**Forest Plan Guidance – Caves and Other Karst Features**

**I. Mark Twain National Forest - Missouri**

Mechanically constructed firelines for prescribed burns shall be located at least 100 feet from known cave and abandoned mine entrances. Hand constructed firelines shall be located at least 50 feet from cave and abandoned mine entrances.

Designate an area of at least 10 acres completely surrounding a cave or abandoned mine entrance(s) as permanent old growth. This area should include the area above known or suspected cave passages where possible. Vegetation management may occur only as part of natural community management to reach desired conditions (Appendix A).

All structures placed at cave entrances must permit bats to pass with minimal danger and must not alter airflow into or out of the cave, regardless if federally listed bats currently occupy the cave.

Evaluate abandoned mines for use by bats prior to permanent closure.

Prohibit the following within 100 feet of caves and abandoned mine openings:

• Storing construction waste, debris, and excess materials;

• Refueling equipment; and

• Applying fertilizers.

Prohibit timber harvest activities within 100 feet of the edge of a cave entrance.

Prohibit skid trails within 100 feet of the edge of a sinkhole, cave entrance, or other karst feature, or within the buffer zone for wetland features.

Locate new trails at least 100 feet from a cave entrance unless the trail leads to an overlook or other interpretive opportunity regarding the cave. When reconstructing or maintaining existing trails near caves, consider relocating the trail away from the cave.

Do not allow camping within caves or within 100 feet of a cave entrance.

Periodically monitor all cave gates and protective structures to detect trespass, vandalism, or other situations that render those structures ineffective.

Prohibit core drilling or other surface disturbing mineral operations over known caves and in the 20 acres designated around Indiana or gray bat caves, and the additional 130 acres designated around Indiana bat caves.

The area around occupied Indiana or gray bat caves is a smoke-sensitive area. Develop prescribed burn plans to avoid or minimize smoke influences at or near these caves. Give the U.S. Fish and Wildlife Service an opportunity to review and comment on prescribed burn plans within these areas.

Hand-constructed firelines shall be located at least 50 feet from cave and abandoned mine entrances.

Mechanically constructed firelines for prescribed fires are prohibited in the following areas:

• Above known cave passages;

• On slopes greater than 35%, except for short runs with low erosion potential (for example, coming off of a road grade);

• Within 100 feet of known cave and abandoned mine entrances;

• Within 100 feet from the upslope break or crest of the sinkhole;

• Within 100 feet of sinkhole ponds, springs, seeps, fens, shrub swamps, rock bluffs, outcrops, cliffs, and glades,

• Within the RMZ; and

• Within known heritage resource sites.

When using pesticides within the RMZ, WPZ, and within 100 feet of sinkholes, springs, wetlands, and cave openings adhere to the following:

• Minimize the use of pesticides, herbicides, fertilizers, or hazardous materials;

• Use only pesticides labeled for use in or near aquatic systems; and

• Use only hand application and single plant application of herbicides and pesticides, unless other methods are approved by the forest supervisor based on environmental analysis that has shown they are environmentally sound and the most biologically effective method practicable.

Prohibit surface-disturbing mineral activities within 100 feet of the edge of a cave entrance, spring, seep, fen, sinkhole, or shrub swamp.

Do not allow surface disturbing mineral operations on administrative sites, within developed recreation sites, on known endangered and threatened species sites, on National Trails Systems or over known caves or sinkholes.

Do not use caves, sinkholes, and other karst features when locating new common variety disposal locations or pits.

Whenever possible, avoid road construction:

• Above known cave passages;

• Within 100 feet of known cave and abandoned mine entrances;

• Within 100 feet from the upslope break or crest of the sinkhole, other karst feature, rock bluffs, outcrops, or cliffs;

• Within 100 feet of glades;

• Within the buffer zone for wetland features, (Reference Forestwide Standards and Guidelines for Geological Features under Terrestrial and Aquatic Wildlife management.); and

• Within, or near, collapsed features or losing streams.

If existing roads interfere with the natural flow of groundwater seepage and springs associated with adjacent fens and seeps, restore the natural hydrologic flow where feasible if such activities would not result in a loss of habitat.

Where feasible, relocate roads away from known cave entrances during road reconstruction or maintenance activities.

Whenever possible, avoid temporary road construction:

• Above known cave passages;

• Within 100 feet of known cave and abandoned mine entrances;

• Within 100 feet from the upslope break or crest of sinkholes, other karst features, rock bluffs, outcrops, or cliffs;

• Within 100 feet of glades;

• Within the buffer zone for wetland features (reference: Forest-wide Standards and Guidelines for Geological Features under Terrestrial and Aquatic Wildlife management); and

• Within or near collapsed features or losing streams.

Design roads so the runoff does not change natural hydrologic functioning of karst or wetland features.

Temporary roads should be designed and located so they do not change natural hydrologic functioning of karst or wetland features.

Temporary roads should not drain directly into roads, areas of disturbed mineral soil, sinkholes, fens, springs, other small wetlands, or watercourses. Install drainage features at appropriate intervals to prevent erosion.

**II. Hoosier National Forest – Indiana** (\* denotes a standard vs. a guideline)

∗ Prohibit timber harvesting and prescribed burning within 200 feet of cave entrances, direct drainage inputs, such as sinkholes and swallow holes, and any streams flowing into a known cave, except for research purposes.

∗ Do not discharge drilling muds into a karst hydrologic system.

∗ Do not conduct surface disturbing activities on any slopes steeper than 30 percent adjacent to cave entrances without use of mitigation measures.

∗ Do not promote caves as available for general public use unless the Forest develops adequate protection measures to control and manage this use and can clearly establish that no substantial risk, harm, or vandalism of the cave would occur.

∗ Do not conduct seismic surveys within 200 feet of known cave passages or conduits.

∗ Location of caves on NFS lands will not be disclosed.

∗ Cave management will be integrated into general land management practices to protect cave resources from subterranean and surface impacts.

∗ Inventory and evaluate caves in accordance with the Federal Cave Resources Protection Act, Forest Service Manual direction, and Memorandum of Understandings with other organizations.

∗ All caves and karst features shall be excluded from leasing and mineral activities and no drilling will occur within the boundaries of any cave. Boundaries are defined as the area within the known cave plus a buffer zone of 200 feet around the cave.

Cease drilling operations and notify the authorized officer when anyone encounters previously undiscovered voids (more than 12 inches) within 300 feet of the surface.

Do not allow sediment from access roads and other activities to wash into caves or karst features.

Examine and inventory to the extent possible each cave and karst feature.

Prepare management prescriptions and plans describing considerations and criteria for protection of cave resources whenever feasible.

Where practical and beneficial, restore cave and karst hydrologic systems choked with debris from non-natural causes or sediment.

Take corrective action if damage to karst or other resources exists and is likely to continue.

Whenever possible, remove non natural debris from sinkholes to improve water quality entering directly into karst systems.

Gating of cave entrances will only be considered as a last resort on a case-by case basis for safety, and after evidence demonstrates this to be the only option to protect cave species and other resources.

Under normal circumstances, do not place signs with cave names or other information that would reveal cave locations outside of caves. Small signs or registers inside caves (20 to 100 feet) that discuss cave conservation or safety are acceptable.

The Forest will be careful not to promote or dissuade the recreational use of caves; unless it becomes necessary to control access to protect cave resources.

Information on caving basics, ethics and safety, and locations of broad regions of karst topography may be provided. Information about a particular cave may be exchanged with individuals who demonstrate a pre-existing personal knowledge of a cave’s location, extent, and layout.

**III. Bankhead, Conecuh and Talladega National Forests – Alabama**

FW-48. Timber harvesting activities on the Bankhead, Conecuh and Talladega National Forests are prohibited within sinkholes and within 200 feet of their defined boundary and within 200 feet of cave entrances (for caves not associated with sinkholes). Caves that are occupied by Gray or Rafinesque’s big-eared bats should have a 0.25-mile radius buffer and Indiana bat caves should have a 0.50-mile radius buffer. This buffer does not preclude management that would improve conditions for listed or sensitive species, but provides protection for cave integrity.

FW-49. Herbicides will not be used within 200 feet of defined sinkhole boundaries.

FW-100. Gates or structures that allow for entrance and egress by bats are constructed and maintained at entrances of caves and abandoned mines occupied by significant populations of bats to reduce frequency and degree of human intrusion. Forest Supervisor Closure Orders are acceptable as long as monitoring indicates the Orders are effective. If Orders are ineffective, appropriate physical structures must be constructed. Camping and fire-building at the entrance to caves, abandoned mines, and rock shelters used by these species is prohibited. To discourage human disturbance at these caves, nonessential public access routes within 0.25 miles of cave entrances are closed during periods when bats are present. Human access to caves for educational and recreational use may be allowed during periods when bats are not present. If damage to caves occurs as a result of human use, the caves may be closed to human uses. Access for activities such as surveys and scientific study during times when bats are present is determined on a case-by-case basis.

FW-111. Prescribed burn plans written for areas near caves or mines that contain bats identify these sites as smoke sensitive targets and plan to avoid smoke entering cave or mine openings when bats are present.

**Standards for Caves and Abandoned Mines Protection and Enhancement:**

9.F-55. Develop site-specific management plans for each significant cave to meet the intent of the Federal Cave Resources Protection Act.

9.F-56. Until caves or abandoned mines have been surveyed for use by federally listed bats, these species are assumed to be present and habitat is maintained for them by applying standards for occupied caves and mines.

9.F-57. For all caves and abandoned mines suitable for supporting cave-associated species, a minimum buffer of 200 feet is maintained around portals and any associated sinkholes and cave collapse areas. Prohibited activities within this buffer include use of wheeled or tractor vehicles (except on existing roads), mechanical site preparation, vegetation cutting, recreation site construction, tractor-constructed firelines, livestock grazing, herbicide application, and construction of new roads (including temporary roads), skid trails, and log landings. Wider buffers are identified through site-specific analysis when necessary to protect cave and mines from subterranean and surface impacts, such as recreational disturbance, sedimentation and other adverse effects to water quality, and changes in air temperature and flow.

9.F-58. Use of caves for disposal sites or alteration of cave entrances is prohibited, except for construction of appropriate cave gates or closures. Where previously modified entrances are causing adverse impacts to cave fauna, entrance area restored to eliminate adverse effects.

9.F-19. Do not introduce fish into seasonal or sinkhole ponds.

9.F-20. Do not permanently drain seasonal or sinkhole ponds, block or inhibit overflow channels from the ponds, or otherwise alter the hydrological regime.

9.F-21. Where livestock grazing occurs near a sinkhole pond, fence off and provide a buffer of sufficient size to prevent nutrient input from the livestock. Buffer size will be determined on a site-specific basis based on soils, topography and vegetation.

**IV. Cherokee National Forest - Tennessee**

FW-30: CONSTRUCT AND MAINTAIN GATES AT ENTRANCES OF CAVES AND MINES OCCUPIED BY FEDERALLY LISTED BATS, OR BATS DEEMED AT RISK OF LOSING VIABILITY WITHIN THE PLANNING AREA, AS NEEDED TO REDUCE FREQUENCY AND DEGREE OF HUMAN INTRUSION.

FW-31: GATES OR OTHER STRUCTURES THAT ALLOW FOR ENTRANCE AND EGRESS BY BATS ARE CONSTRUCTED AND MAINTAINED AT ENTRANCES OF CAVES AND MINES OCCUPIED BY SIGNIFICANT POPULATIONS OF BATS TO REDUCE FREQUENCY AND DEGREE OF HUMAN INTRUSION. FOREST SUPERVISOR CLOSURE ORDERS ARE ACCEPTABLE AS LONG AS MONITORING INDICATES THE ORDERS ARE EFFECTIVE. IF ORDERS ARE INEFFECTIVE, APPROPRIATE PHYSICAL STRUCTURES MUST BE CONSTRUCTED. CAMPING AND FIRE-BUILDING AT THE ENTRANCE TO CAVES, MINES, AND ROCK SHELTERS USED BY THESE SPECIES IS PROHIBITED. TO DISCOURAGE HUMAN DISTURBANCE AT THESE CAVES, NONESSENTIAL PUBLIC ACCESS ROUTES WITHIN 0.25 MILES OF CAVE ENTRANCES ARE CLOSED DURING PERIODS WHEN BATS ARE PRESENT. HUMAN ACCESS TO CAVES FOR EDUCATIONAL AND RECREATIONAL USE MAY BE ALLOWED DURING PERIODS WHEN BATS ARE NOT PRESENT. IF DAMAGE TO CAVES OCCURS AS A RESULT OF HUMAN USE, THE CAVES MAY BE CLOSED TO HUMAN USES. ACCESS FOR ACTIVITIES SUCH AS SURVEYS AND SCIENTIFIC STUDY DURING TIMES WHEN BATS ARE PRESENT IS DETERMINED ON A CASE-BY-CASE BASIS.

FW-90: PRESCRIBED BURN PLANS WRITTEN FOR AREAS NEAR CAVES OR MINES THAT CONTAIN BATS ARE IDENTIFIED. THESE SITES ARE DESIGNATED AS SMOKE SENSITIVE TARGETS AND PLAN TO AVOID SMOKE ENTERING CAVE OR MINE OPENINGS WHEN BATS ARE PRESENT.

**OBJECTIVE 9.F-4.02** Develop site-specific management plans for each significant cave to meet the intent of the Federal Cave Resources Protection Act.

RX9F-27: AS SOON AS POSSIBLE FOLLOWING DISCOVERY, ACCESSIBLE CAVES AND MINES ARE SURVEYED TO DETERMINE USE BY BATS.

RX9F-28: UNTIL CAVES OR MINES HAVE BEEN SURVEYED FOR USE BY BATS, IT IS ASSUMED THAT FEDERALLY-LISTED BATS ARE PRESENT AND HABITAT IS MAINTAINED FOR THEM BY APPLYING APPROPRIATE STANDARDS FOR OCCUPIED CAVES AND MINES (SEE FORESTWIDE STANDARDS, TERRESTRIAL WILDLIFE AND TES SPECIES HABITAT).

RX9F-29: A MINIMUM BUFFER OF 500 FEET IS MAINTAINED AROUND THE PERIMETER OF PORTALS ASSOCIATED WITH CAVES, CAVE COLLAPSE AREAS, MINES AND SINKHOLES THAT ARE CAPABLE OF SUPPORTING CAVE-ASSOCIATED SPECIES. PROHIBITED ACTIVITIES WITHIN THIS BUFFER INCLUDE USE OF WHEELED OR TRACTOR VEHICLES (EXCEPT ON EXISTING ROADS OR AS NEEDED FOR CAVE PROTECTION AND MAINTENANCE ACTIVITIES), MECHANICAL SITE PREPARATION, VEGETATION CUTTING, RECREATION SITE CONSTRUCTION, TRACTOR-CONSTRUCTED FIRELINES, LIVESTOCK GRAZING, HERBICIDE APPLICATION, AND CONSTRUCTION OF NEW ROADS (INCLUDING TEMPORARY ROADS), SKID TRAILS, AND LOG LANDINGS. WIDER BUFFERS ARE IDENTIFIED THROUGH SITE-SPECIFIC ANALYSIS WHEN NECESSARY TO PROTECT CAVE AND MINES FROM SUBTERRANEAN AND SURFACE IMPACTS, SUCH AS RECREATIONAL DISTURBANCE, SEDIMENTATION AND OTHER ADVERSE EFFECTS TO WATER QUALITY, AND CHANGES IN AIR TEMPERATURE AND FLOW.

RX9F-30: USE OF CAVES FOR DISPOSAL SITES OR ALTERATION OF CAVE ENTRANCES IS PROHIBITED, EXCEPT FOR CONSTRUCTION OF APPROPRIATE CAVE GATES OR CLOSURES. WHERE PREVIOUSLY MODIFIED ENTRANCES ARE CAUSING ADVERSE IMPACTS TO CAVE FAUNA, ENTRANCES ARE RESTORED TO ELIMINATE ADVERSE EFFECTS.

RX9F-31: CONSTRUCT AND MAINTAIN GATES AT ENTRANCES OF CAVES AND MINES OCCUPIED BY FEDERALLY LISTED BATS, OR BATS DEEMED AT RISK OF LOSING VIABILITY WITHIN THE PLANNING AREA, AS NEEDED TO REDUCE FREQUENCY AND DEGREE OF HUMAN INTRUSION.

RX9F-32: GATES OR OTHER STRUCTURES THAT ALLOW FOR ENTRANCE AND EGRESS BY BATS ARE CONSTRUCTED AND MAINTAINED AT ENTRANCES OF CAVES AND MINES OCCUPIED BY SIGNIFICANT POPULATIONS OF BATS TO REDUCE FREQUENCY AND DEGREE OF HUMAN INTRUSION. FOREST SUPERVISOR CLOSURE ORDERS ARE ACCEPTABLE IF MONITORING INDICATES THE ORDERS ARE EFFECTIVE. IF ORDERS ARE INEFFECTIVE, CONSTRUCT APPROPRIATE PHYSICAL STRUCTURES. CAMPING AND FIRE-BUILDING AT CAVE AND MINE ENTRANCES AND ROCK SHELTERS USED BY THESE SPECIES IS PROHIBITED. TO DISCOURAGE HUMAN DISTURBANCE AT THESE CAVES, NONESSENTIAL PUBLIC ACCESS ROUTES WITHIN 0.25 MILES OF CAVE ENTRANCES ARE CLOSED DURING PERIODS WHEN BATS ARE PRESENT. HUMAN ACCESS TO CAVES FOR EDUCATIONAL AND RECREATIONAL USE MAY BE ALLOWED DURING PERIODS WHEN BATS ARE NOT PRESENT. IF DAMAGE TO CAVES OCCURS AS A RESULT OF HUMAN USE, CAVES MAY BE CLOSED TO HUMAN USES. ACCESS FOR ACTIVITIES SUCH AS SURVEYS AND SCIENTIFIC STUDY DURING TIMES WHEN BATS ARE PRESENT IS DETERMINED ON A CASE-BY-CASE BASIS.

RX9F-33: IN PRESCRIBED BURN PLANS WRITTEN FOR AREAS NEAR CAVES OR MINES, IDENTIFY THESE SITES AS SMOKE SENSITIVE TARGETS AND PLAN TO AVOID SMOKE ENTERING CAVE OR MINE OPENINGS WHEN BATS AND OTHER VIABILITY CONCERN SPECIES ARE PRESENT.

FW-83: NO HERBICIDE IS BROADCAST ON ROCK OUTCROPS OR SINKHOLES EXCEPT FOR MANAGEMENT OF TES SPECIES, FOR EXAMPLE, RUTH’S GOLDEN ASTER PITYOPSIS RUTHII. NO SOIL-ACTIVE HERBICIDE WITH A HALF-LIFE LONGER THAN 3 MONTHS IS BROADCAST ON SLOPES OVER 45 PERCENT, ERODABLE SOILS, OR AQUIFER RECHARGE ZONES. SUCH AREAS ARE CLEARLY MARKED BEFORE TREATMENT SO APPLICATORS CAN EASILY SEE AND AVOID THEM.

FW-22: IMPLEMENT A NO GROUND – DISTURBING OR PESTICIDE APPLICATION ACTIVITY ZONE WITHIN THE INTERIOR AND WITHIN A MINIMUM 25 FOOT BUFFER AROUND THE PERIMETER OF ALL SINKHOLES WITH NO APPARENT SURFACE PORTAL. THE PERIMETER IS DEFINED BY A “LIP” OR SIGNIFICANT/ABRUPT BREAK IN THE TOPOGRAPHY AROUND THE UPPER EDGES OF THE SINKHOLE. THE BUFFER SHOULD BE WIDE ENOUGH TO PREVENT ADDITIONAL SOIL MOVEMENT INTO THE SINKHOLE AND TO MAINTAIN EXISTING SURFACE TO SUBSURFACE WATER FLOW.

**V. Daniel Boone – Kentucky**

DB-MIN-2. Within 200 feet of any cave openings associated with karst systems: the surface is

not to be disturbed during any federal mineral exploration or development activity; development of federally owned oil and gas is subject to the No-Surface-Occupancy stipulation.

DB-MIN-3. No drilling or mining is allowed into known cave voids (systems) where federal leasing is authorized.

DB-ENG-1. Subject to valid existing rights, no new roads, or trails will be built or maintained in protected zones around cave openings, associated sinkholes, or cave collapse areas, except for designated recreational caves.

DB-REC-1. Recreational activities inside caves will not be promoted except for designated recreational caves. Public information concerning location and access to non-recreational caves will be limited.

DB-WLF-9. For non-vegetation management projects, currently suitable Indiana bat roost trees may be felled only from October 15 through March 31, if they are more than five miles from a significant bat caves (Indiana bat). If tree removal occurs at other times, the trees must be evaluated for current Indiana bat use, according to U.S. Fish and Wildlife Service protocol.

DB-WLF-10. For non-vegetation management projects, removal of currently suitable roost trees (Indiana bat) within five miles of a significant bat cave (Indiana bat) may occur only from November 16 through March 15. If removal occurs at other times, the trees must be evaluated for current Indiana bat use, according to U.S. Fish and Wildlife Service protocol.

DB-WLF-11. Timber harvest will not occur on the DBNF within one mile of a known significant bat cave, or PETS bat staging cave (with the exception of the wooded grassland/shrubland habitat association), if this activity would result in more than 120 acres of forest less than 10 years of age on all ownerships (public and private).

DB-WLF-12. Within five miles of a significant Indiana bat hibernaculum, tree cutting is not to be conducted from September 1 through December 1.

DB-WLF-13. Where caves exist outside Cliffline Community Prescription Area a minimum zone of 200 feet is to be maintained around openings to caves and mines suitable for supporting cave-associated species, as well as any associated sinkholes and cave collapse areas, except for designated recreational caves. Prohibited activities within this protective area include use of motorized wheeled or tracked equipment (except on existing roads and trails), mechanical site preparation, recreation site construction, tractor-constructed fire lines for prescribed fire, herbicide application, and construction of new roads, skid trails, or log landings. Vegetation in this buffer zone may be managed only to improve habitat for PETS or Conservation species.

**VI. Ozark-St. Francis – Arkansas** (KMZ is a Karst Management Zone)

\*FW83 No commercial timber harvest may be used in KMZs up to 200 feet from cave entrances except for habitat protection or enhancement for threatened and endangered species.

FW110 Close or seasonally restrict access in caves known to be habitat for endangered species.

FW117 Catalog, inventory, and classify wild caves as they are discovered according to the

Cave Resources Protection Act (CRPA) guidelines and determine significance using established protocols. Management direction of cave resources will be made following the CRPA guidelines and will allow for input from interested outside agencies and the public. Known or suspected threatened or endangered species occupancy and/or use is adequate to define a cave or mine as significant.

FW118 Districts will be responsible for maintaining inventory records for caves on their district.

Districts that permit wild cave use will maintain permit records to be used to document

visitor use and aid in the safety of permitted cave users. Master copies of inventory and

permit records will be kept at the Supervisor's Office.

FW119 Manage cave significance and public use on the basis of the Cave Resources

Protection Act (CRPA) guidelines as either:

Permitted open with year-round use

Permitted seasonally

Open with interpretation

Closed year-round

\*FW83 No commercial timber harvest may be used in KMZs up to 200 feet from cave entrances

except for habitat protection or enhancement for threatened and endangered species.

FW120 A Karst Management Zone (KMZ) is a 200-foot buffer identified around all caves

including associated sinkholes and other related karst features identified if projects are proposed adjacent to any KMZ. Wider buffers can be identified through site-specific

analysis when needed to protect cave and mines from subterranean and surface impacts, such as recreational disturbance, sedimentation and other adverse effects to

water quality, and changes in air temperature and flow.

FW121 Where caves exist, a KMZ of 200 feet is to be maintained around openings to caves and

mines suitable for supporting cave-associated species, as well as any associated

sinkholes and cave collapse areas, except for designated recreational caves. Prohibited

activities within this protective area include use of motorized wheeled or tracked

equipment (except on existing roads and trails), mechanical site preparation, recreation

site construction, tractor-constructed fire lines for prescribed fire, herbicide application,

and construction of new roads, skid trails, or log landings. Vegetation in this buffer zone

may be managed only to improve habitat for PETS or Conservation species.

FW122 When managing for habitat protection or enhancement for threatened and endangered

species within the KMZ, slash will not be deposited or dumped into cave entrances or

sinkholes.

\*FW123 Prohibit camping and campfires within 200 feet from the entrance to caves, mines, and

rock shelters used by TES species.

FW127 To reduce frequency and degree of human intrusion, post and enforce seasonal or year-

round closure orders as needed around entrances of caves and abandoned mines that

have unique resources or are occupied by significant populations of threatened,

endangered, or sensitive (TES) species. Exceptions are recreation-use caves, such as

Blanchard Springs Caverns or Roland Cave. If closure orders are ineffective, appropriate

physical structures must be constructed.

FW128 Where endangered bat caves exist, a 200-foot buffer is to be maintained around openings to caves and mines suitable for supporting cave-associated species, as well as

any associated sinkholes and cave collapse areas, except for designated recreational

caves. Prohibited activities within this protective area include use of motorized wheeled

or tracked equipment (except on existing roads and trails), mechanical site preparation,

recreation site construction, tractor-constructed fire lines for prescribed fire, herbicide

application, and construction of new roads, skid trails, or log landings. Vegetation in this

buffer zone may be managed only to improve habitat for PETS or Conservation species.

For Indiana bat caves, pesticide application is prohibited within the primary zone except on a site-specific basis for control of invasive species and insect pests.

\*FW123 Prohibit camping and campfires within 200 feet from the entrance to caves, mines, and

rock shelters used by TES species.

FW129 Where disturbance or vandalism of critical resources may occur, close, or restrict

access to caves.

FW131 Identify caves or abandoned mines that contain significant populations of TES species

as smoke-sensitive targets.

FW134 The use of caves for disposal sites or the alteration of cave entrances is prohibited

except for the construction of cave gates or similar structures to ensure closure.

FW135 Prescribed burn plans written for areas with caves in or near significant caves or mines

will identify these sites as smoke sensitive targets and plan to avoid active combustion and smoldering phase smoke from entering these sites when bats are present.

FW138 All known Indiana bat hibernacula should be evaluated for gates. If additional

hibernacula are found, the caves should be evaluated for gating to protect Indiana bats

during the critical hibernation period.

FW65 Drilling operations will not be allowed in Karst KMZs.

**VII. Tongass National Forest – Alaska**

**KARST and CAVE RESOURCES**

**Forest-wide Standards and Guidelines**

**Karst Resources: KC1**

***I. Strategy***

A. Maintain, to the extent practical, the natural karst processes and the productivity of the karst

landscape while providing for other land uses where appropriate.

B. Strive to maintain the productivity of the soils of the karst landscape after harvest, to maintain

the quality and quantity of the waters issuing from karst hydrologic systems, and to protect the

many resources values within underlying significant cave systems as per the requirements of the Federal Cave Resources Protection Act of 1988 (FCRPA).

C. See Appendix H for additional guidance.

***II. Management***

A. Evaluate karst resources as to their vulnerability to land uses affecting karst systems, as described in the Karst and Cave Resource Significance Assessment, Ketchikan Area, Tongass

National Forest, Alaska (Aley et al. 1993), Karst landscapes and associated resources: a

resource assessment (USDA Forest Service Gen. Tech. Rep. PNW-383) (Baichtal and

Swanston 1996), Karst Management Standards and Implementation Review, Final Report of

the Karst Review Panel (Griffiths et al. 2002), and the information provided herein.

B. Seek participation from interested individuals and organizations, such as caving groups, scientists, recreationists, and development interests in managing the karst resources.

C. Integrate and coordinate karst management with the management of other resources.

Consider the function and biological significance of the entire karst landscape; recognize the

importance of protection of karst systems, not solely specific karst features.

D. Public education and interpretative programs should be developed to ensure an increased understanding of the components and function of the karst landscape.

E. Work with universities and other appropriate research facilities to foster partnerships to study

and characterize the function and biological significance of karst landscapes.

F. Manage the karst lands with an adaptive management approach.

G. **Low Vulnerability Karst Lands.** Low vulnerability karst lands are those areas where resource damage risks associated with land management activities are negligible from a karst management perspective. No special direction is needed.

H. **Moderate Vulnerability Karst Lands.** Moderate vulnerability karst lands are those areas

where resource damage risks associated with land management activities in the areas are

appreciably greater than those posed by similar activities on low vulnerability karst lands

adjacent to areas of high vulnerability.

1. Road Construction

a) Existing roads shall be utilized in preference to the construction of new ones.

b) Roads shall avoid sinkholes and other collapse features and sinking or losing streams.

c) Roads shall not divert water to or from karst features. Measures shall be taken

to reduce erosion and sediment transport from the road surface and cut slopes. Sediment traps, cut and fill slope revegetation, and road closure and revegetation may be appropriate.

d) Because subsurface drainage networks may be more open to the surface in moderate vulnerability areas, additional design criteria may be required.

2. Quarries

a) Existing quarries will be utilized in preference to the construction of new ones.

b) No quarry shall be developed atop karst without adequate site survey and design.

c) Quarries should be properly closed after abandonment.

3. Karst Feature Buffers

a) No surface disturbing activity such as timber harvest, road construction, and/or

quarry development shall occur within a minimum of 100 feet of the edge of a

cave, sinkhole, collapse channel, doline field, or other collapse karst feature.

Manage an appropriate distance beyond the no-harvest zone to provide for a

reasonable assurance of windfirmness (RAW) of that zone (see Reasonable

Assurance of Windfirmness Guidelines, Tongass National Forest, June 2006.

b) No surface disturbing activity such as timber harvest, road construction, and/or

quarry development will occur on lands that overlie a known "significant" cave.

"Overlie" is defined here as the area between lines projected from the outside

walls of the cave passage at a 45-degree angle to the surface.

c) As cave discoveries are made and those caves are mapped and inventoried, it

is quite probable that very significant cave systems will be discovered. Consider

a Geologic Special Area on a case-by-case basis for such caves.

d) Protect all sinking or losing streams and their tributaries irrespective of

whether the channels carry perennial, ephemeral, or intermittent flows. A non-

harvest buffer is required of a minimum of 100 feet from the edge of a sinking or

losing stream within no less than 0.25 mile (1,320 feet) upstream of their swallow

hole or loss point.

e) The area surrounding resurgences should be protected to maintain the

environment surrounding the springs and the quality of the waters flowing from

them.

f) If at any time during project development or implementation an un-inventoried

karst feature (or features) discovered, all activity in the vicinity of the feature (or

features) shall cease until a karst vulnerability assessment can be conducted.

I. **High Vulnerability Karst Lands.** High vulnerability karst lands are those areas where resource damage risks associated with land management activities are appreciably greater than those posed by similar activities on low or moderate vulnerability karst lands. These areas shall be managed to ensure conservation of karst values through the implementation of a high level of protection.

1. Karst lands found to be of high vulnerability shall be identified and removed from the

commercial forest lands suitable land base. Timber management and related activities

are excluded from these lands.

2. Limited recreational development may be appropriate.

3. Roads are considered inappropriate unless no other route or option is feasible. Small

expanses of these areas may be crossed by roads to access areas where harvest is

appropriate (i.e., low or moderate vulnerability karst lands and non-carbonate areas). If

roads must be built across areas of high vulnerability, the following guidelines will apply:

a) Minimize clearing limits and grubbing. Flush cut stumps to the ground. Do not

deck logs pioneered from the road clearing limits outside the clearing limits.

b) Use a fill-type construction rather than a balanced cut and fill design. This will most likely be possible because the slope gradient in these areas is generally less than 15 percent.

c) Utilize log stringer bridges or similar structures to span across collapse features, if necessary. Geotextile should be used to keep aggregate overlay from falling into the collapse feature.

d) Sediment traps and erosion control measures will be needed in most cases.

e) Same-season revegetation of the cut and fill slopes should be required to minimize sediment production potential.

f) No quarry development would be allowed on these lands.

***III. Catchment Area Management***

A. The catchment areas for karst systems, comprised of carbonate or non-carbonate substrate,

are an integral portion of those systems. Catchment area management measures can be most

effectively developed if both catchment types are delineated, and their sensitivity to cumulative land use activities is evaluated. Use the karst vulnerability assessment procedures to approximate the sensitivity of specific autogenic recharge areas.

***IV. Young-Growth Management on Karst***

A. On lands underlain by carbonate substrate, where either pre-commercial or commercial

thinning is proposed, a karst resource inventory shall be conducted as described above. B. The openness of the underlying karst system, that system’s vulnerability to surface disturbance, and the likelihood of additional sediment production or runoff by thinning the young-growth timber shall be determined.

C. Pre-commercial thinning is appropriate on all karst lands when the karst management

objectives can be met.

D. No slash or debris may fall or be placed in identified high vulnerablility karst features.

E. If any introduced slash or debris finds its way into karst features or losing streams, it must be

removed by hand.

F. Commercial thinning is appropriate on low to moderate vulnerability karst lands when the karst management objectives can be met.

G. Generally, no thinning shall be permitted on lands determined to be of high vulnerability, such as within 100 feet of a cave entrance, a karst feature accepting surface flow, or on the edge of a sinking or losing stream within 0.25 mile upstream of their swallow hole or loss point. A zone equal to one tree height should be left untreated to ensure that no material will be placed in these features.

***V. Salvage of Windthrown Timber on Karst***

A. Salvage is appropriate on low to moderate vulnerability karst lands when the karst management objectives can be met. Generally, no salvage shall be permitted on lands determined to be of high vulnerability, within 100 feet of a losing stream, a karst feature, or on lands that overlie a "significant cave.” For relatively minor, isolated features surrounded by low

to moderate vulnerability karst, if the logging system to salvage the windthrown timber can be

designed to not disturb the timber spanning or blown into the feature, salvage shall be permitted within 100 feet of the lip or edge of the feature.

***VI. Mineral Development***

A. The impacts of any proposed mineral development within the karst landscape can be analyzed through the environmental analysis that is triggered once a Plan of Operations is received.

**Cave Resources: KC2**

***I. Management***

A. Manage lands in a manner that, to the extent feasible, protects and maintains significant caves and cave resources. See direction in 36 CFR 290.3 and “definitions” for guidance determining cave significance. See Appendix H for specific guidance.

B. Locate, map, and describe caves, and evaluate and document the resource values discovered when appropriate. Although the word "inventory" is not used in FCRPA, it is clear that the significant cave designation process is an inventory process for identifying caves that will require some form of management. Carry out data storage and collection in a manner that is

consistent, at a minimum, with the processes outlined in 36 CFR 290.3 and FSM 2881.42 for nomination, evaluation, and designation of significant caves.

C. Develop a comprehensive Cave Resource Management Strategy on known cave resources.

Strategies for cave resource management are suggested in Appendix H and within these guidelines.

1. **Class 1. Sensitive Caves**. Caves considered unsuitable for exploration by the general public either because of their pristine condition, unique resources, or extreme safety hazards. These caves will be closed by a Forest Supervisor Order and entry allowed by permit only.

2. **Class 2. Directed Access Caves**. Caves with directed public access and developed for public use. These caves are shown on maps or have signs directing visitor access; public visitation is encouraged.

3. **Class 3. Undeveloped Caves**. Caves that are undeveloped, but are suitable for

exploration by persons who are properly prepared. Location of these resources will not be advertised or shown on maps.

D. Develop public education and interpretative programs to foster an increased appreciation of the function and biological significance of the cave resources, caving ethics and safety, and safe

and responsible uses of these resources for research and recreation purposes.

E. Specific information concerning Significant Caves on the Forest will not be made available to

the public (FCRPA). This information is also not available under Freedom of Information Act

requests. Treat this information as confidential and secure it in such a manner as to prevent

access by unauthorized individuals.

F. Search and rescue in caves is the primary responsibility of the Alaska State Troopers. Supply

appropriate support and equipment where needed and available.

G. The following are prohibited in caves:

1. In bat caves, or caves with sensitive species, it is prohibited to go into or be upon any area that is closed for the protection of threatened, endangered, rare, unique, or vanishing species of plants, animals, birds, or fish.

2. Applicable to all caves, except for purposes of research and exploration, it is prohibited to:

a) Build, maintain, attend, or use a campfire or stove fire; fires may be allowed in regard to traditional native ceremonies in compliance with the American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act, their amendments, and implementing regulations;

b) Smoke;

c) Camp;

d) Possess, discharge, or use any kind of fireworks or other pyrotechnic device;

e) Discharge a firearm, air rifle, or gas gun; or

f) Allow domestic animal access.

**Minerals and Geology Resource Preparation: MG1**

***I. Resource Inventory***

A. Maintain the Mineral Resource Inventory. Include historic and current mining activity, regional

and local geology, access routes, and geologic and mineral terrains. Continue to work with the

United States Geological Survey (USGS) to update and map the geology on the Forest and

incorporate the new data into the Tongass Geology Layer. Geologic inventory includes the

collection, analysis, and interpretation of geologic data necessary for identification and solution

of management problems, and for the assessment and development of the geologic resources.

The creation of geologic inventories is basic to carrying out geologic resources and services.

Geologic inventory includes bedrock geology, surficial geology, stratigraphy, hydrogeology,

geomorphic features, geological hazards, karst features, caves, and paleontology, including

potential for geologic formations to yield fossil resources of scientific and other values.

(Consult Forest Service Manual [FSM] 2881 for specific direction.)

***II. Resource Planning***

A. Assemble and provide minerals and geology information as needed for project planning.

Conduct inventories and assessments of geologic resources and hazards, paleontologic

resources, and mineral resources for use in land management planning (FSM 2884.11).

Geologic reports written for specific projects as the result of geologic inventory and/or

investigation may include some combination of the geologic history; location and extent of

locatable, leasable, and salable minerals; location and extent of aquifers; groundwater quality

and quantity; structural features; geologic and geomorphic processes affecting the area; cave

and karst resources; and paleontological resources.

**Low Vulnerability Karst Lands.** Low vulnerability karst lands are those areas where resource damage risks associated with land management activities are negligible from a karst management perspective. No special direction is needed.

**Moderate Vulnerability Karst Lands.** Moderate vulnerability karst lands are those areas where resource damage risks associated with land management activities in the areas are appreciably greater than those posed by similar activities on low vulnerability karst lands adjacent to areas of high vulnerability.

a) No surface disturbing activity such as timber harvest, road construction, and/or quarry development shall occur within a minimum of **100 feet of the edge of a cave, sinkhole, collapse channel, doline field, or other collapse karst feature**. Manage an appropriate distance beyond the no-harvest zone to provide for a reasonable assurance of wind firmness (RAW) of that zone.

b) No surface disturbing activity such as timber harvest, road construction, and/or quarry development will occur on lands that overlie a known "significant" cave. "Overlie" is defined here as the area between lines projected from the outside walls of the cave passage at a 45-degree angle to the surface.

d) Protect all sinking or losing streams and their tributaries irrespective of whether the channels carry perennial, ephemeral, or intermittent flows. A non-harvest buffer is required of a **minimum of 100 feet from the edge of a sinking or losing stream within no less than 0.25 mile (1,320 feet) upstream of their swallow hole or loss point.**

e) The area surrounding resurgences should be protected to maintain the environment surrounding the springs and the quality of the waters flowing from them.

f) If at any time during project development or implementation an un-inventoried karst feature (or features) discovered, all activity in the vicinity of the feature (or features) shall cease until a karst vulnerability assessment can be conducted.

**High Vulnerability Karst Lands.** High vulnerability karst lands are those areas where resource damage risks associated with land management activities are appreciably greater than those posed by similar activities on low or moderate vulnerability karst lands. These areas shall be managed to ensure conservation of karst values through the implementation of a high level of protection. **Karst lands found to be of high vulnerability shall be identified and removed from the commercial forest lands suitable land base. Timber management and related activities are excluded from these lands.**

Entry permits will be required for caves based upon specific resource considerations.