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AESO/SE
2-21-02-F-030

April 5, 2002

Mr. John C. Bedell
Forest Supervisor
Apache-Sitgreaves National Forests
P.O. Box 640
Springerville, Arizona 85938

Dear Mr. Bedell:

This biological opinion responds to your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation was dated October 12, 2001, and received by us on October 16, 2001. At issue are effects to the Apache trout (*Oncorhynchus apache*) from the proposed Mineral Ecosystem Management Area (MEMA) project located on the Apache-Sitgreaves National Forests (A-S) in Apache County, Arizona.

In your letter you requested our concurrence that the proposed action may affect, but is not likely to adversely affect the endangered black-footed ferret (*Mustela nigripes*) and southwestern willow flycatcher (*Empidonax traillii extimus*), and the threatened bald eagle (*Haliaeetus leucocephalus*) and Mexican spotted owl (*Strix occidentalis lucida*). Your letter further determined that the proposed action may affect, but is not likely to jeopardize the proposed mountain plover (*Charadrius montanus*) and Chiricahua leopard frog (*Rana chiricahuensis*), and the experimental/non-essential population of Mexican gray wolf (*Canis lupis baileyi*). We provided our concurrence with these determinations in our 30-day response letter dated November 20, 2001. Rationale behind our concurrences with your effect determinations on listed species is contained in Appendix A.

This biological opinion is based on information provided in the Biological Assessment and Evaluation (BAE) for the MEMA, dated October 4, 2001, discussions between our respective staff, and other information in our files. Literature cited in this opinion is not a complete bibliography of all literature available on the species of concern or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at the Arizona Ecological Services Field Office (AESO).

CONSULTATION HISTORY

On October 16, 2001, the Service received the U.S. Forest Service's request for formal consultation regarding effects to the Apache trout from the proposed MEMA project. On November 20, 2001, the Service transmitted the 30-day letter acknowledging initiation of formal consultation on October 16. Additional coordination occurred between staff biologists during the consultation period. On March 1, 2002, a draft biological opinion and request for a 60-day extension was sent to the Forest Service. On March 13, the Service received the Forest Service's letter of March 12 indicating that the Forest Service had no comments on the draft and concurred with a 60-day extension.

DESCRIPTION OF THE PROPOSED ACTION

The following project description is based on information contained in the BAE. The Mineral Ecosystem Management Area is approximately 40,000 acres and is located entirely within the Mineral Creek watershed (T10N, R25E; T9N, R25E; T8N, R25E; T9N, R26E, T8N, R26E; and T8N, R27E) within the Springerville Ranger District of the A-S (Figure 1 in Appendix B). For consultation purposes, the action area is defined as the entire MEMA including the aquatic environment of Mineral Creek.

The MEMA project would authorize vegetative treatments to meet forest and watershed restoration goals. The objective of these restoration treatments is to reduce tree density and modify fuel density and arrangement to a more sustainable state. The goal is to accomplish these objectives through prescribed burning and timber harvest. After initial treatment, periodic low-intensity prescribed burns would be conducted to maintain conditions. The proposed project life is five years.

A minimum of 20% of the MEMA will be allocated for old growth management, and procedures to protect historic properties and places of cultural significance are included. Associated actions that increase the effectiveness of treatments or meet secondary objectives are identified. These items, which will be described in detail, include road management, structural and non-structural habitat improvement, riparian enhancement, willow restoration, watershed improvement structures, and accommodation of a local demand for dead spruce products.

In summary, the proposed action would include:

- 1) Timber harvest and prescribed burning on 15,265 acres of ponderosa pine forestland.
- 2) Mechanical and/or burning treatments within 7,308 acres of current or former grasslands.
- 3) Removal of dead spruce products by permit to local small-business enterprises on 738 acres.
- 4) Timber harvest along Mineral Creek on approximately 170 acres and structural improvements in or along selected riparian stretches.
- 5) Road closures specified in the analysis.

- 6) Old growth allocations within the EMA.
- 7) Willow restoration.
- 8) Watershed improvement structures.
- 9) Slashing and burning of 1,219 acres of pinyon-juniper woodland to meet enhancement objectives for elk winter range.

Goshawk Treatment

Some 15,265 acres within the total 18,515 acres of ponderosa pine would be treated under this treatment (combined areas identified as the “Goshawk Rx” and “Presettle Rx” on treatment map). Small openings (one-fourth to 4 acres in size for 1,498 total acres) will be created to meet the 10% VSS 1 desired condition. These openings will be created primarily within the VSS 3 class, which is nearly three times as abundant as the desired condition. The stand matrix between openings (remaining 13,767 acres in the treatment block) will be thinned-from-below to increase growth and vigor on residual trees and reduce live fuel loading. Specifications in the goshawk guidelines of the Forest Plan will be used for creating these openings. Refer to the description of thinning in residual groups of Pre-Settlement Treatment for specifications for the matrix thinning between openings.

Pre-Settlement Treatment

The same 15,265 acres of ponderosa pine will be treated under this alternative as Goshawk Treatment (combined areas identified as the “Goshawk Rx” and “Presettle Rx” on treatment map). This is a conceptual treatment patterned after restoration studies designed to mimic the open, park-like stands in much of the ponderosa pine type of a century ago. The prescription for this treatment is basically clumps of the largest trees; one-fourth to 4 acres in size are selected and thinned from below (18” cap). An open zone approximating the radius of the leave group is then created surrounding each group by removing all trees less than 18 inches. This results in a mosaic of leave groups within a primarily open stand. Test plots of this design show that such a treatment will result in 74% of the area within the open zones and 26% of the area within the residual tree groups. Thinning within the leave groups is designed to maintain the 40% canopy cover in VSS 4-6 recommended in management guidelines for the northern goshawk.

30/70 Treatment

This treatment reduces the extent of the pre-settlement restoration prescription to 30% of the treatment block (the stippled portion entitled “Presettle Rx” on treatment map). The other 70% (the shaded portion entitled “Goshawk Rx” on the map) will be treated under the goshawk prescriptions of alternative 2. This is a hybrid of the Goshawk and Pre-Settlement Treatments. The design features of both treatments would remain essentially the same, except that because of the large proportion of openings in the pre-settlement prescription, no additional patch openings will be created in the goshawk portion. Some 4,638 acres will receive the pre-settlement prescription and 10,627 acres will receive the goshawk matrix thin prescriptions. The same

15,265-acre block will be treated, as under the two treatments and the same 3,250 acres of the ponderosa pine type will not. This would treat 15,322 acres of ponderosa pine cover type as follows: 30% of the treatment block, 4,639 acres in a pre-settlement restoration prescription. The other 70%, 10,683 acres will be treated under the goshawk matrix thin prescription.

The goshawk matrix thin prescription will follow the guidelines in General Technical Report RM-217 (U.S. Forest Service 1992) except that no patch openings will be created, and trees larger than 18 DBH will not be removed. The proposed action would provide restoration treatment at a landscape scale (1,000-5,000 acres), which will break up the continuity of the ponderosa pine type, while requiring less drastic tradeoffs in wildlife habitat and watershed disturbance. Several opportunity projects have been incorporated into the proposed action. These include meadow restoration, maintenance prescribed burning, Mineral Creek riparian treatment, spruce salvage, elk winter range enhancement, willow restoration, watershed improvement structures, and road management. Each is described in greater detail below.

Non-riparian timber treatments will take place during spring, summer, and fall months in normal weather years, and possibly winter months in dry years. Treatments will not occur concurrently for all acres within the analysis area designated for treatment.

Meadow restoration will occur within the 7,308 acres of grassland type identified on the treatment areas map. Not all sites will be treated nor will the entire area within any given site necessarily be treated. The target areas are groups, patches and sometimes complete blocks of grassland or former grassland that have a substantial conifer component present. This conifer component may be established pinyon-juniper or young ponderosa pine. The objective of treatment is to significantly reduce the conifer component to maintain or restore the meadow condition. The size and density of the invasive conifers will determine the appropriate treatment. Prescribed fire will be the preferred method although mechanical treatment may be necessary, sometimes in combination with fire. Machine mowing and chainsaw slashing would be the mechanical methods employed. No intensive mechanical methods like dozer chaining or dozer pushing would be used. The use of mechanical equipment to establish fire control lines prior to ignition may be necessary in some locations.

Maintenance prescribed burns will be conducted through treated areas on a 3-10 year cycle to maintain low fire risk in timber stands and retard conifer invasion in meadows. For pine stands, measures will be taken to maintain down heavy logs as specified in the goshawk guidelines. For meadow burns in elk winter range, spring burning is preferable to fall burning. For the Mineral Creek riparian area, a no-burn buffer zone will be established along both sides of the creek. This will consist of the 64 Road on the west side and the Hutcherson Spring Road on the east. Otherwise, a minimum distance of 100 yards or outside the enclosure fence will be the no-burn boundary. Burning of piled logging and thinning slash could occur during all times of the year.

Again, a no burn buffer zone will be established on both sides of Mineral Creek consisting of the 64 road on the west side and the Hutcherson Spring Road on the east. Otherwise a 100 yard buffer, or outside the enclosure fence, will be the established buffer. Other stream courses that

drain directly into Mineral Creek, above the fish migration barrier will have between a 75 to 150 ft. no burn buffer, depending upon soil erosion hazard rating.

Mineral Creek riparian treatment will consist of removing conifers in a mosaic of treatments along Mineral Creek. Up to 80% of the conifer basal area in these selected stretches may be removed. The objective is to increase the availability of daylight to deciduous species and open up the under-story to promote ground vegetation over 40-60% of the length of Mineral Creek. Treatment will be concentrated in those areas currently dominated by conifers and may extend out into the no-burn buffer to meet these objectives. An estimated total of 170 acres will be treated in discontinuous segments of varying size and shape. No trees larger than 18 inches in diameter will be removed. Trees will be designated for removal under the on-site supervision of the District Biologist or Forest Hydrologist. Sections of Mineral Creek that flow through active goshawk nest stands or stands meeting query specifications for existing old growth (6004/0006, 6004/0025, 6015/0016, 6025/0003) will be deferred from treatment. Impacts to the riparian zone by mechanized equipment will be minimized by utilizing whole tree skidding techniques and designating skid trails. Existing roads on each side of Mineral Creek will be utilized for treatment access so creek crossings other than existing ones will not be required.

Spruce salvage will be allowed in the 738 acres shown on the treatment map. Although these stands are not currently needed to meet the 20% old growth objective, treatment limitations are established to maintain sufficient snags for old growth and goshawk habitat. The old growth criterion for high sites (which these are) is four snags per acre 16 inches or larger. The goshawk criterion is 3 snags per acre 18 inches or larger. Maintaining 4 snags per acre 18 inches or larger would meet both criteria and is the treatment limit for these sites. That is, only dead snags in excess of this limit, or snags less than 18 inches in diameter, will be removed under a spruce products permit. Down logs of any size may be removed as long as 10-15 tons per acre are retained in 3-inch plus woody debris.

Road management for the MEMA was developed utilizing the current Road Access and Travel Management (RATM) map. The A-S reviewed roads designated to remain open and roads designated for closure and selected the following roads to be decommissioned through project activities or as funds become available. These roads are poorly located, of environmental concern, or no longer needed for an adequate transportation system: Forest Road (FR) 64 will be decommissioned from Mineral Springs to the junction with the FR 404 (1.86 miles), except for a short spur (approximately 1/8 mile long) into the dispersed recreation sites near Brady Spring. That portion from the junction with FR 65 to Mineral Springs will remain open. The open portion will be improved for better drainage and surfaced with native material as funding becomes available or through cooperative requirements of treatment contracts. After completion of vegetative treatments, the decommissioned section will be blocked with native material barriers and wing fencing as needed.

The following roads are designated for closure:

FR 8683 from the junction of FR 65E (.25 miles).

FR 8671 east of its junction with FR 117 (1.07miles).
FR 8698A east of the junction of FR117 (.28 miles).
FR 8696A from the junction of FR 8696 (.28 miles).
FR 8682 south of its junction with FR 65E (.41 miles).
FR 8670 between FR 404 and FR 65 (.56 miles).
FR 404Y east of the junction with FR 404 (.34 miles).
FR 8486 south of Guest Spring (.54 miles).
FR 8486D from its junction with FR 8486 (.78 miles).
That portion of FR 67A crossing and adjacent to Vernon Creek (.66 miles).
FR 8312 from the junction with FR 8662 (.3 miles).
FR 8277 south of the junction with FR 8262 (.17 miles).
Un-numbered non-system roads that currently exist, or that may come about through spontaneous or impulsive vehicle use, will be closed and/or obliterated as opportunity and funding permit.

Elk winter range enhancement will take place within three pinyon-juniper stands covering 1,219 acres. Treatment will consist of prescribed burning or a combination of prescribed burning with some hand or mechanical slashing pretreatment. The target areas are groups, patches and sometimes complete blocks where pinyon-juniper cover is inhibiting production of forage and will result in approximately 75% of the area within these stands actually being treated. The objective is to stimulate forage production by reducing the pinyon-juniper component and rejuvenating the under-story.

Willow enhancement/protection projects will be completed within the EMA watershed. The willow community through out the EMA has been significantly degraded as a result of grazing by livestock and wildlife. Most of these willow communities are so degraded that even light browsing by wildlife is preventing community expansion or maintenance. The goal is to protect willow communities by constructing wildlife exclosures, from 1/8 acre up to 4 acres, to rest willows from grazing pressure and allow for community expansion. Willow exclosure locations are depicted in Figure 2 of Appendix B.

Watershed improvement structures will be designed to minimize soil erosion within the watershed in areas identified as actively headcutting or gullying. Rock dropdown structures are proposed at two sites as shown in Figure 3 of Appendix B. These sites are within the MEMA but more than a mile away from Mineral Creek (K. McMillan, A-S, personal communication). Structures will be installed as funding becomes available.

Mitigation to be Implemented

- A. Adhere to State Best Management Practices in vegetation treatments as detailed below.
- B. Openings created through treatment will be susceptible to invasion by noxious weeds. Funding requests for project implementation will include costs to survey created openings for noxious weeds.
- C. Loss of snags, large trees and large down logs to prescribed burning will be minimized by using a cool burn prescription, adjusting ignition patterns, and wet-lining or fuel-clearing around these important features. Burning in forested stands should be in a mosaic pattern

with only about 60 percent of a treatment unit burned at one time. Consumption of smaller fuels (less than 3-inches in diameter) is desired; consumption of larger fuels is not.

- D. Adhere to State air quality permit procedures in managing smoke from prescribed burns.
- E. If new goshawk territories (or habitats of listed species or other species of management interest) are established within the EMA that affect scheduled treatments, then treatments will be modified as provided for in current Forest Plan guidelines for that species. The pre-settlement prescription will not be applied in goshawk PFAs (post-fledging areas). If new PFAs are established during implementation that fall within stands shown for pre-settlement treatment, the pre-settlement treatment will be shifted to alternate stands, or suspended, and the PFA will be treated according to the goshawk guidelines in the Forest Plan.
- F. All improvements within the project area (fences, cattleguards, etc.) will be protected during project activities.
- G. Interior low standard roads used for treatment activities that are currently in stable condition will receive little or no blading in preparation for use.
- H. All water sources and sensitive landscape features (such as turkey roosts, squirrel nest trees, dispersed recreation sites, and cultural sites) will be retained and/or buffered according to Forest Plan Standards and Guidelines.
- I. Unless a more restrictive measure is adopted, the following guidelines from the Forest Plan as amended on 6/5/96 will be followed in all treated stands:
 - 1) All existing snags greater than or equal to 12 inches DBH and 10 feet high will be protected, unless they pose a threat to public safety.
 - 2) Where they exist in treatment areas, a minimum of three to five mature and old, live trees per acre will be retained for replacement snags. Priority will be given to leaving trees with little or no mistletoe infection.
 - 3) Leave 5-7 tons per acre of woody debris greater than 3-inches in diameter after treatment for small animal habitat and long-term site productivity. This should include at least 3 large downed logs per acre. Large logs for this purpose are at least 12-inches mid-point diameter and 8-feet or greater in length.
 - 4) Piling of slash will be limited to created openings and wildland urban interface fuelbreaks. On soils identified as sensitive to compaction, machine piling will only be done during dry or frozen conditions.
 - 5) There will be no management activities within an active goshawk PFA from March 1 through September 30.
 - 6) There will be no harvest activities within goshawk nest stands. Only thinning-from-below in VSS 3 and smaller will occur in the rest of the PFA.
- J. Because VSS 5 and 6 ponderosa pine are already deficit, trees 18 inches and larger will not be harvested.
- K. Other mitigation measures are included under descriptions of specific treatments in the Forest Service environment assessment.
- L. Silvicultural prescriptions will not be applied on unique and diverse features.

- M. Because of the intense nature of the pre-settlement prescription, approximately 10% of the dense portion of each stand will not be treated. This is above and beyond areas deferred under L. above. These dense leave areas may, however, be placed adjacent to unique and diverse features to provide additional buffering. These dense leave patches should be one-fourth to 4 acres in size and distributed in a mosaic pattern within the stand. Approximation by ocular estimate is sufficient in determining these areas.
- N. Wildland/urban interface boundaries receiving mechanical treatment will have fuelbreaks constructed concurrent with mechanical treatment. Preferences of the owner(s) of the urban side of the line will be accommodated in fuelbreak design to the extent that adequate protection is not jeopardized. The fuelbreak will be designed to protect both the landowner and National Forest from increased short-term risk associated with treatment slash.
- O. Ignition of prescribed burning operations will be suspended if a shift in wind direction will carry the smoke into human occupied areas of residence within the EMA. Ignitions within 3 miles of the community of Vernon will likewise be suspended if the prevailing wind will carry smoke into occupied residential areas.
- P. Restrict livestock grazing from areas of meadow restoration burns during the first year following treatment. Do this primarily by coordinating burning with the annual grazing plan to conduct burning in rested pastures.
- Q. Large-scale treatments in ponderosa pine carry a risk of triggering beetle outbreaks, especially in lower elevations. The following mitigation will reduce this risk.
 - 1) Utilize as much material as feasible 4 inches in diameter and larger.
 - 2) Trees cut from July to December dry out during the fall and winter and become unfavorable beetle habitat. Minimize cutting trees from January to June.
 - 3) Beetle populations will remain manageable if projects are conducted every other year or if a buffer of two miles or more separates treatment areas in consecutive years.
- R. Conduct mountain plover survey at the prairie dog colony north of Kitchen Springs before grassland/meadow treatments begin in and adjacent of the colony.
- S. Survey for Goodding's onion in Mineral Creek before riparian treatment occurs to minimize impacts to plants.
- T. Treatments within one quarter mile of established Mexican spotted owl PACs will be restricted to outside the breeding season (March 1 - September 1).
- U. Treatment in stands within established gowhawk PFAs will be restricted to outside the breeding season (March 1 - September 30).

Soil and Water Conservation Best Management Practices (BMPS) to Mitigate Harvest Activities for the Mineral EMA

A. Limit the Operating Season - Ground disturbing activities (tractor skidding, decking and machine piling, etc.) will be limited to dry or frozen soil conditions. This will reduce compaction and soil displacement (rutting) that is associated with timber harvesting activities when soils are wet or are saturated. Hauling and skidding is restricted on all soils by the timber sale administrator during wet periods to prevent damage to the road system (see A/S Guidelines for Excessive Rutting, 6/10/92). Operations can be suspended due to wet weather in accordance

with contract provision B6.6. Six TES units were identified within the sale area that have severe limitations for timber harvest due to low bearing strength. Impacts to these soils will be mitigated by restricting ground disturbing activities to dry or frozen soil conditions.

B. Use of Sale Area Maps for Designating Stream Courses for Water Quality Protection - Locations of protected stream courses and filter strips will be shown on the sale area map. Riparian areas and meadows to be protected are also shown on sale area maps.

C. Stream Course Protection - Stream courses to be protected are shown on the Forest sale contract map. Filter strips are to be designated along protected stream courses. Stream courses are to be crossed at designated crossings only. There is no skidding or road construction longitudinally within protected stream courses. There will be no decking and machine piling of slash within stream courses. Leadout ditches, waterbars, will not be constructed in such a manner as to divert run-off into stream courses. Debris generated from timber harvest activities will be removed from designated stream courses. Trees that can be harvested from stream courses are those trees with exposed root systems that have lost their value in providing bank stability. Trees are to be felled outside the stream channel. Trees, in or on the banks of stream courses, with unexposed root systems that are providing bank and stream channel stability are not to be harvested. The timber sale administrator will use authority over skid trail and log landing location to protect, as needed, stream courses that were not designated on the sale map.

D. Streamside Management Zone (Filter Strip) Designation - Filter strip are designed to decrease erosion hazard and are designated based on erosion hazard and existing vegetative groundcover conditions. Filter widths are as follows:

Slight erosion hazard = 75 feet (slope distance) on both sides of the stream course beginning at the high water mark within the stream channel.

Moderate to Severe hazard = 150 feet (slope distance) on both sides of the stream course beginning at the high water mark within the stream channel, or modified as needed to best feasibly protect specific streams/reaches.

Activities permitted within the filter strip are limited to directional falling of trees. Ground skidding, decking of logs and machine piling (permitted only on existing roads that are located within filter strips), road construction, and burning of concentrated slash are prohibited within the filter strip. Stream courses to be protected with filter strips are to be identified on watershed and sale area maps. Stand prescription field cards will include a sketch of the filter strip location and width.

E. Treatment of Ephemeral Drainages - Ephemeral drainages are recognized in the following ways. They form the lowest spot of the surrounding ground. They form obvious channel continuity along its length and joins with more obvious channels downstream. They show

evidence of having run water on previous occasions, i.e., litter and vegetation has moved, or there is a lack of litter in the channel.

The following are BMPs for harvest activities around ephemeral drainages, whether designated or not.

No skidding allowed down ephemeral channels or low points or swales. No road construction allowed in or immediately adjacent to ephemeral streams. Maintain an undisturbed filter strip of vegetation and litter between skid trails/log decks/roads and the channel. Minimize the number of skid trail and road crossings across these channels. No log decks will be located within the ephemeral streams or depressions.

F. Log Landing Location - Log landings (decking areas) are prohibited in meadows, riparian areas, stream courses, or filter strips of stream courses (whether designated or not). Key areas will be clearly designated on the timber sale contract map.

G. Log Landing Erosion Prevention and Control - Immediately after use, landings will be scarified as needed to eliminate compaction. Once scarified, log landings are to be reseeded with an erosion control native seed mix. Slash should be scattered on landings (to further retard formation of rills and gullies) where fuel loadings are less than 10 tons/acre in the pine type, or less than 14 tons/acre in the mixed conifer type. Where fuel loadings exceed these levels, machine piling will be permitted followed by burning, scarification and reseeded.

H. Use of Terrestrial Ecosystem Survey (TES) - TES was consulted and TES map units were evaluated for suitability for various management practices based on TES map unit properties.

I. Tractor Skidding Design - Skid trails will be designated or approved by the Timber Sale Administrator in conjunction with the timber sale purchaser. To minimize soil disturbance by equipment use, trees are to be felled to the lead and skid trails should be located by the Sale Administrator as far apart as possible to reduce the number of skid trails needed to harvest the unit. Any harvesting of trees within a filter strip will be accomplished by falling to the lead and end lined out of the filter strip. This will allow a faster rate of recovery of the soil from equipment impact. Soil productivity benefits through increased growth in tree seedlings, number of tree seedlings stocked per acre and increased forage production.

Use existing skid trails where properly located. Designate new skid trails throughout the sale area to prevent long, straight skid trails from running up and down slopes. Skidding of logs will be with the front end of the log suspended above the ground surface. Skidders should be required to stay on the skid trail system, except where other objectives take priority (like maximum site disturbance wanted for seed cuts, etc.), which shall be noted on the stand prescription field card. Additionally, eight TES units were identified with severe limitations for timber harvest due to erosion hazard. Proper skid trail design and skidding practices as mentioned above, along with timely implementation of erosion control practices (See J below)

will generally mitigate potential soil loss. No mechanized equipment shall be used on south facing aspects of cinder cones within TES mapping unit 536 (map in Project File).

J. Erosion Control on Skid Trails - Skid trails will be waterbarred, scarified and seeded as needed, with a grass species mix designed to control surface erosion. Depressions such as ruts and berms will be filled in or removed, restoring skid trails to the natural grade of the slope where possible. In addition, slash generated from the timber sale may be spread by hand in lieu of waterbarring where conditions are favorable.

K. Soil Productivity - To maintain or improve soil productivity, manage towards a minimum 6 to 12 tons/acres in pine types, in the 3 + size class where feasible. Reduced levels of organic debris may be allowed within fuel breaks, or where treatments to achieve other objectives are needed, such as scarification for regeneration cuts or areas to be grass seeded for forage production.

L. Slash Treatments in Sensitive Areas - Tractor slash piling should not, but could, occur in meadows, stream-side management zones (filter strips), and riparian areas.

M. Meadow Protection During Timber Harvesting Activities - Meadows will be protected from timber harvesting activities.

N. Soil Loss at Tolerance - Current soil rates are within tolerable soil loss limits. In order to prevent soil loss from exceeding soil loss at tolerance, maintain effective vegetative ground cover at or above tolerance. Soil loss that exceeds tolerance soil loss rates is considered to impair soil productivity.

The following average good ground cover (vegetation basal area + litter 1" thick) percentage levels are required as a minimum in order to prevent accelerated soil loss from occurring, (map in A-S Project File):

Map unit 502, 503, 518 = 35 percent

Map unit 515, 523, 532, 534, 535, 537, 543 = 30 percent

Map unit 505, 538, 540, 536, 561, 572, 574, 577, 583 = 50 percent

Map unit 591, 592 = 55 percent

Map unit 672, 690 = 65 percent

Map unit 567, 568, 584 = 80 percent

These ground cover percents will be used as guidelines for BMP effectiveness monitoring (see below).

O. Road Obliteration - Roads recommended for obliteration will be drained, seeded and closed by the timber purchaser where the road is located within a timber harvest unit. Other roads will be obliterated to the extent that CWKV funding is available for obliteration.

Roads to be obliterated will be cross-ripped at the road entrance(s) to disguise the road location. Depressions such as berms, ditches and ruts will be filled as needed to restore to natural contours, cut slopes will be sloped to stable grade, the road surface will be sloped as needed to control concentrated run-off. All connected disturbed areas (CDA high runoff areas like roads, skid trails, mines, burns, or highly compacted soils that drain directly into the stream system), where possible, will be disconnected from stream systems. The entire road length will be ripped to a minimum depth of 6 inches. Ripping should be continuous throughout the entire length and from edge to edge of the roadway, including disturbed areas. Ripping will not occur within stream channels. Consideration should be made where ripping may be more detrimental to water quality if the road has already been stabilized. Grade dips are installed where necessary to reduce concentrated surface run-off and erosion. At the completion of ripping, all remaining material from the roadside such as rocks, downed woody material, brush and logging slash shall be scattered across the ripped area by hand or by machine. This is especially important at the beginning and end of the road to be obliterated. The area shall be seeded with an erosion control seed mix. Success of revegetation shall be evaluated the following year, and where necessary, the road should be lightly scarified and reseeded to meet erosion control objectives.

P. Long Term Road Closures - Closed roads will be disguised or blocked and in some instances signed to traffic, lightly scarified and reseeded with an erosion control seed mix. Road berms will be removed and ruts will be filled in. Drainage will be maintained and improved as needed to prevent erosion. Due to the road surface condition being depressed on some existing roads, waterbars of enough size to either remove the water from the road or with enough storage to prevent run-off from returning to the road will be installed. All CDAs, where possible, will be disconnected from stream systems. Road closures are to be funded through CWKV funds or completed by the timber sale purchaser as specified in the project implementation plan. Closed roads shall be evaluated the following year, as part of the Mineral EMA Monitoring Plan to determine effectiveness of road closure and revegetation. Where necessary, scarify, reseed and camouflage the road entrance with rocks and slash to improve the road closure. Wing fence construction may be necessary in some cases to effectively prevent new resource damage from vehicles attempting to drive around closures.

Q. Maintenance of Roads - Existing and newly constructed roads are maintained throughout the life of the timber sale to insure that drainage structures (culverts, rock crossings, rolling dips, etc.) are functioning correctly, and that concentrated surface run-off does not occur. Drainage control structures are to receive maintenance prior to winter shutdown of logging operations.

R. Road Reconstruction and Construction - Drainage structures must be incorporated into each road design. Erosion control practices will be implemented during construction of new roads and the reconstruction of existing roads. Drainage control structures are maintained during the construction of roads and during the life of the timber sale. Maintenance will also be done prior to the winter shutdown of logging operations.

Road management will be conducted in accordance with mandatory road BMPs as described in 33 CFR 323.4(a)(6)

S. Acceptance of Timber Sale Erosion Control Measures Before Timber Sale Closure - The timber sale administrator will verify that the timber sale purchaser has implemented erosion control practices prior to the closure of the timber sale.

T. Machine Piling of Slash - If it is necessary to machine pile slash, then pile only slash that is generated from the timber sale. Minimize disturbance to existing ground cover, surface soil and rock material and any existing surface organic matter material (i.e. surface litter and duff and old branches and logs). Rough piling will also reduce impacts from equipment. This involves piling only large concentrations of slash, leaving areas of low concentration undisturbed. Machine pile when soils are dry or frozen. Refer to A/S Guidelines for Excessive Rutting, 6/10/92, for allowable operation on all other soils when wet. Keeping slash piles free from soil material will minimize smoldering of piles when burning. This should have a positive effect on air quality. Retention of a minimum of 9-14 tons/acre on mixed conifer sites and 6-12 tons/acre on pine sites, of large woody material (3"+) will help maintain long term soil productivity if litter and duff are left intact.

U. Under-burning - For the retention of long term soil productivity and to reduce erosion, under-burning should be accomplished when the lower duff layer (decomposed organic matter) in contact with the soil surface is moist enough so a cool burn can be assured to avoid hydrophobic soil conditions. Test burns or fuel/burn intensity modeling will determine proper moisture levels. This allows for effective ground cover to be retained. These conditions also allow for nitrogen to be condensed into the soil instead of being volatilized into the air.

V. Servicing and Refueling Equipment - During servicing or refueling of equipment, pollutants from logging or road construction equipment are not allowed to enter any waterway, riparian area or stream course. Select service and refueling areas well away from wet areas and surface water, and by constructing berms around such sites to contain spills. Spill prevention, containment and countermeasures plans are required if the fuel exceeds 660 gallons in a single container or if total storage at a site exceeds 1320 gallons. The timber sale administrator will designate the location, size and allowable uses of service and refueling areas. They will be aware of actions to be taken in case of a hazardous substance spill.

The purchaser shall take all reasonable precautions to prevent pollution of all National Forest soil and water. The operator will maximize the recovery and proper disposal of all fuels, fluids, lubricants, empty containers and replacement parts. Refuse resulting from the purchaser's use, servicing, repair or abandonment of equipment shall be removed from National Forest land by the purchaser to the appropriate disposal facilities, or buried properly at agreed locations upon permission from the sale administrator as advised by soils/watershed specialists.

W. Conduct Implementation and Effectiveness Monitoring for Best Management Practices - The Timber Sale Administrator will use the Timber Sale Administrator Agreement and/or Notice Form (R3-2400-7) as a vehicle for monitoring BMP implementation in the comments section. These forms will be reviewed annually to verify BMP implementation. Implementation review and selection of effectiveness monitoring sites will be accomplished as a part of either the annual TSO review of Sale Administrators or District Activity Review. Utilize forms provided for BMP Implementation and Effectiveness Monitoring. See "Best Management Practices Effectiveness Program Procedures" for site selection and detailed monitoring procedures. Results of BMP monitoring will be forwarded to ADEQ in the Annual Assessment of Water Quality Accomplishment Report to be completed by the Supervisor's Office due in September of each year.

The desired result of BMP monitoring is to document forest practices and BMPs that appear effective in reducing sediment and moderating flow regimes in forest streams. BMPs that are found to be ineffective in protecting identified resources, aquatic habitats and water quality goals, will be adjusted. Poor performance in BMP implementation will be documented and forwarded to District for corrective action.

STATUS OF THE SPECIES

The Apache trout was listed as endangered in 1967, included with the passage of the Endangered Species Act in 1973, and downlisted to threatened status in 1975. In 1974, all Arizona waters were closed to the "taking of Apache trout. The downlisting to threatened status allowed action agencies more flexibility to manage for Apache trout; including establishment of sport fish hatcheries for the trout. The species' recovery team produced an initial recovery plan in 1979 and a revision in 1983. The plan focuses on: 1) surveying and addressing the genetic status (purity) of existing Apache trout populations, and protecting those populations, 2) renovating selected streams in historic habitat and repatriating Apache trout following elimination of non-native trout species, 3) surveying populations and habitat conditions and developing and implementing habitat recovery measures, and 4) developing a hatchery broodstock and enhancing sport fisheries for the species.

Distribution

Before the turn of this century, Apache trout was the only salmonid resident of streams originating in the White Mountains of east-central Arizona. Early settlers reported abundant population of trout in pristine montane habitat. Introduction of non-native, trout species and degradation of habitat associated with rapid human development of this area quickly eliminated or drastically reduced most populations of this species in about 50 years.

Historically, Apache trout inhabited most of the streams occurring greater than about one mile in elevation (5279 ft). They were known since 1873 and were formally described almost 100 years later (Miller 1972). Habitat loss, overfishing, and predation and competition from introduced

non-native trout species greatly reduced the numbers and distribution of Apache trout. By 1950, the only known populations of Apache trout were located on the Fort Apache Indian Reservation (FAIR). Streams occupied today by this trout species within its former historic range are located on the FAIR and the A-S.

The original distribution was described as the upper Salt River (Black and White rivers), the San Francisco River (Blue River) and the headwaters of the Little Colorado River, Arizona (Miller 1972). First specimens of Apache trout collected from the White River were described as a variety of Colorado River cutthroat trout (*Salmo pleuriticus*) (Cope and Yarrow 1875). Specimens taken from the headwaters of the Little Colorado River were called *Salmo mykiss pleuriticus* (Jordan and Evermann 1896). Subsequent authors referred to the native trout of the White Mountains as *Salmo gilae* until the 1970's.

Trout native to Oak Creek in the Verde River drainage had the general appearance and spotting pattern typical of Gila trout and were identified as *Salmo gilae* (Miller 1972). Behnke and Zarn (1976) tentatively identified additional samples from trout taken from Sycamore Creek (Agua Fria drainage) as hybrids. Changes in nomenclature of North American trouts has since included the change of *Salmo* to *Oncorhynchus*.

There is some confusion persistent about the former distribution of Apache trout with that of Gila trout (*O. gilae*). Apache trout occupied the headwaters of the Little Colorado, Salt, and possibly the San Francisco rivers (Behnke and Zarn 1976). Specimens collected by F. W. Chamberlin in 1904 from K.P. Creek (a tributary of the Blue River in the San Francisco drainage) exhibited spotting patterns of Apache trout but also showed hybrid influence (Miller 1972). These fish were reported to have a distinct red band, a characteristic of Gila trout. In 1913, specimens collected from Oak Creek (Verde River drainage) were identified as hybrid Gila trout x rainbow trout by Miller (1972). These specimens showed morphological characteristics of Apache trout but spotting patterns of Gila trout, suggesting a possible intergrade between these two species.

At the geographical extremes of the historical salmonid range in Arizona, specimens have been collected which show characteristics of both species. If the distribution patterns as described are correct, the K.P. Creek specimens from the Blue River drainage should have been Apache trout. All other specimens of native trout collected from the Gila River drainage (excluding the Salt River drainage located above the barrier falls in Salt River Canyon) have been identified as Gila trout. This includes a 1973 collection from Chitty Creek (a tributary of Eagle Creek), which was tentatively identified as hybrid Gila trout X rainbow trout (personal communication from Minkley and Miller to the authors of the Draft Apache Trout Recovery Implementation Plan).

Kynard (1976) disagreed with this identification and suggested the Chitty Creek population was a subspecies of Apache trout. Resampling and genetic testing of the Chitty Creek trout population has since identified these fish as rainbow trout.

Taxonomic analysis of southwestern New Mexico trouts included a population of “Gila trout from Spruce Creek, tributary of Dry Creek which is tributary to the San Francisco River. Characteristics of Spruce Creek specimens suggest they may be an intergrade between Apache and Gila trout. The Spruce Creek lineage is the pure, endemic stock of trout native to the San Francisco River system. In 1998, the Apache Trout/Little Colorado River Spinedace Recovery Team and the Gila Trout Recovery Team, along with other agencies charged with recovery and management of these two closely related native trout, agreed that the Spruce Creek trout should be used exclusively for all native trout restoration efforts in the San Francisco River drainage (including tributaries of the Blue River and Eagle Creek. Gila trout were introduced into Raspberry Creek and the Blue River in 2000.

Headwaters and remote streams throughout the White Mountain area may contain additional, unidentified Apache trout populations (Carmichael et al. 1993). Many streams in the White Mountains support populations that display both Apache trout and rainbow trout characteristics. Presence of these hybrids suggests unknown sources of Apache trout may still remain, and additional surveys and genetic testing are needed to determine the extent of Apache trout populations.

In 1964, the WMAT developed a management plan to reclaim streams and construct fish barriers and lakes for the repatriation of Apache trout. This plan included renovation of Sun and Moon creeks and construction of an impoundment (Christmas Tree Lake). In 1965, the WMAT closed Ord Creek, the upper reaches of the East Fork of the White River, Paradise Creek, and tributaries to fishing. Christmas Tree Lake filled (1967) and Apache trout were stocked from Ord, Firebox, and Deep creeks.

Life History

Distinguishing characteristics of Apache trout include a deep and compressed body, a large dorsal fin, and obvious spots on the body that are often uniformly spaced. These spots are roundish in general outline and medium-sized, appearing slightly smaller than most interior subspecies of cutthroat trout but more like the typical cutthroat trout rather than spots on the Gila trout (Miller 1972).

Dominant ground colors are yellowish or yellow-olive, with live specimens showing tints of purple and pink; however, no red or pink lateral band was present in Miller’s specimens (Miller 1972). In 1987, specimens taken during renovation of Hurricane Creek and Lake on the FAIR included fish with a red or pink lateral band. These fish were genetically tested and found indistinguishable from pure Apache trout (personal communication from G. J. Carmichael to the original authors of the Draft Apache Trout Recovery Implementation Plan).

Dorsal, pelvic and anal fins show conspicuous cream or yellowish tips. A yellow cutthroat mark is usually present (Miller 1972). Vertebrae number 58 to 61; pyloric caeca number 21 to 41, scales number 133-172 (range of means 146 to 158) in the lateral line series, and scales above the lateral line number 32 to 40 (range of means 34 to 36) (Behnke and Zam 1976).

Information on all life stages for Apache trout is limited. Apache trout mainly inhabit headwater areas upstream from natural and artificial barriers. This environment is subject to extremes in water temperature and flow. In winter, formation of anchor ice and ice bridges is common in mountain streams. Streams examined showed low pool-riffle ratios and stream widths that greatly exceeded their depths (Harper 1978). The majority of habitats containing Apache trout consisted of riffles and runs.

In Big Bonito Creek (FAIR), feeding habits of Apache trout depended on their size (Harper 1978). Apache trout measuring 2.36 to 3.54 inches long fed primarily on Ephemeroptera; those measuring 5.91 inches or longer consumed more Trichoptera. Apache trout in all size classes eat terrestrial insects. Use of Diptera, Trichoptera, and terrestrial insects changes with the seasons. Apache trout 5.91 to 6.69 inches long from Maime Creek on the A-S showed similar feeding habits, with Ephemeroptera more prevalent in the diet of larger trout specimens (unpublished data held by AGFD). Clarkson and Dreyer (1996) found that the Apache trout they examined from Lee Valley reservoir (ASNF) were omnivorous. These trout fed on lake surface and bottom organisms, including aquatic and terrestrial insects, zooplankton, crustaceans, snails, leeches, nematodes and fish.

Apache trout spawn in White Mountain streams from March through mid-June, varying with stream elevation. Redd construction begins as water temperatures reach eight degrees Celsius (Harper 1978). Egg production in Apache trout relates to their size. Fecundity of Big Bonito Creek fish (total length (TL) 5.16 to 7.52 inches) ranged from 72 to 238 eggs (Harper, 1978). Apache trout from Christmas Tree Lake (TL 11.75 to 13.75 inches) produced eggs from 646 to 1,083 (Roseland 1974). Apache trout collected from Ord Creek in 1962 (and held by AGFD) produced an average of 72 eggs per female trout. Five years later, the same fish produced an average of 4,215 eggs per female. The smallest mature female found in Bib Bonito Creek was TL 5.12 inches long and the smallest mature male was TL 5.71 inches, corresponding to a spawning age of three years old (Harper 1978).

Two redds examined by Harper (1978) contained 43 and 67 eggs. Since the fecundity of all fish checked was greater than redd egg deposits, Harper suggested fish may deposit eggs in several redds during a single spawning season. Redds are constructed primarily at downstream ends of pools in a wide variety substrates and water velocities and depths. Eggs hatch in about 60 days and the period from egg deposition to emergence of fry in Big Bonito Creek (above 8203 feet in elevation) was 60 days.

Controlled propagation

Apache trout are reared by the Service at the Williams Creek National Fish Hatchery located in the White Mountains of Arizona. Captured Apache trout (1983 and 1984) from the East Fork of the White River on the FAIR (type locality for this species) were spawned on-site and embryos transferred to the hatchery. This resulted in 944 Apache trout reared to maturity and available as

initial broodfish. Fish culture facilities and technology has generated large numbers of hatchery-reared Apache trout.

As of 1988, fish used for controlled propagation at WCNFH were still representative of Apache trout, confirmed by biochemical genetic analysis (Carmichael et al. 1993). Fish that rarely exceeded 11.81 inches in a wild setting grew larger and faster in the hatchery setting. Females typically exceeded 23.62 inches long and weighted around 2,200 grams within four years. Fecundity increased two to 10 times that of wild fish. Hatchery production of Apache trout has increased from 1,200 in 1986, to 550,000 in 1990. These fish were successfully used for restoration and sport fishing.

The White Mountain Apache Tribe (WMAT) began conservation measures for this trout in the late 1940's and 1950's. The only known Apache trout populations at that time were on the FAIR. WMAT began with wilderness stream closures (1955), controlled fishing, surveys in the 1960's, and a cooperative agreement with the Arizona Game and Fish Department (AGFD) and the Service for a controlled propagation program for Apache trout. This initial program resulted in the stocking of a number of waters throughout Arizona with Apache trout for sport fishing and restoration of the species. As a direct result of these efforts, Apache trout populations were established in Coyote/Maime and Mineral creeks on the A-S, North Canyon Creek on the Kaibab National Forest, Grant Creek on the Coronado National Forest, and Sun and Moon creeks on the FAIR.

Hybrids

Hybridization can be determined genetically, and techniques and methods continue to improve. Current work includes the use of isozyme locus polymorphisms, which are an aggregate diagnostic for discrimination between Apache trout, rainbow trout (*Oncorhynchus mykiss*), and cutthroat trout (*Oncorhynchus clarki*). It was used to assess the extent and directionality of interspecific hybridization on 645 individuals from 31 wild populations within the historical range of the Apache trout (Carmichael et al. 1993). Apache trout possess 56 diploid chromosomes with 106 arms (Miller 1972). Genetic linkage analyses of the polymorphic locus products have not indicated comigration of the genetic markers for Apache trout.

From 1987 to 1989, samples from various sites throughout the range of the Apache trout were obtained from the FAIR and the A-S (Carmichael et al. 1993). Unhybridized populations of Apache trout were found in 11 of the sampled streams. These 11 streams represented 10 discrete Apache trout populations.

Rainbow trout introgression was documented in 19 of the 31 populations, including at least of these in which all individuals samples were hybrids. In four of these introgressed populations, hybridization between cutthroat trout and Apache trout was detected. In two of these populations, individuals with alleles from all three species were sampled.

Apache-cutthroat hybrids occurred in one population where no rainbow trout alleles occurred. In 19 of the 20 hybridized populations that were sampled, a backcrossing trend toward Apache trout was seen. Pure rainbow or cutthroat trout were not found in the population samples. Because the hybridization was so extensive, it was not possible to estimate the genetic variability existing in the Apache trout genome; only one of seven alleles detected exclusively in hybridized populations could be confidently assigned to a species of origin (rainbow trout).

Thirteen additional streams were sampled using these techniques since the original collections conducted from 1987 to 1989. Six additional unhybridized populations of Apache trout were confirmed at that time from collections from Big Bonito Creek/Highey/Peasoup, Coyote Creek (FAIR), Coon Creek, Little Bonito Creek, Smith Creek, and North Canyon Creek. This brought the number of pure Apache trout populations to 16, which represented 14 discrete natural stocks. In 2000, the Service's Arizona Fishery Resources Office listed genetically pure Apache trout living in 25 streams in their historic range in Arizona.

Threats

Apache trout are threatened by non-native introduced fish species (competitors, predators, and hybridizers) and habitat alterations associated primarily with timber harvest operations, livestock grazing, water quality and flow alterations, and mining (sand and gravel operations). These threats reduce the ability of Apache trout to survive and greatly limit the present range of the species. Many of the threats to this species have been removed and many of the recovery goals have been met. Many parties have contributed to the stabilization and increase in this species.

ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process.

Status of the species within the action area

Within the Mineral EMA, Mineral Creek provides habitat for a known population of Apache trout. Mineral Creek is a north flowing moderate to high gradient spring-fed stream found at 7600 to 8520 feet. From the perennial headwater at Mineral Spring, the drainage is a moderate gradient meadow reach converting to a high gradient canyon reach. At the confluence with the intermittent east tributary, the stream is again a moderate gradient meadow reach. The eastern tributary to Mineral is intermittent and joins the main drainage just south of FR 404. Intermittent Udall Draw drains the larger portion of the watershed and joins the main drainage north of the Forest boundary. This 26 mile north flowing drainage terminates in Little Ortega Lake within a closed basin.

The objective of the species Recovery Plan, originally dated 1979 and revised in 1983 and 1999, is to restore this species to a non-threatened status. One of the goals under this objective is to establish or maintain 30 self-sustaining discrete populations of pure Apache trout throughout its historic range. Mineral Creek contains one of the 30 populations identified in the Recovery Plan. Projected timeline for initiating delisting is 2003. The Mineral trout population is considered genetically pure but has not, in the past, been confirmed as such due to low numbers of individual fish available for collection. Apache trout were collected in 2000 for genetic analysis and though assumed to be pure, the documented results are pending.

General Aquatic Wildlife System (GAWS) surveys were conducted within Mineral in 1985, 1991, and 1996. Surveys were also conducted in 2001; results of these surveys are pending. The 1996 survey indicates a gradual overall improvement in habitat conditions from those first described in 1985. The 1996 Habitat Condition Index (HCI) for Mineral is 56% (fair condition) compared to 1985 HCI of 30% (poor condition). This difference is largely attributed to improved riparian condition along Mineral's perennial drainage. Spawning gravel embeddedness limits fish reproduction within this drainage. Substrate embeddedness measured in 1996 is high at 70% with ratings >51% considered to indicate poor condition. Pool quality and quantity is another limiting factor for Apache trout in this drainage. The pool measure rating in 1996 is 3% and the pool structure rating was 8% with ratings <39% considered poor. Channel width:depth ratio has increased from 51% in 1986 to 95% in 1996. A rating >26% is considered poor. Potential fish habitat is confined to four miles of perennial flow originating at Mineral Spring continuing downstream to the fish barrier, approximately one mile from the Forest boundary. Downstream from the fish barrier, the flow is diverted into an irrigation ditch. 1996 population survey utilized six, 328.1 foot stations distributed in three reaches of the stream: from Mineral Springs (reach 3) downstream to the fish barrier (reach 1). Electrofishing survey produced 10 Apache trout ranging in length from 3.46 to 6.14 inches. No fish were noted in the drainage from Mineral Spring to one-half mile downstream. No other species were present in this drainage. 1991 population survey utilizing the same stations produced six Apache trout ranging in length from 5.28 to 9.49 inches. Previous surveys conducted from 1976-1985 indicate a decline in numbers and limited reproduction evident except in years with higher runoff levels. Novy and Lawry (1986) compared precipitation levels with trout year class strength from 1976-1985. Their findings indicate that reproductive success was highly correlated with high spring runoff. They noted heavy accumulations of silt prevalent in lower Mineral Creek. Silvey and Thompson (1978) indicated that siltation was responsible for the lack of reproductive success in Mineral during their 1976 survey. Novy and Lawry (1986) estimated the entire population within Mineral to be approximately 100 individuals with an average of 1.4 fish sampled per 328.1 feet. One young of year was sampled in 1985. In 1996, survey results indicated 1.7 fish sampled per 328.1 feet. The results of 2001 population surveys are not yet available. Stream temperatures are bordering a stress threshold level. In 1996 the highest water temperatures were recorded at the confluence of the East and West forks of Mineral Creek indicated at 1335, stream was 68° F. Adult Apache trout cease feeding when water temperatures reach 70.1 to 73.4°F (Alcorn 1976, Lee and Rinne 1980). Apache trout fingerlings cease feeding at 68.0° F (Harper 1978). The upper lethal limit is 75.2° F, but the fish can withstand temperatures as high as 84.2° F for short time periods (Alcorn 1976, Lee and Rinne 1980).

Factors affecting the species within the action area

Past management activities within the allotment have influenced existing conditions. Management activities within Mineral Creek drainage since 1967 have been directed at improving instream habitat conditions for Apache trout. Conversely, livestock grazing, timber harvest, fire suppression and road construction and maintenance have contributed, over time, to degradation of aquatic systems within the watershed but more recent management has implemented strategies designed to produce better overall watershed conditions.

Prior to 1980, livestock had access to all of Mineral Creek. In 1980-1981, a portion of the Mineral Spring area and 0.4 miles of stream were fenced from livestock. In 1987-1988 the perennial portion of Mineral Creek as well as a wet meadow adjacent to Mineral Springs were fenced to exclude cattle grazing, from the barrier upstream to the spring. Brady Park pasture was fenced as a riparian pasture at this time also allowing cattle access to Mineral Creek from just south of FR 404 to approximately 0.8 miles downstream. In 1989, 3500 willow cuttings were planted along the streambanks within the two exclosures. In 1996, a corridor fence exclosed Mineral Creek drainage from grazing within the former riparian pasture at Brady Park. By the end of 1996, the perennial portions of Mineral were excluded from livestock with the exception of a narrow travel corridor south of FR 404, which was used to access the adjoining pasture. Stocking levels have been reduced, beginning in 1998, to levels equal to one-third the pre-1998 levels. This year, in 2001, the final reduction is in place. Beginning in 2001, livestock were excluded from all of Mineral Creek as well as its eastern tributary, from Sawmill Spring to the confluence with Mineral Creek.

Previous timber treatments and prescribed burns over the past twenty years in the Mineral EMA have been relatively small projects of less than 2000 acres each. These projects have consisted of small timber sales, thinnings, meadow restorations, elk winter range enhancements, and aspen regeneration. A proposed small-scale timber treatment may occur in the near future within the MEMA. This treatment would occur within 500 acres and treat only small trees less than 12 inches DBH.

Fire suppression has resulted, over time, in loss of meadow riparian habitat within the watershed as well as denser forest stands with smaller diameter trees that may have lowered the water table level. Road construction and maintenance have for changed stream channel morphology due to culverts and have increased sediment in streams.

It is unclear whether Apache trout or any other native fishes historically occupied Mineral Creek, but stream terminus within the Concho Sink indicates that there are no known natural migration routes for native fish to this drainage. From 1932 to 1952, non-native salmonids were periodically stocked in Mineral Creek. A chemical renovation occurred in 1962 within the stream and Apache trout were stocked in Mineral in 1967 and 1968. A fish migration barrier was constructed in 1982 approximately one mile south of the Forest boundary to eliminate upstream movement by non-native salmonids stocked in private waters downstream from the Forest boundary. In 1986, 20 rock and log stream improvement structures were installed at the northern end of the Mineral Spring exclosure. In 1990, 35 rock and log instream structures were added to the creek just upstream of the fish barrier. Also in 1990, just upstream of the migration barrier,

approximately 25 pools were excavated, debris jams were removed and spawning gravel was added.

The Apache trout was the focus of informal consultation in 1989 for a stream improvement along Mineral Creek (2-21-90-I-009). In a letter dated November 2, 1989, the Service concurred that proposed stream habitat improvements would improve habitat for the Apache trout in Mineral Creek. No incidental take was anticipated. Elsewhere, the Apache trout has been addressed in a number of formal consultations including grazing, road construction, and timber harvest projects.

EFFECTS OF THE ACTION

Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

There should be an overall improvement in watershed condition with the implementation of the proposed action. Substantial effort has been put into improving habitat conditions within Mineral Watershed over the past decade by improving overall watershed conditions through reductions in livestock impacts, addressing the need for fire in the ecosystem, maintenance of forest health, the reduction of unneeded road networks and the implementation of management activities that directly benefit Apache trout habitat in Mineral Creek.

Timber Treatments

The Forest Service's BAE (U.S. Forest Service 2001) anticipates that implementation of the non-riparian timber treatments will result in some short-term negative impacts but mostly in long-term positive habitat improvements. The BAE (U.S. Forest Service 2001) also states that potential adverse effects from riparian timber treatments cannot be discounted as insignificant in the short-term.

Short-term increases in runoff rates and erosion are expected to occur in treated areas, but they are expected to recover within 2 to 5 years. With increase in runoff rates, there is the likelihood that increased sediment levels will enter Mineral Creek. For the first two years, adverse effects to Apache trout are likely from increased sedimentation levels resulting in increased substrate embeddedness, decreased production of macroinvertebrate food source, and a decline in pool habitat (U.S. Forest Service 2001).

Adhering to mitigation measures and BMPs, including retention of a riparian burning buffer along Mineral that is a minimum of 150 ft., will offer a large degree of protection from sediment movement into Mineral Creek but is not expected to eliminate the potential for short-term adverse effects to the species as described above (Forest Service 2001). Over the long-term, the

non-riparian timber treatments are expected to be beneficial to Apache trout. Watershed conditions should improve particularly in the Ponderosa pine and pinyon-juniper forest types. More openings will likely be created in the pine stands, resulting in increased water retention within Mineral basin; possibly increasing base flows in Mineral Creek, thus benefitting the Apache trout. The reduction in fuel loading in the pine type is expected to reduce the potential for catastrophic wildfire in these stands thus reducing the potential for sediment, debris, organic detritus and fire-derived nutrients to enter the stream channel during large fire events.

Based on groundwater elevations, riparian treatments could reduce invading conifers along Mineral Creek and promote deciduous and herbaceous species in some areas within the riparian zone. Over the long-term, this treatment is expected to provide more effective herbaceous ground cover and deciduous riparian species that will maintain stream bank integrity during high flows and trap sediment. Additionally, stream temperatures should eventually return to normal as the channel deepens and narrows to transport sediment more efficiently and provide better quality microhabitat, such as undercut banks.

Prescribed Burning

The project should minimize potential effects of prescribed burns on Apache trout and their habitat through maintenance of unburned areas (buffers) adjacent to all perennial streams; maintenance of lengthy, unburned stretches of intermittent tributaries; restrictions on areas to be burned (burn blocks) to flat or gentle slopes <40% within the treatment areas; and, emphasis on fall burning (October-November) when climatic conditions will promote a mosaic of burned and unburned forest floor. Fall burning will permit the regrowth of grasses, and accumulation of litter prior to summer rains. Therefore, implementation of the proposed burning is not expected to alter the quality or quantity of flow in Apache trout streams.

Other Project Amenities

Road closures and rock stabilization structures are not expected to have detrimental effects on the aquatic environment of Mineral Creek. The eventual conversion of roads to native vegetation should reduce the introduction of sediments into the creek that may be associated with those roads. The dropdown stabilization structures should reduce erosion at their proposed localities and reduce the introduction of sediments into the creek that may be associated with those problem areas.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service has not identified potential future State, tribal, local or private actions that are reasonably certain to occur in the MEMA, since the entire action area is under jurisdiction of the A-S.

CONCLUSION

After reviewing the current status of the species, environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Apache trout. No critical habitat has been designated for this species, therefore none will be affected. This conclusion is based on:

- 1) Buffers associated with prescribed burning are sufficient to protect Mineral Creek and the prescribed burns are expected to have a beneficial effect on the overall watershed condition.
- 2) Implementation of the BMPs would minimize anticipated short-term adverse effects of timber harvest and are expected to promote healthier watershed conditions over the long-term.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including mitigation measures and BMPs that are incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of the Incidental Take Statement.

Amount or extent of take

The Service does not anticipate the proposed action will incidentally take any Apache trout. Implementation of the BMPs are expected to minimize project effects to the level where incidental take is not reasonably certain to occur.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the Service's Law Enforcement Office, Federal Building, Room 8, 26 North McDonald, Mesa,

Arizona (telephone: 480/835-8289) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- 1) We recommend the Forest Service work with our office to incorporate a survey and monitoring effort that includes the following: a control stream (or reach); at least 30 survey and monitoring stations along both the control and Mineral Creek; and an empirically based statistical method of analyzing the effects of timber harvest treatments on Apache trout habitats.
- 2) We recommend the Forest Service utilize the established mountain plover survey protocol to conduct surveys in appropriate habitat and notify our office if plovers are detected.
- 3) We recommend the Forest Service utilize native vegetation for all erosion control needs.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the MEMA. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates the Forest Service's efforts to identify and minimize effects to listed species from this project. For further information please contact Mike Martinez (x224) or Debra Bills (x239). Please refer to the consultation number 2-21-02-F-030 in future correspondence concerning this project.

Sincerely,

/s/ David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
District Ranger, Springerville Ranger District, Springerville, AZ
Project Leader, Fisheries Resource Office, Pinetop, AZ

Supervisor, Project Evaluation Program, Arizona Game and Fish Department, Phoenix, AZ
Center for Biological Diversity, Tucson, AZ
Director, Arizona Cattlemen's Association, Phoenix, AZ

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APPENDIX A - CONCURRENCES RATIONALE

Black-footed ferret

Black-footed ferrets are not known to exist on the A-S. Government-sponsored prairie dog eradication efforts in the 1900s successfully eliminated this ferret food base. Although two small prairie dog colonies currently exist on the A-S, ferrets have not been detected.

Southwestern willow flycatcher

Flycatchers are not known to utilize Mineral Creek during any life history stage. Additionally, the BA indicates that vegetation along the creek does not meet the suitability criteria for the species.

Bald eagle

Bald eagles are not known or nest along Mineral Creek, though they could utilize the creek for roosting during winter. However, if bald eagle nesting or roosting sites are detected in the project area prior or during project implementation, untreated buffers will be established in coordination with the Service.

Mexican spotted owl

No Mexican spotted owl nesting or roosting habitats will be altered by the proposed timber harvests. Although treatments will occur in 170 acres of restricted habitat along Mineral Creek, adverse effects are not expected because: 1) Mexican spotted owls have not been detected in these areas, 2) no trees larger than 18 inches DBH will be removed, and 3) treatments will no occur within a ½ mile of a PAC during the breeding season from March 1 - August 31 (V. Ordonez, A-S, personal communication). Prescribed burning will be conducted in accordance with following prescription:

ELEMENT	MAXIMUM	MINIMUM
Temperature	80	20
Relative Humidity	100	10
Fuel Moisture		
10 hour	7-12	3
100 hour	17	7
1000 hour	25	10

Mid-Flame Wind Speed	15	3
Fire Line Intensity	700	75
Flame Length	7	1

Mexican gray wolf

The project area is located approximately 23 miles from the primary Recovery Zone and nearest release pens. Disturbance to release site, den sites, or reestablishment effort would not occur from this proposed action. Also, the likelihood of transient wolves entering the MEMA is considered to be low.

Mountain plover

No mountain plovers are known to exist on the MEMA, though potential habitat exists at the lower elevations of the projects area, near the prairie dog colony north of Kitchen Springs. Minor timber treatments are proposed within this potential habitat. However, the area will be surveyed for plovers prior to initiation of meadow restoration treatments.

Chiricahua leopard frog

Chiricahua leopard frogs are not known to inhabit any portion of the MEMA.

Figure 1

MINERAL EMA Treatment Areas

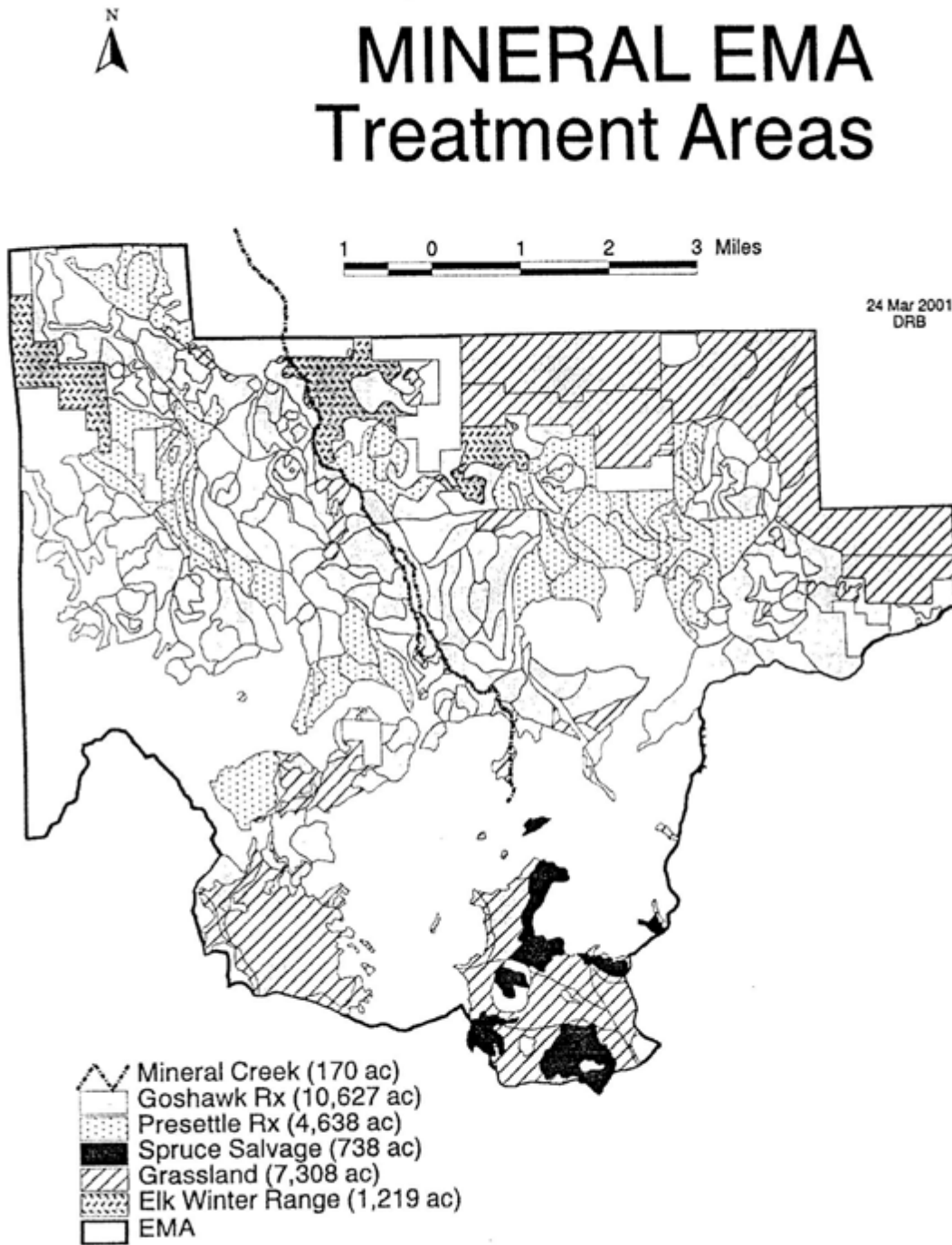


Figure 2

MINERAL WATERSHED

Mineral EMA

Bebbs Willow Exclosure Sites Include: community sites 6-22 and relict community sites 27,31,37

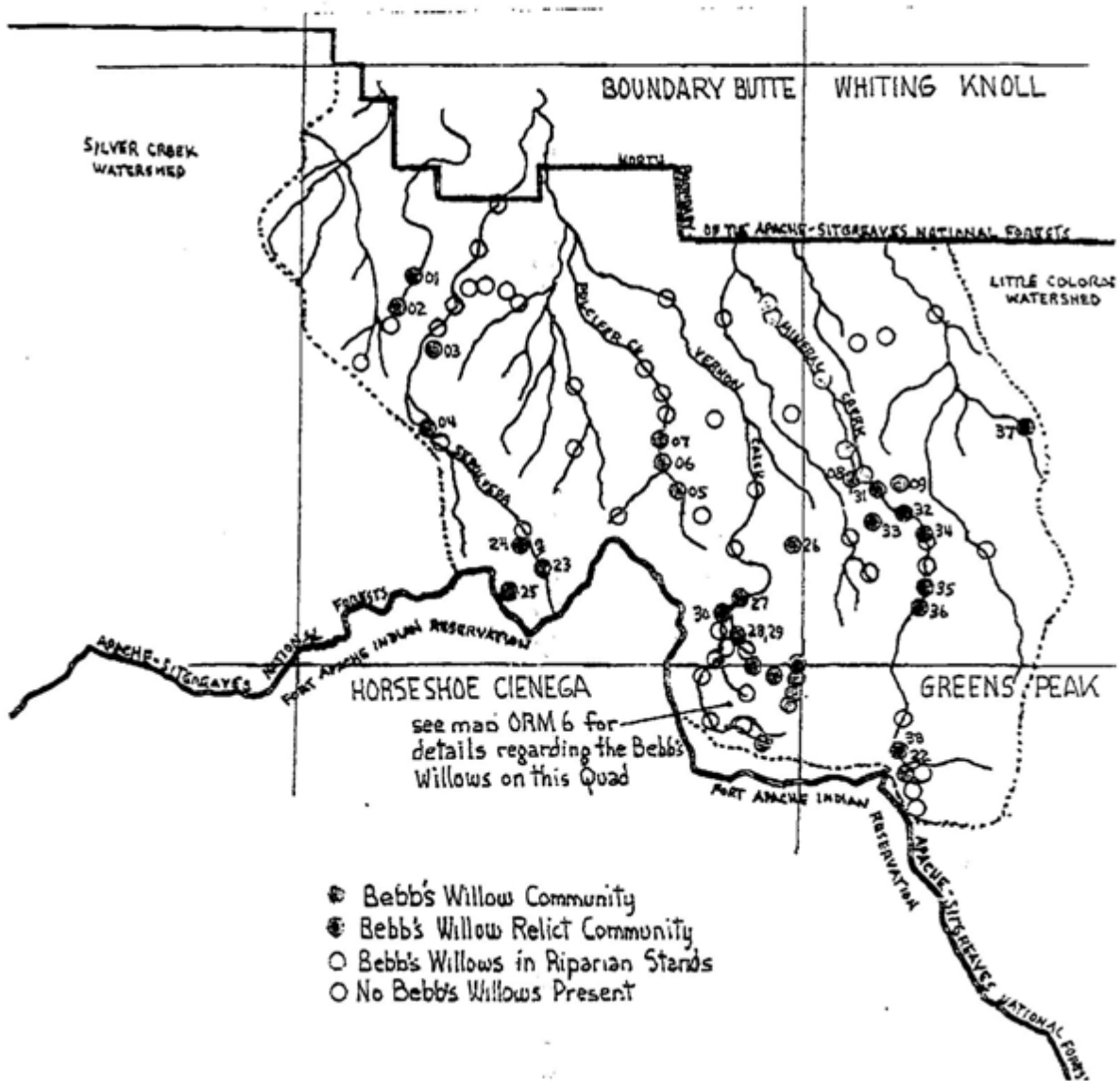
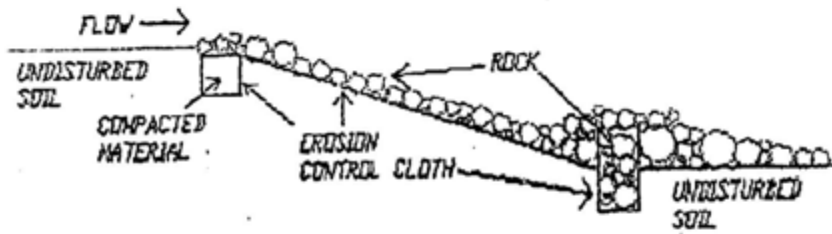


Figure 3

raw Change View Assist Settings Measure File 5/12/52

ROCK DROPDOWN



DROPDOWN

Mineral EMA
Proposed Rock Dropdown Watershed Structures

T9N, R25E, Sec. 24: gully paralleling FR 61

T8, R26E, Sec. 4: headcut on cinder cone