Minerals and Geology[12]

The Cibola Mountain Districts host occurrences of important mineral resources. Minerals are important as a raw materials source: useful in a native or refined state. As economic and political conditions fluctuate, certain mineral commodities can become more valuable, prompting new or renewed interest in prospecting, exploration, and mining of these minerals. Management of mineral activities on the Cibola National Forest are carried out to facilitate the development of mineral resources and contribute to local, national, and global markets for valuable commodities.

The purpose of the Cibola National Forest minerals and geology program is to provide appropriate access to mineral resources in accordance with the law; while facilitating mineral development in a manner that minimizes adverse impacts to surface resources. Valuable mineral resources on the Cibola National Forest range from soil for making adobes and limestone for cement, to rare-earth minerals used in hi-tech applications such as battery-operated cars and aerospace components, to uranium as an energy fuel in itself. It is Forest Service policy to support responsible, environmentally sound energy and mineral development and reclamation on the Cibola National Forest.

How minerals may be searched for or acquired on the National Forest is prescribed by Federal law and mineral type. There are three categories of minerals, known as locatable, leasable, and salable minerals; each is subject to different laws and implementing regulations. This affects whether the Forest Service has the discretion to refuse a mineral operation proposal. Minerals subject to the 1872 Mining Law, as amended, can be obtained by locating a mining claim. These “locatable” minerals include metals such as gold, silver, copper, or uranium. The Forest Service does not have the authority to outright deny locatable mineral activities providing they follow applicable laws and regulations. The agency role in managing such resources is to provide reasonable protection of surface resources. The potential for locatable minerals within the boundaries of the Cibola National Forest is high because the geology of the area is conducive to their creation, and the mountain ranges expose mineralized zones in a number of places. Pursuant to Federal mining laws, the Forest Service is required to respond to proposals for conducting exploration and mining operations for locatable minerals. The Forest Service must determine whether to approve the preliminary plan of operations submitted, or to require changes or additions deemed necessary to meet the requirement of the regulations for environmental protection. All proposals must comply with Federal laws and regulations, and should be managed to reduce adverse environmental impacts to the extent practicable on National Forest System lands. The Mount Taylor Ranger District includes an area of world-class uranium deposits which were widely explored and mined during a period of previous mining from the 1950s through the late 1970s. In an area of known deposits, interest for exploration and mining of the mineral resource is expected to continue. There are also uranium deposits on the Magdalena Ranger District. There are areas of historic gold and silver mining on all of the ranger districts. Interest in these mineral areas continues as gold panning has been increasingly popular. It is expected that the “small miner” will continue to operate in these areas. Whether it is considered “recreational” by some or “subsistence mining” by others, it is important to note that all of these gold operations are regulated by the same minerals regulations at 36 CFR 228.4.

Some types of minerals are managed by lease, such as all hydrocarbon-based resources including oil, gas, and coal, and certain other solid minerals such as phosphate, potassium, and sodium. Also,

[12] Minerals refers to extractive mineral operations, while geology refers to geologic features and the enjoyment and scientific study of these features.

minerals usually locatable may be leased on acquired lands. The Cibola does not have the geologic environment in the mountain districts to host conventional oil and gas resources or solid leasable minerals. Geologically, oil shale or tar sand deposits could potentially occur in the southern San Juan Basin on the Mount Taylor Ranger District. If deposits were to exist, favorable economic and geologic conditions and future technological advances would all be required to economically extract a petroleum resource. Small coal deposits do occur and are exposed in many locations in the mountain districts. These “deposits” are really no more than coal exposures and occur in such small volume that that they are not of economic interest. There are presently no leases or proposals on acquired or other lands and there are no indications that resources are present. For these reasons, the potential for leasable minerals is low, and no management of leasable minerals is anticipated for the Plan area. However, should mineral leasing be proposed, the Forest Service role in managing leasable resources is to recommend or consent to the Department of the Interior, BLM, whether leases for these commodities should be issued, and specify any surface resource protections that may be needed. Stipulations to protect surface resources would be made for exploration or mining.

The last category, salable minerals, applies to lower-value, common variety materials such as rock, gravel, and soil (salable minerals is synonymous with mineral materials), for which the Forest Service has total discretion to manage and is sold at the discretion of the local Forest Service unit.

Salable Minerals/Mineral Materials

Mineral materials, obtained by personal-use permit or contract, provide a number of products that are valuable and often used or sold locally. Soil is used for traditional adobe construction, as well as rock rubble for foundations and wall construction. Moss rock used for landscaping rock is very popular on the Cibola Mountain Districts. Personal-use permits may be obtained to gather rock, borrow, or soil in designated areas which have been cleared so as not to disturb other resources. Mineral material permits and contracts are available at the discretion of the local district ranger, in designated and cleared areas.

Desired Conditions

- Mineral materials provide important raw materials for personal, commercial, and traditional uses, and the Forest makes these materials available as appropriate with other resources and subject to applicable laws and regulations.
- Mineral material mining activities are conducted in a manner that avoids negative impacts to surface resources, including groundwater, while allowing reasonable access to minerals.

Standards

- Personal and commercial mineral material sites are administered according to 36 CFR 228 part C; Mineral Materials.
- Talus slopes will not be used as a common variety mineral materials source where disturbance would destabilize the talus slopes and alter any endemic or rare species habitat or presence.
- Mining activities for mineral materials will incorporate mitigation and reclamation measures that reduce contrasts with the surrounding landscapes.
- Mineral materials such as gravel will not be removed within water resource features to ensure satisfactory conditions.

Guidelines

- Where appropriate, mineral materials (such as moss rock, boulders, and borrow material) should be made available for personal use through rock permits.
- Requests for commercial mineral material sales should be considered where appropriate with other resource desired conditions.
- Mineral materials (such as gravel and borrow) from designated areas should be made available for Forest Service transportation system and road maintenance, and should be issued as free use on a mineral material permit to other Federal, State, county and local agencies for use in public projects 36 CFR 228 part C, 228.57d and 228.62.
- Mineral materials should be made available to support internal resource management needs, such as erosion control features, rock dams, and recreation site materials (barriers and landscaping).
- Personal-use mineral material sites should be monitored to prevent resource damage due to over-use.
- Once a permit site is depleted of desirable materials, or if resource damage is occurring, a different site should be used for further permits.

Management Approaches

- Areas for mineral materials sales should be planned, cleared, and made available if compatible with other resource concerns. Permits for landscape rock, soil, and other mineral materials in these areas are sold to the public for personal use.
- Although the mineral materials program is a discretionary use of the Forest, responding to requests for mineral materials desired by local landowners and the public are the drivers of this program, and the use of these resources should be encouraged.

Laws and Regulations Affecting Mineral Activities for Locatable Minerals

Background and Description

Where minerals are located on a mining claim, the 1872 Mining Law requires that the claimant must be allowed reasonable access to those minerals. Pursuant to Federal mining laws, the Forest Service is required to respond to proposals for conducting exploration and mining operations for locatable minerals. The Forest Service must determine whether to approve a preliminary plan of operations submitted, or to require changes or additions deemed necessary to meet the requirement of the regulations for environmental protection. The Forest Service does not have the authority to outright deny locatable mineral activities providing they follow applicable Federal laws and regulations. The agency role in managing such resources is to provide reasonable protection of surface resources.

Desired Conditions

- Reasonable plans of operation are approved and administered to reduce adverse environmental impacts to the extent practicable on National Forest System lands.
- Mineral and mining administration on the Cibola National Forest meets legal mandates to allow reasonable access to locatable minerals. Locatable mineral mining activities are conducted in a manner that minimizes negative impacts to surface resources, including groundwater.

- Information on Forest Service operating requirements for gold prospecting, gold panning, and related activities is made available to the public.

Guidelines

- Locatable mining operations should be planned in advance to minimize disturbance area and more effectively and efficiently operate and reclaim the site.
- Locatable mineral operations should accommodate desired conditions of other resources as far as possible.
- To the extent possible, locatable operations should avoid or minimize the alteration or removal of natural features providing wildlife habitat. Avoid disturbance to and maintain cliffs, rock features, and vegetation around rock features to provide screening and cover for wildlife (big game and smaller wildlife such as reptiles, amphibians, small mammals, ground- and cliff-nesting birds and bats).
- To the extent practicable given the requirements of the mineral activity, mineral developments should be located so as to blend with the natural environment, not detract from the scenic character, and remain visually subordinate to the surrounding landscape.
- Streambed material disturbed by placer mineral operations should be replaced into its source location to ensure stream stability.
- Locatable mineral operations should accommodate desired conditions of other resources as far as possible.

Standards

- Minerals administration will be carried out according to the U.S. mining laws and Forest Service regulations pertaining to locatable minerals at 36 CFR 228, subpart A.
- Approved plans of operation will authorize operations that avoid or minimize adverse impacts to surface and groundwater resources to the extent possible.
- Structures and/or occupancy for mining purposes will be limited to only those that are necessary and incidental to approved mining operations.
- Use of access to mineral operation sites will be included in the plan of operation. Potential impacts due to the use of road, trail, track or cross-country travel, or by other means of access, will be analyzed in NEPA.
- Plans of operation will include contingencies to address stabilization and interim reclamation of mineral sites during periods of unforeseen shutdown according to 36 CFR 228.10. This applies to any time of mine cessation during development and production and before planned closure.

Management Approaches

- Gold prospecting information (panning, sluicing, etc.) could be made available to the public such as on the Forest website and information should be available at each district.
- Coordination of the Cibola mineral program with mineral divisions of State and other Federal agencies is desirable. Sharing information regarding mining operations on the Cibola National Forest can create opportunities to eliminate redundancy and coordinate inspection and enforcement.

Geology Resource Management

Background and Description

Geology addresses the science and physical features of the earth apart from an extractive uses as minerals resources. This covers aspects such as landforms, rock formations, and fossils. Geologic features occur on every ranger district and illustrate the origin of mountain ranges, provide opportunities for scientific study and offer stunning scenic values. Geologic educational opportunities and scientific research can contribute to the greater understanding of our planet and its history.

Desired Conditions

- The outstanding geologic features on the Cibola National Forest provide high-quality educational opportunities for students, scientists, and the casual visitor.
- Significant geologic features are protected from being defaced or destroyed.
- The Cibola National Forest will encourage geology-based educational opportunities.

Standards

- Professional geologic field investigations involving sampling, such as for fossils, rock and mineral types, and formal investigations into geologic features, will be accommodated by permit according to regulatory requirement.
- The scientific collection of paleontological and geological specimens will be accommodated and permitted as required.

Management Approaches

- Opportunities for public geologic interpretation should be developed; these could include interpretive signs, printed material, and interpretive information on the Forest Service websites.
- Geologic field investigations and instruction occurs on the Cibola National Forest. Study of fossils and volcanic rock specimens, as well as other geologic phenomenon will occur according to regulatory requirements.

Reclamation

Background and Description

Reclamation on the Cibola National Forest goes hand-in-hand with all mineral activities and operations. Each operation has a reclamation component which is site-specific and tied to that single operation. For example, appropriate reclamation is discussed with operators for small sluicing operations as well as required in plans of operation for mining. It is the responsibility of the operator to reclaim mineral activity sites as authorized in their plan of operation. In addition to plans of operation, bonds collected by the Forest Service insure that money is available for site reclamation. The bond can be returned once satisfactory reclamation is completed by the operator.

Desired Conditions

- Reclamation of mining and mineral activity sites provides for public safety and the protection of forest resources, and is conducted to return sites to a natural condition as nearly as possible.

Guidelines

- Mine reclamation should use a geomorphic approach that results in landforms similar to adjacent natural terrain and hydrologic functions similar to natural systems to minimize long-term monitoring and maintenance requirements.
- Mining activities should incorporate reclamation measures that reduce visual contrasts with the surrounding landscapes. Mitigation measures, including recontouring topography and revegetation of bare sites where necessary, should be utilized to move areas impacted by mining activities to the long-term scenic integrity objectives of that area.
- Lands where past mineral development or exploration has occurred should be stable and vegetated; native species should be used where possible.
- Post-mining restoration areas should be designed to allow the sustainability of other forest resources.
- Plans of operation should address avoiding or minimizing the alteration of natural features providing wildlife habitat.
- Streambed and floodplain alteration or removal of material should not prevent attainment of riparian, channel morphology, or streambank desired conditions.
- Only native or non-persistent seed and plant materials should be used when revegetating disturbed sites.
- Mining and mineral activities of all sizes should be planned to minimize the disturbance footprint of the operations site.
- Mining and mineral operations should be logically planned, opened, and operated in order to meet final reclamation objectives.
- Where water sampling is indicated, baseline, interim and post-mining operation surface water and ground water monitoring should occur where needed to detect possible adverse changes at the earliest possible time.
- Talus slopes should not be altered and materials should not be removed from them (with some exceptions). In areas that harbor talus snails, reclamation and revegetation treatments should be designed to retain microhabitat characteristics for endemic snails and other talus-dependent species unless as needed to meet statutory requirements (mining law or as needed to protect public health and safety).
- On sites that may contain radionuclides, remediation of soil radiation levels should follow the Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico, developed by the New Mexico Energy, Minerals & Natural Resources Department, Mining and Minerals Division; and the New Mexico Environment Department, Mining Environmental Compliance Section, or current Federal standards as dictated by the appropriate Forest Service hazardous materials on-scene coordinator.

Standards

- Bonds will be collected for each plan of operation or mineral materials operating plan to insure appropriate closure for operations of all sizes.
- Reclamation will be carried out concurrently with mining; restoration of the environment takes place at the earliest opportunity for each area on a mine site.

- Soil disturbance will be kept to a minimum. Where removal of soil is necessary, soil will be stockpiled and stabilized for use in later reclamation.
- Plans of operation will address interim reclamation requirements for unforeseen shut-down and temporary cessation.
- Suitable interim and post-project surface water and groundwater monitoring will be implemented where needed to detect adverse changes at the earliest practicable time.
- On site disturbances where radionuclides may exist, reclamation will eliminate any potential for radionuclide exposure to humans and the environment.
- Reclamation plans will be site specific and appropriate for the setting; for example, soils, vegetation, climate, and slope.

Management Approaches

- Locatable mineral operations should accommodate desired conditions of other resources as far as possible.
- Applying seed immediately when replacing soils or roughening surface growth media increases vegetative success.

Abandoned Mine Lands

Background and Description

Abandoned mines are the remains of former mining operations. The Abandoned Mine Lands Program in the Forest Service identifies mine features posing a danger to the public; these are prioritized and identified for closure and or remediation. The classification as abandoned applies when there are no entities or individuals left operating the mining activity or who have financial ties to the mining. The significance of this classification is that for most abandoned sites there is no money from the original operators available to clean up the sites. Although occasionally a potentially responsible party can be found and contribute toward cleanup, the major burden falls on the Forest Service to fund cleanup/remediation.

Closures are conducted to remediate hazardous materials as well as to safeguard physical openings such as shafts, adits, collapsed headframes, and remaining mine equipment.

Desired Condition

- Abandoned mines are appropriately remediated and do not endanger people or the environment.

Standards

- When closing underground mine features to public entry, pre-closure inspections shall be conducted to determine if cave-dependent species are present. Closures will be designed and implemented to address the needs of resident or historically occurring wildlife within the constraints of meeting public safety concerns.
- Environments in abandoned mines should not be altered except where necessary to protect associated natural resources or human health and safety.
- Where mining-related features remain, a cultural resource survey shall be conducted to inform the closure design. Altering cultural resources will be avoided unless public safety is in jeopardy.

- Appropriately remediated abandoned mines are available for roosting bats, reducing the potential for displacement, abandonment of young, and possible mortality.
- No Forest Service employee will enter abandoned mine underground workings unless certified as a Qualified Certified Mineral Examiner (QCME) or accompanied by a QCME or person similarly qualified.

Management Approach

- The Cibola should coordinate management of bat roosts with New Mexico Department of Game and Fish and the U.S. Fish and Wildlife Service.

Caves

Background and Description

Caves are natural biophysical features that include any naturally occurring void, cavity, recess, or system of interconnected passages beneath the surface of the Earth or within a cliff or ledge and which is large enough to permit a person to enter, whether the entrance is excavated or naturally formed. This definition includes any fissure (large crack), lava tube, natural pit, sinkhole, karst feature, or other opening which is an extension of a cave entrance or which is an integral part of the cave. Cliffs are any high, steep, or overhanging rock or earth face. Most caves on the Cibola can be described above as lava tubes and/or overhanging cliff features, although there are some karst features. These features provide specialized seasonal and year-round habitats for a variety of wildlife species including bats, cliff-nesting birds, snails, reptiles and amphibians. Animal species found in caves include many species of bats and small and large mammals as opportunistic users.

The Cibola National Forest contains two significant caves. The National Caves Resources Management and Protection Act (Public Law 110-691) defines a significant cave as a cave located on National Forest System lands that has been evaluated and shown to possess features, characteristics, values, or opportunities in one or more of the following resource areas: biota; cultural; geologic, mineralogic or paleontologic significance; hydrologic; recreational; or educational-scientific for scientific, educational or recreational purposes; and which has been designated “significant” by the Forest supervisor. The Cibola’s two significant caves are distinctive due to archaeological and cultural values. The Sandia Man Cave in Las Huertas Canyon is a significant archaeological feature and the location of the other significant cave may not be disclosed due to on-going traditional cultural uses and archaeological resources.

Desired Conditions

- Caves are managed to retain their cultural, historic, geologic, and biologic integrity.
- Bat diseases, such as White-nose Syndrome, are not introduced in caves.
- Caves known to be important for species of conservation concern are intact or provide habitat for these species.
- Significant cave resources’ aesthetic, cultural, and scientific values remain intact, and are protected from damage to provide for uses either by people (traditional cultural uses) or wildlife.
- Caves provide habitat for species that require specialized conditions for roosting and overwintering, such as bats. Caves maintain moisture and temperature levels consistent with historic conditions.

- Archaeological, geological, paleontological, and biological features of caves are not adversely affected by visitors.

Guidelines

- In caves where traditional or cultural uses exist, management should include the accommodation of those uses.
- Where deemed appropriate by specialists, decontamination procedures should be followed for preventing White-nose Syndrome when entering caves.
- If bat roost sites are present, closure structures such as wildlife friendly bat gates that meet the most current recommendations should allow bats to continue to use the cave.
- Environments in caves should not be altered except where necessary to protect associated natural resources or to protect health and safety. Where mine closure is necessary to protect human health and safety, closures should preserve habitats for roosting bats and avoid direct impacts to bats.

Standards

- When closing caves to public entry, pre-closure inspections shall be conducted to determine if cave-dependent or other species are present. Closures will be designed and implemented to address the needs of resident or historically occurring wildlife within the constraints of meeting public safety needs.
- Caves that have been designated or nominated as “significant,” will be managed to perpetuate those features, characteristics, values, or opportunities for which they were designated.

Management Approaches

- Caves can provide a setting for educational opportunities.
- Closure to the public may be used as a method to protect resources.
- Identified bat roosts should be managed to provide for the enhancement and protection of bat populations. Protective measures may include seasonal closures, public education, and wildlife-friendly gates.
- Monitoring significant caves or other biophysical features to determine visitor impacts and the conditions of key resources could be useful to protect the ecology of the feature or resource.
- Management activities should be designed to avoid or minimize the alteration of naturally occurring rocky outcroppings or cliff faces associated with caves.

Renewable Energy

Background and Description

The Cibola National Forest Mountain Districts have the potential to host or facilitate the development of alternate or renewable energy sources which may include solar, wind, and biomass. Renewable energy has the potential to provide ecosystem services which are important to people in a local, regional, and national scale. Construction and maintenance of facilities and/or transmission lines could provide employment while energy produced or transmitted provides direct benefits in power generation. Wind and solar energy are clean fuels which do not release hydrocarbons to the atmosphere and as such do not contribute to global warming. Use of small solar panels can provide energy for wildlife, and livestock range improvements.

Desired Conditions

- Energy transmission and development on the Cibola National Forest meets mandates to facilitate the transmission and development of energy resources in a manner that minimizes adverse impacts and does not detract from meeting other desired conditions applicable to the area.

Guidelines

- Construction and maintenance of energy facilities/transmission corridors/transmission lines should avoid the introduction and spread of nonnative invasive species.
- Energy corridors should be planned to avoid or limit disturbance in or near riparian zones to protect surface water, shallow groundwater, unstable areas, hydric soils or wetlands, and surface water.
- Colocation and joint use of rights-of-way should be utilized for transmission lines or facilities to the extent possible in order to minimize surface disturbance.
- Forest management within energy rights-of-way should allow for the operation and maintenance of the facilities and infrastructure as well as desired vegetative conditions and land uses.
- Energy facilities/transmission corridors should avoid locations in areas identified as having a demonstrated high risk to wildlife, cultural resources, and agricultural land uses.
- Environmental analysis of proposed energy facilities/transmission corridors should address the overall wildlife habitat of the project area. To safeguard migration of smaller mammals, amphibians, ground-nesting birds, and reptiles, any facilities should be designed and constructed to avoid habitat fragmentation. Projects should avoid disturbance to rock features which are often dens or burrows. Vegetation around rock features should be maintained for wildlife cover. Project development should minimize activities during breeding seasons. Projects should minimize mortality for wildlife, including small species.
- When considering proposed wind energy developments, current industry technology to protect against wildlife mortality should be investigated and the best available technology should be used in any wind project implementation.
- Proposals to develop solar energy should investigate the impacts to wildlife such as heated micro-climates adjacent to solar energy arrays. Any solar energy developments should use best available technology to mitigate heat-induced impacts to wildlife.
- Solar energy projects should give priority consideration to previously disturbed sites to minimize wildlife and vegetation impacts.
- Proposals for renewable biomass energy should be considered. Portable biomass pellet plants could reduce the need to burn slash, while providing a heating fuel.
- Potential solar and/or wind energy development should not be located in areas with high scenic integrity objectives or in the foreground along concern level 1 trails, recreations sites, and roads (concern level 1 are the routes identified with the most public concern for scenery).

Standards

- Energy corridors will allow a reliable supply of energy essential to meet local, regional, and national economic demands.
- The operation of renewable energy projects will provide for beneficial uses without endangering forest or agricultural resources.

- Reclamation plans for disturbed sites will be site-specific and appropriate for the soils, vegetation, and climate.

Management Approaches

- Energy transmission lines should not be visible (usually underground) across the landscape.
- The Cibola National Forest should coordinate with relevant local, State, and Federal agencies during all phases of proposed energy projects.
- Where possible, renewable energy projects should be planned to provide economic benefits for the citizens of surrounding counties.

Recreation

General Recreation

Background and Description

The Cibola National Forest provides a diversity of outdoor recreation opportunities, connecting people with nature in a variety of diverse settings and activities. Participation in recreational activities is what draws most people to the Forest, making it an important portal for understanding the meaning, history, and relevance of public lands as a whole. Recreation contributes greatly to the physical, mental, and spiritual health of individuals, bonds family and friends, instills pride in heritage, and provides economic benefits to communities, regions, and the Nation.

The natural, cultural, and scenic environments of the Forest offer settings for a wide range of high-quality recreation and tourism opportunities. Quiet mountain, forested, and high-desert places provide an escape and climatic relief from urban environments. Cultural features provide historical context to the natural scenery, and add to the richness of the experience and sense of place.

Recreation opportunities on the Cibola National Forest include non-motorized, motorized, developed, and dispersed recreation on land, water, and in the air. The social, managerial, and physical attributes of a place, when combined, provide a distinct set of recreation opportunities. The Cibola National Forest uses the recreation opportunity spectrum to define the types of outdoor recreation opportunities, settings, and experiences the public might desire, and identifies that portion of the spectrum the Forest might be able to provide. The opportunities, settings, and activities for obtaining experiences are arranged across a continuum or spectrum of six classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban. The current set of recreation opportunity spectrum classes are presented in Appendix F of this document.

Forest landscapes, resources, and programs offer opportunities for education and engagement of children and adults alike. This facilitates an understanding of and participation in resource conservation and promotes knowledge and appreciation of the natural world and its relationship to human communities.

Desired Conditions

- The Cibola National Forest welcomes a diverse group of visitors by providing a variety of developed and dispersed recreation and tourism opportunities (for example, camping, picnicking, hiking, mountain biking, hunting, fishing, wildlife viewing, driving for pleasure, and motorized recreation) that are appropriate for the recreation setting and other resource values.