. The St. Louis Limestone formation was quarried for foundations, concrete/paving, macadam, dimension stone, and building stone^[11, 14, 4]. Clay was mined for brickmaking (firebrick, common brick, etc.), tile, sewer pipes, chinaware, crockery ware/terracotta, and paints^[14, 5, 7, 18]. The mined coal was used for energy and heat.

FORMATION OF LIMESTONE, COAL, AND CLAY

The limestone that was mined in St. Louis City was from the St. Louis Limestone formation^[14, 7]. This rock is older than the coal and clay and was deposited during the Mississippian period (~354-323 million years ago) when a shallow inland sea covered the land^[7, 23]. The St. Louis Limestone is 100-250 feet thick^[10] and it is found at a depth of 3-120 feet below the ground surface^[14, 7].

The coal formed in the swampy conditions of the Pennsylvanian period (~320-299 million years ago) after the sea receded; vegetation decomposed and became coal after burial and consolidation^[7]. The clay formed around the same time and in the same environment, where organic acids leached metals from the clay, making it harder and more resistant to heat; this heat-resistant clay was dubbed “fireclay”^[25, 7]. The clay varies in thickness from 1 to 12 feet but can be as thick as 15 feet^[7] and was typically mined at a depth of 60-120 feet below the ground surface^[3]. The coal was found only locally, often above the fireclay and was 2-6 feet thick^[7].



FIGURE 1 WORKERS STANDING ALONGSIDE CLAY CARTS IN ONE OF THE HIGHLANDS FIRECLAY COMPANY'S TUNNELS UNDER THE OLD FOREST PARK HIGHLANDS IN 1908. Photo by Sam Leone. From: <https://bit.ly/2Wwn4ZA>

HISTORY OF MINES AND QUARRIES IN ST. LOUIS

The earliest surface and underground mines opened in 1820 in the present-day Tower Grove South area where the Russell family found coal deposits on their land^[24]. In 1855, they also began to mine clay^[24]. Both the clay and coal mines ceased operating around 1887 when the coal ran out and the family's land was sold to make way for the construction in Tower Grove South^[25, 24].

The Hill, Northampton, and Southampton underground mines opened in the 1840s and 50s^[12]. By 1900, there were more than five miles of underground mine tunnels in the area^[12]. Mining in these areas ceased around 1952^[12]. Dogtown also was defined by underground clay mining from 1860 to the 1930s^[18, 17]. There were over 25 underground clay and coal mines in the Dogtown area alone, with 95 mines total in the county and city^[8]. Figure 1 is an image of miners in an underground clay mine. With the onset of the Great Depression, mining died out within the neighborhoods of Dogtown and was replaced by blue-collar factory work^[18]. All coal and clay mine locations can be seen in Figure 2.

The earliest documented limestone mining began in 1839^[14]. The number of quarries within St. Louis City and County peaked in the 1880s when there were 69 active limestone quarries^[14]. By 1902, only 37 quarries were operating within the city limits^[4]. Many quarries were filled in and built upon in either the early 1900s^[4] or after World War II during the “post-war housing crunch”^[19, 22]. Some were left to fill with water and became junk piles or landfills^[2, 13, 1, 9] while a few were turned into parks^[21, 22]. There were also a few underground limestone mines created. All limestone quarry and underground mine locations can be seen in Figure 2.

SUBSIDENCE CONCERNS

Because of the deteriorative effect of groundwater on the fireclay pillars and mine floors, surface subsidence can result from these underground mines, and can occur at any time. Common mine subsidence features are surface depressions (or sags) or sinkholes (pits), cracks in a building's foundation and walls (often in brittle brick masonry), and concrete floors.

Additionally, fill placed in abandoned quarry pits was likely uncontrolled and of various depths. This means that the fill was likely not up to building code standards and is compressible. This creates difficult foundation conditions for construction and causes building settlement and damage (as noted locally in St. Louis city^[19, 20, 22]).

CURRENT MINING WITHIN ST. LOUIS CITY AND COUNTY

There are no active coal mines in St. Louis City or County today^[6], nor are there any active clay mines in St. Louis City or County^[15]. There are four mining permits covering seven active limestone quarries in St. Louis County today, but there are no active quarries within the city limits^[16].

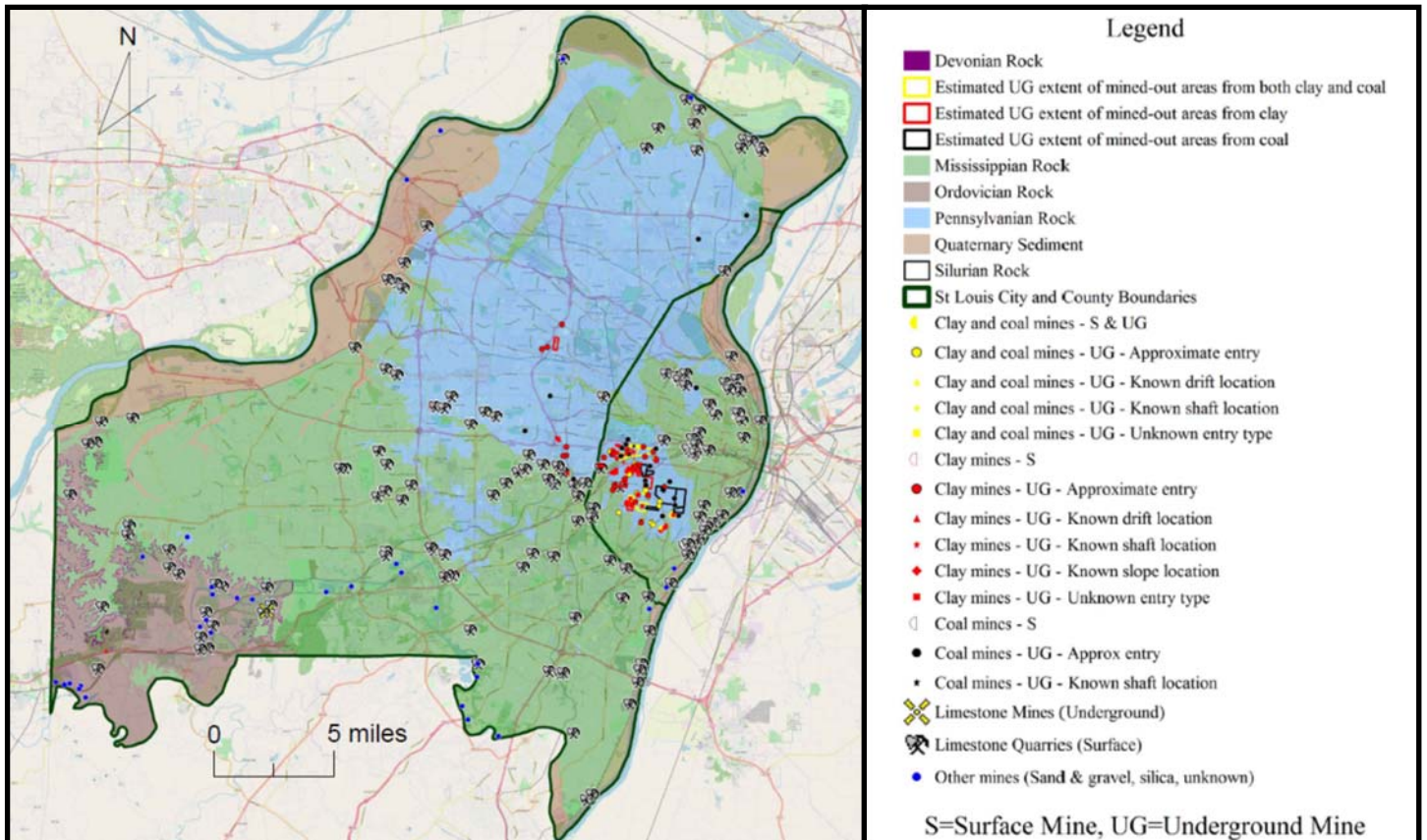


FIGURE 2 LOCATIONS OF MINES AND QUARRIES IN ST. LOUIS CITY AND COUNTY. (SEE MAP REFERENCES)

DISCLAIMER FOR FIGURE 2: Information came from the Missouri DNR GeoSTRAT page (2018) , a map by K.G. Larsen (1956), and a map by M. Garstang (1987) titled "Underground Coal and Clay mines in the City of St. Louis, Missouri" which is available for purchase from the Division of Geology and Land Survey at Rolla. Mine data is only as accurate as the information or data from which they were compiled. No warranty, expressed or implied, is made by MEA as to the accuracy of the data and related materials.

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Other MEA Publications that may be of Interest:

- [UPDATE #14: Establishing Mine Subsidence Risk](#)
- [UPDATE #41: Earthquake Hazards in the Midwest](#)

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FOR MORE INFORMATION: There is a significant amount of additional information that is available on the above subject. For more information, please contact MEA at the address listed below.

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