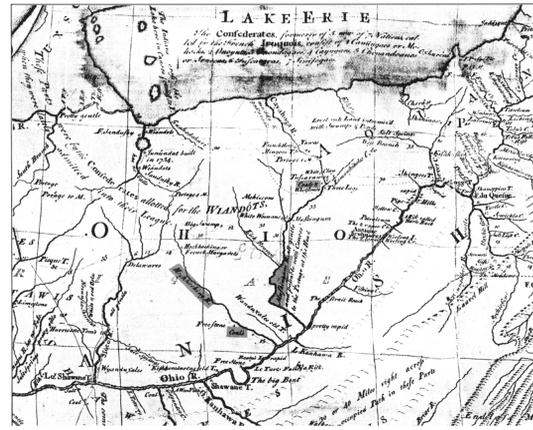


Coal Mining in Ohio, Then and Now

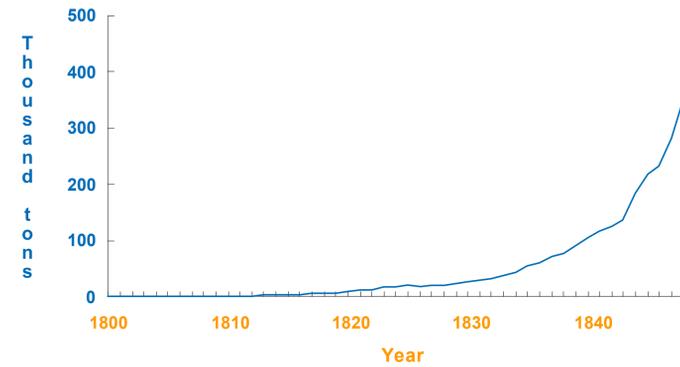


Doug Crowell
Ohio Department of Natural Resources
Division of Geological Survey



A portion of Lewis Evans' map,
"Middle British Colonies in America," 1755

Coal Production 1800 - 1849



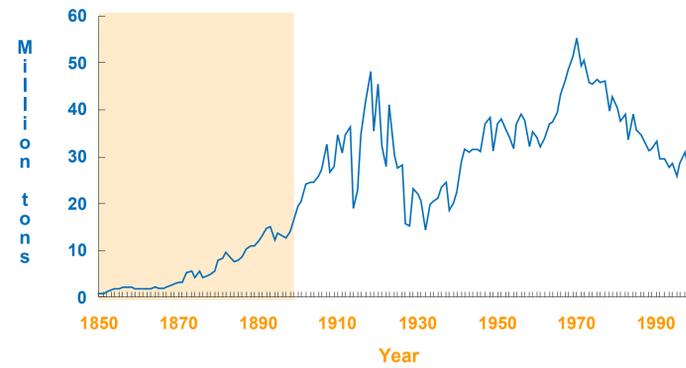
Highlights of Ohio Coal History 1800 - 1849

- 1748 - 1st report of coal in Ohio - at Bolivar (Tuscarawas County)
- 1755 - "Map of the Middle British Colonies in America" published by Lewis Evans
- 1800 - 1st report of coal production
- 1825-1848 - canal construction period
- 1827 - 1st load of coal shipped by canal boat (*State of Ohio*)



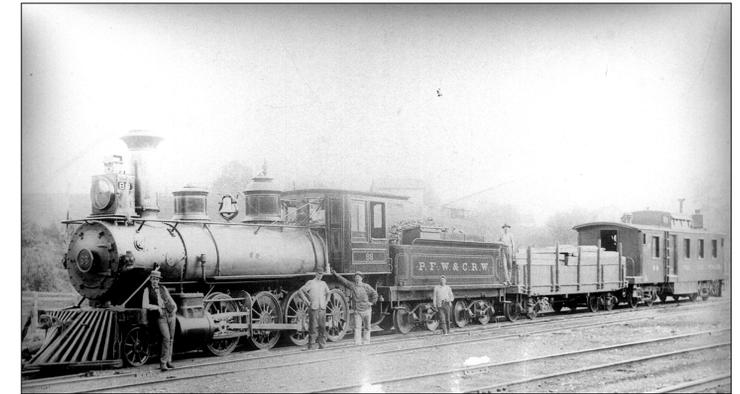
The canal boat *E. Moore* taking on a load of coal at Trenton (Tuscarawas County) - circa 1889

Coal Production 1850 - 1899

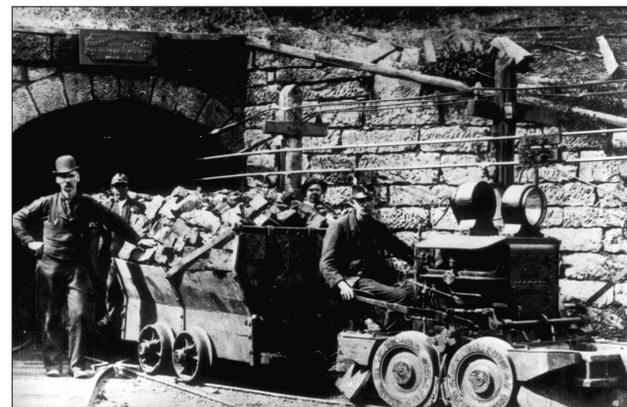


Highlights of Ohio Coal History 1850 - 1899

- 1850-1880 - explosion of railroad construction and a growing need for coal-fired steam locomotion
- 1873 - 1st statewide mine safety law is passed
- Late 1870s - 1st mechanized underground-mining equipment is developed
- 1883 - 1st coal-fired electric power plant is constructed - Tiffin Edison Electric Illuminating Company at Tiffin (Seneca County)
- 1888 - 1st electric locomotive is used to haul coal at the Ironpoint mine near Shawnee (Perry County)
- 1890 - formation of the United Mine Workers of America at Columbus
- 1898 - record number of underground mines - 1,113



The 2-8-0 steam locomotive, the workhorse of U.S. railroads from 1866 to well into the 20th century

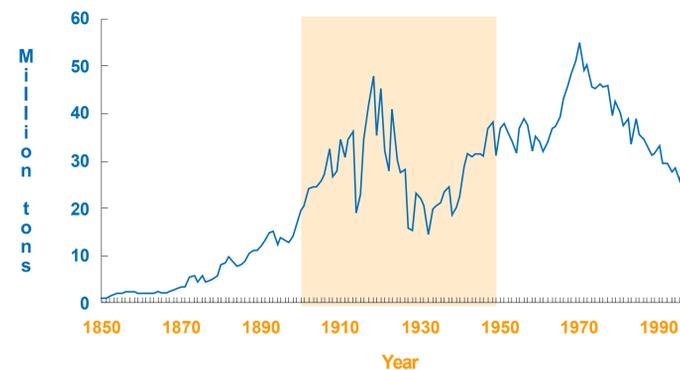


Electric locomotive at Ironpoint mine near Shawnee (Perry County) - circa 1888



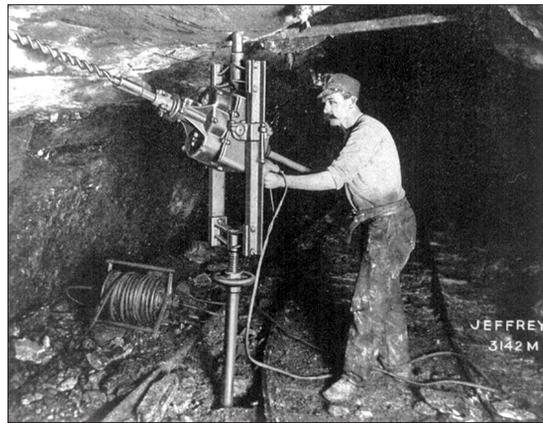
Canal boat family transporting coal near Navarre (Stark County) - circa 1896

Coal Production 1900 - 1949



Highlights of Ohio Coal History 1900 - 1949

- 1900-1920 - mine capacity steadily grows to meet increasing demand, especially during World War I
- 1908 - record employment - 50,267 miners
- 1920-1933 - mine capacity exceeds demand - 700 mines are idled
- 1930 - Millfield mine disaster (Athens County) - 82 miners died
- Late 1930s - vigorous tourism trade based on underground mine fires near New Straitsville (Perry County)
- 1939-1945 - mine capacity grows to meet increasing demand for growing war economy during World War II
- 1940 - Willow Grove mine disaster near St. Clairsville (Belmont County) - 72 miners died; U.S. electric utilities consume 49 million tons of coal
- 1948 - surface mining becomes the dominant method of producing coal and electric utilities surpass the railroad industry as the largest consumer of coal in the United States

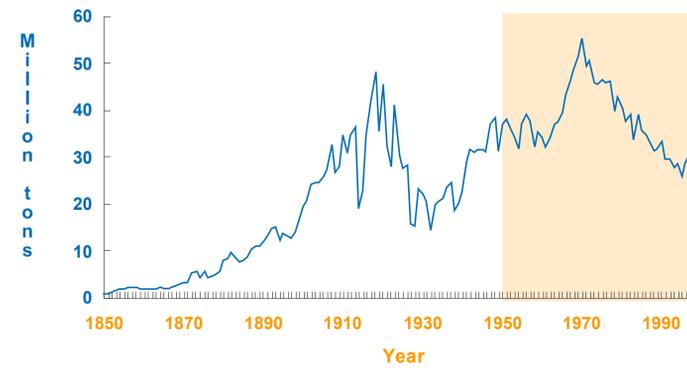


Coal miner using an electric rotary drill - circa 1909



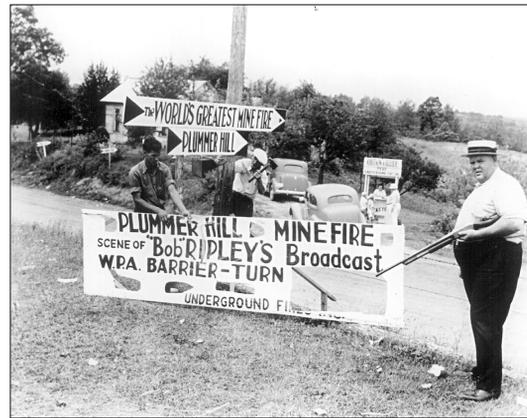
News of the disaster at the No. 6 mine of the Sunday Creek Coal Co. in 1930 at Millfield (Athens County)

Coal Production 1950 - 2000



Highlights of Ohio Coal History 1950 - 2000

- 1940-1960 - two decades of giant power shovels & introduction of automated underground mining equipment
- 1956 - introduction of longwall mining machines; *Mountaineer* is built
- 1969 - *Big Muskie* is built; passage of Coal Mine Health and Safety Act
- 1970 - Ohio record production - 55 million tons; passage of Clean Air Act
- 1971 - U.S. EPA enacts New Source Performance Standards for SO₂ emissions
- 1973-1974 - Arab oil embargo; longwall mining stimulated by introduction of shield supports in 1974
- 1977 - passage of Surface Mining Control and Reclamation Act
- 1990 - passage of Clean Air Act Amendments
- 1993 - Climate Change Action Plan is developed to achieve stabilization of greenhouse gases

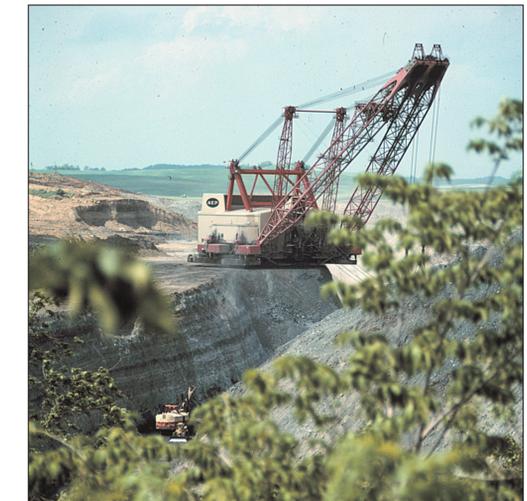


Howard Essex (right) guarding vandalized tour sign near New Straitsville (Perry County) - circa 1938

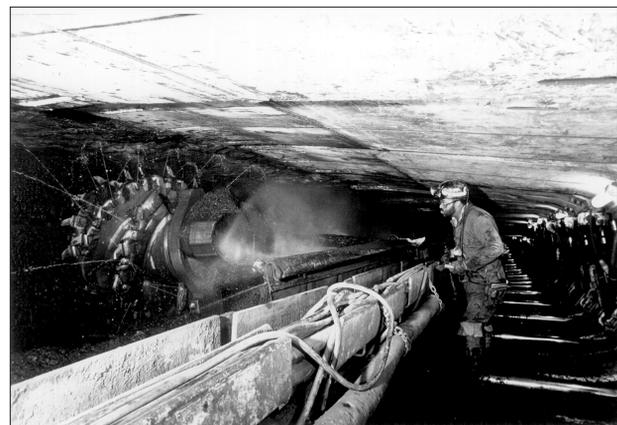
A B & O Railroad EM-1 2-8-8-4 locomotive pulling 97 coal cars loaded with 8,700 tons of coal near Bannock (Belmont County) - circa 1957



The power shovel *Mountaineer* next to a coal-fired steam locomotive - circa 1956

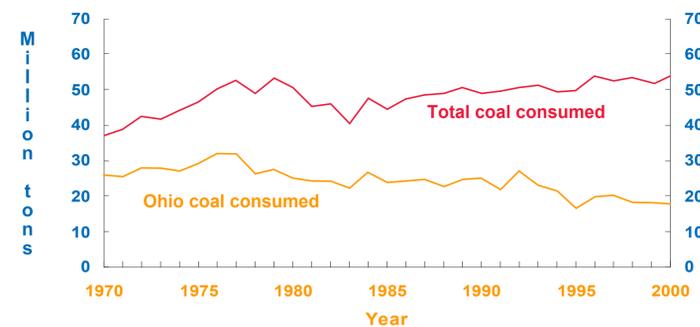


The *Big Muskie*, a Bucyrus-Erie 4250-W dragline operated by Central Ohio Coal Co. from 1969 to 1999:
 weight - 13,500 tons
 height - 222 feet
 boom - 310 feet long
 bucket capacity - 220 yd³ (325 tons)
 cost - \$24 million



Longwall mining machine at Southern Ohio Coal Company's Meigs No. 31 mine - circa 1990

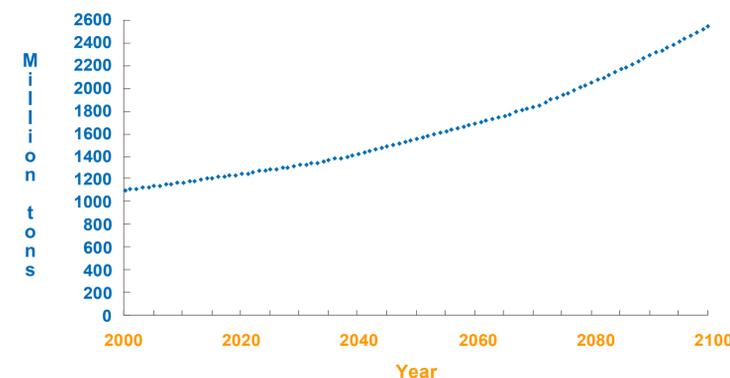
Coal Consumed by Ohio Utilities



Coal consumption by U.S. electric power plants:

| | |
|--------------------------|--------------------------|
| 1940: 49.0 million tons | 1980: 569.2 million tons |
| 1950: 88.2 million tons | 1990: 773.5 million tons |
| 1960: 173.8 million tons | 2000: 857.6 million tons |
| 1970: 318.9 million tons | |

Projected U.S. Coal Production 2000 - 2100



U.S. Coal Highlights 2000 - 2100

- 1999-2010 - electric demand is projected to increase at an annual rate of 1-1.5%
- 2000 - phase II (Title IV) of Clean Air Act Amendments of 1990 went into effect
- 2001 - first Ohio CO₂ Reduction, Capture & Sequestration Forum
- 2015 - projected demonstration of 21st Century Energy (zero emissions) Power Plant - technologies include: flexible-fuel gasification, fuel cells, pressurized-fluidized-bed combustors, high-efficiency gas turbines, integrated combined-cycle systems, and carbon sequestration
- 2020 - projected retirement of 41% of existing nuclear electric-generation capacity
- 2035-2070 - projected depletion of remaining recoverable domestic natural gas supply - projected annual coal-production growth of 0.85% - commercialization of flexible-fuel, zero-emission power plants
- 2070-2100 - projected annual coal-production growth of 1.1%