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Minerals and Energy Specialist Report

Forest Plan Revision Draft Environmental Impact Statement (DEIS)

Submitted by:

/s/ Polly A. Haessig

Physical Scientist/NEPA Specialist
Mogollon Rim Ranger District,
Coconino National Forest

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Preface

The information in this specialist report reflects analysis that was completed prior to and in conjunction with the completion of the Draft Environmental Impact Statement (DEIS) for the revision of the 1987 Coconino National Forest Land Management Plan (the Plan). The primary purpose of specialist reports associated with the DEIS is to provide detailed information to assist in the preparation of the DEIS. As the DEIS was prepared, review-driven edits to the broader DEIS resulted in modifications to some of the information contained in some of the specialist reports. As a result, some reports no longer contain information and analysis that was updated through an interdisciplinary review process and is included in the DEIS in its entirety. This is a complete specialist report which includes all the information that was summarized in the DEIS and other supplemental information. Efforts have been made to ensure that the retained information in the specialist reports is consistent with the DEIS. If inconsistencies exist between specialist reports and the DEIS, the DEIS should be regarded as the most current, accurate source of analysis.

Executive Summary

This specialist report evaluates and discloses the potential environmental consequences on the Minerals and Energy resource that may result with the adoption of a revised land management plan. It examines, in detail, four different alternatives for revising the 1987 Coconino National Forest Land Management Plan (1987 Plan).

Mining activity on the forest falls into three minerals management categories: locatable materials such as hard rock minerals such as manganese and gypsum (which is subject to mining claims); saleable (permitted) mineral activities such as sand, gravel, and common building stone; and leasable minerals which includes geothermal resources, oil and gas.

The Coconino Forest has very few locatable mineral resources, no oil and gas leases or developments, but has potential geothermal resources (no current leases, no developments) associated with the San Francisco Volcanic Field. Locatable minerals with past or current production have included manganese, gypsum, flagstone and pumice. The Forest has a small amount of common variety mineral materials production including cinders, crushed and pit run aggregate, rock and fill dirt, and landscape rock/decorative stone. Most of the use of mineral materials on the forest is by the Forest Service or authorized contractors or permittees for projects and by Coconino County under permits or other agreements. Aggregate production and saleable minerals are anticipated to increase with future forest restoration activities. Some areas are withdrawn from locatable mineral entry. National demand for energy is also projected to increase, and the Forest has received recent requests for additional power line corridors and energy exploration on the Forest.

Environmental Consequences – Alternative A, 1987 Plan

The 1987 plan reiterates FS Policy and Federal law and regulations pertaining to the locatable, leasable and mineral materials. It is outdated with respect to leasing authorities, and the role of the BLM and FS in managing these resources. The No Surface Occupancy stipulations proposed as a standard may be overly restrictive in that a different kind of stipulation would be sufficient to protect the resources of wildlife, soils or scenery at a site specific location. Many of the standards and guidelines are a function of geology and minerals program management and could vary upon the issues and priorities faced by the leadership team of the forest. With respect to the mineral withdrawals, various specific sites were recommended in the plan. This could cause unnecessary mineral restrictions and could cause an expenditure of staff time on withdrawals that may not provide added protection to resources. All withdrawals individually need to go through the mineral withdrawal process which includes NEPA. There could be unknown issues and concerns with sites that would factor into the withdrawal process, including mineral potential. Also, the decision to proceed with a withdrawal and the NEPA analysis for individual withdrawals would consider whether a withdrawal is warranted, or whether existing law and regulation or other alternatives to withdrawals provide adequate protection of the resources.

Environmental Consequences – Alternative B, Proposed Revised Plan

The general description for energy and minerals adequately characterizes the current resource potential for minerals and geothermal development on the forest. There will be an ongoing need for future development of common variety mineral materials and gypsum. The desired condition statements summarize Forest Service Minerals Policy and development of minerals resources while protecting important sites, habitats and scenery through use of mitigations and stipulations.

Compliance with law and regulation is also emphasized without reiterating specific requirements. Reclamation of mine areas is also highlighted. Use and development of mineral materials for in service use by the Forest is also covered and a balanced approach is described for making materials available to local agencies.

Consequences to mineral resources include the loss of the mineral resource potential of lands proposed for wilderness and special area designation. Proposed new wilderness areas would be withdrawn from mineral entry if it becomes congressionally designated. Proposed RNAs and geologic special areas may be withdrawn from locatable mineral entry if they are administratively designated and the withdrawal is approved by the Secretary of the Interior. Strawberry Crater Addition has potential mineral resources of cinders, decorative stone and geothermal resources. There is no location specified in the data sources consulted except for the geothermal interests were in the southwestern portion of the existing and proposed wilderness. Walker Mountain has had a mining claim history of decorative stone but no recent claims. Davey's, Cottonwood Basin Fumeroles, West Clear Creek RNA, Rocky Gulch RNA and San Francisco Peaks RNA Addition have low mineral potential. Most of the areas mapped as very high scenic integrity appear to have low mineral potential except for 13 Mile Rock Pit and the Strawberry Crater proposed wilderness. The consequences of implementing this alternative are that potential geothermal resources and saleable mineral materials could be lost from potential development in the area of the Strawberry Crater Wilderness addition. The consequences for the 13 Mile Rock Pit are that any future development would be restricted within areas having very high scenic integrity and that would mean a loss of aggregate resources.

Environmental Consequences of Alternative C

Alternative C has the same overall environment consequences as Alternative, with respect to Minerals and energy desired conditions and guidelines.

The consequences are the same as for Alternative B but with the following additional consequences. Abineau proposed wilderness has potential geothermal resources that would be lost upon wilderness designation. East Clear Creek has manganese minerals but no economical potential for development so there would be no loss of valuable minerals on wilderness designation. Hackberry and Cedar Bench proposed wildernesses have past active mining claims for flagstone and possibly gold but no past mining or current claim interest. There would be no loss of valuable minerals on wilderness designation. The 13 Mile rock Pit is in the Black Mountain proposed wilderness. It is an inactive rock pit but could be used in the future for pit run cinders and crushed basalt by the forest service or other agencies. This rock source is also in an area mapped as very high scenic integrity. Designation of the wilderness would result in the loss of an aggregate materials source. The proposed WHMAs overlap with several rock pits and the manganese mineral district. The guidelines for public and administrative roads use would not affect the use or development of the rock pits. Mining activities including locatable, leasable and mineral materials uses are considered to be available in the lands within the WHMAs. However, locatable and leasable mineral potential is low in these areas.

The proposed Hackberry Wilderness includes part of the Cottonwood Basin Fumeroles Geologic and Botanical Area. It includes all of the geological special area that is in Alternative B. Very high scenic integrity areas are the same as for Alternative B and the effects would be the same except that the 13 Mile Rock Pit is within Black Mountain proposed wilderness. The other proposed wilderness, RNAs and special areas have low potential for mineral materials.

Environmental Consequences, Alternative D

Alternative D recommends no new wilderness areas, but otherwise is the same as Alternative B. It allows mechanized recreation such as bicycles on designation trails in botanical and geological areas. This aspect of the alternative will not affect minerals and energy resources. Because no new wildernesses are proposed, Alternative D will leave the most area on the forest open to mineral entry for locatable, leasable and mineral materials.

Cumulative Effects, All Alternatives

The Verde Gypsum Mine recently had its patent application approved and so about 243 acres of Coconino forest lands are now privately held lands which will be mined or used in mine operations. Parts of the mine are still on forest land and the mineral operations remain under a plan of operations which will be updated. Mitigation measures to protect surface resources will remain applicable on Forest Service lands covered by the updated plan of operations. Parts of the gypsum mine that are on leased state lands or on private lands will be subject to applicable State and Federal requirements to protect air, water and environmental quality enforced by the State of Arizona. It is anticipated that this mine will continue operations far into the future providing gypsum to local cement plants. Production may increase as the economy improves and construction and development increases.

The anticipated uses of mineral materials for road aggregate and other uses on the Forest is anticipated to increase as forest products companies start up, forest restoration projects get underway and when planning efforts like the Four Forest Restoration Initiative are completed. The Coconino-Kaibab Rock Pit Environmental Analysis proposes to allow use and development of 19 rock pits on the forest, eight of which are totally new sources. 20 existing and new rock pits are proposed for use on the Kaibab National Forest. This action will likely be decided before implementation of the new Forest Plan but the consequences of it will allow for increased use of aggregate mineral materials on both Forests throughout the life of the new Forest Plans. Most of the rock will be used by the two forests, but some may be made available and sold to counties, cities, other agencies for use. It is anticipated that as road management agencies such as ADOT implement road improvement projects within the forest, there may be requests for use and development of existing or new pits. ADOT or counties public works departments may propose to use or develop new or existing pits. This will be evaluated on a case by case basis and mineral materials will be made available where it is feasible, available and consistent with other resource values.

It is likely that there will be increased interest in geothermal exploration and development on the forest particularly with the promotion of renewable energy sources by energy companies, and state and local government policies and incentives. The forest will work cooperatively with the BLM in evaluation of any nominations or leasing proposals for geothermal resources. Exploration for uranium and future development of it may continue on the Kaibab and Tonto Forests. This exploration and future development is not likely to affect the environment of the Coconino National Forest. Uranium exploration is not anticipated on the Coconino Forest due to the lack of economical resources.

The Apache-Sitgreaves National Forest is evaluating Leonard Canyon on the Coconino and Sitgreaves National Forests as a potential wilderness area. The potential wilderness areas on the Coconino National Forest are not associated with any known active locatable mining claims, and there are no known past or potential future oil, gas or geothermal leasable mineral activities or resources. There are no common variety mineral material pits in the potential wilderness lands considered. The proposed Leonard Canyon Wilderness would not result in a loss of availability of any minerals or energy resources as the areas have low mineral resource potential.

Comparison of Alternatives

The alternatives were compared on the basis of how many acres would be withdrawn from mineral entry. Existing withdrawals include: permanent withdrawals of areas/sites withdrawn prior to 1976 and the enactment of the Forest Land Policy and Management Act; withdrawals after 1976, congressionally designated wildernesses and Fossil Creek and Verde W&S Rivers. Kachina Peaks Wilderness is within another withdrawal after 1976 and is not double counted. Existing and New Special Areas considered for withdrawal include RNAs and Special Areas (botanical and geological). Please see Table A6 for a master list of all existing withdrawals and tables of how the withdrawals were summed up.

The total existing acres withdrawn and new areas considered for withdrawal are the lowest for Alternative A and highest for Alternative C. Alternative D is lower than Alternative B because no new wilderness is considered.

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Introduction

This specialist report evaluates and discloses the potential environmental consequences on the Minerals and Energy resource that may result with the adoption of a revised land management plan. It examines, in detail, four different alternatives for revising the 1987 Coconino National Forest Land Management Plan (1987 Plan).

This report will discuss the affected environment for the minerals and energy resources on the forest and environmental consequences of the alternatives analyzed. Existing and potential energy developments including alternative sources, corridors and associated infrastructure are not analyzed in this report but may be discussed in the Lands Specialist Report.

Relevant Laws, Regulations, and Policy that Apply

All alternatives are designed to guide the Coconino NF's management activities in meeting all applicable Federal and State laws, regulations, and policies. The following is a list of key policies, laws and regulations that guide minerals and energy management as applicable to the Forest.

Laws

Energy Policy Act of 2005: Section 225 – Geothermal. Coordination between Forest Service (FS) & Bureau of Land Management (BLM); and program to reduce lease backlog.

Federal Land Policy and Management Act of 1976: recognized that the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals etc. from the public lands including implementation of the Mining and Minerals Policy Act of 1970.

Mining and Minerals Policy Act of 1970 and the Forest Service Minerals Program Policy August 3, 1995: “foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security and environmental needs.

Geothermal Steam Act of 1970: Secretary of the Interior may lease geothermal steam and related resources on NFS lands. Secretary of Agriculture must consent and lease subject to terms and conditions to protect the resource.

Multiple Surface Use Act of 1955: disposal authority for common variety minerals such as sand, stone gravel pumice, cinder and other common minerals. Withdrew common varieties from the 1872 Mining Law.

Mineral Materials Act of 1947: provides for disposal of common varieties of mineral materials. Disposal may be by sales and competitive bidding, or free use by government agencies, municipalities and non-profit organizations and in service FS use.

Mineral Leasing Act of 1947 as amended: extended provisions of the Mineral Leasing Act of 1920 to acquired national forest system lands.

Mineral Leasing Act of 1920, as amended: established which minerals on public domain land are leasable.

Organic Administration Act of 1897: opened all Forest Reserves to the U.S. Mining Laws. Miners and prospectors are subject to rules and regulations. Use of timber and stone may be permitted for use free of charge for mining and prospecting.

The General Mining Law of 1872, Act of May 10, 1872, 30 U.S.C. 22-47: all valuable mineral deposits and lands where they are found are free and open to exploration, occupation and purchase under regulations prescribed by law.

Regulations

36 Code of Federal Regulations 228, Subpart C, Disposal of Mineral Materials: Forest Service regulations for the disposal of mineral materials.

36 Code of Federal Regulations 228, Subpart A, Locatable Minerals: These contain Forest Service surface management regulations pertaining to the mining of locatable minerals.

36 Code of Federal Regulations 228, Subpart E, Oil and Gas Resources: These contain Forest Service surface management regulations pertaining to leasable minerals.

43 Code of Federal Regulations 3200, Geothermal: BLM leasing regulations

Forest Service Manuals and Handbooks

FSM 2800 Minerals and Geology

Chapter 2810 Mining Claims

Chapter 2820 Mineral Leases

Chapter 2830 Mineral Reservations and Outstanding Mineral Rights

Chapter 2840 Reclamation

Chapter 2850 Mineral Materials

Chapter 2860 Mineral Prospecting and Collecting

Chapter 2880 Geologic Resources, Hazards and Services

FSM 2700 – Special Uses Management, Chapter 2760 Withdrawals

FSH 2809.15 Minerals and Geology Handbook, Chapter 10 Surface Use Determinations

Forest Service Minerals Policy

Management of minerals and geology resources is an integral part of our multiple use mandates for National Forests and Grasslands. The Forest Service Minerals Policy Statement which was issued in 1995 by former Chief Jack Ward Thomas (Thomas 1995) outlines the objectives and policy of the mineral programs which are based on the Mining and Minerals Policy Act of 1970. Key objectives and policy are:

- “ to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security and environmental needs.”
- Exploration, development and production of mineral and energy resources and reclamation of activities are part of the Forest Service ecosystem management responsibility.
- The Forest Service will administer its minerals program to provide commodities for current and future generations commensurate with the need to sustain the long-term health and biological diversity of ecosystems.
- Maintain opportunities to access mineral and energy resources that are important to sustain viable rural economies and to contribute to the national defense and economic growth.

Definitions and Mineral Authorities

The principal minerals and energy resources on the Coconino National Forest are: locatable minerals, mineral materials and leasable minerals, chiefly geothermal resources. The following section provides an overview of the main mineral regulation authorities and the decision space associated with mineral activities and mineral proposals. Note that minerals management is complicated and mineral authority changes with land status. To keep the following discussion as simple as possible, the land status is assumed to be public domain lands which are the dominant land status type on this forest.

Locatable Minerals: Minerals that may be located and removed from Federal lands under the General Mining Law of 1872 as amended and which were not excluded in later legislation. They include hard rock, placer and industrial minerals and uncommon varieties of rocks found on public domain lands. This category includes gold, silver, manganese, copper and other valuable deposits specifically named in the law. Later regulatory acts removed certain mineral and energy resource from the locatable classification.

The role of the Forest Service in this process is to minimize environmental impacts on National Forest System surface resources. It does not manage the mineral resource *per se*; the responsibility for management of the mineral resource is in the Department of the Interior. The Forest Service manages the surface resources and the Forest Service surface management regulations are found at 36 Code of Federal Regulations (CFR) 228, Subpart A, Locatable Minerals.

The forest has two active locatable mining operations, the Verde Gypsum Mine and the Paint Rock Group which mines flagstone for construction and decorative purposes. Gypsum is normally a common mineral material. However, the gypsum mined at the Verde Gypsum Mine is used as a cement additive and so it is not a mineral material (36CFR 228.41d (5)). The Paint Rock Claim was located in 1947 prior to the Multiple Use Mining Act of July 23, 1955, and so the flagstone (usually a common variety mineral material) is classified as a locatable mineral. This law removed common varieties of rock from the category of locatable minerals and authorized the multiple uses of surface resources on mining claims. The forest has several other mining claims which are discussed in another section below.

The White Vulcan Mine, which ended operations in 2011, mined pumice which at one time was considered locatable because the pumice at that time had a distinct and special value. Under 36CFR 228.41d (6) block pumice which occurs in nature in pieces having one dimension of two inches or more and which is valuable and used for some application that requires such dimensions is not covered under the mineral materials regulations but is covered under the locatable regulations. The pumice at White Vulcan mine was used in the manufacture of stone washed jeans in the 1980s, but in the 1990s other chemical methods were used and so the pumice lost its value as a special application

and use. A settlement agreement was reached to close the mine in 2000 and in 2010-2011; the mine owner/operator reclaimed the mine.

The courts have consistently upheld the Forest Service authority to regulate mining activities on NFS lands. Forest Service authority is the Organic Administration Act of 1897, which made miners and prospectors subject to Forest Service rules and regulations. The authorized officer may not say “no” to a plan of operations, the regulations specify responses to a proposed plan of operations. They are: plan approved; operations do not require a plan; more information needed to process the plan; more time needed; EIS required. The authorized officer may say no to illegal operations or due to noncompliance with Endangered Species Act (ESA) or Clean Water Act (CWA). For more information on the requirements of the locatable minerals surface management regulation, found in 36 CFR 228 Subpart A, see Teixeira (2010).

Mineral Materials or Saleable Minerals include petrified wood, common varieties of sand, gravel, stone, pumice, pumicite, cinders, clay and other similar materials. Such mineral materials include deposits which although they have economic values, are used for agriculture, animal husbandry, building, abrasion, construction, landscaping and similar uses. Peat is also a mineral material. Mineral materials regulations are found in 36CFR 228 Subpart C.

The Forest Service is responsible for managing the surface occupancy and use of NFS lands and the disposal of certain mineral materials. The Mineral Materials Act of 1947 provides for the disposal of mineral materials (common varieties). It specifically requires competitive bidding for mineral materials on public domain lands unless it is impracticable to obtain competition or a

Federal, State, or local Government agency is to use the mineral materials in a public works improvement program and the public exigency does not permit the delay that would result from advertising. No preference-right type of disposal was ever contemplated for public domain lands. The disposal of mineral materials by the line officer is discretionary, but is conducted with the public interest in mind. The Forest Service Manual direction allows disposal of mineral materials only when the authorized officer determines that the disposal is not detrimental to the public interest and that the benefits to be derived from a proposed disposal exceed the total cost and impacts of resource disturbance. The types of mineral materials disposals include sales, free use, and force account or in service use (use by the Forest Service).

Leasable Minerals: Leasable minerals are oil, gas, coal, phosphate, potassium, sodium, sulphur, gilsonite, oil shale, geothermal resources and hardrock minerals¹. Geothermal energy is natural heat from within the earth captured for production of electric power, space heating or industrial steam. A geothermal area is any that may contain underground reservoirs of hot water or steam created by heat from the earth, or that have subsurface areas of dry hot rock.

A lease grants the exclusive right to explore for, develop, and produce the mineral commodity identified in the lease. Lease stipulations are used to limit or constrain those rights. Lease notices are used to make the lessee aware of constraints based on existing law or regulation. Lease regulations for the Forest Service are found in 36 CFR 228 Subpart E.

On public domain lands, for oil and gas, coal and geothermal, the FS must consent to the issuance of leases by the BLM. For phosphate, sodium and sulfur the FS role is to provide recommendations for lease. Consent involves a Federal Action under NEPA and requires a decision that is subject to

¹ Leasing of hardrock minerals is governed by several free-standing statutory authorities which apply to particular areas of National Forest system lands reserved from the public domain and two categories of acquired National Forest System lands.

appeal, while recommending does not. “Recommendations” are not legally binding on the BLM. For consent decisions, the FS normally takes the lead on NEPA compliance with BLM as a cooperating agency per national Memorandum of Understanding (MOUs). Note: a decision “not to consent” is still a “consent” decision under NEPA and the leasing laws and is subject to appeal under 36 CFR 215 (binding on BLM). Recommendations are not subject to appeal per 36 CFR 215.12(h). For essentially all leasing decisions, FS and BLM cooperate in NEPA analysis and make a collaborative decision; FS has the lead when "consent" is involved; BLM has lead when "recommendation" is involved; national MOUs are followed for Oil and Gas, and Geothermal. The Geothermal Steam Act of 1970 requires consent of the FS prior to issuing leases on NFS lands but not for the approval of a Utilization Plan, which is equivalent to a surface use plan or a mine plan.

Leasing is a discretionary decision and activity and the FS can say "no" to leasing for oil and gas and geothermal but doing so must be fully justified and documented in our NEPA analysis of the leasing decision per 36CFR 228.102 (c).

The FS cannot deny lease operations of an Application for a Permit to Drill or a Mine Plan but

The FS can mitigate impacts within the terms of the lease and to the extent negotiated with the lessee/operator. The FS can deny lease operations if it would violate ESA or some other statute.

Methodology and Analysis Process

Scope of Analysis and Data Sources

The following data sets were reviewed for information on past, potential and active mineral uses and resources across the Coconino NF. Data quality is discussed. Appendices for this report used much of these data sources and are discussed. Mineral uses and resources that were evaluated includes: locatable and leasable minerals (geothermal) and common variety mineral materials. More detailed reviews were carried out for each recommended Wilderness Area, proposed Special Areas (including Geologic and Botanical), and Research Natural Areas. Eligible Wild and Scenic Rivers were not reviewed because once established by statute they would be withdrawn from locatable mineral entry. Past, potential and active mineral uses were also reviewed within areas of very high scenic integrity.

1. **LR2000 Mining Claim (MC) geographic reports** – identifies mineral claims and their status by forest. LR2000 website search (<http://www.blm.gov/lr2000/>) was completed on February 14, 2011 and on June 15, 2011. The extent of the mining claim search included the Coconino NF. Both open and closed case files were reviewed. The review also utilized the GeoCommunicator National Integrated Lands System (NILS) map viewer for land and mineral use and leasing records when it was available in February. Please see supporting documents in the project file for scanned outputs from the GeoCommunicator with comments from the February 2011 website search. The data was used and is displayed in Figure 3 and Table A3. The BLM GeoCommunicator map viewer was removed from their web site in May of 2011 and is no longer available for searching.
2. **Arizona Geological Survey, Database for Mineral Districts in the State of Arizona** – identifies areas of mineral deposits which indicate areas of past, current and/or potential future mineral activity (Keith et al. 1983; and a GIS database layer compiled by Welty et al., 1989, Arizona Geological Survey Open File Report 89-9. The data was used to make the Map in Figure 2.
3. **Mineral Resource Appraisal of the Coconino National Forest, Arizona** (Lane, 1992). This was a study conducted by the U.S. Bureau of Mines of the mineral resources, mineral

exploration probability and development potential of the Coconino National Forest. The data was used in the discussions of mineral potential in the affected environment section of this report. See Figure 4 for a map reproduced from the report.

4. **Articles on Geothermal Potential of the San Francisco Volcanic Field:** Duffield et al. 2000; Morgan et al. 2003; and Morgan et al. 2004.
5. **Forest Rock Pit Inventory (1995) and Coconino-Kaibab Rock Pit NEPA geodatabase (2011) and Pits shape file(2005).** The geodatabase for the Coconino-Kaibab Rock Pit NEPA project contains a group of existing and new rock sources considered for development. The Forest Rock Pit Inventory is an old list of rock pits on the forest that perhaps dates from 1995. The Pits shape file has limited data in the attribute table and was developed from the Forest's Rock Inventory list. The 2005 GIS shape file points are poorly located and some existing rock pits were not captured. Shape files used in this analysis are in the project GIS files for the EIS. These sources were used for the table and maps for Figure 5, and Table A4 and Table A5.
6. **IWEB/INFRA Database for Minerals and Geology – Mineral Materials.** This database was used to derive current production and estimated future production of minerals and mineral materials. Data searches are in the project files for the report: Energy and Minerals Production Estimates, Coconino Forest Plan Revision, By Polly Haessig, Physical Scientist, Coconino National Forest: June 10, 2011; Revision Date: June 14, 2011. The data was also used to compile the list of personal use rock collection areas on the forest in the Affected Environment section.
7. **Minerals Availability System, Minerals Industry Location System (MAS/MILS) Arc Info point coverage for Western U.S.** (Causey 1998; U.S. Department of Interior – Bureau of Mines 1993). The Mines Database/GIS Layer was clipped to the Coconino National Forest boundary. Department of Interior, Bureau of Mines, 1993. Shape files used in this analysis include mines, mineshafts, mine properties. Shape files are in the project GIS files for the DEIS. The data was used for the map in Figure 1, Table A1 and A2.
8. **Mineral Favorability Database/GIS Layer Clipped to the Coconino National Forest** (U.S. Department of the Interior, Bureau of Mines, 1993). Shape files used are known mineral deposit areas. Shape files are in the project GIS files for the DEIS. The data was used in the map for Figure 2.
9. **Mineral Withdrawal Data:** Data used to compile existing information on mineral withdrawal status for the forest came from searches of the LR2000 database for case info, old lists and internal letters regarding mineral withdrawal reviews. Data sources are in the project supporting files. The mineral withdrawal data was compiled in the spreadsheet tables of Table A6.

The LR 2000 (#1, #9) is a national database developed by the Bureau of Land Management and is used by agencies and the public. A user can run reports on BLM land and mineral use authorizations for oil, gas, and geothermal leasing, rights-of-ways, coal and other mineral development, land and mineral title, mining claims, withdrawals, classifications, and more on federal lands or on the federal mineral estate. The data quality is good.

The Database for Mineral Districts in the State of Arizona (#2) is produced by the Arizona Geological Survey and this GIS coverage and the book reference is widely used by specialists doing mineral reports. The data quality is good and for many mineral districts, there is a reference list which provides further information about the history and production of mineral districts.

The Mineral Resource Appraisal of the Coconino National Forest, Arizona (#3) (Lane, 1992) is a study conducted by the U.S. Department of Interior, Bureau of Mines. The Bureau of Mines (BOM) is charged with the collection, analysis, and dissemination of information about mining, mineral resources and mineral processing of the United States and the world. The BOM has conducted similar studies of mineral resource potential for many of the national forests in the western United States, and this data is commonly used in mineral reports. The data quality is excellent.

The Minerals Availability System (MAS) was established by the U.S. Bureau of Mines in 1975 to ascertain the potential supply of selected mineral commodities. The MAS database describes over 5,000 significant mines, deposits, and minerals processing plants around the world with operation specific feasibility evaluations. The Mineral Industry Location System (MILS), provides location and identification information on about 22,000 (mostly U.S.) mineral sites. The MAS/MILS GIS database on this is the result of the inventorying process (#7, #8). The mineral sites have varying degrees of data quality and location accuracy. The information was compiled from state mineral survey publications and other literature sources going back into the 1800s and continuing to the 1970s. The MAS/MILS database and GIS coverage is commonly used by the Forest Service and Bureau of Land Management in their abandoned/inactive mine surveys and together with the voluminous literature about mines and mining make this a valuable database to evaluate the mineral potential of an area. The MAS/MILS database GIS layers are commonly used in mineral reports. The Mineral Favorability database is derived from the MA/MILS database. Overall the data quality is excellent.

The IWEB/INFRA Database for Minerals and Geology (#6) is Forest Service database used to track sales and free use offerings of mineral materials as well as other mining- related administrative actions. The data quality is good for sales of minerals to the public but the database does not track very well Forest Service use or County use of mineral materials because we don't always enter in the information of this use.

The Forest Rock Pit Inventory (1995) and Coconino-Kaibab Rock Pit NEPA geodatabase (2011) and Pits shape file(2005) (#5) are all Coconino National Forest data and inventories. Used together, and with air photos as a back cover image, active, inactive, and proposed rocks pits on the forest can be identified. Overall the data quality is good.

Articles on Geothermal Potential of the San Francisco Volcanic Field (Duffield et al. 2000; Morgan et al. 2003; and Morgan et al. 2004) (#4) were used to determine the geothermal potential of the San Francisco Volcanic Field. The data quality of their reports is good.

Mineral withdrawal data that was used (#9) came from internal Forest Service files letters, and data, discussions with Linda Fox, the Forest Reality Specialist, and BLM LR2000 information. The data was used to determine the status of existing, and expired mineral withdrawals on the forest. The data quality is good.

The overall uncertainty of data and information presented in this report is very low. All data is cited and is derived from agency and professional reports and databases. The data sources are widely used in mineral reports.

Revision Topics and Issues Addressed in this Analysis

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund or carry out any project activity. There are implications or longer term environmental consequences of managing the forest under this programmatic framework. The focus of this environmental analysis is on the consequences energy and minerals management on desired conditions for key resources. In turn, the analysis takes a look at what the likely or possible outcomes

are of managing other resources to meet their desired conditions are on minerals and energy management.

Revision Topics

The Analysis of the Management Situation (Forest Service May 2010) identified several forest revision topics related to minerals and energy. These are listed below.

- Update guidance on energy and mineral development. Plan guidance related to energy development should anticipate emerging technologies and alternative energy sources.
- Additional guidance should be provided regarding appropriate locations for mineral development and associated rehabilitation as well as energy development and associated infrastructure. Existing mineral withdrawals should be identified.

Issues and Concerns

Public scoping concerns have been raised with the mining of locatable minerals and leasing in areas of: high density habitat for threatened or endangered or sensitive wildlife species, high density archeology sites, areas of very high scenic integrity and Traditional Cultural Properties.

Another issue and concern has to do with wilderness areas. Recommending additional wilderness areas would prohibit and further geographically constrain management activities, such as minerals and energy management and associated uses that would otherwise be allowed.

Units of Measure Used To Respond to Issues and Concerns

- How guidance has been updated on appropriate locations for mineral development and associated rehabilitation as well as energy development and associated infrastructure. This is a qualitative analysis.
- The amount (acres) of land currently withdrawn from locatable mineral entry (same for all alternatives)
- The amount (acres) of land that could be recommended to be withdrawn from locatable mineral entry, by alternative and type such as wilderness, special areas etc.
- Possible mineral and energy resource opportunities lost by existing and recommended wildernesses and special areas that once designated would likely be withdrawn from mineral entry or could have no leasing stipulations. This analysis will also review the proposed Wildlife Habitat Management Areas and areas of Very High Scenic Integrity Objectives for mineral resource potential. This is a qualitative analysis.

Assumptions

The following assumptions have been made as part of this analysis:

Forest Plan

- The land management plan provides a programmatic framework for future site-specific actions.
- Land management plans do not have direct effects. They do not authorize or mandate any site-specific projects or activities (including ground-disturbing actions).
- Land management plans may have implications, or environmental consequences, of managing the forests under a programmatic framework.

- The plan decisions (desired conditions, objectives, standards, guidelines, management areas, monitoring) will be followed when planning or implementing site-specific projects and activities.
- Laws, regulations, and policies will be followed when planning or implementing site-specific projects and activities.
- Monitoring will occur and the land management plan will be amended, as needed.
- We will be funded similar to past budget levels (past 5 years).
- The planning timeframe is 15 years; other timeframes may be analyzed depending on the resource (usually a discussion of anticipated trends into the future).

Minerals and Energy Resource

- The Forest has the capacity to evaluate process and administer mineral activities.
- The economy will fluctuate and influence mineral exploration.
- Past mineral uses, mining claims and activities provide a useful indication of current and potential future uses and activities on the forest.
- New technologies will influence mineral exploration and development.
- There are no known leases on the forest for the following leasable mineral resources: oil and gas, oil shale, coal or geothermal. See the affected environment section for discussions of past leases and current interest.

The Forest Service would respond as a cooperating agency when requested by the BLM, which is the lead agency for subsurface mineral extraction, including geothermal. Because there are no current leases, the consequences to leasable minerals will not be analyzed in this report.

Summary of Alternatives

Four alternatives are analyzed in detail in this Specialist Report: Alternatives A through D. Alternative A is the current 1987 Coconino National Forest Plan as amended (Forest Service 1987). Alternative B is the Preferred Alternative/Proposed Action, drafted over the past several years and refined with several periods of internal and informal public feedback. Alternative C considers increases in the amount of wilderness and special areas, as well as increased opportunities for quiet semi-primitive recreation, while Alternative D considers slightly fewer restrictions than Alternatives B and C on human access and use of the Forest and its resources.

The following summaries of the alternatives focus on the components that affect or could be affected by energy and minerals management.

Alternative A, 1987 Plan

Sections pertaining to energy and minerals of “1987 Plan” are found in the supporting documents folder associated with this report. The 1987 Plan contains detailed standards and guidelines for minerals management. The 1987 Plan has the following unique and special areas that are consistent with management direction to be recommended for mineral withdrawal.

- All or part of ten Wilderness Areas: Sycamore Canyon Wilderness, Fossil Springs Wilderness, Kachina Peaks Wilderness, Red Rock-Secret Mountain Wilderness, West Clear Creek Wilderness, Wet Beaver Wilderness, Strawberry Crater Wilderness, Kendrick Mountain Wilderness, Mazatzal Wilderness, and Munds Mountain Wilderness.

- Four Research Natural Areas: Casner Mountain, G.A. Pearson, Oak Creek Canyon, and San Francisco Peaks Research Natural Areas.
- Two Wild and Scenic River segments: Fossil Creek and the Verde River
- One Scenic Area: Oak Creek Canyon Scenic Area
- Four Botanical Areas: Mogollon Rim, Verde Valley, Fern Mountain and Fossil Springs Botanical Areas
- One Geological Area: Red Mountain Geologic Area.
- Two National Historic Landmarks: Winona Village and the C. Hart Merriam Base Camp
- Eleven segments of stream courses are eligible for consideration for Wild and Scenic River designation.
- Six National Register Districts: Ridge Ruin, Nuvakwewtaqa, Clear Creek Ruins, Winona Village, Sacred Mountain, and Honanki.

The 1987 Forest Plan also contains an extensive list of areas recommended for mineral withdrawal such as RNAs, special areas, cultural sites, recreation and scenic areas and administrative sites. It also contains a list of current withdrawals recommended for continuation, modification or revocation.

Alternative B, Modified Proposed Plan

Forestwide desired conditions, guidelines and management approaches are found in Forest Plan that accompanies the EIS. The proposed revised forest plan is the preferred alternative. It would provide strategic, program-level guidance for managing the Forest and its natural resources over the next 10 to 15 years. Within the Minerals and Energy section of the plan, desired conditions are presented for these resources to guide management. Guidelines are presented to use in recommending lands for mineral withdrawals, and considerations for various stipulations for leasable minerals to limit impacts to resources. Most standards and guidelines that were found in the old 1987 plan were eliminated because they are redundant with Forest Service management direction and policy, Federal law and regulation pertaining to minerals and energy. Other differences include:

- Three new wilderness areas are recommended: an addition to the existing Strawberry Crater Wilderness, Davey's which would serve as an extension to the already existing Fossil Springs Wilderness, and Walker Mountain, a new wilderness.
- Proposing or re-proposing² three Research Natural Areas: West Clear Creek, Rocky Gulch, and an expansion of the existing San Francisco Peaks Research Natural Area.
- Proposing the Cottonwood Basin Fumeroles as a geological special area.
- Including desired conditions in the Volcanic Woodlands management area that highlights the scenic and cultural importance of the volcanic features in the area, and that cinder cones outside of the Cinder Hills OHV area maintain their integrity, form, and natural processes. A management approach is also included to foster collaboration with the National Park Service on projects that could affect their lands and/or mission.

Alternative C

The Forest proposes Alternative C to be responsive to public recommendations for more wilderness and primitive areas on the Forest, as well as other special and management areas to provide additional protection to botanical and wildlife resources.

² West Clear Creek and Rocky Gulch were proposed in the 1987 Plan, but were never established. This alternative, however, identifies a different location for the proposed West Clear Creek RNA that is further from recreation uses that could affect the RNA.

Alternative C differs from the other alternatives in the following areas that affect Minerals and Energy:

- Recommends 13 new wilderness areas (Strawberry Crater, Abineau, Railroad Draw, Deadwood Draw, Walker Mountain, Cedar Bench, Black Mountain, Cimmaron-Boulder, Hackberry, Tin Can, Davey's, East Clear Creek, and Barbershop) totaling 92,386 acres;
- Designates 8 additional Management Areas for wildlife habitat: Anderson Mesa Wildlife Habitat Management Area (WHMA), East Clear Creek WHMA, Hospital Ridge WHMA, Jack's Canyon WHMA, Knoll Lake WHMA, Limestone Pasture WHMA, Pine Grove WHMA, Second Chance WHMA), totaling 340,481 acres.
- Expands the Cottonwood Basin Fumeroles geological area to be a combined geological and botanical area that highlights the outstanding botanical diversity of the area (1,850 acres).

Alternative D

Alternative D differs from the other alternatives in the following ways:

- Recommends no new wilderness areas;
- Allows mechanized recreation (e.g., bikes) on designated trails in botanical and geological areas.

In the analysis for this Alternative, it was assumed that the Cottonwood Basin Fumeroles would be designated as both a botanical and geological area.

Description of the Affected Environment

The Coconino Forest has very few locatable mineral resources, no oil and gas leases or developments, but it has potential geothermal resources (no current leases, no developments) associated with the San Francisco Volcanic Field. Locatable minerals with past or current production have included manganese, gypsum, flagstone and pumice³. The Forest has a small amount of common variety mineral materials production including cinders, crushed and pit run aggregate, rock and fill dirt, and landscape rock/decorative stone. Most of the use of mineral materials on the forest is in service use and by Coconino County under permits or other agreements. In service use is use by the Forest Service or authorized contractors or permittees for projects. Aggregate production and saleable minerals are anticipated to increase with future forest restoration activities. Some areas are withdrawn from locatable mineral entry. National demand for energy is also projected to increase, and the Forest has received recent requests for additional power line corridors and energy exploration on the Forest.

Mining activity on the forest falls into three legal and regulatory categories: locatable materials such as hard rock minerals such as manganese (which is subject to claim); saleable (permitted) mineral activities such as sand, gravel, and common building stone; and leasable minerals which includes geothermal resources and oil and gas. Please see the following discussion on law regulation and policy for information on mineral authorities.

³ Gypsum, flagstone and pumice are included as locatable minerals because each of these has been mined on the forest under locatable authorities. Controversy over whether the gypsum deposits of the Verde Valley Gypsum mine are a common variety mineral or a locatable mineral was settled by the Bureau of Land Management in 1964 when they decided that it was locatable and the issue was dropped by the Forest Service in 1967. Flagstone that is mined on the forest associated with the Paint Rock Claims is locatable because the claims were located before 1955 when sandstone landscape rock was considered a locatable mineral. Pumice associated with the White Vulcan Mine was mined as a locatable mineral because it was determined to have a distinct and special value for use in stonewashed jeans. In the 1990s the demand for pumice of this quality and for this use has declined and it is no longer more valuable than common variety pumice. However, block pumice having one dimension of 2 or more inches is an uncommon variety of mineral material under the Surface Resources Act, and is subject to location under the mining laws.

Exploration and Mining History and Mineral Resources

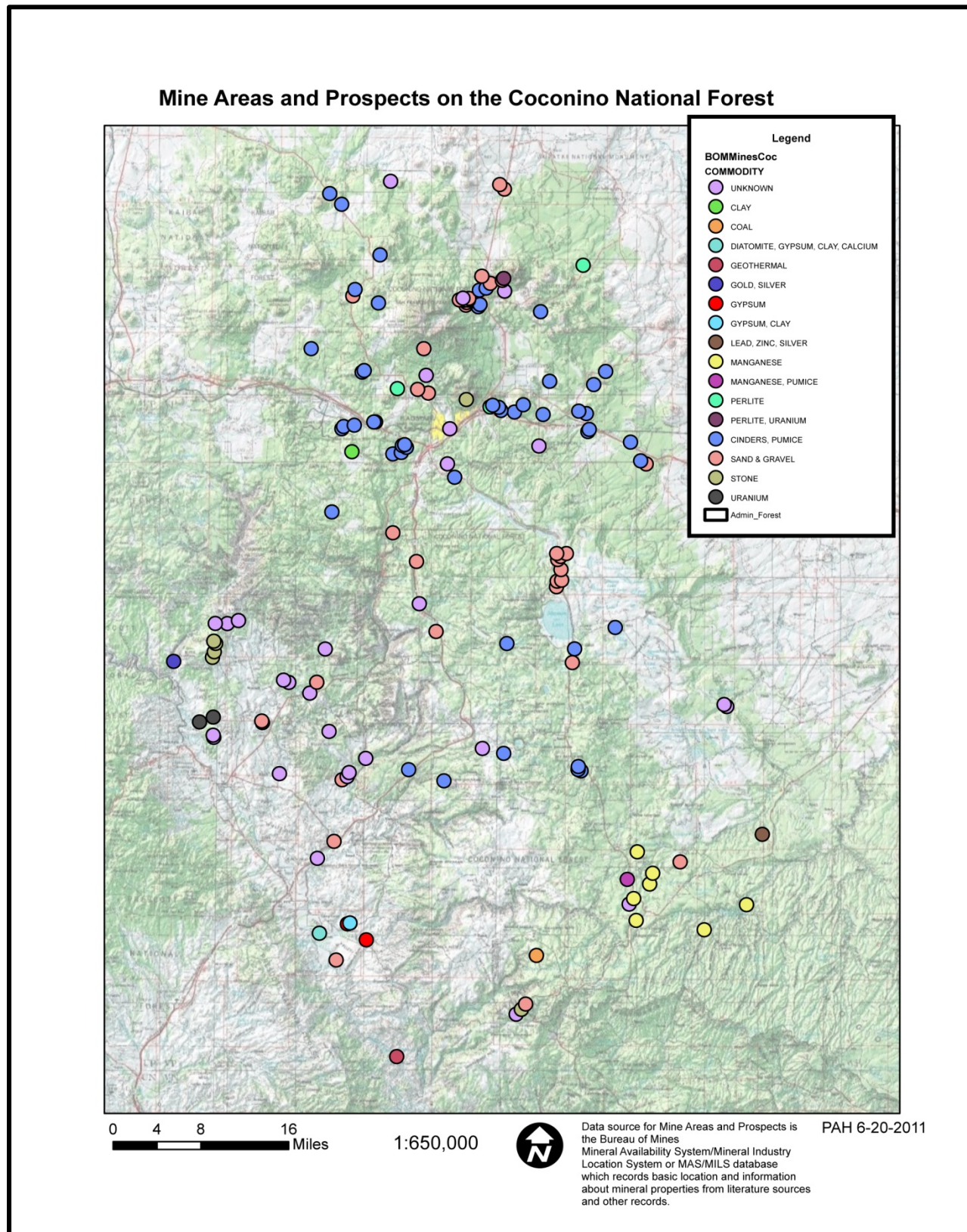
This section describes past exploration for mineral resources on the forest, and past and current mining activities. The mining authority such as locatable leasing or common variety is deemphasized here because this section focuses on mineral resources in general. The emphasis on past mining exploration is important to consider when evaluating existing mineral resources and future mineral potential. This is because economic values of mineral resources constantly change as does technology to produce and process minerals. Past mineral occurrences may have future production and uses with technological advances, new uses and higher values of the minerals.

Mineral Commodities Explored for and Mined on the Forest

Historically there has been limited mining activity on the forest (Appendix A, Table A1). The most common commodity and mine types listed are surface pits and borrow sources for cinders, pumice and sand and gravel. Past exploration and production on the forest has included the following mineral commodities: clay, coal, diatomite, gypsum, gold, silver, lead-zinc-silver, manganese, perlite, uranium, pumice, sand, gravel and stone (Appendix A, Table A2 and Figure 1). Past mining production (other than aggregate and stone) has mainly consisted of manganese surface mining in the 1930s and 1950s, gypsum open pit mining that from the 1960s to the present, sandstone landscape rock, and pumice surface mining from 1990 – 2010. Mining activities for sand, gravel and stone occurs mainly at rock pits managed on the Forest and is discussed further in the section below.

Uranium occurs in the Verde Formation buttes east of Tuzigoot National Monument. The area has been extensively investigated for uranium in the 1970s or 1980s as is evidenced by the many shallow trenches and surface exploratory holes and diggings. As part of their study, the Bureau of Mines (Lane 1992) sampled many locations in the area. They found that the uranium content was overall low (0.015%). However, it was not considered a resource at that time due to highly variable and overall low uranium content, lack of definable deposit boundaries, and discontinuous occurrences (Lane 1992). They also noted that at the time of their study, the uranium market was depressed. Given that the time of their study was the early 1990s the uranium mining technologies and economic feasibility may have changed since that time. The only other uranium occurrence occurs north of Flagstaff outside of the forest (Ulrich et al. 1984). This is the Cameron Mineral District east of Gray Mountain where uranium is found in the sandstone and mudstone member of the Chinle Formation. Uranium-bearing fossil logs are common. There are many other higher potential uranium prospects in Arizona and in other states such as New Mexico and Texas that are currently being explored. Currently as evidenced by the lack of active mining claims surrounding the Tuzigoot National Monument area, there appears to be no interest in uranium there presently. Development of uranium in this area is unlikely during the life of the forest plan unless there are significant and unanticipated changes in the technology, industry and economics of development.

Figure 1. Mine Areas and Mineral Prospects on the Coconino National Forest



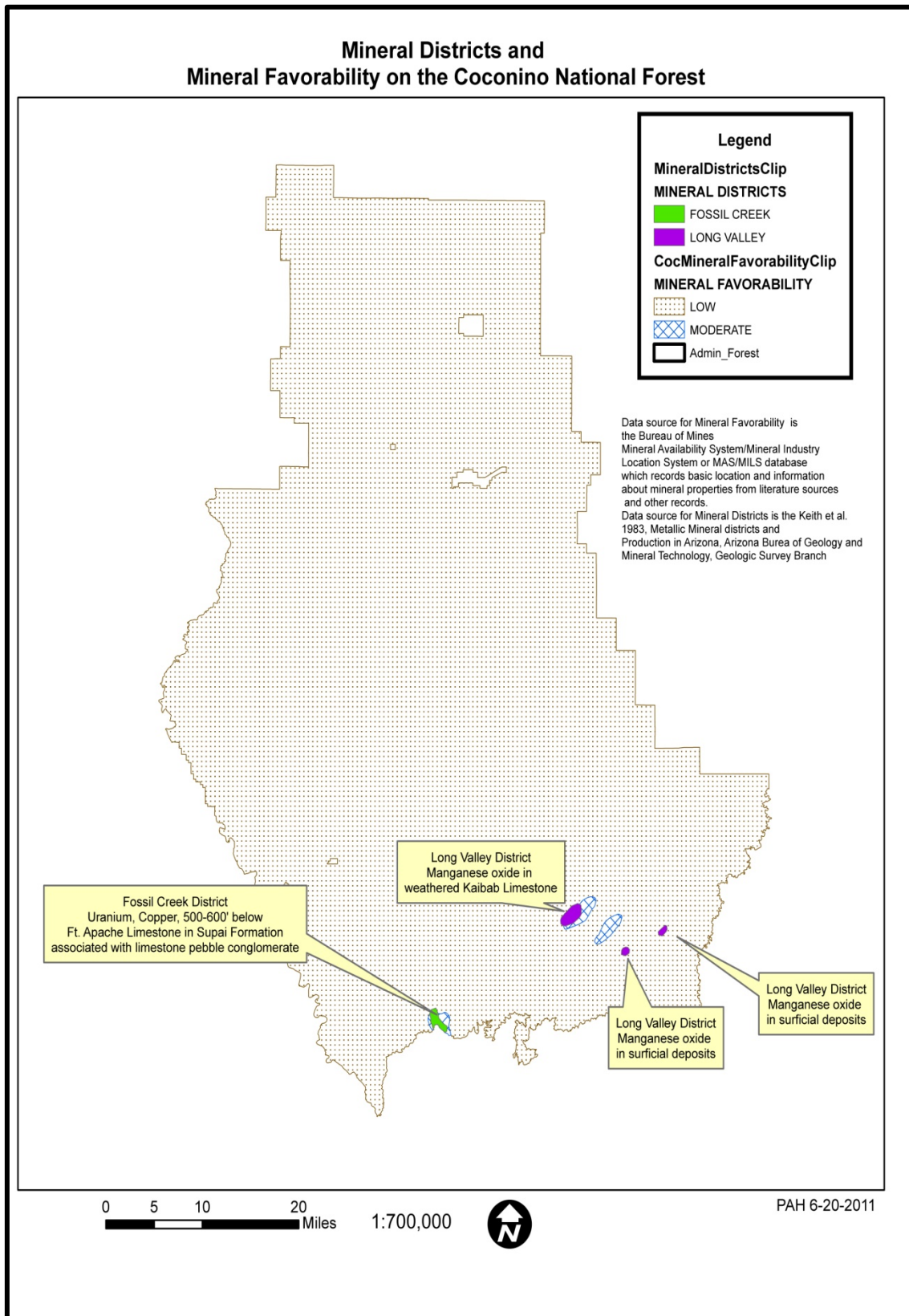
Mineral Districts on the Forest

Mineral districts for Arizona (Keith et al. 1983) were defined and mapped according to geological criteria. The principal goal was to arrange known metallic mineral occurrences into discrete metallogenic systems of similar age and style of mineralization. Many of the metallic occurrences have poorly understood geological controls and hence, many of the district boundaries will change as knowledge of both their deposits and geologic settings is improved.

There are two mineral districts on the forest: (Figure 2) the Long Valley District for manganese and the Fossil Creek District for uranium and copper (Keith et al, 1983). Manganese oxide occurs at several localities near Clints Well, Blue Ridge, East Clear Creek and the Battleground Ridge area (Lane 1992). The manganese occurs as surface replacement deposits on bedding surfaces of the Kaibab limestone and sandstone and in the Moenkopi sandstone formation. Manganese also occurs as nodules or masses in weathered limestone and sandstone and as cement in rim gravel deposits. In the Clints Well and Long Valley area manganese was first described and mined in the 1920s. Mining occurred again in the 1940s and 1950s. The ore was trenched and strip mined on the surface and evidence of the shallow trenches and dump piles still remains. Samples collected by the Bureau of Mines (BOM) as part of their study (Lane 1992) indicated that the manganese content was as high as 46.9%. However, the manganese oxide is not considered a resource due to the lack of sufficient quantities and discontinuous deposits of the ore.

The Fossil Creek mineral district is described as a strata-bound uranium deposit with copper in the Supai Formation associated with limestone pebble conglomerate. Four areas of bulldozer cuts show evidence of mineral prospecting within the Fossil Creek Roadless area, and mining claims were located there in the 1960s. The four copper-uranium prospect locations are mapped and described in Weit et al. 1983 and Weir and Beard 1984 in their mineral resource potential study of the Fossil Creek Roadless Area. There is no reported production known from this occurrence. Field studies conducted by the U.S. Geological Survey and the U.S. Bureau of Mines during 1980-1981 of the Fossil Springs Roadless area concluded that the Supai formation rocks contain only spotty occurrences of copper and uranium and has therefore little promise of mineral or energy resources (Beard and Ellis 1984; Weir et al. 1983; Weir and Beard 1997). This mineral district is entirely within the Fossil Creek Wilderness and is partly within Wild sections of the Fossil Creek Wild and Scenic River which makes it withdrawn from mineral entry on two counts. An area of moderate mineral favorability is mapped all around the mineral district area (U.S. Department of Interior – Bureau of Mines, 1993). Except for a few acres outside of the wilderness boundary on the Coconino and nearly 1,000 acres on the Tonto Forest, the area of moderate favorability is also withdrawn from mineral entry (wilderness and a wild section of the Fossil Creek Wild and Scenic River).

Figure 2. Mineral Districts on the Coconino National Forest



Active Mining Claims

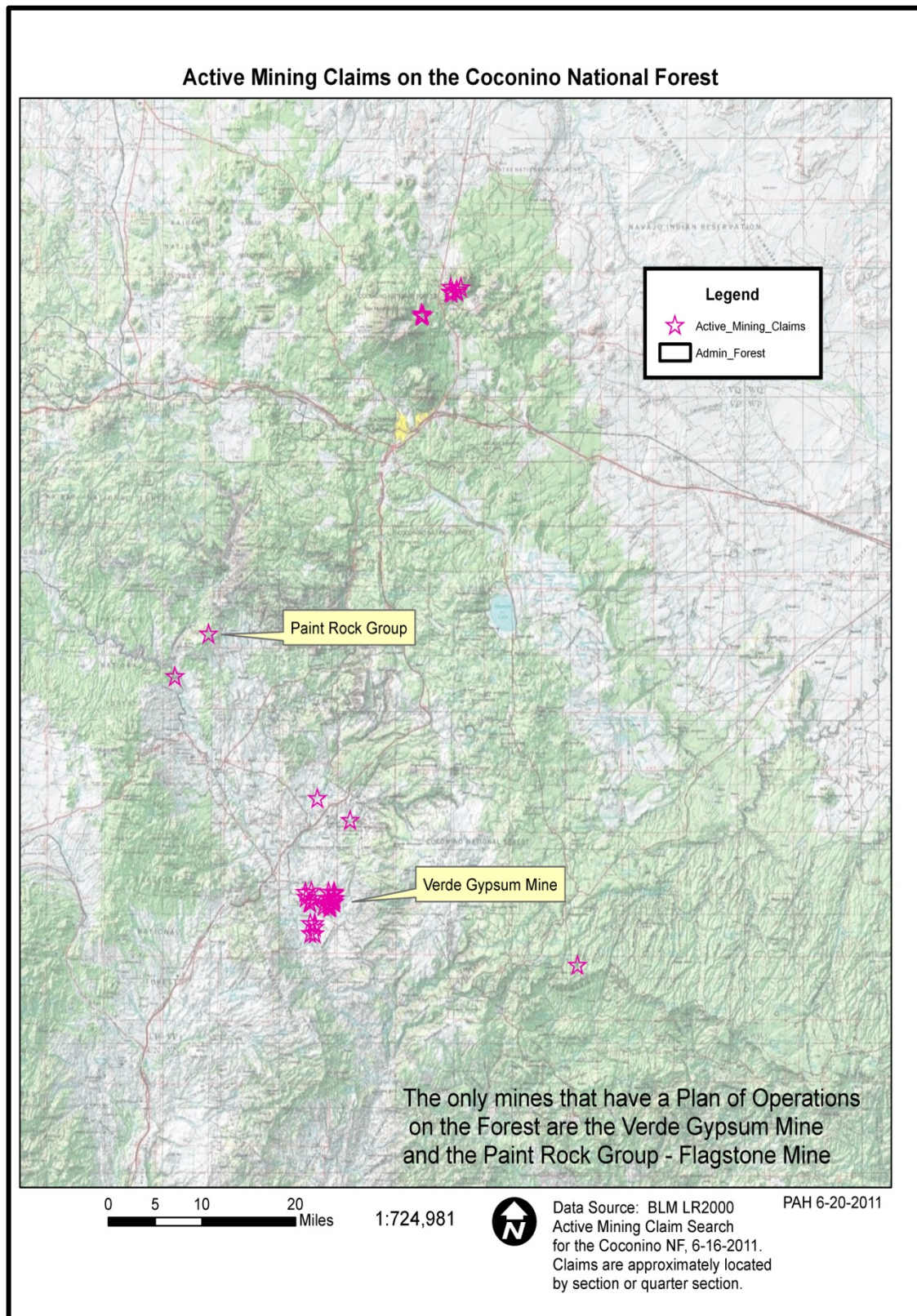
The BLM database, LR2000 was queried to determine the number of active mining claims on the forest. Mining claims are strictly authorized and managed by the Bureau of Land Management. Knowledge of where current and past claim activity has occurred is important to understand the mineral potential of the forest and past and future trends. Having a mining claim on the forest also does not mean that active mining is going on the claim. In many instances claims are filed to hold claims for sampling and exploration or other reasons, and many times no mining activity is going on at all.

Currently, there are about 18 located mining claims across the forest (Figure 3, Table A-3). Most of the current active claims are in the Verde Valley area associated with the currently active Verde Gypsum Mine operated by Phoenix Cement/Salt River Materials Group and owned by the Salt River Pima-Maricopa Indian Community. Recently, 242.73 acres were patented on the gypsum mine which conveyed land of the United States to the Phoenix Cement Company (Forest Service June 16, 2011; U.S. Department of Interior – Bureau of Land Management May 30, 2011). There are still areas on the Forest used by the Verde Gypsum Mine and are covered under a Plan of Operations (see discussion below in Active mining operations). The claim(s) associated with the Paint Rock Group that are being mined for decorative flagstone are noted on the map (Figure 3). These claims were located in 1947 and are authorized under a Plan of Operations (see discussion below in Active Mining Operations). There are a few other mining claims located in the eastern part of the San Francisco Volcanics likely associated with cinders and pumice prospects. No surface disturbance or mining is occurring in that area however as indicated by viewing the 2010 aerial photos. Overall, the existence of a total of 18 mining claims on the forest indicates a very low level of mining interest or activity.

Active Mining Operations

There are two active mining operations on the Forest that are administered under a Plan of Operations: the Verde Gypsum Mine and the Paint Rock Group (Table A-3, Figure 3). The Verde Gypsum mine produces gypsum for use in cement as an additive and for limited use in agricultural fertilizer. The mine has patented mining claims (private lands) and also leases land from the State Lands Department in addition to having mining claims on lands managed by the Forest Service. The Paint Rock Group mine produces a small amount of flagstone and decorative stone. The White Vulcan Mine is a past active open pit mine that ceased operations in 2010. It operated from 1990 to 2010 and produced pumice for stone-washing jeans and for and common uses. It is currently totally reclaimed and revegetated with no future mining permitted there. Please see footnote #3 in the previous section on mineral commodities mined on the forest for information on why gypsum, flagstone and pumice were/are locatable minerals in these instances.

Figure 3. Active Mining Claims Map for the Coconino National Forest.



Mineral Resource Potential of the Coconino National Forest

The following information is summarized from the Mineral Resource Appraisal of the Coconino National Forest conducted by the Bureau of Mines (Land, 1992). These mineral appraisals are conducted by the Bureau of Mines (BOM) to assist the Forest Service in incorporating mineral resource data in forest plans. Again all commodities are discussed in general without reference to locatable, leasable or mineral materials authorities and regulations.

The findings from the BOM study of the Coconino National Forest are summarized as follows (Lane 1992; Figure 4). There are gypsum and clay resources in the Verde Valley most of which are being currently mined by Phoenix Cement/Salt River Materials Group on their claims and properties. The Verde Valley area outside of the Verde Gypsum mine has moderate development potential for gypsum, clay, uranium, diatomite and limestone. There are also areas of moderate development potential for sand and gravel in the alluvial deposits of Wet Beaver, Dry Beaver, Verde River, Oak Creek and Sycamore Creek. Many of the areas mapped include private lands and wilderness and Wild and Scenic Rivers so the real development potential is limited. Clay resources are present at Rogers Lake that may be useful in making lightweight aggregates; Rogers Lake is characterized as having high development potential for clay (Figure 4). Most of Rogers Lake is Coconino County property and is a wetlands area with prime wildlife habitat. The manganese occurrences at Long Valley, Blue Ridge and near East Clear Creek are not considered to be a resource or have any future development potential. Volcanic cinders which are widespread across the forest in cinder cones but are particularly abundant in the San Francisco volcanic field are the primary resource of the forest for aggregates, cinder block manufacture and decorative stone. Dimension stone is another available resource such as found sandstones found in the Coconino Sandstone, Supai and Moenkopi Formations. These rock formations are fairly widespread across the forest. Basalt lava flows and limestone are another resource for use as aggregates for road construction and surfacing. Pumice and cinders are currently being mined on private lands in the northeastern part of the San Francisco Volcanic Field. Additional resources exist on forest lands. The expected trend is for minimal future new mining development and ongoing mining and exploration for gypsum in the Verde Valley.

Mineral Materials

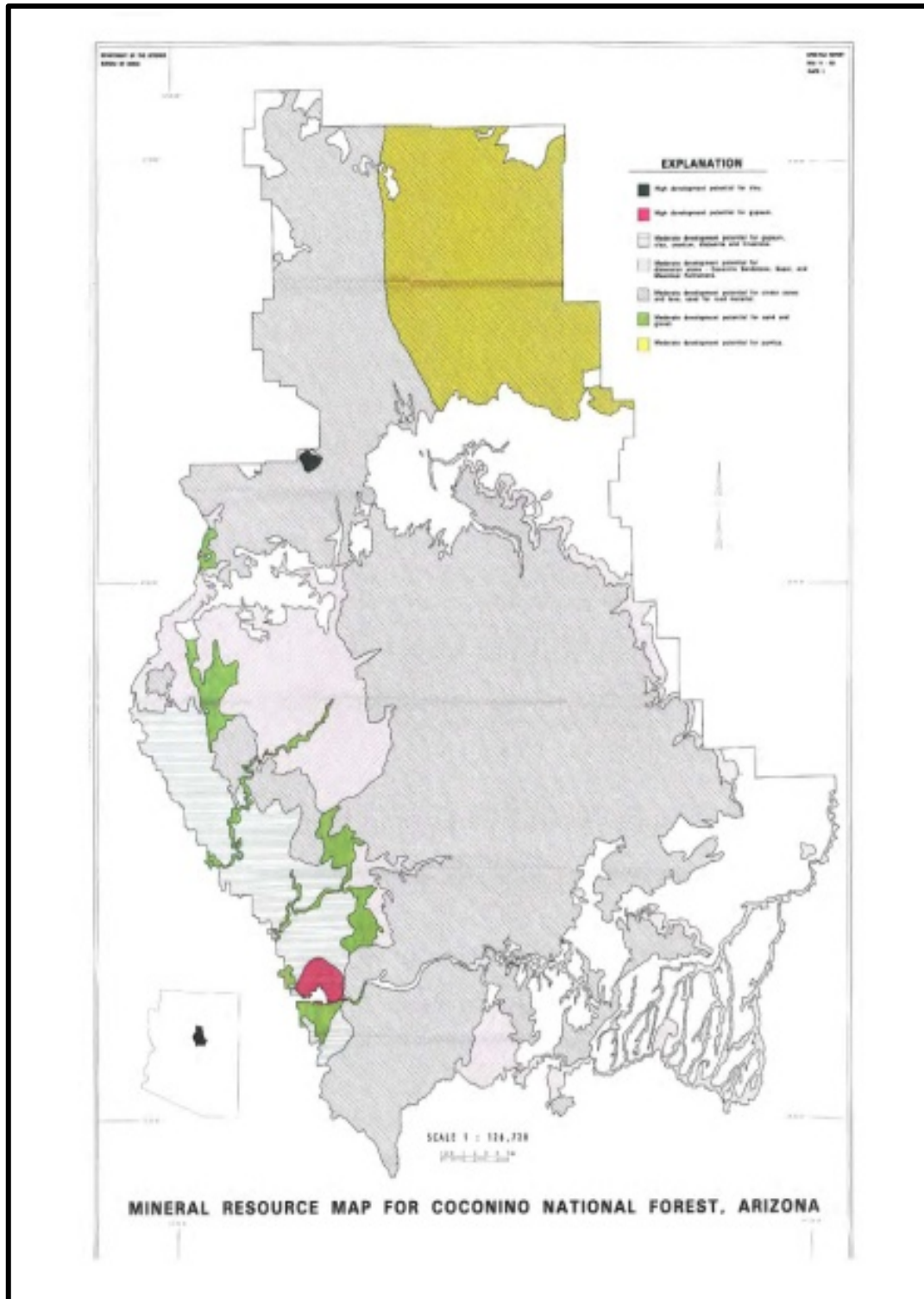
This section describes current uses of mineral material commodities on the forest, and includes information on inactive, active and proposed new rock pits on the forest. The mining authority such as common variety is deemphasized here because this section focuses on mineral materials in general. Mineral materials resources on the forest includes: cinders, crushed basalt and crushed limestone aggregate, sand and gravel including alluvium and rim gravels; and decorative stone including malpais rock⁴, sandstone rock, limestone rock and landscaping sand, gravel and cobbles.

Rock Collection for Personal Use

On the forest, we have several locations where the public can be issued a permit to collect rocks for personal use. Maps of these areas are located in the project files associated with this report. These areas are:

⁴ Malpais rock is multicolored volcanic lava rock sometimes with lichen or moss on the surface of the stone.

Figure 4. Mineral Resource Potential Map for the Coconino National Forest, from Lane 1992.



- Mogollon Rim Decorative Stone Collection Area, Mogollon Rim Ranger District, on Forest Road (FR) 300 from FR137 to FR295E, not to extend 10 feet beyond bar ditches.
- A-1 Mtn. Rock Gathering Area, Flagstaff Ranger District, FR518 and areas south of A-1 Mountain.
- Ritter Rock Collection Area, Flagstaff Ranger District, west of I-17 north of FR 253 to James Canyon.
- Tombstone Rock Gathering Area, Flagstaff Ranger District, FR700 west of Ward Camp Tank
- Slate Rock Gathering Area, Flagstaff Ranger District, along buried pipeline that crosses US180 near Slate Lakes east to the junction of the pipeline and FR549.
- Red Rock Picking Area, Red Rock Ranger District, FR761B.
- Dry Beaver Rock Gathering Area, Red Rock Ranger District, east of Hwy 179 FR9206L on floodplain of Dry Beaver Creek in the vicinity of the gaging station.

Rock Pits on the Forest

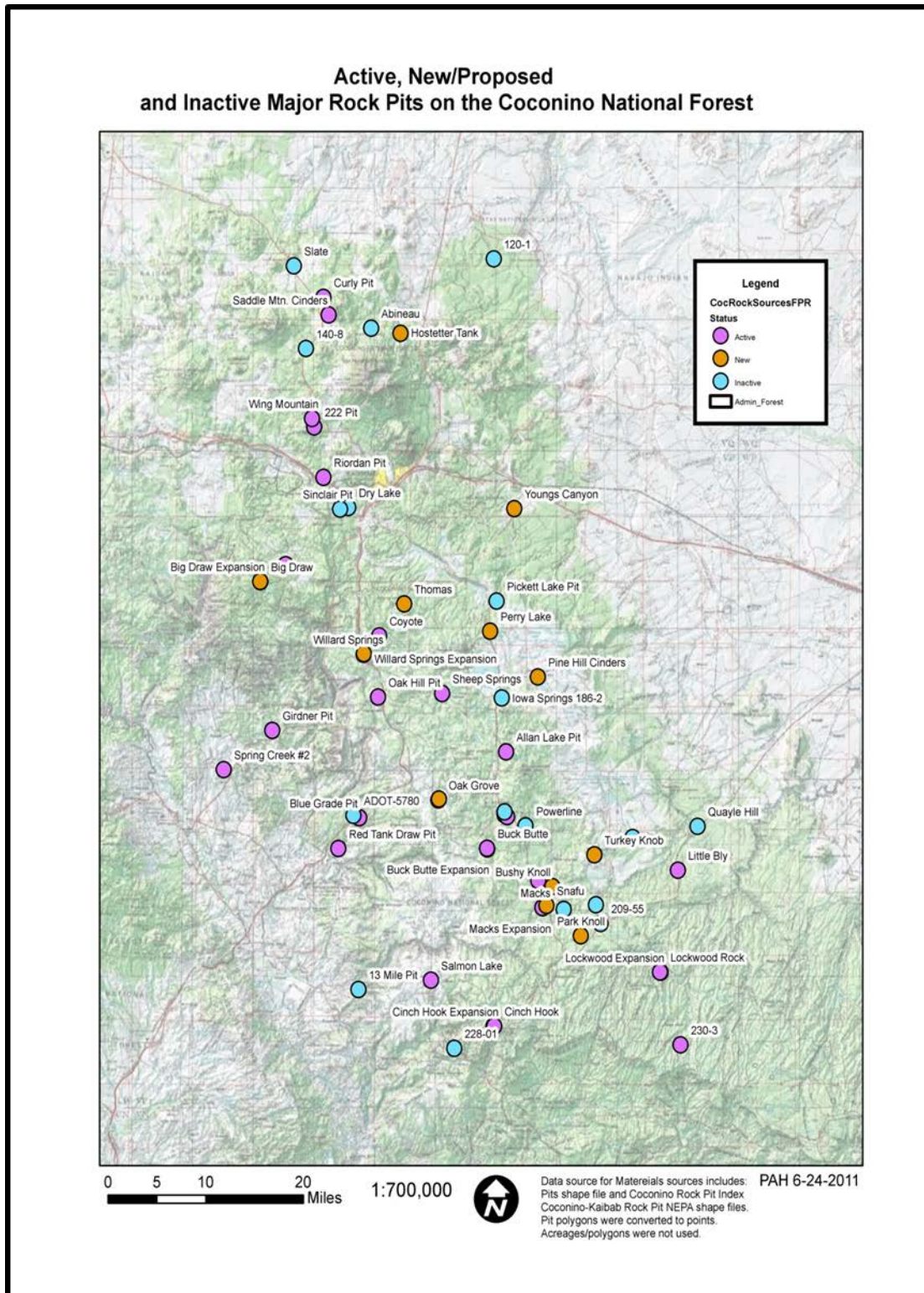
For this report, the best available rock pit location data was compiled using data sources listed in the Methodology and Data Sources Section of this report and a listing of the major rock pits on the forest was developed (Table A4). Rock pit locations are shown a map, Figure 5.

Across the forest we have many rock pits that are open for future use and are considered “active”. Other rock pits are considered inactive and closed mainly due to scenery and visual concerns or because they have high cuts, or other resource concerns. A few other rock pits that are described are not actively being utilized for rock resources but are being used for disposal sites for wood debris, oversize rock and fill soil. One rock pit site, Wing Mountain is managed as a snowplay site in the winter. Cinch Hook rock pit is an active rock pit that has also been used by the public in the past as a snow play area. In recent years it has been closed to public use year round because of safety issues and other concerns.

The Coconino- Kaibab Rock Pits Project (Preliminary Environmental Assessment, Forest Service June 30, 2013) proposes to develop and expand a number of rock pits on the forest as well as reclaim some rock pits that are no longer needed. Rock pits on the Coconino that are proposed for development are included in the list (Table A5). That project proposes development of 19 rock pits on the Coconino NF. Of these, eight are entirely new rock sources and 11 are existing sources proposed for further development and expansion. The decision for the rock pit project is expected to be completed before publish the final EIS for plan revision so rock pit development and expansion would occur regardless of which forest plan alternative is selected.

Mineral materials use authorizations are largely comprised of mineral materials permits for saleable decorative rock and cinders. Free use permits are also authorized to local agencies and non-profit groups and in service use (use by the Forest Service). In the past, the Forest has permitted use of aggregate sources to Arizona Department of Transportation and Coconino and Yavapai County. These rock sources have included Cinch Hook Pit (crushed basalt), Salmon Lake Cinder Pit (cinders) and several others. Currently we don’t have any permits with ADOT, but we allow free use or have permits with Coconino County at several rock sources on the Forest. Coconino County has shared in the cost of crushing contracts implemented by the Forest and has obtained use of the appropriate share of the material produced. In addition, the Forest has permitted uses by ADOT, Coconino County and Gila County among others various at rock pit sites for temporary storage of milling materials or oversize rock when they have done road construction on highways that cross the forest. This type of use is anticipated to occur in the future.

Figure 5. Rocks Pits on the Coconino National Forest.



Construction-related materials like these are typically consumed within the local area due to transportation costs. Therefore, demand is greatly influenced by local construction activities. The demand for these materials has been low in recent years, but as the economy recovers, the demand for construction materials should increase. Demand for put run and crushed aggregate on the forest is anticipated to increase with future forest restoration projects that include timber sales or stewardship contracts.

Leasable Minerals

Oil and Gas

Leasable minerals on the forest includes oil and gas and geothermal. As evidenced by past exploration, there are no oil, gas, or oil shale resources on the forest. Exploration and lease activities are summarized below.

Exploration for oil and gas occurred in the Oak Creek and Mormon Lake areas in the 1960s (Lane 1992). 28 wildcat exploration holes were drilled; however, there was no indication of hydrocarbon fluids. The forest had one oil gas lease in T17N, R9E G&SR Meridian that was opened in 1982 and closed in 1983. In the late 1990s the Bureau of Land Management received another expression of interest in developing oil and gas in the area of Mint Springs on the Mormon Lake District. The Mint Springs Environmental Analysis (EA), 1998 was completed and the Decision Notice and Finding of No Significant Impact (DN/FONSI) authorized implementation of Alternative 2 to consent to leasing with both standard and special stipulations and lease notices. Special stipulations that would be incorporated into the leases if issued included: No Surface Occupancy for protection of Federally Threatened Species and their habitats, Region 3 Sensitive plant species, prevention of soil erosion on slopes > 40% and visual quality. Controlled surface use stipulations and timing limitation stipulations were also identified for the protection of wildlife, cultural resources and riparian areas and for the prevention of soil erosion. The DN/FONSI and EA is filed with the references for this project (Forest Service 1998). The oil and gas lease was never offered by BLM. It was an anomalous occurrence because on the basis of the past exploration efforts, there are no known oil or gas resources on the Forest. In 1976 one exploratory hole was drilled to a depth of about 4,000 feet and was dry hole.

Geothermal Resources

Potential geothermal resources are present on the forest in two areas: the first is associated with geologically recent volcanics of the San Francisco and Mormon Mountain volcanic fields; the second is associated with geothermal waters near Montezuma's Castle and at the Verde Hot Springs. The San Francisco Peaks area is classified by the USGS as prospectively valuable for geothermal steam (Duffield et al. 2000; Morgan et al. 2003; Morgan et al. 2004). Geothermal resources of the Verde Hot Springs and Montezuma's Castle area have not been extensively evaluated from the brief literature search that was conducted for this report.

There have been previous geothermal leases on the forest in the San Francisco Volcanic Field, but they were closed in 1989. There has been a geothermal nomination proposed in the Eastern San Francisco Volcanic Field in 2008 and 2009 (Sierra Geothermal Power, 2009; Coordts, Forest Service, Southwestern Regional Office, 2008). The nomination consists of approximately 15 sections in T23N, R8E and T 24N, R8E. A leasing analysis is necessary. No leasing analysis has been conducted to date. The lands where recent geothermal interest has been expressed are in an area of very high

density of heritage sites. It also is near to the Sunset Crater National Monument and other mountains of cultural significance to the tribes.

Geothermal Leasing in the Western US, Programmatic EIS

The following information is presented as it may have future relevance to geothermal leasing analysis on the forest.

In response to the Energy Policy Act of 2005, the Bureau of Land Management and the Forest Service in cooperation with the Department of Energy prepared a Programmatic Environmental Impact Statement (PEIS), for Geothermal Leasing in the western US (U.S. Department of Interior, Bureau of Land Management 2008a; 2008b). One of the purposes of the PEIS was to provide the Forest Service with a framework to facilitate pending geothermal lease applications and future determinations for projects on National Forest System Lands. The PEIS developed a comprehensive list of stipulations, BMPs, and procedures to serve as consistent guidance for future geothermal leasing and development on public and NFS lands. The Record of Decision, (ROD) identified NFS land with geothermal potential as being legally open or closed to leasing. The Apache-Sitgreaves, Tonto and the Coronado National Forests were the only Arizona forests with geothermal potential considered in their analysis. The Coconino was not included in their analysis even though there is geothermal resource potential and there has been past geothermal leases and interest. Their analysis identified proposed acres legally closed (by law, regulations or other authority) to geothermal leasing and available to leasing (BLM, 2008, Table 2-2, Figure 2-5). Examples of non-discretionary closures on lands administered by the FS and BLM include: National Monuments, Wilderness Areas, Designated Wild and Scenic Areas etc. (BLM 2008, p. 2-6). Their ROD did not amend any forest plans. The ROD and PEIS have the most use to the Coconino in their descriptions of various stipulations and BMPs that the authorized officer can issue to impose moderate to major constraints on use of the surface of any leases in order to mitigate impacts to resources or desired conditions as defined in the guiding land management plan.

Mineral Withdrawals

A withdrawal is a management tool for withholding an area of National Forest System land from settlement, sale, location, or entry under some or all of the general land laws, including the mining and mineral leasing law, for the purposes of limiting activities under those laws in order to maintain other public values in the area, or reserving the area for a particular public purpose or program.

Section 204 of The Federal Land Policy and Management Act of 1976 (43 U.S.C. 1714) (FLPMA) gives the Secretary of the Interior (BLM) general authority to make, modify, extend, or revoke most withdrawals on public or reserved Federal lands. The Forest Service must apply to the Secretary of the Interior for withdrawal actions on National Forest lands.

Many of our existing withdrawals predate the Federal Land Policy and Management Act and generally will never expire Table A6). Other areas have been withdrawn by specific acts and subsequent amendments. These areas are subject to withdrawal review as prescribed by Section 204(l)(1) of FLMPA; except those withdrawn by the following act (FSM 2760.01):

- Wilderness Act of 1964.
- National Recreation Areas (specific acts).
- Wild and Scenic Rivers Act of 1968.

Objectives of the FS withdrawal program are as follows (FSM 2760; 6/1990):

1. Protect the United States' improvements and other unique values that are subject to disposition or destruction under the public land laws.
2. Provide a consistent and efficient withdrawal program that meets land and resource management objectives.
3. Ensure cooperation and coordination with the Secretary of the Interior and the Bureau of Land Management.
4. Encourage mineral activity where mineral extraction is the best use of the site.

FS policy for withdrawals is as follows (FSM 2760, 6/1990):

1. Forest officers should consider withdrawals for areas with a history of mineral findings and in which the management direction is not compatible with alienation or use under the mining laws; for example, research natural areas, interpretive or cultural sites, scenic areas, geologic areas, critical habitat of endangered species having a very limited range and specific habitat requirements not found elsewhere, and botanical areas.
2. Forest officers should consider withdrawals for the National Forest System lands that are occupied by capital improvements in which relocation or replacement would be impractical. These areas would include sites containing major improvements such as offices, work center complexes, and developed recreation areas.
3. Requests for withdrawal from mineral leasing should be made rarely (see FSM 2761.04). Existing public laws, Federal regulations, and leasing stipulations provide substantial opportunities (FSM 2822.2) to accommodate both surface resources and the recovery of leasable minerals.
4. Forest officers should consider withdrawals for National Forest System lands occupied under special-use authorization. Notify permittees holding permits on lands open to mineral development of their risks and liabilities where withdrawal of the area is not appropriate (FSM 2720).

Under the 1987 Plan and the current condition, lands currently withdrawn from mineral entry include designated wildernesses, designated Wild and Scenic Rivers, National Historic Landmarks, National Register Districts, one traditional cultural area, other cultural sites of significance, scenic and recreation areas and administrative sites. For this report, the best available mineral withdrawal information of existing past and current withdrawals was compiled and a listing of the withdrawals on the forest was developed (Table A6). Key sites withdrawn include:

- San Francisco Peaks Mt. Eldon Recreation withdrawal: includes also Elden Environmental Study Area, Elden Pueblo, Medicine Fort, San Francisco Peaks Research Natural Area (RNA) Flagstaff Watershed, Lockett Meadows recreation Area, Snowbowl Ski Area, and Kachina Peaks Wilderness.
- Administrative sites such as: National Forest Roadside Zones, Long Valley Administrative Site, lookouts, campgrounds, new Red Rock Ranger Station among others.
- Cultural Sites such as Chavez Pass Ruin, Clear Creek Ruins among others
- Wildernesses
- Verde and Fossil Creek Wild and Scenic Rivers

Withdrawals are complicated to undertake and maintain the case files. Many are very old and others expire every 20 years. Some information is lacking on the withdrawal listing that was compiled such as expiration date. Some sites will have no expiration date. Others expire after a period of 20 years and must either be continued, amended or revoked (discontinued). The status on some of the sites is uncertain from the research that was done for this report and some of the withdrawals may have expired. In the early 2000s seven sites including Red Mountain Geological Area were recommended for withdrawal, continuation or modification and were in their two year segregation period during which time the Forest had to complete the NEPA and case file for submission to the Secretary of the Interior. Unfortunately the case file and NEPA was not completed. These sites will have to start the process all over again. The lands proposed for withdrawal are described in a Federal Register notice and are segregated from new location and entry under the U.S. mining laws for a two year period. Mining claims with valid existing rights are not affected.

Mineral withdrawals are covered in this report because areas of past mineral findings or potential mineral resources must be considered when reviewing areas recommended for special status in plan alternatives such as: wildernesses, eligible Wild and Scenic Rivers, recommended geologic, and botanical areas, recommended Research Natural Areas, and areas of very high scenic integrity. If mineral resources exist then the line officer must weigh the values of the resources that exist, understand potential conflicts, and consider whether there may be other protection opportunities to accommodate both surface resources and recovery of locatable or leasable minerals. In some cases the best use of the site may be minerals management. If the proposed management direction for these areas is not compatible with use under the mining laws, then that finding should be presented. On the other hand if there are no potential mineral resources then there are no conflicts between surface resources and mineral values.

Environmental Consequences and Cumulative Effects

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities (including ground-disturbing actions), there can be no direct effects. However, there may be implications, or long-term environmental consequences, of managing the forests under this programmatic framework.

General Consequences of Mining

Public domain lands on the Coconino NF are available for exploration, development and extraction of mineral resources except where lands have been withdrawn from mineral entry. All minerals activities including locatable, leasable and common variety mineral materials are subject to Federal, State and Local laws and regulations to protect the environment. The Forest Service Policy as it relates to minerals has been previously described.

On the Coconino Forest, past mining activities and anticipated future mining activities are like to continue to be surface or open pit mining of cinders, pumice, sand and gravel, crushed aggregates, gypsum, and clay. Geothermal resource development has the potential to occur in the future if economic resources exist. Disturbances associated with this type of mining includes removal of trees and surface vegetation, displacement of surface soils, erosion and sedimentation, construction of roads, buildings, wells, pumping stations, waste water ponds and transmission lines. Other disturbances include equipment noise, blasting, dust, emissions from generators and engines and noxious weed infestation and spread.

Best Management Practices (BMPs) and other mitigation measures can be implemented to reduce impacts to surface resources. For leasable minerals a variety of types of constraints called

stipulations can be imposed to reduce impacts to surface resources, wildlife, heritage sites, soils and water quality. Such stipulations are conditions of a lease issuance and include the following:

- No Surface Occupancy – a major constraint as this does not allow surface development
- Controlled Surface Use Stipulation - this is employed to achieve resource protection. Types include: protection of riparian and wetland habitat, protection of visual resources, protection of recreational areas, compatibility with urban interface, protection of erosive soils and soils on slopes greater than 30% and protection of important habitat and migration corridors.
- Timing Limitations – commonly applied to wildlife and occupied habitat
- Endangered Species Act, Sensitive Species, Cultural Resources Stipulations – these are lease notifications to ensure that appropriate consultation has been carried out under applicable laws.

Reclamation is part of any mining operation and should be ongoing as mine development proceeds. Mining activities can alter habitat and the environment but implementation of BMPs, stipulations and reclamation can minimize effects.

Alternative A. 1987 Plan

Excerpts from the 1987 Plan pertaining to minerals and energy management are found in supporting information associated with this report.

Environmental Consequences

Minerals Goals

The goals of the 1987 plan are consistent with today's policy and desired conditions -- "support of sound energy and minerals exploration and development. Administer the mineral laws and regulations to minimize adverse surface resource impacts". The consequences of implementing these goals would be that the Forest would be following law and regulation and FS minerals policy.

Mining Law Compliance and Administration

The plan reiterates FS policy and the laws and regulations pertaining to locatable minerals and mineral materials and the proper administration of plans of operation. It emphasizes environmental analysis for mineral projects and working to avoid potential conflicts between surface resource issues and mineral development. These are standard Forest Service policies and procedures and do not need to be detailed in the plan in order to carry them out.

Minerals Management Leasable

The type of leasable mineral is not specified and that could have some bearing on the type of stipulations that could be considered.

No surface occupancy is prescribed where listed endangered species exist, on surface slopes greater than 40% or where VQO is foreground Retention, on the Montezuma Castle Backdrop Area or the portion of Deadman Wash basin adjacent to Wupatki National Monument. Buried pipelines may be considered if Retention VQO is met.

The No Surface Occupancy stipulations that are described are broad based and restrictive. There may be site specific resource conditions that would allow for other mitigations and stipulations to reduce or eliminate effects. There may be other timing stipulations or controlled use stipulations that may be adequate lessen effects to TE wildlife or scenery. In other cases, No Surface Occupancy stipulation may be an option to be considered for a site specific location. The 40% slope criteria and scenery standards especially in proximity to the National Monuments and National Parks may be appropriate and protective of those resources. The stipulations described limit decisions that could come about through environmental analysis and NEPA which may allow for more flexible responses to resource issues of wildlife habitat, soils and scenery. The consequences of implementing this standard/guideline are that there may be conflicts between implementing the 1987 Forest Plan and the current Forest Service Minerals policy and leasing regulations.

Minerals Management--Oil and Gas

The guidelines are not totally accurate according to FS policy (FSM 2800 Chapter 2820, subpart E, Oil and Gas Resources). The Forest Service has no statutory responsibility for issuing or supervising prospecting permits or leases. The Forest Service reviews permit and lease applications brought forward by the Department of the Interior, and makes recommendations to protect surface resources and to prevent conflict with other activities, plans and programs of the Forest Service, and other users. Exploration is considered operation. For any geophysical or geochemical exploration involving surface disturbance, the operator must submit a proposed surface use plan as part of their Application for Permit to Drill. Sensitive areas are not described in detail in the 1987 Plan and so that could be open to interpretation for when to apply a Limited Surface Use stipulation which is the same as a controlled surface use stipulation. FS and BLM regulations are complex for oil and gas. Reiterating FS policy in the forest plan is not necessary and may lead to conflicts between law, regulation and policy and the Forest Plan as policies are updated nationally.

Minerals Management -- Geothermal

The plan supports studies to determine whether a geothermal resource exists. The FS can certainly support studies but it is BLM's role in evaluating the geothermal resource. The plan is outdated regarding the role of the FS in geothermal resources. The FS role is to provide consent or non-consent to leasing on FS lands through a leasing analysis (U.S. Department of Agriculture – U.S. Department of Agriculture - 2006). The FS does not process lease applications except for reviewing and providing consent or non-consent to the Secretary of the Interior. Changes in geothermal resources legal authorities and practices have occurred with the Energy Policy Act of 2005. As a result, these projects reviewed in light of this standard/guideline would be inconsistent with current Forest Service Policy.

Minerals Management – Uranium

The FS does not manage mining claims, the BLM does. The locatable minerals regulations apply to uranium, and any notice of intent to mine or proposed plan of operations would be processed expeditiously the same as with any other type of locatable mineral. Implementing this standard/guideline would be consistent with law and regulation. Maintaining maps of potential mineral locations is a part of minerals and geology management, but keeping up with current activities in exploration and production is not a purpose or function of the forest plan. The resource potential for uranium is low for the forest and so would be the need for implementing this standard/guideline.

Minerals Management – Non-Energy

This section appears to address other leasable minerals such as sodium or phosphate, neither of which has known resource potential on the forest.

Minerals Management - Common Variety Minerals

The forest has lists of material source pits (rock pits) but, again this is a responsibility of professional staff assigned to rock resource management and does not fit in with the objectives of a strategic plan. Again, the guideline reiterates regulations and policy as well as environmental review standard practices. Economic analysis of using material sites is stressed which is also a program management consideration and is also emphasized in the FS Mineral Policy. We may not meet the demand from State, County and City agencies for aggregate material as providing common variety materials is a discretionary decision and the types of resources needed may not be available in the locations or quantities desired. Resource impacts must also be considered. Coordinating mineral sources to provide other uses such as snow play areas is something that can only be done in limited areas where the site meets slope and safety requirements and where snowplay can be properly managed to minimize liability, risk and protect public safety. Scenery and landscape analysis is also mentioned and though it uses the Visual Management System VQOs, the intent is to provide for rock resources while still maintaining the scenic integrity of the area. The consequences of implementing this standard/guideline from the 1987 Plan are that it would be generally consistent with Forest Service Policy, but may not be entirely implementable due to current resource considerations and safety standards.

Mineral Reservation and Outstanding Rights

This discussion in the 1987 Plan is talking about evaluating land status. Again this is part of FS policy and regulations that would be applied to a project on a case by case basis. Most of the Forest is public domain lands.

Mineral Character or Potential Evaluation

This prescribes that the Forest maintains a map on mineral potential. Actually this has been done by the Department of Interior, U.S. Bureau of Mines in 1992 (Lane 1992). Minerals are a necessary part of the case file for most land exchange or sale cases. This is again reiterating FS policy.

Mining Area Reclamation

This standard is to prepare a reclamation schedule. Reclamation is the responsibility of the mining operator, not the FS, and that is why reclamation bonds are held for mining operations. Reclamation is also part of law and regulation and therefore this part of the 1987 Plan is outdated.

Geological Planning and Inventory

Include a geologist or minerals specialist as part of the interdisciplinary process in the next Forest Plan update. That is me – see this report. This is also a function of geology and minerals program management and also could depend on the issues driving the plan at the time of the forest plan revision or amendment.

Mineral Withdrawals

The 1987 plan recommends a large number of mineral withdrawals for special areas within the first decade of the decision. Many of these are current withdrawals, but some have expired. The current status of some areas is also not known. The consequences of implementing the withdrawals that aren't in effect and are recommended for completion are that it would require a large budget and resource specialists to complete the NEPA and case file for the application. The consequences of site-specific withdrawal requirements in the Forest Plan would result in scarce resources being directed to areas that may not have a high risk of resource-mining conflicts and would not necessarily lead to improved resource protection.

Summary

The 1987 plan reiterates FS Policy and Federal law and regulations pertaining to the locatable, leasable and mineral materials. It is outdated with respect to leasing authorities, and the role of the BLM and FS in managing these resources. The No Surface Occupancy stipulations proposed as a standard may be overly restrictive in that a different kind of stipulation would be sufficient to protect the resources of wildlife, soils or scenery at a site specific location. Many of the standards and guidelines are a function of geology and minerals program management and could vary upon the issues and priorities faced by the leadership team of the forest. With respect to the mineral withdrawals, various specific sites were recommended in the plan. However, all of them individually need to go through the mineral withdrawal process which includes NEPA. There could be unknown issues and concerns with sites that would factor into the withdrawal process, including mineral potential. Also, the decision to proceed with a withdrawal and the NEPA analysis for individual withdrawals would consider whether a withdrawal is warranted, or whether existing law and regulation or other alternatives to withdrawals provide adequate protection of the resources.

Alternative B. Proposed Land Management Plan

Refer to Proposed Land Management Plan that accompanies the Environmental Impact Study.

Environmental Consequences

Desired Conditions and Guidelines

The general description for energy and minerals adequately characterizes the current resource potential for minerals and geothermal development on the forest. There will be an ongoing need for future development of common variety mineral materials and gypsum. The desired condition statements summarize Forest Service Minerals Policy and development of minerals resources while protecting important sites, habitats and scenery through use of mitigations and stipulations. Compliance with law and regulation is also emphasized without reiterating specific requirements. Reclamation of mine areas is also highlighted. Use and development of mineral materials for in service use by the Forest is also covered and a balanced approach is described for making materials available to local agencies, the state, cities and the county, consistent with other resource values.

One standard is proposed:

- Mineral operations and activities must avoid archeological sites that have been determined to be eligible or may be eligible for the National Register of Historic Places

The above standard in Alternative B relates to heritage sites. It states that mineral operations and activities must avoid archaeological sites that have been determined to be eligible or may be eligible for the National Register of Historic Places. This standard affects all mineral activities and future proposed developments. The consequences of implementing this standard are that significant heritage sites, site complexes, and National Register sites would be protected from impacts due to mineral development and activities. This complies with existing law and regulation. The consequences of implementing this standard are difficult to analyze with respect to mineral potential on the forest because these areas are not identified or mapped. Due to the low overall mineral potential on the forest, the consequences are likely to be that there is minimal overlap between cultural sites and high mineral potential areas or rock pit sites.

Two guidelines focus on mineral withdrawals and leasable minerals stipulations. Instead of providing a list of sites that should be recommended for withdrawal, revocations or modifications, (as in alternative A) the plan provides some general criteria for consideration of withdrawals. The general criteria include protection of social, cultural and ecological values and where management direction is not compatible with mineral development. This general criterion is consistent with FSM 2760 for withdrawals. Additional criteria for locatable mineral withdrawal with current or past withdrawals as examples include:

- Properties with a substantial Forest Service investment in facilities such as [administrative sites](#) and campgrounds. An example is the red Rock Ranger station which has been withdrawn.
- Traditional Cultural Properties where historic preservation laws alone do not adequately protect the cultural resource. An example is the San Francisco Peaks Mount Elden Recreational Area and Oak Creek Canyon which has been withdrawn.
- Established research natural areas not located in wilderness. There are no examples.
- Geological and botanical areas. The Red Mountain Volcanic Area was withdrawn in 1977 but the withdrawal has expired.
- Habitat of species having a very limited range and specific habitat requirements not found elsewhere where law and regulation alone do not adequately protect the resource. There are no examples.

These additional criteria are also generally consistent with FSM 2760. Many of our RNAs and Botanical Areas have not been withdrawn from mineral entry and could be considered for withdrawal as a consequence of this Alternative. This is also true with the proposed Cottonwood Basin Fumeroles Geologic area. An example of a an area containing a plant species that has a very limited range and habitat requirements that could be considered for withdrawal is the San Francisco Peaks groundsel; however the area where it is found may already be within the San Francisco Peaks Mount Elden Recreational Area withdrawal area. A few sites that are of great significance to the public and tribes are candidates for maintenance of their existing withdrawals, namely, Oak Creek Canyon Recreational Area and the San Francisco/Mt. Elden Recreation Area. Both are already withdrawn and implementation of Alternative B would allow for retention/maintenance of these withdrawals. The consequences of retaining these withdrawals are that very important cultural, social, scenic and ecological resources will be protected from locatable mineral entry. There may be an unquantifiable loss of potential geothermal resources within the existing San Francisco Peaks Mount Elden Recreational Area withdrawal. As part of implementing Forest Service policy for withdrawals, it is understood that as part of the withdrawal process, potential mineral resources and the history of mineral findings will be evaluated in any area considered. The consequence of pursuing any mineral withdrawal for a forest is that there may be a loss of potential mineral resources but that loss is thoroughly evaluated with respect to the resources at risk at the project/withdrawal level. The

consequence of implementing these guidelines is that the future potential mineral resource loss due to withdrawals cannot be either quantitatively or qualitatively analyzed due to the lack of specificity.

The other guideline deals with areas that should be considered for “No Surface Occupancy”, “No Leasing” or other leasing stipulations for leasable minerals. This guideline’s purpose as stated is to protect social, cultural and ecological values. This is a guideline that would be evaluated and considered during site specific project planning. Stipulations are made during a leasing analysis for a site specific area, in an interdisciplinary and public process. Implementing this guideline would be consistent with FS policy to minimize surface disturbance to resources as part of a FS leasing analysis that undergoes NEPA. This guideline provides examples or kinds of areas to be considered for restrictive leasing stipulations to minimize resource impacts and includes the following:

- Designated and Eligible Wild and Scenic Rivers
- Research Natural Areas not located in wilderness.
- The Foreground of State and National Scenic Byways and National Trails
- Areas of Very High Scenic Integrity not located in Wilderness, Wild and Scenic Rivers or other withdrawals.
- San Francisco Peaks/Mount Elden Recreation Area Withdrawal
- Areas of very high archaeological site density (greater than 60 sites per square mile) and potentially eligible for the National Register of Historic Places
- Areas with threatened, endangered, or sensitive species
- Traditional Cultural Properties where historic preservation laws alone do not adequately protect the cultural resource

Implementation of this guideline has the consequences of limiting activities associated with leasable mineral development particularly geothermal resources for which there is potential on the forest. The areas listed which have potential for geothermal resources and development includes parts of the San Francisco Peaks/Mount Elden Recreation Area Withdrawal which is also considered a Traditional Cultural Property. Areas of very high scenic integrity were reviewed to see what they leasable resources they might include. Very high scenic integrity areas include the Red Mountain Geologic Special Area, designated wildernesses, designated and proposed/eligible Wild and Scenic Rivers, parts of the Walker Mountain and Davies proposed wilderness areas, and all of the Strawberry Crater proposed wilderness area, and parts of the Verde Valley Management Area. Some of these areas are not available to leasing, such as designated wildernesses and Wild segments of designated Wild and Scenic Rivers. Of the areas reviewed, only the Strawberry Crater proposed wilderness area has possible geothermal resource potential. Very highly scenic areas that are available to leasing can be considered for No Leasing or No Surface Occupancy, but likewise other less constraining stipulations can be utilized to protect resources while still consenting to leasing. This would be evaluated as part of a leasing analysis. Areas of very high cultural site density include the Volcanic Woodlands Management Area which overlaps an area of recent geothermal interest north of Sunset Crater in O’Leary Basin, O’Leary Peak and Robinson Mountain. Areas of very high cultural site density would be protected by all the available types of stipulations. Areas with a high density of threatened, endangered or sensitive species occur throughout the forest. Sensitive plant species would be the most likely occurrence in areas of potential geothermal resources. As with the cultural resources described above, they would be protected by all the available types of stipulations.

Past leasing analyses, such as the Mint Springs Environmental Analysis for Oil and Gas Leasing would be reviewed if the area overlapped with a new leasing proposal. Any future request from the BLM to consider an offer to lease in that same area would necessitate a Chapter 18 review of the

1998 decision to determine if any new information or changed circumstances exist and whether the old decision is within the context of the new proposal. If new information or changed circumstances exist that fall outside the context and intensity of effects disclosed in the EA it would require the EA be corrected, supplemented, or revised.

Mineral Resources and Proposed Wilderness and Special Areas

Proposed wildernesses, RNAs, the geologic special area and areas of very high scenic integrity were evaluated for past, active or ongoing and future mineral commodity uses. Consequences to mineral resources include the loss of the valuable mineral resource potential of the lands proposed for wilderness, RNA special area designation, or because of very high scenic integrity. Valuable mineral resources that could be lost include locatable, leasable and saleable mineral materials.

Proposed new wilderness areas if authorized/approved under the decision, would be recommended for withdrawal from locatable mineral entry until such time it becomes congressionally designated. In the interim, minerals management activities would be inconsistent with preserving wilderness values and would be unlikely to occur unless there were prior valid existing mineral rights, or proposed mineral activities would not disturb the surface.

Proposed RNAs and geologic special areas may be withdrawn from locatable mineral entry if they are administratively designated and the withdrawal is approved by the Secretary of the Interior. Thus, potential locatable mineral resources may become unavailable upon designation of new special areas and RNAs as consequence of this plan.

Though saleable mineral materials and leasable minerals are both discretionary management activities, meaning in general they can be approved or not approved, the potential loss of these resources was analyzed because the resource may be important, valuable, the only resource in that particular area, and their management would be consistent with Forest Service Minerals Policy. The consequences of Alternative B is that ongoing or new leasable or mineral materials activities would not be considered in proposed wilderness, special areas, and RNAs because it would be inconsistent with their desired conditions and other standards or guidelines.

Saleable mineral materials are also a valuable resource and existing active or proposed rock sources may be lost to future use upon designation of wilderness, new special areas, and RNAs because mineral material management may be inconsistent with desired conditions or other guidelines.

Eligible wild and scenic rivers considered under all alternatives that are classified as wild would not be available for mineral activities because it is Forest Service policy to protect their eligible status pending a suitability determination. Valid existing mineral rights would be the exception to this. All alternatives consider the same group of eligible wild and scenic rivers.

The current areas that are withdrawn from mineral entry would be carried forward in all alternatives (Table A6).

Table 1 is a summary of mineral commodity and energy resources in proposed wildernesses and special areas found from the data sources consulted.

Table 1: Alternative B, Mineral commodity or energy resources in areas proposed for wilderness or special status.

Area	Acres	Mineral Commodity and Energy Resources	Mineral Potential and How the Commodity is Managed
Proposed Wilderness			
Walker Mountain	6,377	Closed placer mining claims ⁵ 1956-1979 Flagstone Group, T14N R6E, Section 11, SW ¼	Flagstone (likely saleable)
Davey's	1,779	Outside of and not within in bedrock units associated with the Fossil Creek Mineral District.	Low
Strawberry Crater Addition	6,611	Closed placer mining claims in the 1980s. T24N R9E, Secs. 19, 20. (pumice, perlite, cinders?). Closed non-competitive geothermal lease in 1988-1989 Union Oil Co. T24N R9 E, Secs. 19, 20, 21, 28,29, 30, 31, 32, 33. This area includes part of the existing and proposed wilderness. Closely borders an area of expressed geothermal interest (nomination to the BLM) in the Deadman and O'Leary Basins. Area is no longer nominated. Probable geothermal resource potential (Wolfe and Light 1984).	Cinders, Decorative stone, (likely saleable) Geothermal (leasable)
<i>Sub Total Acres</i>	14,767		
Special Areas			
Cottonwood Basin Fumeroles Geologic Area	217		Low
West Clear Creek RNA	1,007		Low
Rocky Gulch RNA	926		Low
San Francisco Peaks RNA Addition	141		Low
<i>Sub Total Acres</i>	2,291		
Total Acres	17,058		

Data Sources: LR2000 Mining Claim Geographic Reports, 2-14-2011; Lane, 1992; Keith, 1983; Welty et al. 1989; Coconino Rock Pit sources for FPR 2011; Forest Rock Pit Inventory 1995; Coconino-Kaibab Rock Pit NEPA geodatabase 2011; Pits shape file, 2005; Wolfe and Light 1984.

Strawberry Crater Addition has closed geothermal leases within parts of it. The leases were part of a Union Oil Co. geothermal lease that was closed in 1989. Strawberry Crater Wilderness and the proposed addition closely borders an area of expressed geothermal interest in Deadman and O'Leary Basins. This area is no longer nominated. As the Strawberry Crater proposed wilderness addition is in an area of silicic volcanism, it has potential for geothermal resources. It is outside the San Francisco Peaks Mt. Eldon Recreation Area mineral withdrawal and could be of future interest for geothermal leasing.

⁵ Closed claims and leases were determined using the Geocommunicator GIS interactive system on LR2000 when it was available in February, 2011. Past active/closed mining claims and leases are described and noted because it provides an indication of the mineral resource potential of an area and possible future interests of the area for commodity development. If there is no past claim or lease activity in an area then that indicates probable low future mineral potential. Past active claims and leases are commonly reviewed and noted in Mineral Reports for withdrawals.

Walker Mountain proposed wilderness has past active mining claims for flagstone but these were closed in 1979 and there has been no recent claim activity. Future saleable minerals potential in this area is probably low.

Areas of very high scenic integrity were reviewed for mineral resource potential. The areas classified as having very high scenic integrity are the same for Alternatives B, C, and D. The examples and types of areas classified as very high scenic integrity include (not all named here) the Red Mountain Geologic Special Area, designated wildernesses, some areas near to designated wildernesses, designated Wild and Scenic Rivers, parts of the Walker Mountain and Davies proposed wilderness areas, and all of the Strawberry Crater proposed wilderness area, parts of the Verde Valley Management Area, some of the proposed eligible Wild and Scenic Rivers such as Barbershop, some of the existing special areas such as Casner Canyon, Verde Valley Botanical Area, West Clear Creek RNA and parts of the proposed Cottonwood Basin Fumeroles Geologic Area (Alternative B) and Botanical Area (Alternative C). Note that there is overlap of special areas and proposed wildernesses previously analyzed for mineral potential with these very high scenic areas.

Some of these areas are not available to leasing, such as designated wildernesses and Wild segments of designated Wild and Scenic Rivers. The resource potential of the three proposed wildernesses is shown in Table 1. Review of all of the areas with very high scenic integrity for mineral potential showed few possible conflicts. Only a few acres of the area of potential mineral favorability associated with the Fossil Creek Mineral District are within areas of very high scenic integrity and lie outside of wilderness. However, this mineral district has no known mineral development activity aside of a few prospects (old claims that were explored) and is considered to have low potential for mineral development. The Verde Valley area where gypsum is mined is outside of very high scenic integrity areas. 13 Mile Rock Pit is within an area of very high scenic integrity so potential future use or development would be restricted if the very high scenic integrity condition was validated during project analysis. This rock pit is inactive but may have future use potential.

In summary, Strawberry Crater Addition has potential mineral resources of cinders, decorative stone and geothermal resources. There is no location specified in the data sources consulted except for the geothermal interests were in the southwestern portion of the existing and proposed wilderness. Walker Mountain has had a mining claim history of decorative stone but no recent claims. Davey's, Cottonwood Basin Fumeroles, West Clear Creek RNA, Rocky Gulch RNA and San Francisco Peaks RNA Addition have low mineral potential. Most of the areas mapped as very high scenic integrity appear to have low mineral potential except for 13 Mile Rock Pit and the Strawberry Crater proposed wilderness. The consequences of implementing this alternative are that potential geothermal resources and saleable mineral materials could be lost from potential development in the area of the Strawberry Crater Wilderness addition. The consequences for the 13 Mile Rock Pit are that any future development would be restricted within areas having very high scenic integrity and that would mean a loss of aggregate resources.

Alternative C.

Environmental Consequences

Alternative C has the same overall environmental consequences as Alternative B, the Modified Proposed Action with respect to Minerals and Energy desired conditions and guidelines.

Mineral Resources and Proposed Wilderness, Special Areas, and Wildlife Habitat Areas

Additional Wildernesses are proposed in addition to Strawberry Crater Addition, Davey's, and Walker Mountain and include: Abineau, Railroad Draw, Deadwood Draw, Cedar Bench, Black Mountain, Cimmaron-Boulder, Hackberry, Tin Can, East Clear Creek, and Barbershop.

Some of the additional proposed wilderness areas are within areas classified as very high scenic integrity.

Cottonwood Basin Fumeroles is expanded to both a geologic and botanical area. The same RNAs as Alternative B are considered.

Eight additional Wildlife Habitat Management Areas (WHMAs) are considered for wildlife habitat. Mineral resources within the WHMAs are analyzed to determine if there could be any conflicts between minerals management and maintaining the ecological integrity of these areas, a desired condition).

Table 2 below is a summary of the mineral commodities and energy resources present within the various proposed areas from the data sources consulted.

Table 2. Alternative C, Mineral or energy resources in areas proposed for special status or new management areas.

Area	Acres	Mineral and Energy Resources	Mineral Potential and How the Commodity is Managed
Proposed Wilderness			
Walker Mountain	6,377	Closed ⁶ placer mining claims 1956-1979 Flagstone Group, T14N R6E, Section 11, SW ¼.	Flagstone (likely saleable)
Davey's	1,779	Outside of and not in bedrock units associated with the Fossil Creek Mineral District.	Low
Strawberry Crater Addition	6,611	Closed placer mining claims in the 1980s. T24N R9E, Secs. 19, 20. (pumice, perlite, cinders?). Closed non-competitive geothermal lease in 1988-1989 Union Oil Co. T24N R9 E, Secs. 19, 20, 21, 28, 29, 30, 31, 32, 33. This area includes part of the existing and proposed wilderness. Closely borders an area of expressed geothermal interest (nomination to BLM) in the Deadman and O'Leary Basins. Area is no longer nominated.	Cinders, Decorative stone, (likely saleable) Geothermal, (leasable)
Hackberry	26,044*	Closed lode & placer claims, 1980s. T12N R6E Secs. 27, 34, 35 & T11N R6E Secs. 2 & 3. Landscape rock, decorative stone? Gold?	Flagstone (likely saleable); gold (locatable)

⁶ Closed claims and leases were determined using the Geocommunicator GIS interactive system on LR2000 when it was available in February, 2011. Past active/closed mining claims and leases are described and noted because it provides an indication of the mineral resource potential of an area and possible future interests of the area for commodity development. If there is no past claim or lease activity in an area then that indicates probable low future mineral potential. Past active claims and leases are commonly reviewed and noted in Mineral Reports for withdrawals.

Area	Acres	Mineral and Energy Resources	Mineral Potential and How the Commodity is Managed
Black Mountain	9,774	13 Mile Rock Pit is located on FRX-28195, currently inactive. This is a large pit in cinders and basalt and has material available for future use by the forest service and other agencies.	Cinders, Basalt Aggregate (saleable)
Cedar Bench	5,782	Closed placer mining claims 1991 T14N, R 6E, Section 28 SW ¼. Landscape rock, decorative stone?	Flagstone (likely saleable)
Tin Can	3,972		Low
Abineau	415	Closed geothermal lease in T23N R7E, Sec. 8. It is within the San Francisco Peaks Mt. Elden Recreation Area Mineral Withdrawal, 2000	Geothermal (leasable)
Cimmaron-Boulder	15,305		Low
Deadwood Draw	11,785		Low
East Clear Creek	2,017	Long Valley Mineral District. Blue Ridge Claims, Past Producer of Manganese. Manganese Oxide in weathered surficial deposits associated with limestone, T14N R11E, Sec. 35; T14N R11E, Sec. 2	Manganese (locatable)
Barbershop	1,305		Low
Railroad Draw	1,220		Low
<i>Sub Total acres</i>	92,358		
Special Areas			
Cottonwood Basin Fumeroles Botanical and Geologic Area	1,850		Low
West Clear Creek RNA	1,007		Low
Rocky Gulch RNA	926		Low
San Francisco Peaks RNA Addition	141		Low
<i>Sub Total Acres</i>	3,924		<i>Sub Total Acres</i>
Wildlife Habitat Management Areas			
Anderson Mesa WHMA	262,187	Rock Sources include: Pine Hill Cinders (active); Perry Lake (new); Youngs Canyon (new); Woods Tank Pit (inactive); Turkey Knob (new) Quayle Hill (inactive) Pickett Lake Pit (inactive but used for camping), other small inactive cinder and gravel pits.	Cinders, basalt and limestone aggregate, sand and gravel (saleable)
East Clear Creek WHMA	36,153	Long Valley Mineral District, Managanese. Lost Apache Claims, Manganse. T13N, R10E, Sec. 7. and T14N, R11E, Sec. 35. Moderate favorability for manganese in T13N R10E, Secs. 2, 3 and T14NR10E, Secs. 35, 36.	Manganese (locatable)
Hospital Ridge WHMA	5,026		Low
Jack's Canyon WHMA	17,040		Low
Knoll Lake WHMA	2,607	Rock Pit 230-3 (active, 2011).	Fill material (saleable)
Limestone Pasture WHMA	2,423		Low
Pine Grove WHMA	13,601		Low

Area	Acres	Mineral and Energy Resources	Mineral Potential and How the Commodity is Managed
Second Chance WHMA	1,444		Low
<i>Sub Total Acres</i>	<i>340,481</i>		<i>Sub Total Acres</i>

Data Sources: LR2000 Mining Claim Geographic Reports, 2-14-2011; Lane, 1992; Keith, 1983; Welty et al. 1989; Coconino Rock Pit sources for FPR 2011; Forest Rock Pit Inventory 1995; Coconino-Kaibab Rock Pit NEPA geodatabase 2011; Pits shape file, 2005; Wolfe and Light 1984.

*This number includes 913 acres of Hackberry Wilderness that crosses over onto the Prescott National Forest.

None of the proposed wilderness or RNAs has active locatable mining operations within their boundaries. The East Clear Creek proposed wilderness contains part of the Long Valley Mineral District which has manganese oxide mineral potential. However, the manganese oxide nodules are sporadic in their deposition and economic development of these deposits would be unlikely because of the small volumes of ore and difficulties in extracting it.

Walker Mountain and Cedar Bench have potential for flagstone based on evidence of past active placer mining claims; however, no active mining has occurred there and so the overall mineral potential for saleable materials is low in the future. Black Mountain has an existing basalt and cinder rock source, the 13 Mile Rock Pit, which is currently inactive but could be used in the future by the Forest Service or other agencies. Walker Mountain, Cedar Bench and Hackberry have closed placer and lode mining claims that were located at various times in the 1950s through the 1980s. The minerals of interest on these old claims include flagstone and possibly gold. All of these claims are closed and inactive and except for gold, are saleable minerals. There has been no recent claim activity in these areas. The future potential for saleable and locatable minerals activity is low in these areas.

None of the proposed wilderness, RNAs or other special areas were sampled or of interest to the Bureau of Mines as part of their mineral resource appraisal of the Coconino Forest in their report of 1992 (Lande 1992).

None of the proposed wilderness, RNAs or special areas have past or potential future oil and gas leasable mineral activity.

Abineau proposed wilderness is within the San Francisco Peaks Mt. Eldon Recreation Area mineral withdrawal (2000) and is closed to locatable mineral entry. Strawberry Crater and Abineau have closed geothermal leases within parts of them. The leases were part of a Union Oil Co. geothermal lease that was closed in 1989. Strawberry Crater and the addition closely borders an area of past expressed geothermal interest in Deadman and O'Leary Basins. The nomination for geothermal interest has been withdrawn. As the Strawberry Crater and Abineau proposed wilderness addition is in an area of silicic volcanism, they have potential for geothermal resources. It is outside the San Francisco Peaks Mt. Eldon Recreation Area mineral withdrawal and could be of future interest for geothermal leasing.

The proposed Hackberry Wilderness includes part of the Cottonwood Basin Fumeroles Geologic and Botanical Area. It includes all of the geological special area that is in Alternative B. The proposed botanical and geological special areas have low mineral potential.

Very high scenic integrity areas are the same as for Alternative B and the effects would be the same except that the 13 Mile Rock Pit is within Black Mountain proposed wilderness and would not be

available for use. The other proposed wilderness, RNAs and special areas have low potential for mineral materials.

Mining activities including locatable, leasable and mineral materials are considered to be available in the lands within the Wildlife Habitat Management Areas (WHMA) as there is no standard prohibiting these activities. The alternative is silent on how disturbances associated with mining are to be managed. The alternative states that all roads within WHMAs that are not open for public access should be managed for administrative use or decommissioned. Therefore, access to any new or existing rock pits would not be restricted because Forest Service Administrative use of roads is allowed. In summary, the consequences are the same as for Alternative B but with the following additional consequences. Abineau proposed wilderness has potential geothermal resources that would be lost upon wilderness designation. East Clear Creek has manganese minerals but no economical potential for development so there would be no loss of valuable minerals on wilderness designation. Hackberry and Cedar Bench proposed wildernesses have past active mining claims for flagstone and possibly gold but no past mining or current claim interest. There would be no loss of valuable minerals on wilderness designation. The 13 Mile rock Pit is in the Black Mountain proposed wilderness. It is an inactive rock pit but could be used in the future for pit run cinders and crushed basalt by the forest service or other agencies. This rock source is also in an area mapped as very high scenic integrity. Designation of the wilderness would result in the loss of an aggregate materials source. The proposed WHMAs overlap with several rock pits and the manganese mineral district. The guidelines for public and administrative roads use would not affect the use or development of any existing or new rock pits. Mining activities including locatable, leasable and mineral materials uses are considered to be available in the lands within the WHMAs. However, locatable and leasable mineral potential is low in these areas.

Alternative D.

Environmental Consequences

Alternative D recommends no new wilderness areas, but otherwise is the same as Alternative B. It allows mechanized recreation such as bicycles on designation trails in botanical and geological areas. This aspect of the alternative will not affect minerals and energy resources. Because no new wildernesses are proposed, Alternative D will leave the most area on the forest open to mineral entry for locatable, leasable and mineral materials.

Cumulative Effects, All Alternatives

The time frame and the boundary of this analysis is for the next 10-15 years and includes the forest lands within the Coconino Forest Boundary, the local communities within the boundary and closely adjacent to the forest boundary.

The Verde Gypsum Mine recently had its patent application approved and so about 243 acres of Coconino forest lands are now privately held lands which will be mined or used in mine operations. Parts of the mine are still on forest land and the mineral operations remain under a plan of operations which will be updated. Mitigation measures to protect surface resources will remain applicable on Forest Service lands covered by the updated plan of operations. Parts of the gypsum mine that are on leased state lands or on private lands will be subject to applicable State and Federal requirements to protect air, water and environmental quality enforced by the State of Arizona. It is anticipated that this mine will continue operations far into the future providing gypsum to local cement plants. Production may increase as the economy improves and construction and development increases.

The anticipated uses of mineral materials for road aggregate and other uses on the Forest is anticipated to increase as forest products companies start up, forest restoration projects get underway and when planning efforts like the Four Forest Restoration Initiative are completed. The Coconino-Kaibab Rock Pit Environmental Analysis proposes to allow use and develop of 19 rock pits on the forest, eight of which are totally new sources. 20 existing and new rock pits are proposed for use on the Kaibab National Forest. Most of the rock will be used by the two forests, but some may be made available and sold to counties, cities, other agencies for use. It is anticipated that as road management agencies such as ADOT implement road improvement projects within the forest, there may be requests for use and development of existing or new pits. ADOT or counties public works departments may propose to use or develop new or existing pits. This will be evaluated on a case by case basis and mineral materials will be made available where it is feasible, available and consistent with other resource values.

It is likely that there will be increased interest in geothermal exploration and development on the forest particularly with the promotion of renewable energy sources by energy companies, and state and local government policies and incentives. The forest will work cooperatively with the BLM in evaluation of any nominations or leasing proposals for geothermal resources. Exploration for uranium and future development of it may continue on the Kaibab and Tonto Forests. This exploration and future development is not likely to affect the environment of the Coconino National Forest. Uranium exploration is not anticipated on the Coconino Forest due to the lack of economical resources.

The Apache-Sitgreaves National Forest is evaluating Leonard Canyon on the Coconino and Sitgreaves National Forests as a potential wilderness area. The potential wilderness areas on the Coconino National Forest are not associated with any known active locatable mining claims, and there are no known past or potential future oil, gas or geothermal leasable mineral activities or resources. There are no common variety mineral material pits in the potential wilderness lands considered. The proposed Leonard Canyon Wilderness would not result in a loss of availability of any minerals or energy resources as the areas have low mineral resource potential.

Comparison of Alternatives

The alternatives were compared on the basis of how many acres would be withdrawn from mineral entry. Existing withdrawals include: permanent withdrawals of areas/sites withdrawn prior to 1976 and the enactment of the Forest Land Policy and Management Act; withdrawals after 1976, congressionally designated wildernesses and Fossil Creek and Verde W&S Rivers. Kachina Peaks Wilderness is within another withdrawal after 1976 and is not double counted. Existing and New Special Areas considered for withdrawal include RNAs and Special Areas (botanical and geological). Please see Table A6 for a master list of all existing withdrawals and tables of how the withdrawals were summed up.

The total existing acres withdrawn and new areas considered for withdrawal are the lowest for Alternative A and highest for Alternative C. Alternative D is lower than Alternative B because no new wilderness is considered.

Table 3: Existing withdrawals, new wilderness and special areas considered for withdrawal by alternative.

	Acres			
	Alternative A	Alternative B	Alternative C	Alternative D
Existing Withdrawals	278,677	278,677	278,677	278,677
New Recommended Wilderness (considered for withdrawals)*	0	14,767	91,445**	0
Existing and New Special Areas (considered for withdrawals)	4,944	5,160	6,793	5,160
Total Existing & New Withdrawals	283,621	298,604	376,915	283,837
Total Forest Acres***	1,837,498	1,837,498	1,837,498	1,837,498
Forest Not Withdrawn	1,553,877	1,539,115	1,462,285	1,553,661

*Upon designation by Congress, wilderness areas would be automatically withdrawn.

** the 913 acres of recommended Hackberry Wilderness that crosses over onto the Prescott National forest are not included in this number because it does not affect the total forest acres withdrawn under Alternative C.

***Managed by Coconino NF. Does not include lands of other ownership or experimental forest.

Relationship of Short-Term Uses and Long-Term Productivity

Activities associated with mineral resource development and production including locatable minerals, leasable minerals and common variety mineral materials may have adverse consequences on the environment while providing a needed mineral resource. Environmental consequences are described at the beginning of the Environmental Consequences section of this report. With reclamation during and at the end stages of operations, the disturbed areas can be often partly to fully restored to productive forest or rangelands over time. Buildings and other facilities can also be removed at the end of operations.

Mineral production activities are a fundamental part of our multiple use mandates for National Forests and Grasslands and serve to satisfy our mineral needs for industries, homeland security, and the environment. Some mineral and energy production is renewable such as geothermal. Locatable minerals and common variety mineral materials are finite resources.

Unavoidable Adverse Impacts

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Before any ground-disturbing actions take place, they must be authorized in a subsequent environmental analysis. Therefore, none of the alternatives cause unavoidable adverse impacts. Mechanisms are in place to monitor and use adaptive

management principles in order to help alleviate any unanticipated impacts that need to be addressed singularly or cumulatively.

None of the alternatives directly authorize mineral activities; the alternatives B-D all have the same desired conditions, guidelines and management approaches to use in considering future mineral activities on the forest.

Irreversible and Irretrievable Commitment of Resources

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any ground disturbing actions, none of the alternatives cause an irreversible or irretrievable commitment of resources.

Adaptive Management

All alternatives assume the use of adaptive management principles. Forest Service decisions are made as part of an ongoing process. The land management plan identifies a monitoring program.

Monitoring the results of actions will provide a flow of information that may indicate the needs to change a course of action or the land management plan. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.

Climate Change

The potential geothermal resources on the forest may have a positive consequence to climate change in that geothermal is a renewable resource. Arizona has adopted a renewable portfolio standard that promotes generation of electricity by renewable energy sources by 2025. All mineral development activities create emissions that contribute to air quality effects and in turn may affect climate change. These effects can to some extent be mitigated by various pollution control systems and improved technology. As none of the alternatives directly authorize mining of any type, and alternative B-D have the same desired conditions, guidelines, and management approaches, they all have the same potential consequences to climate change.

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Education and Professional Experience

I have a Bachelors of Arts degree in Anthropology from Occidental College, in Los Angeles, CA and have studied undergraduate level geology at Occidental College and Washington State University, in Pullman, WA for a combined total of more than 4 years. I have a Master of Science degree in geology from Oregon State University (1988). My professional experience totals more than 25 years, including more than 17 years working as a geologist for the Forest Service and the Army Corps of Engineers, and more than 8 years working at a NEPA Specialist/Partnership Coordinator. My geologic area of expertise in is landslide mapping and hazard assessment, watershed analysis and restoration, abandoned mine reclamation and minerals administration. I am a registered Geologist in Oregon (#G1170) and California (#6565), and a registered Engineering Geologist in California (#2313). I have been a contributing author on several unpublished internal Forest Service studies, and have been a senior or contributing author on some short scientific publications relating to geology and forest management and mine reclamation.

Appendix A

Table A1. Bureau of Mines MAS/MILS Database for Mine Areas on the Coconino National Forest.

BOMMinesDataCoc.xlsx

BOMMinesDataCoc

BOM MAS/MILS Database for Mine Areas on the Coconino National Forest, 1993. clipped PAH 6-17-2010 for Forest Plan Revision Minerals and Energy Report.											
SEQ	NAME	COMMODITY	TYPE	STATUS	POR	POP	MAP	TOWNSHIP/RANGE	SEC	SUBDIVISION	YOD
40250010	VERDE HOT SPRINGS	GEOHERMAL	SURFACE	UNKNOWN	OREBODY	UNK	VERDE HOT SPRINGS	011 N 006 E	101		0
40050374	QUARRY		SURFACE	UNKNOWN	TRENCH	100M	STRAWBERRY	012 N 008 E	21 NWNW		0
40050158	GOLD FLAGSTONE	STONE	SURFACE	PAST PRODUCER	TRENCH	100M	STRAWBERRY	012 N 008 E	16 S2		0
40050223	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	STRAWBERRY	012 N 008 E	16 NENE		0
40250861	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	HORNER MTN	013 N 005 E	27 N25E		0
40050156	FOSSIL CREEK COAL	COAL	SURFACE	DEVEL DEPOSIT	OREBODY	UNK	PINE	012 N 008 E	1 C		0
40250474	CLEAR CREEK GYPSUM	GYPSUM	PROSPECT	EXP PROSPECT	OREBODY	UNK	CAMP VERDE	014 N 005 E	18 S2		0
40251556	VERDE RIVER DEPOSIT	DATONITE, GYPSUM, CLAY, CALCIUM	PROSPECT	EXP PROSPECT	OREBODY	100M	CAMP VERDE	012 N 005 E	16 W2W2		0
40050007	LOST APACHE CLAIM	MANGANESE	SURFACE	PAST PRODUCER	OREBODY	UNK		013 N 011 E	7	1952	
40250029	CAMP VERDE GYPSUM PIT	GYPSUM	SURFACE	PRODUCER	TRENCH	100M	CAMP VERDE	013 N 005 E	11 C NE		0
40250019	WINKELMAN MINE	GYPSUM	SURFACE	PRODUCER	TRENCH	10M	CAMP VERDE	013 N 005 E	11 E2NE		0
40251262	LARSON QUARRY	GYPSUM, CLAY	SURFACE	PAST PRODUCER	OREBODY	100M	CAMP VERDE	013 N 005 E	11 C E2NE		0
40050268	HOUGH MANGANESE	MANGANESE	SURFACE	PAST PRODUCER	OREBODY	UNK	LONG VALLEY	013 N 010 E	6 C		0
40050006	BLUE RIDGE CLAIMS	MANGANESE	SURF-UNDERG	PAST PRODUCER	OREBODY	UNK		014 N 011 E	35	1947	
40050422	ROUGH HILL CLAIM MS 4539	MANGANESE	MINERAL LOC	UNKNOWN	CLAIM	100M	LONG VALLEY	014 N 010 E	30 SWSW		0
40050294	LAST CHANCE MINE	MANGANESE	SURF-UNDERG	PAST PRODUCER	OREBODY	100M	LONG VALLEY	014 N 010 E	30 C		0
40050486	STAR CLAIM	MANGANESE	SURFACE	EXP PROSPECT	OREBODY	UNK	LONG VALLEY	014 N 010 E	20 NENE		0
40050439	SUNSET MINING CLAIMS MS 4531	MANGANESE, PUMICE	MINERAL LOC	DEVEL DEPOSIT	CLAIM	100M	LONG VALLEY	014 N 009 E	13 SESE		0
40050305	LONG VALLEY CLAIM	MANGANESE	SURFACE	DEVEL DEPOSIT	OREBODY	UNK	LONG VALLEY	014 N 010 E	17 N2NE		0
40050214	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	LONG VALLEY	014 N 010 E	11 NENE		0
40250277	BORROW PIT		SURFACE	UNKNOWN	TRENCH	100M	CAMP VERDE	014 N 005 E	8 C NE		0
40050109	BLACK EAGLE NO1-6	MANGANESE	UNDERGROUND	UNKNOWN	OREBODY	UNK	TURKEY MTN	014 N 010 E	6 NENE		0
40250857	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	MAINTENT	100M	LAKE MONTEZUMA	015 N 005 E	34 SW		0
40190624	DOGTOWN MINE	LEAD, ZINC, SILVER	UNDERGROUND	PAST PRODUCER	TOWN	54M	TWIN BUTTES	017 S 012 E	16		0
40250447	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	CASNER BUTTE	016 N 007 E	32 SWSW		0
40250026	BLAVER HEAD FLAT PIT	SAND & GRAVEL	SURFACE	PRODUCER	TRENCH	100M	LAKE MONTEZUMA	015 N 005 E	3 SESE		0
40250289	BORROW PIT		SURFACE	UNKNOWN	MAINTENT	100M	LAKE MONTEZUMA	015 N 005 E	2 C N2NE		0
40250283	BORROW PIT		SURFACE	UNKNOWN	TRENCH	100M	CORNVILLE	011 N 002 E	26 NENESE		0
40250288	BORROW PIT		SURFACE	UNKNOWN	MAINTENT	100M	LAKE MONTEZUMA	016 N 005 E	35 NWSE		0
40050078	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	HAPPY JACK	016 N 009 E	29 W2E2		0
40250446	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	CASNER BUTTE	016 N 006 E	34 SESE		0
40050079	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	HAPPY JACK	016 N 009 E	29 N2S2		0
40050077	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	HAPPY JACK	016 N 009 E	29 S2NE		0
40250294	BORROW PIT		SURFACE	UNKNOWN	TRENCH	100M	SEDONA	016 N 006 E	30 SWSW		0
40050086	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	STONE MAN LAKE	016 N 008 E	19 NWNE		0
40250295	BORROW PIT		SURFACE	UNKNOWN	MAINTENT	100M	STONE MAN LAKE	016 N 007 E	14 C SE		0
40251553	VERDE-U CLAIMS		PROSPECT	EXP PROSPECT	MAINTENT	100M	CLARKDALE	016 N 003 E	14 NENWSW		0
40250596	COTTONWOOD CLAIMS		PROSPECT	EXP PROSPECT	MAINTENT	100M	CLARKDALE	016 N 003 E	14 NENWSW		0
40251554	VERDE-U CLAIMS		PROSPECT	EXP PROSPECT	OREBODY	100M	PAGE SPRINGS	016 N 003 E	12 S2		0
40250859	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	MAINTENT	100M	PAGE SPRINGS	016 N 004 E	9 C		0
40251780	SMOKI I-9	URANIUM	PROSPECT	EXP PROSPECT	OREBODY	100M	CLARKDALE	016 N 003 E	9 NE		0
40250860	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	PAGE SPRINGS	017 N 004 E	34 SESESW		0
40251091	PRETTY FOLLY	URANIUM	PROSPECT	EXP PROSPECT	OREBODY	100M	CLARKDALE	017 N 003 E	35 C		0
40050054	CHAVEZ MTN W - 1		UNKNOWN	UNKNOWN	OREBODY	100M	CHAVEZ MTN W	017 N 011 E	25 S2NE		0
40050055	CHAVEZ MTN W - 2		UNKNOWN	UNKNOWN	OREBODY	100M	CHAVEZ MTN W	017 N 011 E	25 NWNW		0
40250281	BORROW PIT		SURFACE	UNKNOWN	TRENCH	100M	SEDONA	017 N 005 E	20 C NE		0
40050441	SUNSET PASS - 2		UNKNOWN	UNKNOWN	TRENCH	100M	SUNSET PASS	017 N 014 E	20 NENE		0
40250851	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SEDONA	017 N 005 E	16 C NW		0
40050440	SUNSET PASS - 1		UNKNOWN	UNKNOWN	TRENCH	100M	SUNSET PASS	017 N 014 E	19 SESE		0
40050203	GRAVEL PITS	SAND & GRAVEL	SURFACE	UNKNOWN	OREBODY	100M	MORMON LAKE	017 N 009 E	3 SESEW		0
40251285	LIMESTONE LODGE	GOLD, SILVER	UNDERGROUND	EXP PROSPECT	OREBODY	100M	SYCAMORE BASIN	017 N 003 E	5 NW		0
40251447	QUARRY	STONE	SURFACE	UNKNOWN	MAINTENT	100M	SYCAMORE BASIN	017 N 003 E	1 NENE		0
40251523	TWO QUARRIES	STONE	SURFACE	UNKNOWN	OREBODY	100M	SYCAMORE BASIN	018 N 003 E	16 NWNWSW		0
40250296	BORROW PIT		SURFACE	UNKNOWN	TRENCH	100M	WILSON MT	018 N 005 E	34 C W2NW		0
40050115	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	MORMON LAKE	018 N 009 E	34 N2NE		0
40050116	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	MORMON MOUNTAIN	018 N 008 E	27 N2S2		0
40251446	QUARRIES	STONE	SURFACE	UNKNOWN	OREBODY	100M	SYCAMORE BASIN	018 N 003 E	25 NENWSW		0
40251522	TWO QUARRIES	STONE	SURFACE	UNKNOWN	OREBODY	100M	SYCAMORE BASIN	018 N 003 E	26 NENESE		0
40050238	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	MUNDS PARK	018 N 007 E	21 NESE		0
40050114	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	KINKINICK LAKE	018 N 010 E	20 NWNW		0
40251670	RED ROCK GROUP		PROSPECT	EXP PROSPECT	OREBODY	100M	LOY BUTTE	018 N 004 E	19 NWNW		0
40250251	BLUE CHIP CLAIMS 1		PROSPECT	EXP PROSPECT	OREBODY	100M	CHERRY	014 N 003 E	14 NW		0

BOM MAS/MILS Database for Mine Areas on the Coconino National Forest, 1993. clipped PAH 6-17-2010 for Forest Plan Revision Minerals and Energy Report.													
SEQ	NAME	COMMODITY	TYPE	STATUS	POR	POP	MAP	TOWNSHIP	RANGE	SEC	SUBDIVISION	YOD	
40250350	BROWN ROCK GROUP		PROSPECT	EXP PROSPECT	OREBODY	100M	LOY BUTTE	018 N	004 E	17	SW	0	
40050459	TWO BORROW PITS		SURFACE	UNKNOWN	OREBODY	100M	MUNDS PARK	018 N	007 E	8	NW/NW	0	
40050236	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	MORMON LAKE	019 N	009 E	32	SENE	0	
40050235	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	MORMON LAKE	019 N	009 E	29	S2S2	0	
40050220	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	MORMON LAKE	019 N	009 E	28	S2S2	0	
40050172	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	ASHURST LAKE	019 N	009 E	21	SESW	0	
40050204	PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	MOUNTAINAIRE	019 N	007 E	20	SWNW	0	
40050170	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	ASHURST LAKE	019 N	009 E	16	SWSW	0	
40050171	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	ASHURST LAKE	019 N	009 E	16	NWSW	0	
40050198	GRAVEL PITS	SAND & GRAVEL	SURFACE	UNKNOWN	OREBODY	100M	ASHURST LAKE	019 N	009 E	16	SENE	0	
40050199	GRAVEL PITS	SAND & GRAVEL	SURFACE	UNKNOWN	OREBODY	100M	ASHURST LAKE	019 N	009 E	17	SENE	0	
40050237	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	MOUNTAINAIRE	019 N	006 E	2	NESE	0	
40050080	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	DUTTON HILL	020 N	005 E	25	N2S2	0	
40050096	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF EAST	020 N	007 E	11	SWNE	0	
40050197	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	OREBODY	100M	ANGELL	020 N	010 E	2	SWNW	0	
40050301	LIMESTONE DEPOSIT		MINERAL LOC	RAW PROSPECT	OREBODY	UNK	FLAGSTAFF WEST	020 N	007 E	3	NENE	0	
40050058	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	ANGELL	020 N	010 E	3	NWNE	0	
40050073	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF WEST	021 N	006 E	35	SENE	0	
40050295	LAVA CLAIM		PLACER	UNKNOWN	OREBODY	100M	FLAGSTAFF WEST	021 N	006 E	36	NWNE	0	
40050421	ROGERS LAKE	CLAY	MINERAL LOC	RAW PROSPECT	OREBODY	UNK	BELLEMONT	021 N	006 E	32	NWNW	0	
40050074	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF WEST	021 N	007 E	30	NWSW	0	
40050302	LIMESTONE DEPOSIT		MINERAL LOC	RAW PROSPECT	OREBODY	UNK	WINOMA	021 N	008 E	25	E2	0	
40050103	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF WEST	021 N	006 E	25	SWNE	0	
40050102	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF WEST	021 N	008 E	25	SENE	0	
40050059	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	ANGELL	021 N	010 E	28	SENE	0	
40050125	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	WINONA	021 N	009 E	23	NWNE	0	
40050124	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	WINONA	021 N	009 E	14	SWSE	0	
40050062	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	BELLEMONT	021 N	006 E	18	SWSW	0	
40050378	QUARRY		SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF WEST	021 N	007 E	14	SWSW	0	
40050063	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	BELLEMONT	021 N	006 E	18	NESW	0	
40050061	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	BELLEMONT	021 N	006 E	17	NESW	0	
40050101	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF WEST	021 N	006 E	15	NESW	0	
40050060	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	BELLEMONT	021 N	006 E	15	SWNW	0	
40050481	WILDCAT HILL		SURFACE	PAST PRODUCER	OREBODY	UNK	WINONA	021 N	009 E	7	C	0	
40050036	BAKER PIT	PUMICE	SURFACE	PRODUCER	OREBODY	UNK	WINONA	021 N	009 E	11	SENE	0	
40050100	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF EAST	021 N	008 E	10	SENE	0	
40050126	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	WINONA	021 N	009 E	10	NENE	0	
40050099	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF EAST	021 N	008 E	9	NWNE	0	
40050098	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF EAST	021 N	008 E	4	SESW	0	
40050020	RED HILL PIT	PERLITE	SURFACE	PRODUCER	TRENCH	500M	FLAGSTAFF EAST	021 N	008 E	9		0	
40050137	CINDER PITS	PUMICE	SURFACE	UNKNOWN	OREBODY	100M	FLAGSTAFF EAST	021 N	008 E	5	NESE	0	
40050097	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF EAST	021 N	008 E	2	NWSE	0	
40050151	ELDEN MTN.	STONE	MINERAL LOC	RAW PROSPECT	OREBODY	UNK	FLAGSTAFF EAST	021 N	007 E	1	N2	0	
40050182	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	FLAGSTAFF WEST	022 N	007 E	33	NWSW	0	
40050213	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	HUMPHREYS PEAK	022 N	007 E	32	N2N2	0	
40050023	SHEEP PIT	PERLITE	SURFACE	PRODUCER	TRENCH	500M	FLAGSTAFF EAST	022 N	008 E	34		0	
40050081	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER E	022 N	009 E	25	NWSW	0	
40050082	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER E	022 N	009 E	29	SWNW	0	
40050303	LIMESTONE DEPOSIT		MINERAL LOC	RAW PROSPECT	OREBODY	UNK	HUMPHREYS PEAK	022 N	007 E	29	NENE	0	
40050131	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	WING MOUNTAIN	022 N	006 E	20	NESW	0	
40050083	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER E	022 N	010 E	19	SWSW	0	
40050132	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	WING MOUNTAIN	022 N	006 E	21	NWSW	0	
40050187	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN			GRAND FALLS SW	022 N	011 E	11	S2S2	0	
40050087	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	PARKS	022 N	004 E	10	SWNE	0	
40050084	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER E	023 N	009 E	30	NWNW	0	
40050438	SUNSET CRATER PUMICE	PUMICE	SURFACE	EXP PROSPECT	OREBODY	100M	SUNSET CRATER W	023 N	008 E	19	NW2E	0	
40050221	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER W	023 N	007 E	24	N2S2	0	
40050437	SUGARLOAF PEAK	PUMICE	SURFACE	PAST PRODUCER	TRENCH	100M	SUNSET CRATER W	023 N	008 E	19	N2S2	0	
40050139	CINDER PITS	PUMICE	SURFACE	UNKNOWN	OREBODY	100M	HUMPHREYS PEAK	023 N	006 E	22	S2N2	0	
40050226	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER W	023 N	007 E	24	S2N2	0	
40050142	COLLINS 1 AND 2 N.P.4650		MINERAL LOC	UNKNOWN	CLAIM	100M	SUNSET CRATER W	023 N	007 E	24	N2N2	0	
40050430	SAND PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER 4	023 N	007 E	24	NWNW	0	

BOM MAS/MILS Database for Mine Areas on the Coconino National Forest, 1993. clipped PAH 6-17-2010 for Forest Plan Revision Minerals and Energy Report.											
SEQ	NAME	COMMODITY	TYPE	STATUS	POR	POP	MAP	TOWNSHIP	RANGE	SEC	SUBDIVISION
40050228	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER W	023 N	007 E	24	N2N2
40050224	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER W	023 N	007 E	23	NENE
40050427	SAND PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SUNSET CRATER H	023 N	007 E	13	SWSE
40050291	KINCAHON NO1 N.P.4652		MINERAL LOC	UNKNOWN	CLAIM	100M	SUNSET CRATER W	023 N	007 E	13	SWSW
40050241	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	WING MOUNTAIN	023 N	006 E	17	SWSW
40050327	O'LEARY PEAK - 1		UNKNOWN	UNKNOWN	TRENCH	100M	O'LEARY PEAK	023 N	008 E	16	SENE
40050248	HARENBERG#1 CLAIM	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	O'LEARY PEAK	023 N	008 E	18	N2N2
40050112	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	KENDRICK PEAK	023 N	005 E	17	N2N2
40050135	CINDER PITS	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	O'LEARY PEAK	023 N	008 E	17	N2N2
40050429	SAND PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	O'LEARY PEAK	023 N	008 E	9	NENE
40050428	SAND PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	O'LEARY PEAK	023 N	008 E	9	SWNE
40050308	MCCORMICK	PERLITE, URANIUM	SURFACE	PAST PRODUCER	OREBODY	UNK	O'LEARY PEAK	023 N	008 E	9	NENE
40050022	BLEAKS PIT	SAND & GRAVEL	SURFACE	PRODUCER	TRENCH	500M	O'LEARY PEAK	023 N	008 E	5	
40050014	DARLING PIT	PERLITE	SURFACE	PRODUCER	TRENCH	500M	ANGELL	021 N	010 E	21	
40050057	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	WHITE HORSE HILLS	024 N	006 E	27	S2S2
40050113	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	KENDRICK PEAK	024 N	006 E	6	NWNNW
40050094	CINDER PIT	PUMICE	SURFACE	UNKNOWN	TRENCH	100M	EBERT MTN	025 N	005 E	35	NWSE
40050233	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SP MOUNTAIN	025 N	008 E	28	NWSE
40050225	GRAVEL PIT	SAND & GRAVEL	SURFACE	UNKNOWN	TRENCH	100M	SP MOUNTAIN	025 N	008 E	28	NWNNW
40050424	SP MOUNTAIN - 1		UNKNOWN	UNKNOWN	TRENCH	100M	SP MOUNTAIN	025 N	006 E	26	NWNNW

Table A2. Mineral Commodity Summary for the Coconino National Forest

BOM MAS/MILS Commodity Summary Coconino NF, for Forest Plan Revision 6-17-2011	
Row Labels	Count of TYPE
CLAY	1
COAL	1
DIATOMITE, GYPSUM, CLAY, CALCIUM	1
GEOTHERMAL	1
GOLD, SILVER	1
GYPSUM	3
GYPSUM, CLAY	1
LEAD, ZINC, SILVER	1
MANGANESE	7
MANGANESE, PUMICE	1
PERLITE	3
PERLITE, URANIUM	1
PUMICE	49
SAND & GRAVEL	36
STONE	6
URANIUM	2
(blank)	29
Grand Total	144

Table A3. Active Mining Claims on the Coconino National Forest, Report Dated July 10, 2013.

Run Time: 06:58 PM		UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT MINING CLAIM GEOGRAPHIC REPORT LIST OF MINING CLAIMS BY SECTION			Run Date: 07/10/2013 Page 1 of 4			
Serial Num	Mer Twn Rng Sec Quad	Claim Name/Number	Claimant(s)	Lead File	Case Type	Status	Loc Dt	Last Assmt
AMC207544	14 0130N 0050E 001 SE	LIBBY 1B	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207544	14 0130N 0050E 001 SE	LIBBY 1B	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207545	14 0130N 0050E 001 SE	LIBBY 1C	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207545	14 0130N 0050E 001 SE	LIBBY 1C	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207546	14 0130N 0050E 001 SE	LIBBY 1D	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/07/1983	2 0 1 3
AMC207546	14 0130N 0050E 001 SE	LIBBY 1D	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/07/1983	2 0 1 3
AMC207547	14 0130N 0050E 001 SE	LIBBY 1E	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/07/1983	2 0 1 3
AMC207547	14 0130N 0050E 001 SE	LIBBY 1E	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/07/1983	2 0 1 3
AMC207548	14 0130N 0050E 001 SE	LIBBY 1F	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/07/1983	2 0 1 3
AMC207548	14 0130N 0050E 001 SE	LIBBY 1F	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/07/1983	2 0 1 3
AMC207554	14 0130N 0050E 001 NE	LIBBY 2E	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207554	14 0130N 0050E 001 NE	LIBBY 2E	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207555	14 0130N 0050E 001 NE	LIBBY 2F	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207555	14 0130N 0050E 001 NE	LIBBY 2F	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/05/1983	2 0 1 3
AMC207561	14 0130N 0050E 001 NW	GYPSUM HEART A	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/04/1983	2 0 1 3
AMC207561	14 0130N 0050E 001 NW	GYPSUM HEART A	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/04/1983	2 0 1 3
AMC207562	14 0130N 0050E 001 NW	GYPSUM HEART B	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/03/1983	2 0 1 3
AMC207562	14 0130N 0050E 001 NW	GYPSUM HEART B	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/03/1983	2 0 1 3
AMC207563	14 0130N 0050E 001 NW	GYPSUM HEART C	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/03/1983	2 0 1 3
AMC207563	14 0130N 0050E 001 NW	GYPSUM HEART C	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/03/1983	2 0 1 3
AMC207564	14 0130N 0050E 001 SW	GYPSUM HEART 2A	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/03/1983	2 0 1 3
AMC207564	14 0130N 0050E 001 SW	GYPSUM HEART 2A	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/03/1983	2 0 1 3
AMC355391	14 0130N 0050E 001 NW	SMITHS WELL #1	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
AMC355392	14 0130N 0050E 001 NW	SMITHS WELL #2	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
AMC355393	14 0130N 0050E 001 NE	SMITHS WELL #3	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
AMC355394	14 0130N 0050E 001 NE	SMITHS WELL #4	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
AMC355395	14 0130N 0050E 001 NE	SMITHS WELL #5	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
AMC355396	14 0130N 0050E 001 SE	SMITHS WELL #6	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
AMC355397	14 0130N 0050E 001 SE	SMITHS WELL #7	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
Serial Num	Mer Twn Rng Sec Quad	Claim Name/Number	Claimant(s)	Lead File	Case Type	Status	Loc Dt	Last Assmt
AMC272763	14 0130N 0050E 004 SE	VERDE STAR #8C	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272763	14 0130N 0050E 004 SE	VERDE STAR #8C	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272764	14 0130N 0050E 004 SE	VERDE STAR #8D	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272764	14 0130N 0050E 004 SE	VERDE STAR #8D	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272765	14 0130N 0050E 004 SE	VERDE STAR #8E	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272765	14 0130N 0050E 004 SE	VERDE STAR #8E	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
NO WARRANTY IS MADE BY BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM								

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<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC272767	14 0130N 0050E 009 NE	VERDE STAR #10A	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272767	14 0130N 0050E 009 NE	VERDE STAR #10A	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272768	14 0130N 0050E 009 NE	VERDE STAR #10B	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272768	14 0130N 0050E 009 NE	VERDE STAR #10B	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272769	14 0130N 0050E 009 NE	VERDE STAR #10C	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272769	14 0130N 0050E 009 NE	VERDE STAR #10C	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272770	14 0130N 0050E 009 NE	VERDE STAR #10D	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272770	14 0130N 0050E 009 NE	VERDE STAR #10D	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272771	14 0130N 0050E 009 NE	VERDE STAR #10E	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272771	14 0130N 0050E 009 NE	VERDE STAR #10E	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272772	14 0130N 0050E 009 NE	VERDE STAR #10F	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272772	14 0130N 0050E 009 NE	VERDE STAR #10F	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272773	14 0130N 0050E 009 NE	VERDE STAR #10G	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272773	14 0130N 0050E 009 NE	VERDE STAR #10G	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272774	14 0130N 0050E 009 NE	VERDE STAR #10H	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272774	14 0130N 0050E 009 NE	VERDE STAR #10H	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3

<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC272783	14 0130N 0050E 010 NW	VERDE STAR #13A	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/17/1987	2 0 1 3
AMC272784	14 0130N 0050E 010 NW	VERDE STAR #13B	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/17/1987	2 0 1 3
AMC272786	14 0130N 0050E 010 NW	VERDE STAR #13D	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/17/1987	2 0 1 3
AMC272786	14 0130N 0050E 010 NW	VERDE STAR #13D	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/17/1987	2 0 1 3
AMC272788	14 0130N 0050E 010 NW	VERDE STAR #13F	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272788	14 0130N 0050E 010 NW	VERDE STAR #13F	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272790	14 0130N 0050E 010 NW	VERDE STAR #13H	PHOENIX CEMENT CO	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3
AMC272790	14 0130N 0050E 010 NW	VERDE STAR #13H	SALT RIV PIMA-MARICOPA IND COM	AMC272753	384201	ACTIVE	06/11/1987	2 0 1 3

<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC207571	14 0130N 0050E 011 NE	GYP SUM HEART 4B	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/02/1983	2 0 1 3
AMC207571	14 0130N 0050E 011 NE	GYP SUM HEART 4B	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/02/1983	2 0 1 3
AMC207572	14 0130N 0050E 011 NE	GYP SUM HEART 4C	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/02/1983	2 0 1 3
AMC207572	14 0130N 0050E 011 NE	GYP SUM HEART 4C	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/02/1983	2 0 1 3
AMC207573	14 0130N 0050E 011 NE	GYP SUM HEART 4D	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/02/1983	2 0 1 3
AMC207573	14 0130N 0050E 011 NE	GYP SUM HEART 4D	SALT RIV PIMA-MARICOPA IND COM	AMC207543	384201	ACTIVE	09/02/1983	2 0 1 3
AMC355408	14 0130N 0050E 011 SE	SMITHS WELL #18	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3
AMC355409	14 0130N 0050E 011 SE	SMITHS WELL #19	SMITH ROGER R JR	AMC355391	384201	ACTIVE	02/24/2001	2 0 1 3

<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC207598	14 0130N 0050E 012 NW	MORMON FLAT A	PHOENIX CEMENT CO	AMC207543	384201	ACTIVE	09/08/1983	2 0 1 3

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UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MINING CLAIM GEOGRAPHIC REPORT
LIST OF MINING CLAIMS BY SECTION

Run Date: 07/10/2013
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<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC62870	14 0180N 0030E 026 NE,SE	PAINT ROCK GROUP	DIPPOLD CHARLES E	AMC62870	384201	ACTIVE	03/15/1947	2 0 1 3
AMC62870	14 0180N 0030E 026 NE,SE	PAINT ROCK GROUP	DIPPOLD JOHN M	AMC62870	384201	ACTIVE	03/15/1947	2 0 1 3
<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC85448	14 0230N 0070E 024 SW	SPENCER TUNNEL PL	NORTH COUNTRY LAND&DEV	AMC85448	384201	ACTIVE	10/08/1979	2 0 1 3
AMC85449	14 0230N 0070E 024 SW	HILDE MILLSITE	NORTH COUNTRY LAND&DEV	AMC85448	384401	ACTIVE	07/29/1972	2 0 1 3
AMC85450	14 0230N 0070E 024 SW	MCCORMACK MOONSAND#1	NORTH COUNTRY LAND&DEV	AMC85448	384201	ACTIVE	07/29/1972	2 0 1 3
<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC132981	14 0230N 0080E 009 SW	LITTLE MELVIN	NORTH COUNTRY LAND&DEV	AMC132981	384201	ACTIVE	06/22/1981	2 0 1 3
AMC327929	14 0230N 0080E 009 NE,SE	SARAH JOHN	NORTH COUNTRY LAND&DEV	AMC327929	384201	ACTIVE	10/06/1993	2 0 1 3
AMC56874	14 0230N 0080E 009 NW,SW	WHITE PUMICE	NORTH COUNTRY LAND&DEV	AMC56874	384201	ACTIVE	02/12/1972	2 0 1 3
AMC56875	14 0230N 0080E 009 NW	BLACK PUMICE NR 1	NORTH COUNTRY LAND&DEV	AMC56874	384201	ACTIVE	02/12/1972	2 0 1 3
AMC56876	14 0230N 0080E 009 NE	WHITE POZZUOLAN NO 1	NORTH COUNTRY LAND&DEV	AMC56874	384201	ACTIVE	02/12/1972	2 0 1 3
AMC56877	14 0230N 0080E 009 NE	WHITE POZZUOLAN NO 2	NORTH COUNTRY LAND&DEV	AMC56874	384201	ACTIVE	02/12/1972	2 0 1 3
<u>Serial Num</u>	<u>Mer Twn Rng Sec Quad</u>	<u>Claim Name/Number</u>	<u>Claimant(s)</u>	<u>Lead File</u>	<u>Case Type</u>	<u>Status</u>	<u>Loc Dt</u>	<u>Last Assmt</u>
AMC56878	14 0230N 0080E 010 NW	POZZUOLAN NO 3	NORTH COUNTRY LAND&DEV	AMC56874	384201	ACTIVE	02/12/1972	2 0 1 3

NO WARRANTY IS MADE BY BLM
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Table A4. Rock Pits on the Coconino National Forest

2011-06-22-MajorCocRockSourcesFPR.xlsx

CocRockSourcesFPR

Major Coconino Rock Pit Sources Compiled for Forest Plan Revision					
phaessig 6-22-2011					
Data Sources: Coconino-Kaibab Rock Pits shaped files, polygons converted to points. Shows what pits are being considered for further development or new development in the PA for the NEPA. Other data sources include 2005 pits shape file and the Coconino Pit Index notebook. Other sources include Forest engineering and lands staff and personal knowledge of the author.					
NAME	INCLUDED IN ROCK PIT NEPA PA 2011	STATUS	USE	MATERIAL TYPE	COMMENT
Cinch Hook Expansion	yes	new	crushed	basalt	
Cinch Hook	yes	active	crushed	basalt	Gila County fire use, temporary materials storage
Salmon Lake	Yes	active	pit run	cinders	old ADOT pit
Lockwood Expansion	yes	new	crushed	limestone	
Lockwood Pit	yes	active	crushed	limestone	permitted to Coc county
Macks Expansion	yes	new	pit run	rim gravels	
Macks	yes	active	pit run	rim gravels	
Snafu	yes	new	pit run	rim gravels	
Bushy Knoll	yes	new	crushed	basalt	
Turkey Knob	yes	new	crushed	basalt	
Buck Butte Expansion	yes	new	pit run	cinders	
Buck Butte	yes	active	pit run	cinders	permitted to Coc county
Powerline	no	inactive	pit run	borrow	
Oak Grove	yes	active	pit run	cinders	
Oak Grove Expansion	yes	new	pit run	cinders	
Pine Hill Cinders	Yes	active	pit run	cinders	
Pine Hill Cinders Expansion	yes	new	pit run	cinders	
Willard Springs	yes	active	pit run	basalt	
Willard Springs Expansion	yes	new	pit run	basalt	
Coyote	no	active	crushed	basalt	
Perry Lake	Yes	new	crushed	basalt	
Thomas	yes	new	crushed	basalt	
Big Draw	yes	active	crushed	basalt	
Big Draw Expansion	yes	new	crushed	basalt	
Youngs Canyon	yes	new	crushed	limestone	
Riordan Pit	yes	active	pit run	cinders	
222 Pit	yes	active	pit run	basalt, cinders	
Hostetter Tank	yes	new	crushed	basalt	
Saddle Mtn. Cinders	yes	active	pit run	cinders	
Curly Pit	no	active	crushed	basalt, Cinders	to be developed summer 2011
Slate	no	inactive	pit run	cinders	
Willow Valley Pit	no	active	disposal	limestone	oversize rock and brush disposal
120-1	no	inactive	pit run	cinders	
140-8	no	inactive	pit run	cinders	
Abineau	no	inactive	pit run	cinders	
Wing Mountain	no	active	snowplay, pit run	cinders	permitted to Snowbowl for rock for their roads
Powerline 162-52	no	active	pit run	cinders	
Pickett Lake Lake	no	inactive	camping	unknown	
Iowa Springs 186-2	no	inactive	pit run	cinders	
Allan Lake Pit	no	active	disposal	cinders	millings disposal for Coc County
Yellow Jacket Pit #2	no	active	pit run	cinders	FS and Lowell use
Yellow Jack Pit #1	no	active	disposal	cinders	bone yard
Happy Jack Cinders	no	inactive	pit run	cinders	

Major Coconino Rock Pit Sources Compiled for Forest Plan Revision					
phaessig 6-22-2011					
Data Sources: Coconino-Kaibab Rock Pits shaped files, polygons converted to points. Shows what pits are being considered for further development or new development in the PA for the NEPA. Other data sources include 2005 pits shape file and the Coconino Pit Index notebook. Other sources include Forest engineering and lands staff and personal knowledge of the author.					
NAME	INCLUDED IN ROCK PIT NEPA PA 2011	STATUS	USE	MATERIAL TYPE	COMMENT
Bald Mesa 2	yes	inactive	reclaim	gravels	proposed for reclamation in Rock Pit NEPA
Park Knoll	no	new	crushed	basalt cinders	Clints PA
209-55	no	inactive	pit run	slst/ss	
Yellow Jacket Ridge	no	inactive	pit run	limestone	
Woods Tank Pit	no	inactive	pit run	limestone ss	
Little Bly	no	active	disposal	limestone	community brush, rock and fill disposal
Quayle Hill	no	inactive	crushed	limestone	
230-3	no	active	pit run	fill	
228-01	no	inactive	pit run	sandstone	
Girdner Pit	no	active	pit run	gravel, ss	
Oak Hill Pit	no	active	pit run	cinders	
Blue Grade Pit	no	active	disposal	cinders	permitted to ADOT
ADOT-5780	no	inactive	crushed	basalt	
Sheep Springs	no	active	pit run	cinders	
Dry Lake	no	inactive	disposal	cinders	
Sinclair Pit	no	inactive	reclaim	cinders	
Spring Creek #2	no	active	pit run	gravels	permitted to ADOT
13 Mile Pit	no	inactive	pit run	cinders	permitted to ADOT
Notes: For the Rock Pit NEPA, 19 rock sources are proposed. Of these 8 are entirely new rock sources, and 11 are existing sources proposed for further development including expansion.					

Table A5. Coconino-Kaibab Rock Pit Environmental Assessment, Alternative B, List of Rock Pits.

Rock Pits Preliminary Environmental Assessment

Table 1. Alternative B - Proposed Action Rock Pit Sites and Expansion Areas.

Pit Name	Existing pit?	Pit Size (acres)	Existing Pit Area (acres)	Expansion or New Disturbance Area (acres)	National Forest
222 Pit	Yes	12.9	12.9	0.0	Coconino
Big Aso	Yes	9.4	9.4	0.0	Kaibab
Big Draw	Yes	4.7	1.9	2.8	Coconino
Big Ridge	Yes	8.2	6.2	2.0	Kaibab
Buck Butte	Yes	14.5	5.8	8.7	Coconino
Bushy Knoll	No	13.8	0.0	13.8	Coconino
Cinch Hook	Yes	18.6	7.9	10.7	Coconino
Crazy Cow	No	14.9	0.0	14.9	Kaibab
Davenport	Yes	15.4	8.5	6.9	Kaibab
Deadhorse	Yes	13.3	5.7	7.6	Kaibab
Dillman	Yes	6.2	3.8	2.4	Kaibab
Dog Knobs	Yes	12.1	11.2	0.9	Kaibab
Double A	Yes	7.1	5.2	1.9	Kaibab
Fitzgerald	Yes	16.8	11.0	5.8	Kaibab
Fues	Yes	9.5	5.3	4.2	Kaibab
Hostetter 2	No	9.7	0.0	9.7	Coconino
Jackass Knoll	Yes	5.4	3.8	1.6	Kaibab
Kaibab Site 1-A	No	13.5	0.0	13.5	Kaibab
Kaibab Site 2-C	No	8.6	0.0	8.6	Kaibab
Kaibab Site 4-A	No	7.6	0.0	7.6	Kaibab
Lockwood	Yes	9.6	4.6	5.0	Coconino
Macks	Yes	5.1	0.5	4.6	Coconino
Marteen	No	7.1	0.0	7.1	Kaibab
Moonset	Yes	23.8	23.8	0.0	Kaibab
Oak Grove	Yes	9.7	4.5	5.2	Coconino
Perry Lake	Yes	6.9	6.9	0.0	Coconino
Pine Hill Cinders	Yes	3.9	2.2	1.7	Coconino
Pittman Valley	Yes	12.0	10.5	1.5	Kaibab
Riordan Pit	Yes	20.9	20.9	0.0	Coconino
Ruin	Yes	11.1	6.2	4.9	Kaibab
Saddle Mtn. Cinders	Yes	6.9	6.9	0.0	Coconino
Salmon Lake	No	10.8	0.0	10.8	Coconino
Smoot Lake	No	11.1	0.0	11.1	Kaibab
Snafu	No	10.7	0.0	10.7	Coconino
Thomas 2	No	19.3	0.0	19.3	Coconino
Turkey Knob	No	7.7	0.0	7.7	Coconino
W Triangle	Yes	13.8	9.5	4.3	Kaibab
Willard Springs	Yes	10.4	8.5	1.9	Coconino
Youngs Canyon	No	11.0	0.0	11.0	Coconino
Totals		434.0	203.6	230.4	

Table A6. Mineral Withdrawal Status, Coconino National Forest

2011-06-22-CoconinoMasterWithdrawalListPlanRevisionFox-Haessig.xlsx

WithdrawalsMasterList

Master List of Mineral Withdrawals and Status on the Coconino National Forest for Forest Plan Revision						
6/22/2011	Prepared by Linda Fox and Polly Haessig, Coconino National Forest					
Data Sources: May 26, 1992: 2760 Letter fro Richard M. Pederson R3 Director of Lands and Minerals to Forest Supervisor Coconino National Forest on Status of Withdrawal Reviews. Letter contains a list of the withdrawn areas for the Coconino , with the recommended action.						
Data source: Coconino Forest Plan Amendment No. 13-7/00 Replacement pages 82-83.						
Data source: Personal Communication with Linda Fox , Realty Specialist, Arizona Lands Adjustment Team.						
Data Source: email from Linda Fox 6-15-2011 with info on Verde River WS River and Fossil Creek WS River						
Data source: email from phone conversations with Peter Pillis s re: Honanki, C. Hart Merriam Base Camp, Winona Village and Sacred Mountain 6-17-2011						
Withdrawal	Arizona Serial No.	PLO	Acreage	Date Issued	Date Expired	Comments
Elden Environmental Study Area	AZA 009131	5743	562.98	8/5/1980	8/5/2000	Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal
Elden Pueblo	AZA 009131	5719	23	5/1/1980	5/1/2000	Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal
Medicine Fort	AZA 009131	5719	48	5/1/1980	5/1/2000	Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal
San Francisco Peaks Research Natural Area		5350	1,023.93	7/24/1973		Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal
Flagstaff Watershed		2458	15,094.92	8/10/1961		For protection of municipal watershed. Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal.
Locket Meadows Rec Area		4687	1,103.00	9/16/1969		Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal
Snowbowl Ski Area						Withdrawn per SUP. Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal
Kachina Peaks Wilderness Area						Contained in San Francisco Peaks/Mt. Elden Recreation withdrawal
San Francisco Peaks Mt. Elden Rec Area	AZA 030749	7467	74,380.50	10/16/2000	10/116/2020	Snowbowl & Kachina Peaks Wilderness incorporated in this withdrawal.
Clear Creek Ruin, Winona Ruin, Chavez Ruin		3858	310.20	10/29/1965		NO expiration date. Chavez renamed Nuvakwewtaqa Arch District. Applications submitted for both Clear Creek & Nuvakwewtaqa to increase the size of the withdrawal. Clear Creek acreage was 80.20 acres & Chavez was 70 acres
Clear Creek Ruins	AZA 31937		320.93			Segregated 2/27/2002 (AZA 31937), segregation expired 2/27/2004
Nuvakwewtaqa Archeological District (renamed from Chavez Ruin)	AZA 31897		4,935.00			Segregated 2/27/2002 (AZA 31897), segregation expired 2/27/2004. Acreage 4780.06 NFS & 150 private (if acquired).
Rocky Mountain Research Station		5754	20.00			NO expiration date.
Rocky Mountain Research Station	AZA 31896		20.00			Segregated 1/2/2002 (AZA 31896), segregation expired 1/2/2004
Turkey Hills Pueblo Archeological District		5753	55.47	9/26/1980	9/26/2000	
Turkey Hills Pueblo Archeological District	AZA31892					Segregated 2/27/2002 (AZA 31892), segregation expired 2/27/2004
Red Mountain Geological Area		5742	1,907.90	8/5/1980		Original withdrawal expired 4/11/2003.
Red Mountain Geological Area	AZA31894		1,907.90			Segregated 1/13/2003 (AZA 31894), segregation expired 1/13/2005
LeBarron Ruin		5719	30	5/1/1980	5/1/2000	Expired
LeBarron Ruin	AZA31895		30			Segregated 2/21/2002 (AZA 31895), segregation expired 2/21/20001
Ridge Ruin Archeological District		5719	240	5/1/1980	5/1/2000	Expired
Ridge Ruin Archeological District	AZA31893		240			Segregated 2/21/2002 (AZA 31893), segregation expired 2/21/20001

Master List of Mineral Withdrawals and Status on the Coconino National Forest for Forest Plan Revision						
6/22/2011	Prepared by Linda Fox and Polly Haessig, Coconino National Forest					
Data Sources: May 26, 1992: 2760 Letter from Richard M. Pederson R3 Director of Lands and Minerals to Forest Supervisor Coconino National Forest on Status of Withdrawal Reviews. Letter contains a list of the withdrawn areas for the Coconino, with the recommended action.						
Data source: Coconino Forest Plan Amendment No. 13-7/00 Replacement pages 82-83.						
Data source: Personal Communication with Linda Fox, Realty Specialist, Arizona Lands Adjustment Team.						
Data Source: email from Linda Fox 6-15-2011 with info on Verde River WS River and Fossil Creek WS River						
Data source: email from phone conversations with Peter Pillis s re: Honanki, C. Hart Merriam Base Camp, Winona Village and Sacred Mountain 6-17-2011						
Withdrawal	Arizona Serial No.	PLO	Acreage	Date Issued	Date Expired	Comments
Rattle Burn Research Area	AZA 009708	5763	320	9/22/1980	9/22/1990	Closed 7/2/1991 per BLM LRS 2000 database. Still need to request revocation? Area is no longer being used by the university for research purposes.
Other Sites Unknown Status						
C. Hart Merriam Base Camp National Historic Landmark						upon designation as NH Landmarks these properties are listed in the National Register of Historic Places. It is unknown whether they have been withdrawn from mineral entry.
Winona Village National Historic Landmark						upon designation as NH Landmarks these properties are listed in the National Register of Historic Places. It is unknown whether they have been withdrawn from mineral entry.
Honanki Ruin						as per Peter Pillis, Sacred Mountain and Nonanki were previous withdrawals but their 20 years period expired without being renewed.
Sacred Mountain Ruin						as per Peter Pillis, Sacred Mountain and Nonanki were previous withdrawals but their 20 years period expired without being renewed.
Administrative Sites and Others						
Withdrawal		PLO	Acreage	Date Issued	Date Expired	Comments
National Forest Roadside Zones		3152	7,268	8/6/1963		Amended (PLO 3157) to a 300' ROW. Includes FH 3, FW 10US 66, US89 & 89A.
Navajo Ordinance Depot		651		8/24/1950		Amends PLO 59 & 176. Includes mineral leasing.
CNF lookouts		5125		9/13/1971		Modification - withdrawal from mining laws
Clear Creek AS	AR 13372	EO 2046	80			
Clear Creek AS addition	A-13371	EO 2128	80			
Ranger Station #2	A-12997	SO 10/26/1906	320	10/26/1906		
Long Valley #1 AS	A-12971	SO 11/23/1906	550	11/23/1906		
Blue Ridge (Moqui) AS	A-12973	SO 10/23/1907	120	10/23/1907		
Beaver Creek AS	A-13356	SO 6/22/1908	90	6/22/1908		
Sedona AS	A-6641	SO 7/10/1908	27.5	7/10/1908		
Elden Guard Station AS addition	AR-06224	PLO 1091	138.125			
	AR-04542	PLO 1161	881.81			includes 6 sites
Banjo Bill FC			88.1			

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Data Sources: May 26, 1992: 2760 Letter fro Richard M. Pederson R3 Director of Lands and Minerals to Forest Supervisor Coconino National Forest on Status of Withdrawal Reviews. Letter contains a list of the withdrawn areas for the Coconino , with the recommended action.						
Data source: Coconino Forest Plan Amendment No. 13-7/00 Replacement pages 82-83.						
Data source: Personal Communication with Linda Fox , Realty Specialist, Arizona Lands Adjustment Team.						
Data Source: email from Linda Fox 6-15-2011 with info on Verde River WS River and Fossil Creek WS River						
Data source: email from phone conversations with Peter Pillis s re: Honanki, C. Hart Merriam Base Camp, Winona Village and Sacred Mountain 6-17-2011						
Withdrawal	Arizona Serial No.	PLO	Acreage	Date Issued	Date Expired	Comments
Happy Jack AS			120			
Manzanita FC			80			
Pine Flat RA			186.35			
Bootlegger (Formerly Slide Rock FC)			40			
Willard Springs Guard Station & Pasture AS			367.36			Revoke 367.36 Acres
	AR-08550	PLO 1229	1,163.54			includes 21 sites
Mt. Elden Lookout	AR 08550	1229	40	9/27/1955		PLO includes campgrounds, lookouts, admin sites, guard station. Mt Elden Guard Station contained in San Francisco Peaks/Mt Elden RecreationArea withdrawal.
Bakers Butte LO Site			40			
Buck Mountain LO Site			40			
Dairy Spring CG			39.97			
Deadman LO Site			40			Revoke 40 ac
Double Springs CG			29.83			
East Pocket Knob LO Site			40			
General Spring Guard Station			162.44			
Hutch Mtn. LO Site			40			
Kohl Spring CG			40			
			127.04, originally 123.72 ac			
Knob Hill AS						revoke 127.04 as per lotting done in 1982
Lava River Cave CG			40			
Lee Butte LO Site			40			
Mormon Lake LO site			40			
Mt. Elden LO Site			40			
O'Leary Peak LO site			40			
Saddle Mtn. LO site			40			
T-6 Springs Recreation Area			120			
Turkey Butte LO Site			40			
Woody Mountain LO site			40			
Red Rock Crossing RA	AR-05427	PLO 1229 modified	127.5			
	AR-06965	PLO 1390	1,072.50			includes 5 sites
Lakeview Picnic Area			40			
Recreation Area #1			300			Revoke
Recreation Area #2			235			Revoke
Recreation Area #3			367.5			Revoke
Recreation Area #4			130			Revoke

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Withdrawal	Arizona Serial No.	PLO	Acreage	Date Issued	Date Expired	Comments
	AR-012759	PLO 1583	1,140.00			includes 3 sites
Blue Ridge AS			80			
Pinchot AS			50			
Sunset Crater Wupatki National Roadside Zone			1,010.00			
	AR-017536	PLO 1810	28			includes 2 sites
Forest Hwy # 10 Roadside Zone						
Recreation Area #2						
	AR-019858	PLO 1849	225			includes 2 sites
Lakeview Picnic Area			105			
Timber AS			120			
	AR-09390	PLO 3152	11,142.45			includes 4 sites
Forest Hwy Roadside Zone			1,928.00			Pending signature from District Ranger and Forest Supervisor
Forest Hwy # 10 Roadside Zone			2,841.00			Pending signature from District Ranger and Forest Supervisor
US Hwy 66 Roadside Zone			3,232.58			Pending signature from District Ranger and Forest Supervisor
US Hwy 89 & 89A Roadside Zone			3,140.87			Pending signature from District Ranger and Forest Supervisor
	AR-010997	PLO 3263	5,900.81			includes 2 sites
Fort Valley Exp Forest Research Area			4,950.28	10/26/1906		originally 4,950.28, revoke 320 ac to 4630.28
Long Valley Exp Forest Research Area			1,260.81			
	AR-035025	PLO 3858	310			includes 3 sites
Chavez Pass Ruin			70			
Clear Creek Ruin			80.2			
Winona Arch Ruin			160			
Buck Springs AS	AR-08106	PLO 1349	240			
Flagstaff Mun Airport	AR-011394	PLO 1418	320.12			continue with 307.62 acres, revoke 12.5 ac
Moqui LO Station	AR-06719	PLO 1545	20			
Camp Verde AS	AR-015596	PLO 1628	213.6			
Flagstaff Watershed	AR-028146	PLO 2458	15,094.92			Partially revokes area within the Kacina Peaks Wilderness
Oak Creek Canyon RA campground	AR-32155	PLO 3138	102.86			
Clint's Well CG	AR-032439	PLO 3264	40			
Clover RA	AR-030859	PLO 3606	150			Partially revokes area within the West Clear Creek wilderness
Knoll Lake RA	AR-035731	PLO 4144	670.4			
Lockett Meadow RA	AR-2777	PLO 4607	1,103.48			Contained within San Francisco Peaks Mt. Eldon Rec. Area Withdrawal. Revoke 331.96 acres to continue with 771.52
Pinegrove Campground	AR-5951	PLO 5209	333.12			
San Fran Peaks Research Area	A-6608	PLO 5350	1,023.93			Contained within San Francisco Peaks Mt. Eldon Rec. Area Withdrawal. Pending Action from Supervisor's Office
Mormon Lake AS	240	SO 7/27/07	240	7/27/1907		

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Withdrawal	Arizona Serial No.	PLO	Acreage	Date Issued	Date Expired	Comments
Red Rock Ranger District	AZA033447		62.08	2/9/2009	2/9/2029	AZA 033447 New office
Oak Creek Canyon Recreation	AZA 028487		10,500	4/12/1999	4/12/2019	AZA 028487
Northern Arizona Land Exchange/Yavapai Ranch	AZA 033457		20,461.37	11/22/2005		AZA 033457
Wild and Scenic Rivers						
Verde River WS River	AZA 035404					
Fossil Creek SE River	AZA 035405					
WILDERNESS AREAS						
Cedar Mtn Wilderness	AZA 028559		16,005	8/28/1984		Prescott NF
Sycamore Wilderness	AZA028561		6,690	8/28/1984		Prescott NF
Mazatzal Wilderness	AZA 028565		46,670	8/28/1984		Prescott NF
Pine Mtn Wilderness	AZA 035335		19,500	2/15/1972		Tonto NF
Red Rock Secret Mtn Wilderness	AZA 035383		47,194	8/28/1984		
Fossil Springs Wilderness	AZA 035392		22,194	8/28/1984		
West Clear Creek Wilderness	AZA 035393		15,218	8/28/1984		
Wet Beaver Wilderness	AZA 035394		6,155	8/28/1984		
Kendrick Mtn Wilderness	AZA 035462		6,510	8/28/1984		Kaibab NF
Munds Mtn Wilderness	AZA035395		24,411	8/28/1984		