Coal Mining History of New Mexico

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From bizjournals.com

Historical Importance

- Coal has been a major economic resource all over the world for centuries
  - Heat, energy, and fuel
  - Primary force behind industrialization
  - Cheap, reliable resource used in steam engines, furnaces, and power plants
- In New Mexico, coal stimulated economic development
  - Sold to surrounding states and inner communities since the civil war
  - Major source of income until it was overtaken by natural gas and oil

AT&SF 2926 is a steam engine that ran over one million miles before retirement. Recently restored in Albuquerque, New Mexico, she now runs proudly once again. From NM Steam Locomotive & Railroad Historical Society.

Coal in New Mexico

- New Mexico has had a rich coal mining history
  - sub-bituminous to bituminous grade
- Coal is formed from plant material that was deposited millions of years ago in swampy environments, before being buried and compressed by heat and pressure over time to become carbon rich bedded layers
- New Mexico's coal beds all formed during the Cretaceous period
  - ranging in age form 66-140 mya with some beds in the Raton field forming in the Paleocene 56 mya

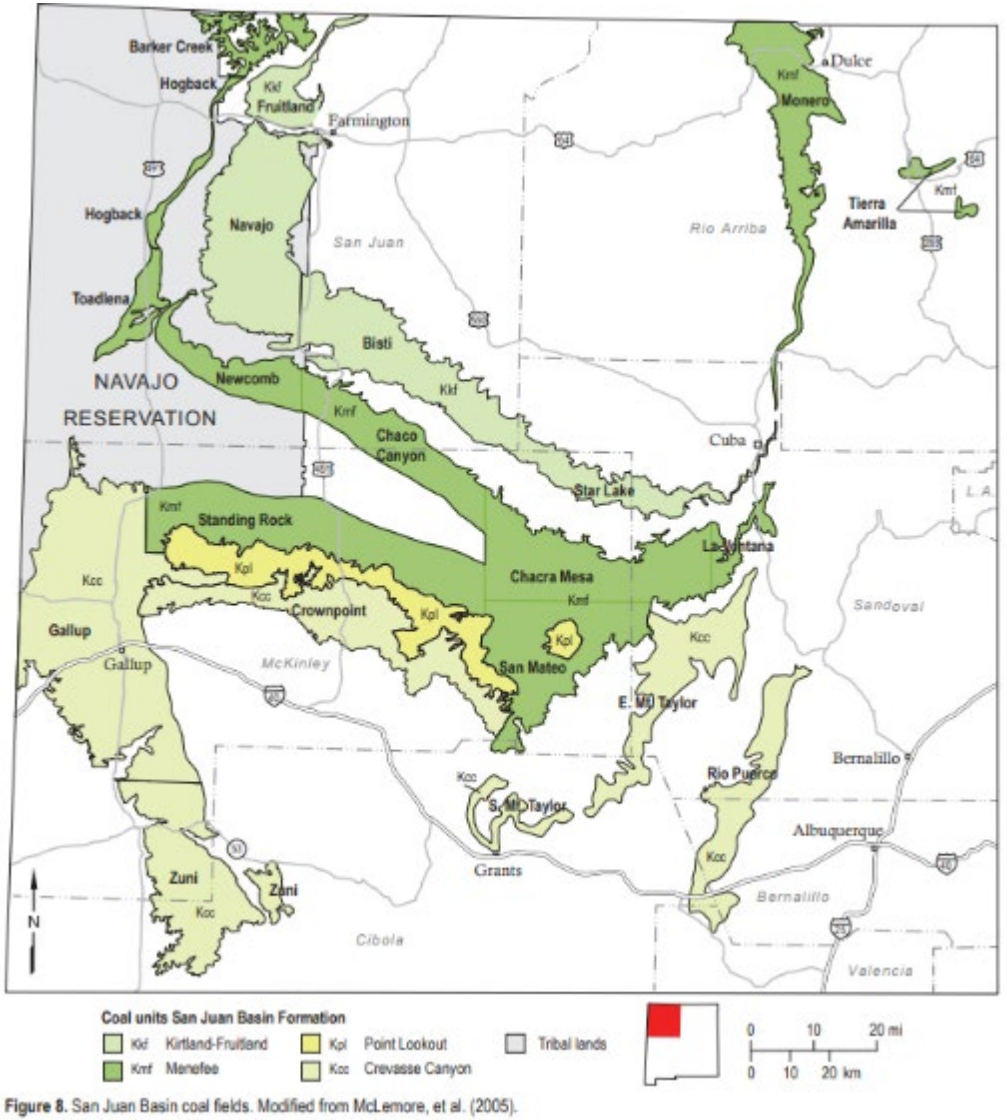


Figure 8. San Juan Basin coal fields. Modified from McLemore, et al. (2005).

From Hoffman, 2017 From NMBGMR

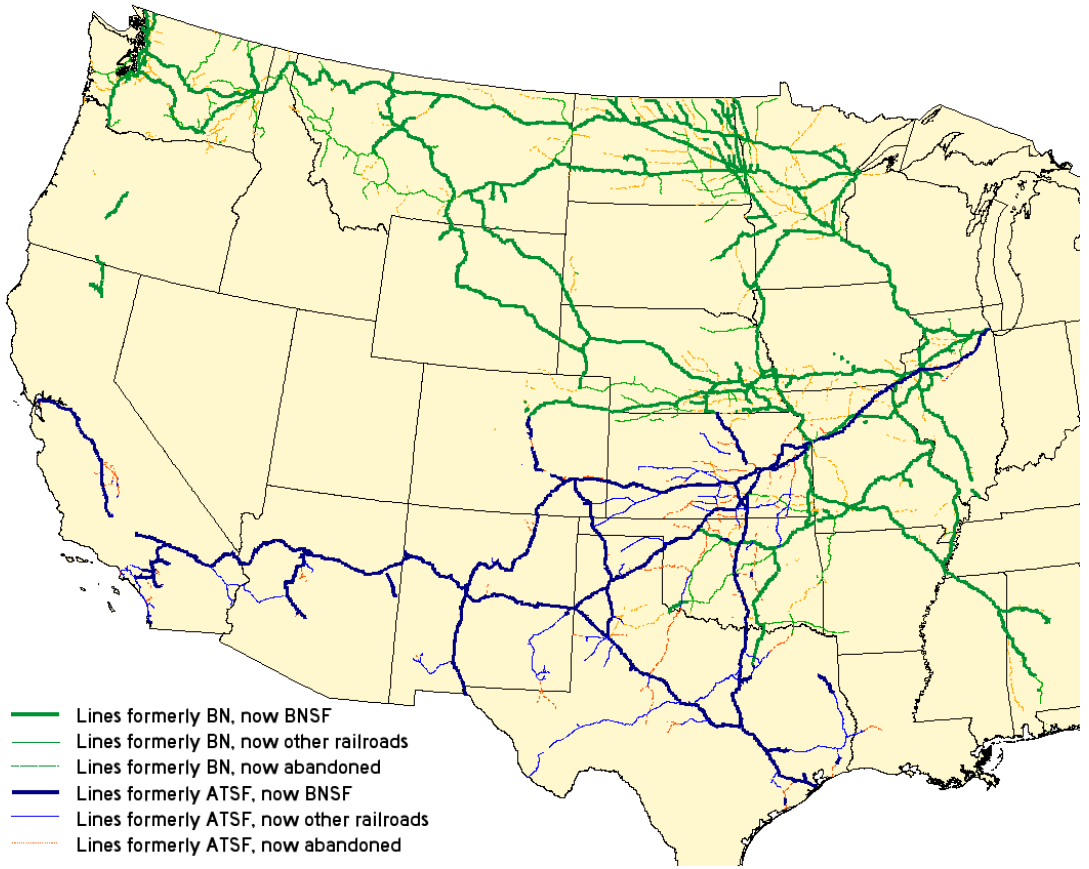
The Beginnings: Cerillos and Carthage Coal Fields

San Antonio coke ovens. From NMBGMR photo archive.

- Coal mined by the Spanish in 1600s to heat homes
- Coal mined around 1835 in Cerillos
- The Carthage coal mine was the first major coal mine in NM
  - Developed in 1862 by the government to supply Fort Craig during the American Civil War
  - Later worked by Santa Fe Railroad in the 1870's as coal and coke source
  - Also known as San Pedro coal field
- Other companies (e.g. Carthage Coal Co.) started appearing late 1800s to early 1900s
- Production decreased at beginning of the Great Depression as coal demand fell while oil and natural gas industries grew
  - All mines in the district closed by 1981
  - 2.2 million short tons mined from Carthage field

The Atchison, Topeka & Santa Fe Railway

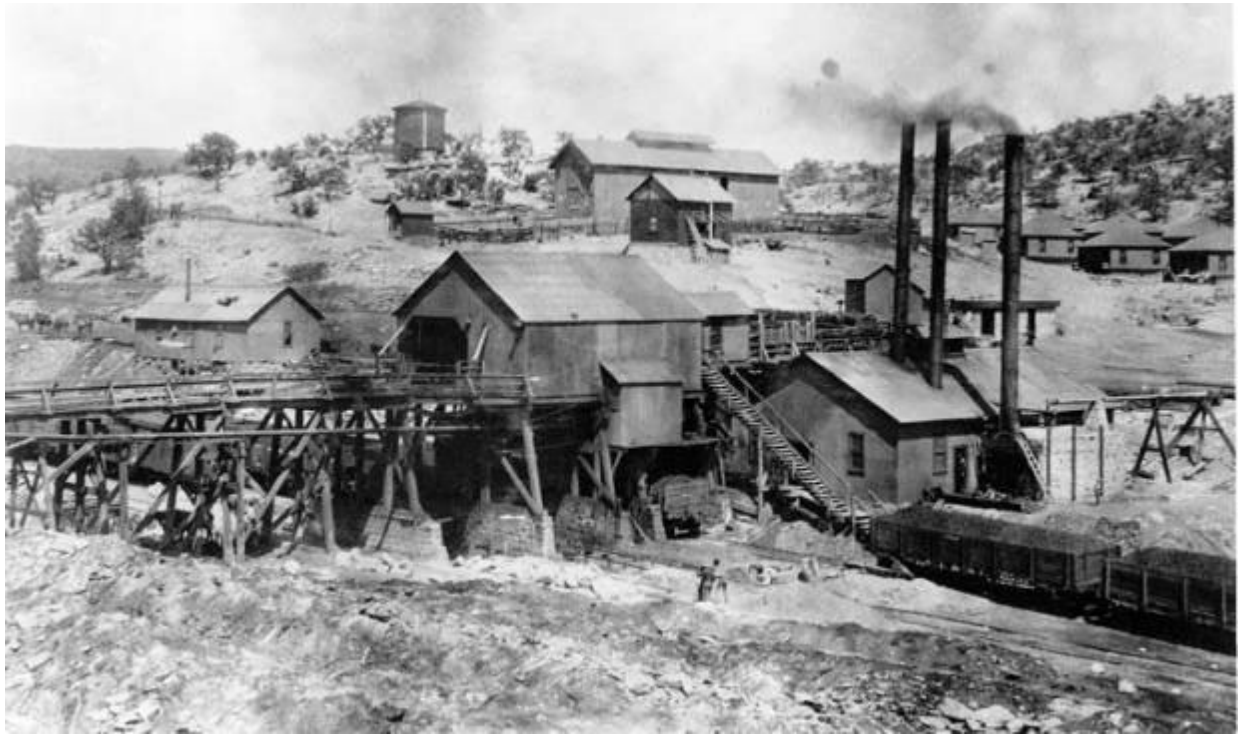
- The Atchison, Topeka & Santa Fe Railway has played a significant role in the coal history of New Mexico
- AT&SF responsible for the early development of many of the coal fields to fuel its operations
  - Coal was a major factor in bringing commercial and industrial development to the state
- In the 1870s-80s, AT&SF sent out surveyors all over state to stake coal resources
  - Carthage (San Pedro) coal field
  - First tracks in NM would be laid in November, 1878
- San Pedro Coal & Coke Co. in Carthage established July, 1881
  - A subsidiary of AT&SF to provide coal and coke for the rails and local smelters
- AT&SF expands to Gallup in 1880s, developing its rich coal fields
- Dominant cargo rail line in New Mexico until merger with Burlington Northern Railroad to become BNSF (Burlington Northern and Santa Fe Railway) at the end of 1996



From BNSF

The San Juan Basin Coal Fields

- The San Juan Basin is New Mexico's largest coal basin in NM
  - Separated into many sub-fields, including Gallup coal field, which was important for its large resource of high quality coal (4-5 ft thick)
  - Upper Cretaceous Fruitland, Crevasse Canyon, and Menefee Formations
- Atlantic Pacific Railroad would be the first in the area before being acquired by Santa Fe Rail
- First mines would open in early 1880s with over 30,000 short tons of coal being mined in 1882
  - Production tripled by 1885
- Numerous other coal companies formed, e.g. Gallup Coal Company, Aztec Coal, Black Diamond Coal, etc.



Weaver Coal mine, Gallup, NM. From NMBGMR photo archive.

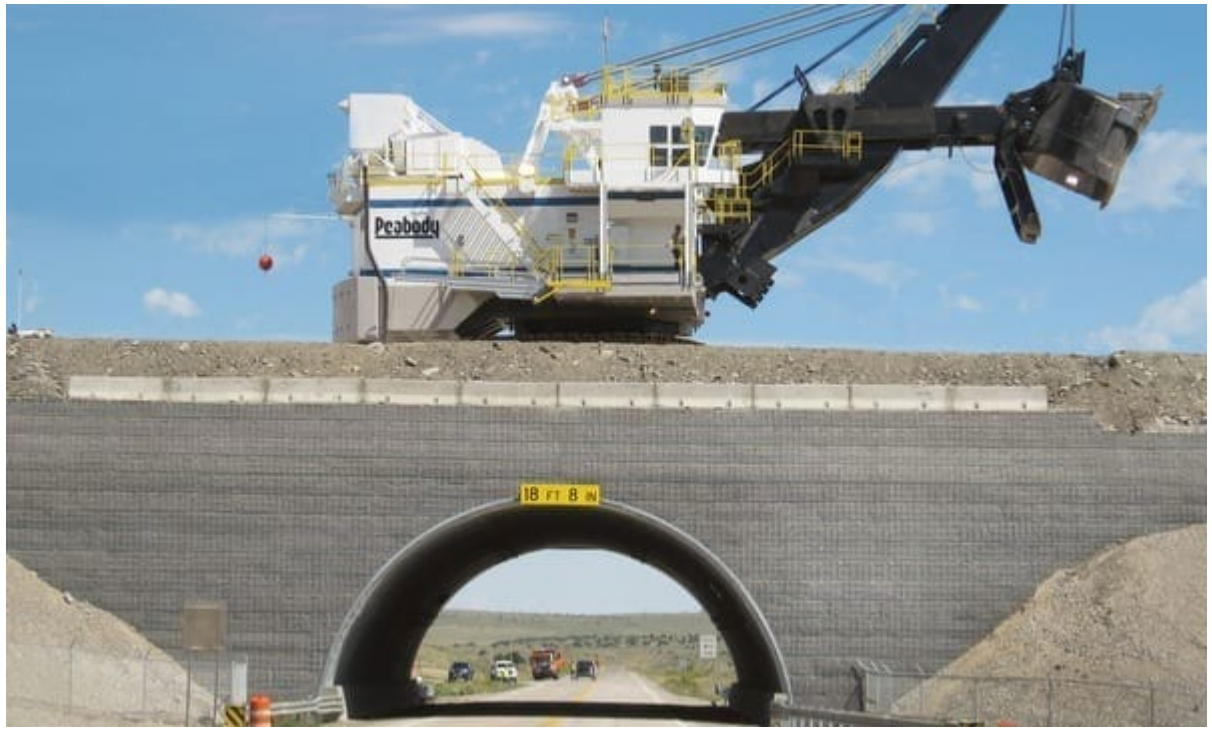
The San Juan Basin Coal Fields

- When the Great Depression began, many mines were forced to shut down as market prices plummeted
  - Some larger mines like Navajo mines (est. 1906) were able to remain open because of lower production costs
- Up to World War II, mines would open up all over the country as demand skyrocketed
  - Growing industry to fuel the war effort
  - Many small mines would open up in the basin
  - After the war, most would shut down as demand fell, leaving only larger mines

Surface mining at the Navajo Mine ca. 1978. From NMBGMR photo archive.

The San Juan Basin Coal Fields

- Larger mines began to shut down as natural gas began to take the place of coal in power plants
  - steam engines were replaced by diesel engines
- The only active coal mines in NM are the Navajo and El Segundo/Lee Ranch Mines
  - El Segundo/Lee Ranch mine (Peabody Energy), 2-3 years of reserves (3.8 million tons produced annually)
  - Navajo mine (NTEC), expected to produce through 2031 (4.7 million tons produced annually)



Power shovel moving across NM 509 at the El Segundo/Lee Ranch mine. From ailmining.com.

The Raton Coal Field

- The Raton Coal Field stretches from north-central New Mexico into southeast Colorado
  - Made up of the Upper Cretaceous Vermejo and Upper Cretaceous-Paleocene Raton Formations
- Development began in the 1880s to fuel the railroads that ran between Colorado and New Mexico
  - Also used in smelting and coke furnaces all over NM, even shipped to other states
- About 105 million short tons of coal produced overall from the 1880s through the 2000s
- The mines in the Raton Coal Field historically had trouble with methane buildup
  - Methane is now used as natural gas resource,
  - First well opened in the 90s and produces over 100 billion cubic ft. of gas per year

Van Houten Mine, NM. From NMBGMR photo archive.

Humate Mining in New Mexico

- Weathered coal, develops high levels of humic acids
  - Used as a soil amendment and can help remediate certain pollutants
- Currently mined by two companies near Cuba, NM in the San Juan Basin Coal Field
- Humates are a partially developed industrial minerals market with potential to expand

Top: Exposure of humate in the San Juan basin near Cuba, NM
Bottom: Humate mine near Cuba, NM.
Virginia T. McLemore photos.

Industry: Rails, Metals, and Power

- Early coal mined in NM used for railroads
- Coal used to produce coke in ovens
  - Coke is used to smelt ores and can be used to heat homes
- Four Corners Generating Station was the first coal powerplant in NM, opened 1963
  - Two other stations would follow and provide up to 1/3 of the state's electrical power as well as neighboring states until closure starting in 2013
- Most coal plants in NM are shutting down, decreasing demand for coal
  - Coal is still used in metal manufacture as a additive and is used in small amounts in medicines, cements, synthetic fuels, and other low usage purposes

Top: Billing Smelter near Socorro ca. 1880s. From NMBGMR photo archive.
Bottom: Four Corners Generating Stations. From Farmington Daily Times.

Economic Impact

- NM coal was popular as it was generally cheaper than the average national coal price
  - Smaller mines closed from the 60s through the 2000s, though demand was met by the larger mines
  - For 2021, the state revenues from NM coal was approximately $12 million
- Coal mines provided economic stimulus to surrounding communities
  - Not just for mines, but for building the infrastructure and support buildings needed for the mines
  - In 2021, the total estimated employment by coal mines was about 837 people, not including support personnel.
- Beginning in the late 19th century, it was common for entire towns to be built to provide support and infrastructure for local mines (company towns)
  - Many towns are abandoned now, some still thrive despite mine closure and rely on other means to be economically strong

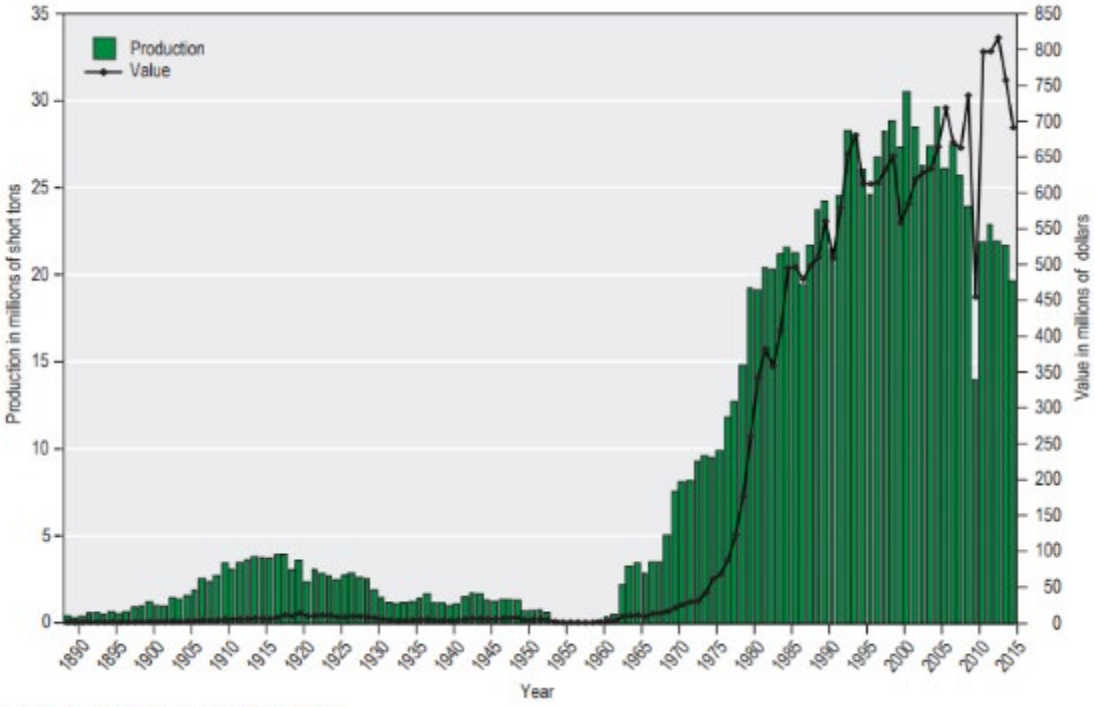


Figure 4. Coal production and value 1899–2015.

From Hoffman, 2017

Future Outlook

- Currently, no new coal mines are being developed in NM
  - Increase in renewable energy demand and outcry against potential environmental impacts of coal mines and coal-fired power plants
- Currently, the DOE has contracted universities in several states to look at coal and related strata for potential rare earth element (REE) and critical mineral resources in coal fields
- To date, New Mexico coals have shown low levels of critical minerals and REE
  - Some related strata have shown more promise like the beach placer (heavy mineral) sandstones in the San Juan Basin

Beach placer sandstone at Sanostee, NM. Evan Owen photo.

Acknowledgements

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- Current research is funded through a DOE grant Carbon ore, rare earth, and CM (CORE-CM) assessment of San Juan-Raton Basins Coal Basin, New Mexico, DE-FE0032051.

Questions?

Resources

- Carthage coal field
- https://nmgs.nmt.edu/publications/guidebooks/downloads/60/60_p0407_p0414.pdf
- Coal mining history nm
- http://agmc.info/uploads/education/new_mexico/New_Mexico_Mining_History.pdf
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- Gallup coal mines
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- Santa Fe 2926
- https://2926.us/#/
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- 100 years of coal mining in san juan basin
- https://geoinfo.nmt.edu/publications/monographs/bulletins/downloads/111/B111.pdf
- Economic impact of coal mining nm
- https://www.osti.gov/servlets/purl/1110771/