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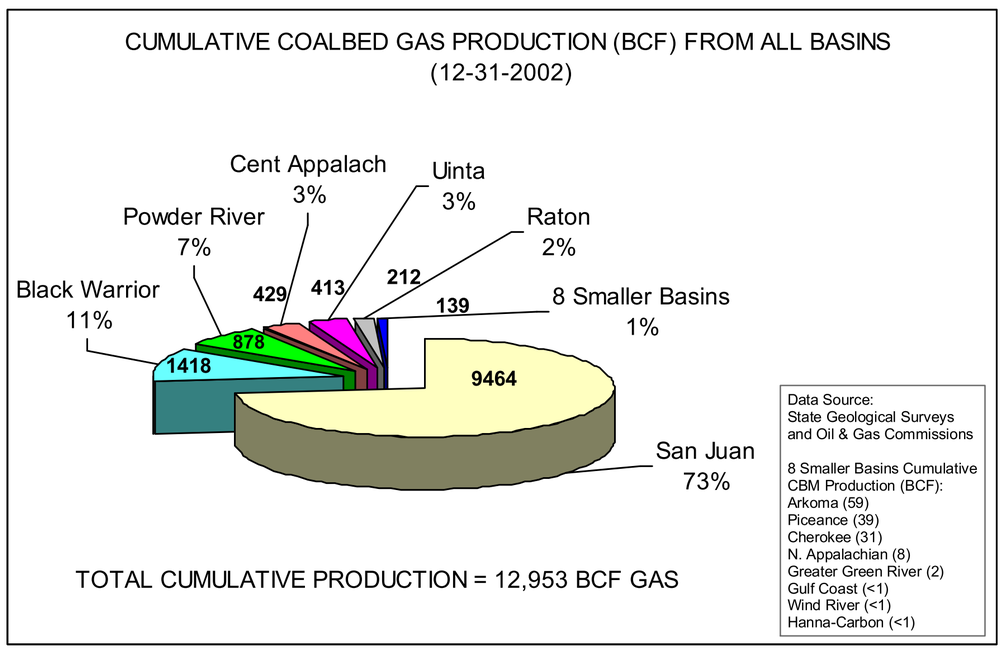
Energy Information Administration

Coalbed Methane In The US: Panel 2 of 2

THE PAST: COALBED GAS PRODUCTION



Annual coalbed methane gas volume data through 12/31/2002 was obtained from 14 state oil & gas regulatory entities or geological surveys. Produced CBM gas volumes from each state were classified by basin. The sum of all reported CBM gas volumes per basin through 2002 is shown as the cumulative production pie chart to the left.

CBM production volumes over time for all basins are shown graphed to the right (upper) . The most obvious trends are (1) the dominance of the San Juan Basin since the late 1980's, beginning a decline in 1999; and (2) the rapid increase for the Powder River Basin from the late 1990's.

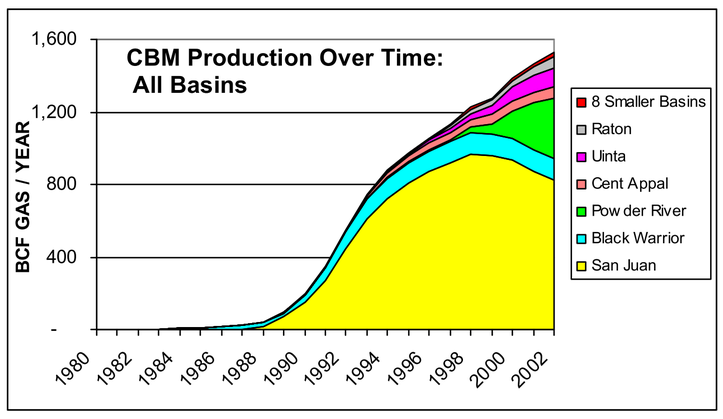
The CBM basins are subdivided into three tiers based on 2002 annual production volumes, shown as graphs to the right and below. Note the vertical scale change between the three figures.

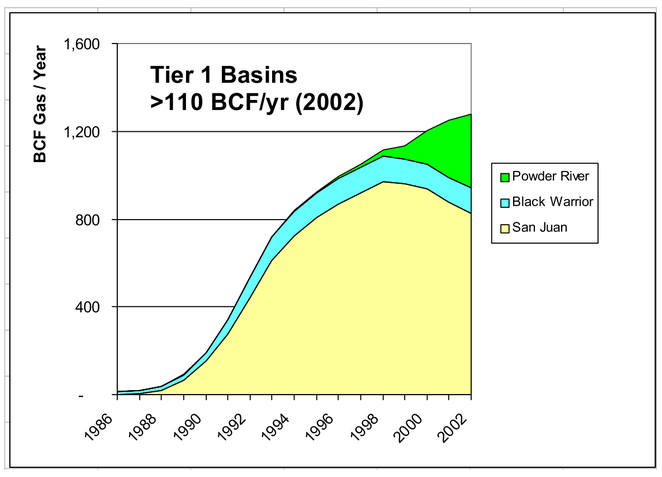
Tier 1 (>110 BCF/year) includes the San Juan and Powder River Basins plus the Black Warrior (steady at ~115 BCF/year).

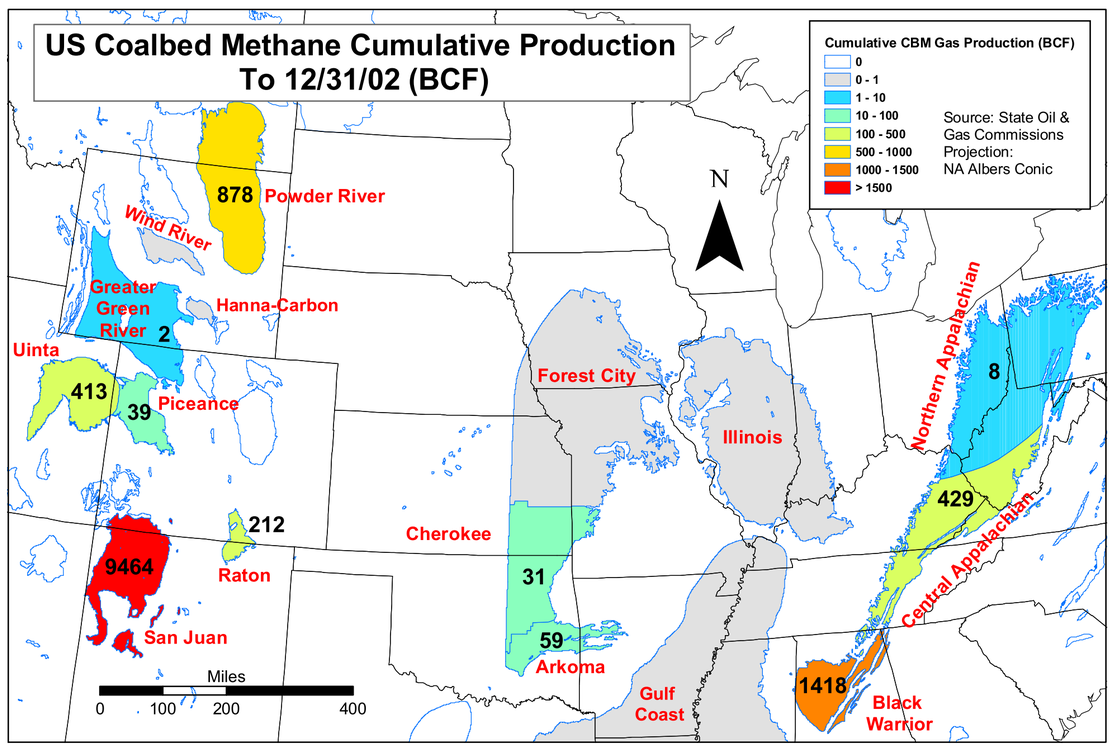
Tier 2 (60-105 BCF/year) is comprised of three basins with significant production additions since 1992-1995: Raton, Uinta and Central Appalachian Basins.

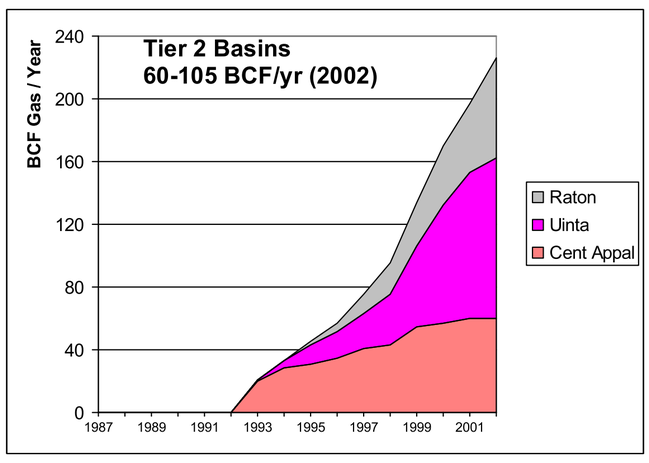
The graph for tier 3 (1 - 12 BCF/year) looks more spiky than the other two because the vertical scale is more stretched out. This graph contrasts growing production in the Arkoma and Cherokee Basins with declines in the Piceance Basin.

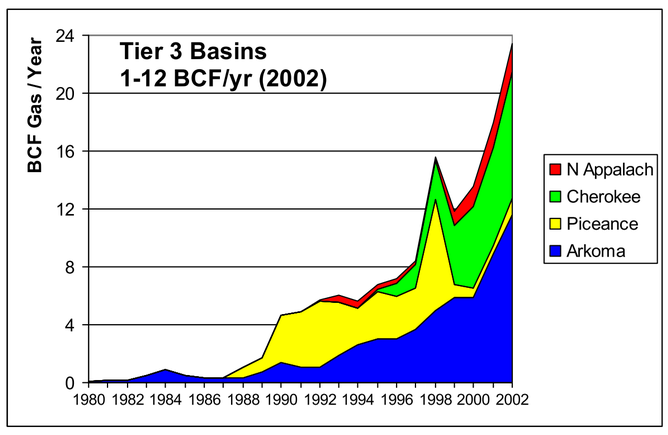
To visualize the relative cumulative production volumes per basin in map view, a chloropleth map (left) was made.



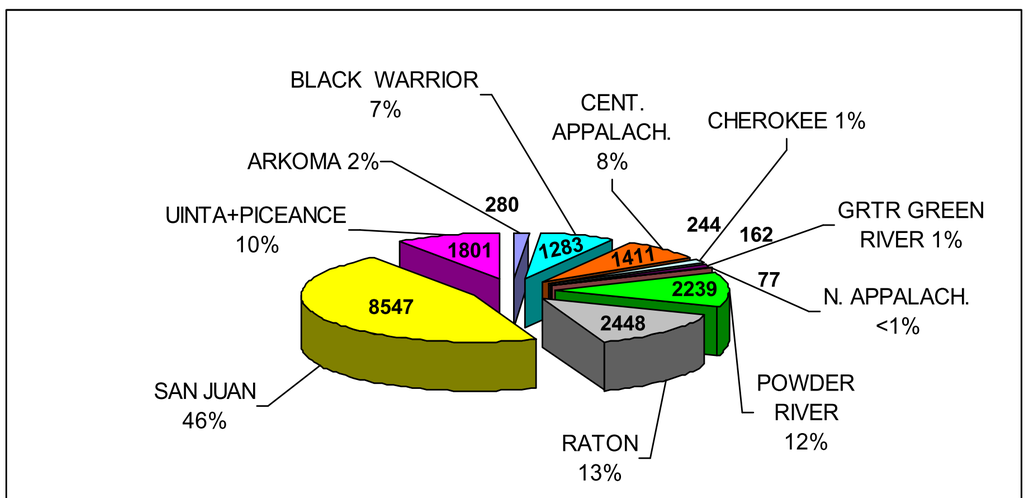








THE PRESENT: COALBED GAS PROVED RESERVES

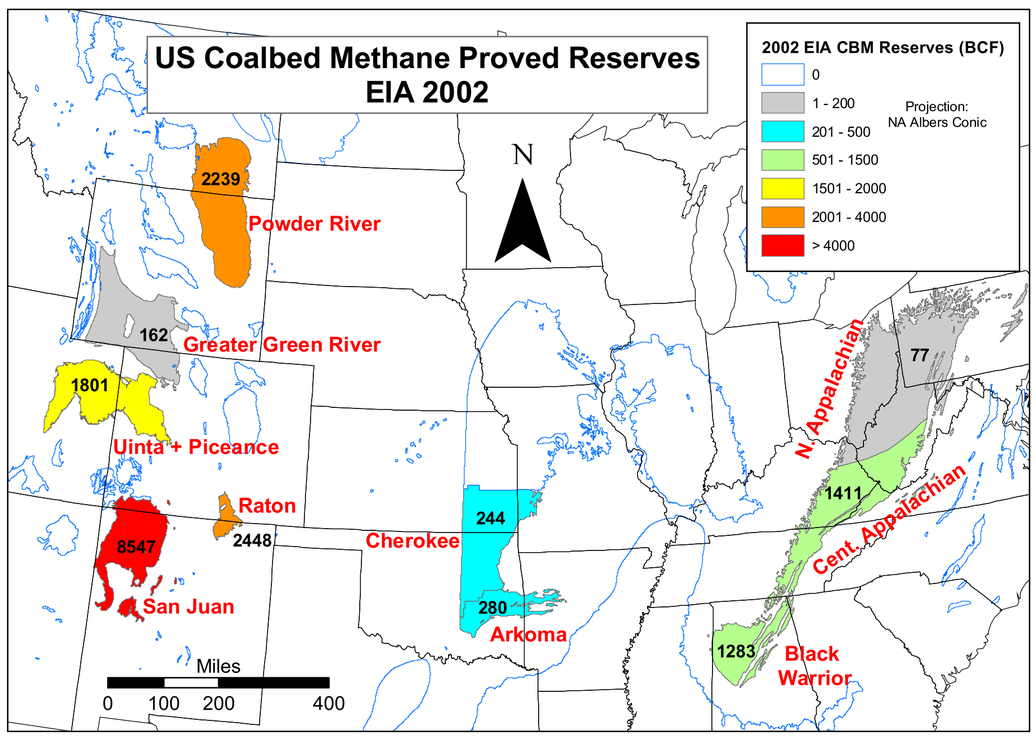


Proved reserves are the quantities of gas that geologic and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

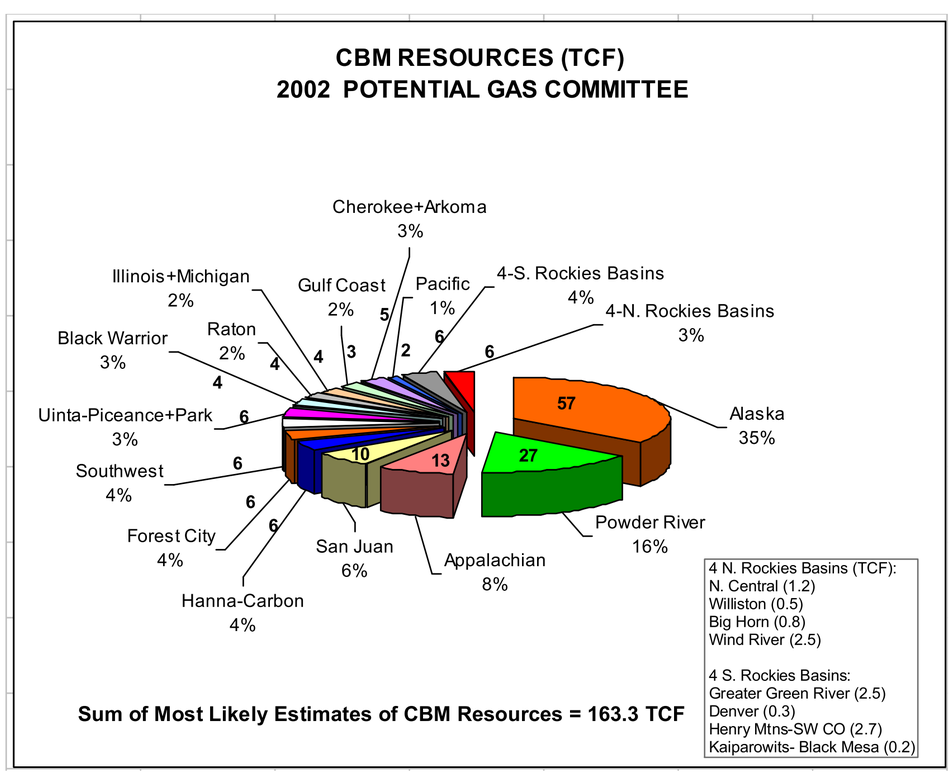
Proved reserves data are from the EIA's US Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 2002 Annual Report. Caveats for this dataset include: (1) only large production volume operators report to the survey, so small volume operators (< 2BCF total gas/ year)will be missed, (2) Uinta + Piceance basins are aggregated for reporting to protect confidentiality of operator's estimates.

The pie chart at left shows the division of proved reserves by basin using 2002 EIA data. When the percents by basin on that chart are compared to the cumulative production pie chart (above), the relative proportion of total CBM for the San Juan Basin has dropped from 73% to 46%, while the Powder River Basin's share has increased from 7% to 12%.

A chloropleth map (right) provides a visual display of the relative proved reserves per basin.



THE FUTURE: COALBED GAS RESOURCES



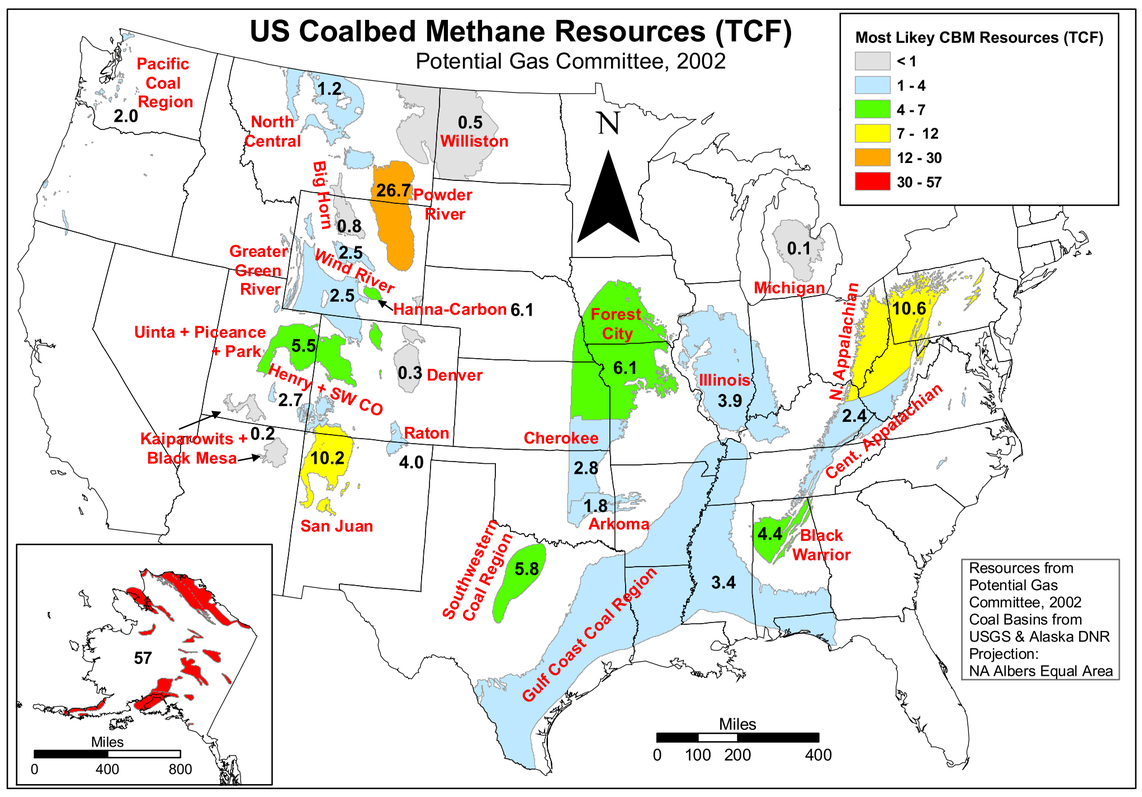
Resources are the most likely estimates of undiscovered, technically recoverable & marketable volumes of hydrocarbons. Estimates are from Potential Supply of Natural Gas in the United States, Report of the Potential Gas Committee, 12/31/2002 (www.mines.edu/research/pga/index.html). The committee is comprised of volunteer experts from the gas industry, government and academia.

The relative portion of each basin's resource potential is shown on the pie chart to the left. Some PGC basins have been aggregated in the pie chart to reduce the number of pie slices.

A map delineating the areas of assessed resources was not supplied with the PGC report, so the resource estimates were assigned to the basin areas on the chloropleth map to the left based on the Coal Region/ Basin /Field given in the report.

The trends noted above continue, with the mature San Juan Basin falling to 6% of the total and the emerging Powder River Basin rising to 16%. Alaska dominates the graph with 35%, but note that Alaska is comprised of multiple basins aggregated together, while most of the lower 48 basins stand alone.

Given their relatively small size, the Raton, Hanna-Carbon, Pacific and Wind River Basins rank relatively high.



Acknowledgments and Data Sources

Well data for field outlines:
AL State Oil & Gas Board (H. Moore), Geological Survey of AL (J. Pashin), CO Oil & Gas Conservation Commission (J. Milne), IL State Geological Survey (D. Morse), IN Geological Survey (J. Rupp), GTI-TICORA (T. Lombardi), Dorado Gas Resources (S. Tedesco), KN Geological Survey (T. Carr), KY Geological Survey (B. Nuttall), LA Geological Survey (C. Breland), MT Board of Oil & Gas Conservation (J. Halvorson), NM Institute of Mining & Technology (M. Cather), OH Geological Survey (J. McDonald, L. Wickstrom), OK Geological Survey (B. Cardott), PA Dept. of Conservation & Natural Resources (T. Markowski), The Exploration Company (R. Scott), UT Division of Oil, Gas & Mining (D. Jarvis), United States Geological Survey (R. Milici, P. Warwick), VA Division of Gas & Oil (B. Wilson, G. Janson), WA State Dept. of Natural Resources (M.A. Shawver), WY Oil & Gas Conservation Commission (G. Strong), WV Geological & Economic Survey (L. Avary)

Coal Basins
USGS (J. Tully, R. Milici, J. East, Prof. Papers 1625 A-D, OFR 99-376), AK DNR (J. Clough, R. Merritt & C. Hawley, W. Ehm. P. Peapples)

Coal Mines
EPA (C. Talkington), MSHA (E. Sherer-Hubert), EIA (W. Watson, D. Morehouse), USGS (T. Rohrbacher), CO Geological Survey (C. Carroll), IL State Geological Survey (S. Elrick), IN Geological Survey (B. Meyer), KY Geological Survey, MT Bureau of Mines & Geology, NM Bureau of Geology and Mineral Resources (G. Hoffman), OK Dept. of Mines (D. Shults), UT Division of Oil, Gas & Mining (J. Morse), WV Office of Miners' Health (D. Kessler), WY BLM (D. McGarry)
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