

Resource Overview for the Original 2016 Bears Ears National Monument Designation and Vicinity



Utah Geological Survey

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According to data compiled by the Utah Geological Survey, the area within the original 2016 designation of Bears Ears National Monument (BENM) holds only low to moderate energy and mineral development potential. Although moderate resource development potential exists for uranium/vanadium, potash, and helium, there is currently no commercial activity related to these commodities within the boundary. Additionally, no coal is found within BENM and renewable energy resources are minimal. The majority of BENM holds low potential for oil and gas development, except small areas in the southeast (Paradox Formation subplay) and northeast (Cane Creek tight oil play) have moderate potential. All oil and gas wells drilled within the boundary are plugged and abandoned, and no applications are pending for permits to drill.

Oil and Gas

BENM is generally west of the Pennsylvanian-age Paradox Formation subplay (e.g., Aneth oil field). Moderate potential in the Paradox Formation subplay does exist in the southeastern corner of BENM (minor historical production) near the Bluff Bench area. BENM is underlain by the Mississippian-age Leadville Limestone, which is productive in other parts of the Paradox Basin to the north and east, but the lack of production from wells in BENM indicates low potential for Leadville production within the monument. The Paradox Formation Cane Creek tight oil play is productive to the north of BENM and the play could extend into the northeastern tip of the monument.

- 255 oil and gas wells have been drilled in BENM and an additional 36 wells were proposed but never drilled (location abandoned) (well data from Utah Division of Oil, Gas and Mining).
 - All 255 wells are plugged and abandoned.
 - Only nine wells had historical oil production, six of these wells had historical gas production. All nine wells are located in the far southeastern corner of BENM.
 - 302,027 barrels of oil was produced from these nine wells (77% of this total is from one well, 94% of this total is from three wells, all located near each other on the Bluff Bench).
 - 204,747 mcf of gas was produced from these six wells.
 - There has been no production from these wells since 1992 (only the two wells with the most production were active into the 1990s, all others pre-date 1985).
- No APDs (applications for permit to drill) currently exist within BENM.

Renewable Resources

There are no recognized or published wind or geothermal resources within BENM, and there is only limited and disjointed

land with utility-scale solar potential. Additionally, the lack of transmission lines within BENM makes renewable development challenging.

Coal

There are no coal resources within BENM.

Helium

Few data are available within BENM, but potential economic concentrations of helium have been identified in gas streams from four oil and gas wells in the southeastern part of BENM. Helium concentrations considered to be economic are above about 0.50 mol% helium and reported concentrations in these wells range from 0.60 to 1.37 mol%. One of the wells is located within a known gas field (Lime Ridge). Economic helium concentrations have also been found outside BENM to the north, east, and south. Helium is typically produced as a byproduct of natural gas production, so its potential is somewhat linked with oil and gas potential as described above. Where oil and gas potential is low, helium potential is also presumably low. Helium is currently being processed at a nearby gas processing plant at Lisbon Valley (east of BENM). Some of the produced helium is sourced from oil and gas fields in the vicinity of Lisbon Valley.

Oil Sands

Two minor oil sand deposits are within BENM, but both have very low development potential.

Uranium, Vanadium, and Other Metals

Historically, Utah is the third most productive state for uranium in the U.S. with most production from the Colorado Plateau. In the BENM region, uranium occurs in sandstone-hosted deposits with associated vanadium. Uranium has historically been the more valuable of the two commodities, though many deposits hold more vanadium than uranium. However, vanadium grade varies more widely than uranium grade between deposits in BENM based on host rock. Moderate copper and minor cobalt and molybdenum mineralization is also known to occur in some uranium-vanadium deposits in the BENM region. Areas of recent past production, and presumably future production, are all located outside the BENM boundary.

Notably, Energy Fuels Resources' White Mesa Mill is located east of BENM. The White Mesa mill is currently the only conventional operating uranium mill in the United States. The mill produces uranium and vanadium from alternative feeds (out-of-state material not from Energy Fuels' mines) but is also exploring production of REE (Rare Earth Elements) concentrate from out-of-state materials.

Potash

Potash resource potential in BENM is found in the Pennsylvanian-age Paradox Formation, which is a thick, cyclic sequence of alternating evaporites and clastic rocks. The cycles in the Paradox Formation are numbered sequentially and a higher number indicates an older, deeper cycle. In BENM, potash resources exist in its northeastern extension. Potash is not currently produced in BENM but is produced just north of the monument. Based on available data, the cycles in the Paradox Formation having the greatest potential in BENM are cycles 13 and 18, but other cycles also have potential. An area of approximately 2200 acres of BENM overlaps with one of the BLM's known potash leasing areas (KPLA). A KPLA is an area where the BLM has determined that valuable potash resources exist.

Salt

Like potash, salt (NaCl) potential in BENM exists within the Pennsylvanian-age Paradox Formation. Thick salt beds are present in the unit and are interbedded with other evaporitic and clastic lithologies. Although the extent of salt resource potential extends beyond that of potash potential, salt in the Paradox Basin is likely to only be produced as a byproduct of potash production.

Lithium

Limited lithium potential exists within subsurface brines related to the Paradox Formation. Although anomalous lithium has been identified in the Paradox Basin, the concentrations are generally below what is currently considered as economic. No data are available within BENM itself, but any lithium potential is likely somewhat coincident with potash in the Paradox Basin, limiting potential within BENM to the northeastern extension. No lithium has been produced in the Paradox Basin.

Limestone

Limestone resource potential for aggregate (crushed stone) or high-calcium limestone in BENM is limited. In the southern part of the monument, thin limestone layers are in the Pennsylvanian-age Honaker Trail Formation and possibly the Halgaito Formation. The limestone in these units is interbedded with clastic horizons inhibiting the potential for economic extraction. Small volumes of limestone have been produced from these formations outside the southern boundary of BENM. In the northern part of the monument, Permian-Pennsylvanian-age Cutler Group exposures may contain limestone beds as well. Cutler Group limestone is also likely to be interbedded with clastic zones and may be of marginal quality.

Sand and Gravel

Known past sand and gravel development in BENM is limited to alluvial deposits around the town of Bluff. Sand and gravel resource potential elsewhere within BENM is also primarily

from alluvial deposits along stream channels and drainages. Development potential of these deposits is limited due to the remoteness of the area.

Clay

No clay development or production has occurred in BENM, but some resource potential for common clay, shale, bentonite, and high-alumina clay exists in the area. Because these potential clay resources do not present a unique resource opportunity and because the resources are remotely located, development potential for clay resources in BENM is low.

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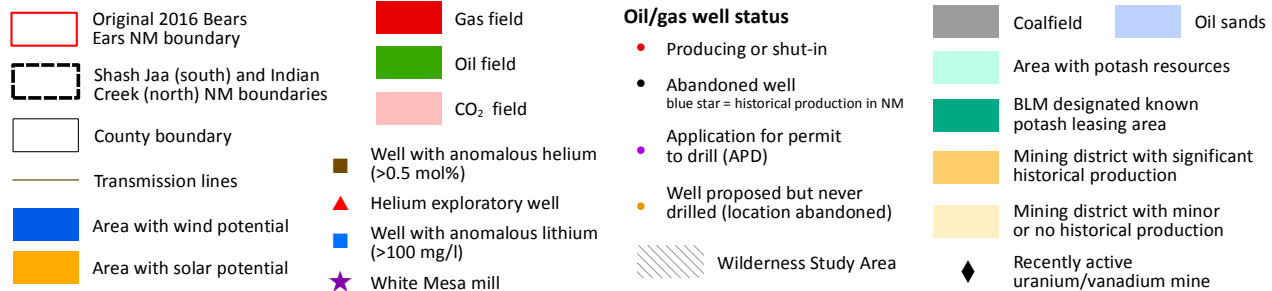
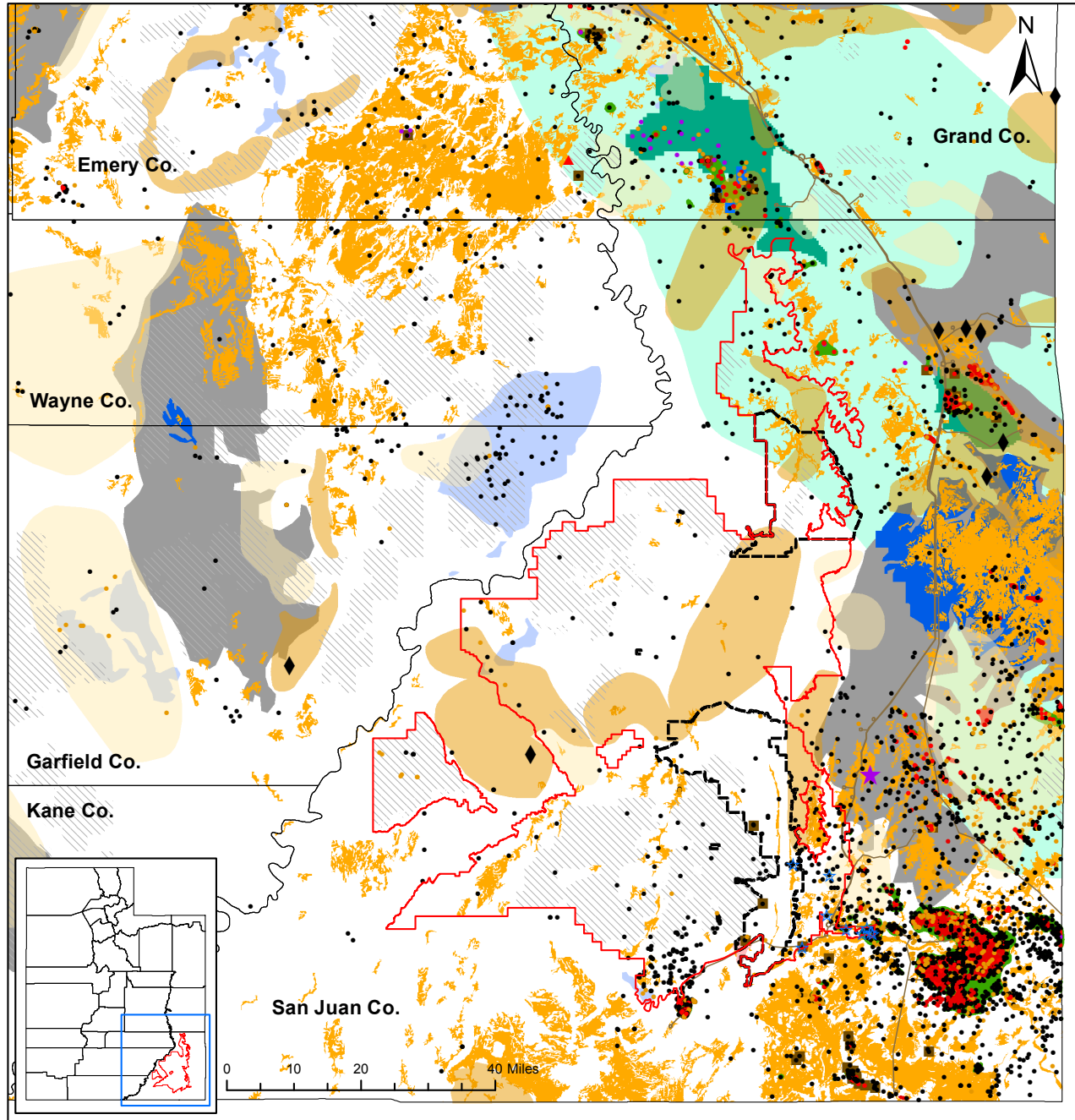
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Resource Overview Map, Bears Ears National Monument and Vicinity



Simplified resource map for Bears Ears National Monument and vicinity. This map was created by the Utah Geological Survey from published data. Nearly all possible commodities are represented on this map, but more specific data can be found in several topical reports (see select references). Oil and gas well data are from the Utah Division of Oil, Gas and Mining.