

TO: *Heather*

FROM: Dave Sire

SUBJECT: Grapevine Springs Botanical Area Designation EA

The Prescott National Forest would appreciate your review of the attached EA. Please direct any comments to Noel Fletcher at (520) 445-7253 or N.FLETCHER:R03F09D03A. A host of specialists have been involved in this analysis, so Noel's basically looking for fatal flaws at this point. Noel would like your comments by April 16th.

Dave

ENVIRONMENTAL ASSESSMENT

for

GRAPEVINE SPRINGS BOTANICAL AREA DESIGNATION

Bradshaw Ranger District

Prescott National Forest

Yavapai County

Arizona

Lead Agency: U. S. D. A Forest Service

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ENVIRONMENTAL ASSESSMENT

GRAPEVINE SPRINGS BOTANICAL AREA DESIGNATION Bradshaw Ranger District Prescott National Forest

CHAPTER 1. PROJECT SCOPE

A. PROJECT LOCATION--ANALYSIS AREA

The area of consideration is located entirely on National Forest System land within the Bradshaw Ranger District in Sections 35 and 36 of Township 13 North, Range 1 West, Gila and Salt River Meridian. See vicinity map on page two.

There is no private land within the project area. There are several patented mining claims about 1/2 mile to the north. They contain private homes and other developments. There are a number of private houses and other improvements about 3 miles to the northeast along Big Bug Creek. Home building and attendant Road 87A upgrading started in spring 1995 on a patented claim associated with the Butternut Mine. This area lies 1.5 miles northeast of the trailhead proposed in some alternatives.

B. BACKGROUND ON BOTANICAL AREA DESIGNATION

This Environmental Assessment discloses effects of designating and managing upper Grapevine Creek as a Botanical Area or making no designation. Any designation would become part of the Prescott National Forest Land Management Plan (Forest Plan). The Plan states on page 71, "Grapevine Creek will be managed to enhance the exemplary scientific values of this area." Forest Service Manual part 2372.05 (3) says "A botanical area is a unit of land that contains plant specimens, plant groups, or plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, rarity, or other features."

Upper Grapevine Creek is unique in its characteristics. The most noteworthy characteristic is the abundant number of springs. Grapevine Creek has 12 perennial springs, far more than any other creek associated with Big Bug Mesa or this part of Arizona. The quantity and quality of the water flow is also very high and unusual for the region. A very unusual feature is the presence of several springs several hundred vertical feet above the riparian strip. Most of these lie on the cool, north-facing slope and have pockets of riparian vegetation, including large alders.

The vegetation associated with the perennial springs is an Arizona alder-Arizona walnut community. While the alder-walnut community is endemic to mid-elevation stream reaches in sub-Mogollon-Rim Arizona (Szaro, 1989) and adjacent western New Mexico, the alder-walnut community in Grapevine Creek is distinct from many other occurrences of this type due to the almost complete absence of other common co-dominant trees such as willows, ash, cottonwood, sycamore, or net-leaf hackberry.

Vicinity Map - Separate Document

Topographic features influencing the uniqueness of the vegetation include the narrow canyon, the easterly flow and the steep gradient. The canyon is relatively narrow compared to adjacent creeks. The easterly orientation of the creek as well as the narrowness of the canyon have additive shading effects. The higher moisture levels associated with the cooler air temperatures influence the vegetation composition. Episodic flooding events occurring in the steep gradient stream influence the substrate composition and thus the vegetative composition.

Big Bug Creek, the next creek to the north, is the only other comparable habitat of this type in the vicinity. While Big Bug Creek does have an alder-walnut vegetation type, past and present activities in the habitat preclude effective expression of potential. Past activities in Big Bug Creek include mining, a townsite, a railroad, and a road. Much of the creek flows through private land now used for home sites. An abandoned private-land tailings pile in the SW 1/4 of Section 28 currently erodes into Big Bug Creek, as do the roads. While the potential natural communities may be inherently similar, human impacts in Big Bug Creek have altered the habitat effectiveness. The quantity of the water flow in Big Bug Creek is also considerably less than that in Grapevine Creek.

C. SUMMARY OF OTHER CURRENT FACTORS

The primary past use in upper Grapevine Creek was continuous yearlong livestock grazing. A Decision Notice of November 9, 1989, a 1990 Allotment Management Plan (AMP), and three AMP amendments now govern grazing in the area. This amended AMP allows for rest and monitoring to ensure riparian recovery.

As stated in Federal Register Vol 60, No. 197, published October 12, 1995, the Grapevine Springs area was withdrawn from mineral entry for 20 years (Project Record Document D3).

Light human use is currently apparent in the proposed Botanical Area.

A fenced enclosure of about five acres below Grapevine Springs was built by the Forest Service in 1992. This area is closed to grazing to assess the biological potential of the area.

Access is by Forest Road 87A from Highway 69. Forest Road 87A is occasionally graded to the Butternut Mine turnoff. Under a new Road Use Agreement, most maintenance is expected to be done by a private homeowner near the Butternut Mine. Beyond there, it is an unimproved road suitable only for high-clearance vehicles. Historic vehicle-use patterns have continued in spite of the 1989 Forest Plan Amendment 4 which designated the four wheel drive (4WD) road between Road 87A and the Coyote Springs drainage as Trail 4 (not open to full-size vehicles). Trail 4 continues the length of Grapevine Creek above the Coyote Springs drainage. There are several forks of the trail. The trail is generally not to Forest Service standards and is difficult to follow in a number of spots. Physical obstructions prevent through traffic on Trail 4 by all terrain vehicles (ATV's).

Water quality is very high.

There is no recorded history of wildfires within upper Grapevine. However, vegetation patterns indicate areas of "stand replacement" fires within the past 150 years.

D. PURPOSE AND NEED FOR ACTION

The purpose and need for this action is to implement and incorporate goals and objectives as stated in the Forest Plan, Environmental Impact Statement, and Record of Decision. Briefly stated these are:

Management emphasis for chaparral, Management Area 3, is on improving and maintaining watershed condition. Wildlife habitat management is emphasized in ponderosa pine, pinyon/juniper, chaparral and juniper areas. Fire management is emphasized in chaparral lands adjacent to high value areas. The Forest Plan also calls for improving all riparian areas and maintaining them in satisfactory condition. (Forest Plan pages 69-70)

Grapevine Creek will be managed to enhance the exemplary scientific values of this area. (Forest Plan page 71)

Since the approval of the Forest Plan there has been an increase in emphasis on riparian recovery, management of aquatic habitats, and the protection and recovery of threatened, endangered, and sensitive plant and animal species and their habitats.

The authority for designating special areas within National Forests is found in 36 CFR 294.1 Recreation Areas:

Suitable areas of national forest land, other than wilderness or wild areas, which should be managed principally for recreation use may be given special classification as follows:

- a) Areas which should be managed principally for recreation use substantially in their natural condition and on which, in the discretion of the officer making the classification, certain other uses may or may not be permitted may be approved and classified by the Chief of the Forest Service or by such officers as he may designate if the particular area is less than 100,000 acres.

As per Forest Service Manual (FSM) 2372.02, the objective for designating special areas is "to protect and manage for public use and enjoyment, special recreation areas with scenic, geological, botanical, zoological, paleontological, archaeological, or other special characteristics or unique values."

The policy in FSM 2372.03 is to "manage each special area as an integral part of the National Forest System with emphasis on its unique values, and manage other values or resources in the area to a level compatible with the area's primary values and overall National Forest management objectives."

In FSM 2372.05, a Botanical Area is defined as "a unit of land that contains plant specimens, plant groups, or plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, rarity or other features."

The Development, Occupancy and Public Use for such areas is listed in FSM 2372.4 as follows:

1. Place campgrounds or other overnight recreation developments outside of special areas whenever possible.

2. Locate roads, trails, sanitary facilities, picnic grounds, and parking spaces without disturbing the special features of the established area.
3. Allow no resorts or other high-impact special uses within the area unless needed for public enjoyment of the principal features of the area.
4. Keep developments such as roads, trails, and other facilities to the minimum necessary for public enjoyment of the area.
5. The rule only applies to Geologic Areas and therefore is not applicable.
6. Encourage public use and enjoyment of each administratively designated special area up to the level the will ensure protection of the special values for which the area was established.
7. Provide interpretive services to enhance visitor's understanding and appreciation of the area's special features.
8. Allow other occupancy and use of the area's resources to the extent they neither interfere with the primary values for which the area was established nor negatively affect the visitor's experience.

E. PROPOSED ACTION

The Current Proposed Action (Alternative 1) includes:

- * Designation of the area as a Botanical Area (# acres approx 800)
- * No permitted livestock to graze Upper Grapevine within the Botanical Area
- # No permitted livestock to trail or drive through the Botanical Area
- # No permitted livestock to graze the Bootlegger area
- * Permitted livestock allowed to trail through the Bootlegger-Grapevine Unit on established roads to Road 87A to the Coyote Springs Trail to the Mesa Unit with NO DRIFTING ALLOWED
- * Hand-clearing of the old Coyote Springs Trail from Road 87A to Coyote Springs
- * Reconstruct Coyote Springs with a waterlot (Waterlot - a fenced enclosure around a water used to water several different pastures by closing and opening different gates to access the various pastures.)
- * Construct Grapevine-Mesa fence on west and south rims
- * Reconstruct 2.6 miles of social trail in the creek bottom
- * Prohibit motorized use of Trails 4, 304, and 9432 below the rim of Big Bug Mesa
- # Prohibit mountain bike use of Trails 4, 304, and 9432 below the rim of Big Bug Mesa
- * Allow day use only in the Botanical Area

- * Reconstruct trailhead at junction of Road 87A and Trail 4
 - * Management-ignited prescribed burns and prescribed natural fires
- # -Originally, three existing activities including trailing livestock through the proposed botanical area, grazing the Bootlegger area, and mountain biking below the rim were included in the Original Proposed Action. In order to design alternatives with complimentary management objectives, these actions were removed from the Original Proposed Action to form the Current Proposed Action. These three actions are now included in both Alternative 3 (existing condition) and Alternative 2. The Original Proposed Action also included a north/south Bootlegger/Grapevine fence that has since been moved to Alternative 2.

The Original proposed action included proposing exclusion of the Botanical Area from mineral entry. On October 12, 1995, in Federal Register Vol 60, No. 197, page 53131, 43 CFR Public Land Order 7166 withdrew the Grapevine Springs Botanical Area from mining of locatable minerals such as gold, silver and other metals for a period of 20 years. The lands remain open to mineral leasing for minerals such as oil, gas, phosphate and coal.

F. DECISION TO BE MADE

The Regional Forester for the Southwestern Region of the Forest Service is the responsible Official. The Regional Forester will decide whether or not to designate upper Grapevine Creek as a Botanical Area, and if so, which of the management alternatives to select. The selected alternative may be a combination of items from more than one alternative. The selected alternative will be identified in a Decision Notice after consideration of the comments received during the 30-day public comment period regarding this project.

If a Botanical Area is designated, management direction would be stated in the Forest Plan as part of the management area prescription. The minimum requirements for the special area component of the Forest Plan are contained in FSM 2370.21 (attached as exhibit A). Standards and guidelines and management direction for the area would be prepared as an amendment to the Forest Plan. The amendment would also describe the unique characteristics of the area.

G. ISSUES AND MEASURES

Using knowledge of the area, inventories, and results of public involvement, a Forest Service interdisciplinary team identified key issues. Key issues are those for which effects vary noticeably between alternatives. They are the issues highly likely to affect the decision. The original proposed action was distributed for review and critique to about 60 potentially affected or interested parties. Key issues and their associated measures follow:

Issue 1. Relationship between livestock grazing and vegetation conditions.

Livestock may affect the species composition, condition, trend, and age class structure of the plant communities which occur in the area.

The ranching operation would be affected by any change made in the operation now guided by AMP Amendment #3. Movement of cattle between the low and high elevations, through Grapevine Canyon, is the primary issue. Use of forage, primarily winter browse, in the proposed Bootlegger Unit, is a secondary issue.

Measure 1: These effects and an analysis of grazing value for livestock are summarized in a narrative which also discusses the degree of potential impact, species diversity, and distribution of plant species.

Issue 2. Relationship between recreation access and use and vegetation conditions.

Recreation may affect the species composition, condition, trend, and age class structure of the plant communities which occur in the area. Changes in road standards may affect vegetation conditions due to increased visitor use. Changes in trail designations may change use patterns of motorized and non-motorized users.

Measure 2: A narrative discusses the degree of potential impact, species diversity, and distribution of plant species.

Issue 3. Effects on threatened, endangered, and sensitive plant and animal species.

The species and/or their habitats may be impacted by management actions in the project area.

Measure 3: A narrative describes the effects on the species and the capability and availability of the habitat.

Issue 4. Effects on fire hazard and risk.

There is an increasing chance of a catastrophic fire in the area as well as an opportunity to return fire to a more natural role in the ecosystem.

Measure 4: A narrative describes the effects of the fire management strategy.

Issue 5. Effects on water quality in the Proposed Botanical Area.

The quality of the water of Grapevine Springs may be impacted by varying levels of recreation use. These springs were sampled in May of 1994 for water quality. Grapevine Springs was adopted as a Reference Riparian Area by the Forest Service Rocky Mountain Experiment Station in April 1995.

Measure 5: A narrative describes the effects on water quality.

Issue 6. Cost of road, fence, and recreation facility construction.

Different proposed development levels would have different costs.

Measure 6: These costs are displayed in tabular form and summarized in a narrative.

The narrative and tabular measures are found, by issue, in Chapter 3.

CHAPTER 2--ALTERNATIVES

Alternatives differ in strategies for management of upper Grapevine Creek. The three action alternatives include designation as a Botanical Area. Those three alternatives vary considerably on the management of the proposed area. A no-action alternative reflects current management. Alternative components include: 1. Botanical Area designation. 2. Livestock management. 3. Recreation access and development. 4. Fire management strategy. A summary chart of the alternatives follows the narratives below.

A. ALTERNATIVE 1 DESCRIPTION (Current Proposed Action -Designate Botanical Area w/ maximum protection)

Alternative 1 has a general theme of Botanical Area designation with maximum protection of botanical resources. No new trail would be built and a trailhead on Big Bug Mesa would not be developed.

1. Upper Grapevine Creek would be designated as a Botanical Area. Designation of the area would create a certain amount of "marketing" of recreation and interpretation opportunity due to the involvement of the Arizona Nature Conservancy. There would be little general marketing by the Forest Service.
2. For livestock management, the Grapevine-Mesa fence would be built on the west rim of Grapevine Creek. This would create a no-grazing Bootlegger-Grapevine Unit in middle and upper Grapevine Creek.

Fencing would be done by the Forest Service and cooperators other than the permittee.

The current term grazing permit would be modified. It currently reflects AMP Amendment #1. Amendment #1 substituted a riparian strip fence on upper Grapevine Creek. The original Environmental Assessment and AMP had required fences to create the no-grazing Grapevine Unit. The decision from this Environmental Assessment will supersede AMP Amendment #1 as it relates to the Grapevine area and will supplement AMP Amendment #3 which left the area open to managed grazing pending the decision on Grapevine Botanical Area designation.

No use of Trail 4 for moving livestock other than saddle and pack horses or mules would be permitted. Trail 4 is the main trail in the Grapevine Creek riparian area. Permittee could use other existing stock trails outside of the proposed botanical area which provide access to the top of Big Bug Mesa. One trail climbs the south rim; the other goes to Coyote Spring on the sidehill. Both trails are currently permittee-maintenance responsibility and would need clearing and minor re-location or re-shaping of tread. Other routes to move stock have been made available by recent fences built by the Forest Service and permittee. In all months except June, July, and August, moving from Hackberry, Daniels, and/or Poland Holding Units is possible around the south side of Breezy Pine (summer-home area in Big Bug Creek) on an old road, up Road 261 through Breezy Pine. Since the Little Mesa Unit was split in 1991 between the Big Bug and Brady allotments, moving onto Little Mesa on Trails 9219 and 304 is another option for getting to the Mesa Unit.

If the permittee elected to use the Coyote Spring trail (Trail 304), the trail would be hand-cleared of brush by the Forest Service to facilitate livestock movement. Trail maintenance would be the permittee's responsibility. A water trough at the spring development would be reconstructed. A new trough would be installed and a "waterlot," or small fenced area, would be built to serve livestock in both Mesa and Little Mesa Units. The waterlot would make it possible to water stock along the way to the mesa without cattle drifting back to Grapevine Creek.

Maintenance work on range improvements would be permittee responsibility. Reconstruction and new construction costs would be shared equally between permittee and Forest Service. In order to maximize timeliness of fence maintenance, routine work would be done by the permittee. Catastrophic damage would merit Forest Service assistance.

3. The recreation setting and experience characteristics would best be described by the "semi-primitive, motorized" Recreation Opportunity Spectrum classification. However, motor vehicle and non-motorized mountain-bike use would be prohibited within the Botanical Area. Cross-country motorized and mechanized use is already prohibited by the Forest Plan.

Trail 4 would be reconstructed and closed to motorized/mountain bike use.

Trail 9434 would be closed to motorized/mountain-bike use between Trail 4 and the south canyon rim (extreme northwest corner of Section 1).

Trail 304 would be closed to motorized/mountain-bike use between Trail 4 and Coyote Spring.

The existing social trail in the creek bottom would be reconstructed, added to the trail system, and would be open to hikers only.

The primary objectives of closing these three trails to motorized/mountain bike and reconstructing the creek bottom trail is to protect riparian vegetation.

A primitive trailhead (no restroom, utilities, or other facilities except signing) would be established at the Road 87A-Trail 4 junction. Minimal interpretation with regulatory messages on access and camping restrictions would be provided at the trailhead.

There would be no developed recreation sites (camp, picnic, interpretation) within the Botanical Area. The Botanical Area would be open to day use only.

There would be no road reconstruction on Road 87A. It would continue to be maintained for high clearance vehicles only.

4. The fire management strategies would include both management-ignited prescribed burning and prescribed natural fire. Specific objectives of both types of burning would be to reduce heavy fuels, provide the proper

seedling environment to encourage pine regeneration, rejuvenate chaparral and Gambel oak, create snags, and improve tree age-class and biological diversity. Overall, a 60% burned-40% unburned ratio would be prescribed.

Actual results would vary. Old-growth white and Douglas-firs trees and riparian species would be somewhat protected by higher fuel moisture during burning, although some incursions of fire and subsequent mortality of some old-growth and younger trees would occur.

Prescribed natural fire would not be implemented until the northernmost prescribed burn area is burned. Once burned, the management-ignited area would serve as a buffer for most prescribed natural fire which might occur in upper Grapevine. The buffer effect would be good for about 25 years, until fuels reached critical levels in the burned area's chaparral.

General objectives of the prescription would be to mimic a natural mosaic pattern of early-, mid-, and late-seral stage vegetation within the Botanical Area and the adjoining areas to the northeast. This prescription would apply to both slopes and riparian parts of the area.

Prescribed natural fire would involve evaluating each natural or human caused ignition at the time of discovery. The likelihood the fire staying within a pre-determined prescription would be evaluated. A suppression or monitoring decision would follow.

B. ALTERNATIVE 2 DESCRIPTION (Designate Botanical Area w/ continued monitored grazing)

Alternative 2 has a general theme of designating the Botanical Area while allowing grazing to continue with riparian and upland-protection standards. Development would occur on an as-needed basis. Cost of land treatments including low-level recreation development would be minimized.

1. The area would be designated as a Botanical Area. As in Alternative 1, no active recreation marketing would be done by the Forest Service.
2. Livestock grazing would continue the full length of Grapevine Creek. The area would remain a portion of the Mesa Unit. The conditions outlined in the AMP and the annual operating plans would govern management. The AMP includes methods and monitoring for riparian recovery.

The former permittee met with the District Range Staff on July 22, 1993, to develop the strategy reflected in Alternative 2. This alternative provides an opportunity to evaluate the permittee's commitment and ability to attain the desired conditions without building more fences. It would also remove the need, at least initially, to maintain additional miles of riparian-strip fences or new unit fences called for in other alternatives. This alternative is based on the idea of taking incremental steps toward an adequate level of protection, as described below. Season of use, stocking rates, selective breeding and culling, herding, salting, and supplementing would be used by the permittee to attain the desired results. A hillside spring near the existing enclosure could be developed with a trough to draw cattle away from the riparian strip.

If monitoring in the first two years that the area were grazed indicated unsatisfactory results, fencing would be required in stages. The first stage would create the Bootlegger-Grapevine grazing unit by constructing the Grapevine-Mesa fence. The Forest Service and permittee (50-50 cost share) would build fences on the south and west rims (per original AMP). If this proved ineffective in protecting the riparian area, two other options would be considered by the Forest Service. One would be to close the Bootlegger-Grapevine Unit to grazing. The other would be to separate the Bootlegger and Grapevine Units by constructing the Bootlegger-Mesa fence (50-50 cost share) and close only the Grapevine Unit to grazing. In this case, moving of cattle through Grapevine might still be allowed.

If neither of these options were effective in keeping livestock out of the riparian zone, the riparian strip fence protecting the springs and the area 2/3 mile below the springs would be constructed and maintained at permittee expense.

The final fallback position would be to close the entire Grapevine Unit to both grazing and cattle driving and increase the level of Forest Service monitoring for compliance.

All maintenance except for catastrophic damage would be permittee responsibility.

To avoid higher levels of development and restriction, Alternative 2 would include frequent Forest Service-permittee communication and monitoring.

The current restriction on grazing of bulls in the Bootlegger Unit from the original AMP would be removed.

On January 16, 1997, the current permittees on the Big Bug Allotment met with Bradshaw District personnel to discuss the Grapevine Botanical Area project and its potential impacts on the allotment. After discussing the alternatives and trade-offs of those alternatives, the current permittees decided that they like and support the Current Alternative 1 with no changes.

3. The recreation setting and experience characteristics would best be described by the "semi-primitive, motorized" Recreation Opportunity Spectrum classification. Motorized access (motorcycle, ATV) would be permitted within the area, however such vehicles would be restricted to Trails 4, 304, and 9432. The trails would also be left open to hiker, equestrian, and mountain-bike (non-motorized) travel. They would be cleared enough by the permittee to facilitate livestock drives. Trail 4 and an existing social trail from Trail 4, along the creek bottom, would be reconstructed.

Primitive trailheads (no restroom, utilities, or other facilities other than signs) would be established at both ends of Trail 4. A higher level of interpretation than in Alternative 1 would be provided with regulatory messages at the trailheads.

There would be no developed recreation sites (camp, picnic, interpretation) within the Botanical Area. The area would be open to day and limited overnight use. Overnight camping would be more restricted

than the policies and regulations applied to other dispersed camping areas on the Bradshaw Ranger District. Stay limits would permit up to 4 days and 3 nights per 30-day period rather than the standard 14 days per 30-day period.

4. The current fire management policy of suppression would continue.

C. ALTERNATIVE 3 DESCRIPTION (No Action--no change)

Alternative 3 has the general theme of making no changes from current management.

1. The Botanical Area would not be designated.
2. The no-change alternative would manage livestock under the Big Bug AMP, with Amendments #1, 2, and 3.

Grazing in upper Grapevine would be managed so that stocking levels and/or season of use would be restricted enough to promote recovery of riparian areas. Active management of the herd by the permittee to avoid adverse riparian effects would be the cornerstone of this alternative. See Alternative 2 for details.

Although no additional fencing is currently required in the Grapevine area, the grazing permit could still be used to require fences around Grapevine if other management methods failed to meet objectives.

3. The recreation setting and experience characteristics would best be described by the "semi-primitive, motorized" Recreation Opportunity Spectrum classification. Motorized access (motorcycle, ATV) would be permitted within the area. Such vehicles would be restricted to Trails 4, 304, and 9432. The trails would also be open to hiker, equestrian, and mountain-bike travel. They would be cleared enough by the permittee to facilitate livestock drives. The existing non-system social trail from Trail 4, would be left as is. Forest Service attempts to restrict use Trail 4 to designated uses (hike, horse, mountain bike, small motorized) would continue at a low level.

There would be no trailhead development or interpretive signs.

There would be no developed recreation sites. The area would continue to be open to day and overnight use. Stay limits would be up to 14 days in a 30-day period.

4. The current fire management policy of suppression would continue.

D. ALTERNATIVE 4 DESCRIPTION (Designate Botanical Area w/ High level of Recreation Development)

Alternative 4 has the general theme of increasing the public's ability to enjoy upper Grapevine Creek's botanical and water resources for interpretation and recreation. However, it does not improve access to the point of giving direct motorized access to the Botanical Area. The increased use of the Botanical Area and associated downstream areas would be partially mitigated by constructing facilities and by restricting or prohibiting certain human and livestock uses.

1. The Botanical Area would be designated. Increased access would draw attention from various user groups and lead to the area being actively marketed to encourage use by interested groups and individuals.
2. Livestock management would be the same as Alternative 1.

Fencing would be done by the Forest Service and co-operators other than the permittee.

Fence maintenance would be the permittee's responsibility.

Spring and trail maintenance work would be permittee responsibility. Reconstruction and new construction costs would be shared approximately 50-50 between permittee and Forest Service.

There would be no loss of permitted numbers related to this alternative, as described in Alternative 1, part 2.

3. The recreation setting and experience characteristics would best be described by the "semi-primitive, motorized" Recreation Opportunity Spectrum classification. However, motor vehicle and non-motorized mountain-bike use would be prohibited within the Botanical Area. As in Alternative 1, Trails 4, 304, and 9434 would be closed to motor/mountain bike use. The primary objectives of closing these trails to motorized and mountain bike use are to increase safety for large groups, including school groups, which would be attracted by the area's interpretive focus, and to help protect vegetation.

Road 87A would be reconstructed to Traffic Service Level "A" standards: single-lane, culverted, graded-and-drained native surface with below-grade drainage dips and safety turnouts. The road would accommodate vehicles comparable to school buses. A cattleguard would be installed at Grapevine Corral on the existing Bootlegger-Poland fence. Appropriate traffic-control signing would be used to enhance user safety.

A 1320-foot wide corridor along Road 87A between the Grapevine Corral and the east boundary of the Botanical Area would be designated as a day use developed recreation site to minimize vegetation disturbance, erosion, and scenery degradation.

The existing Trail 4 trailhead on Road 87A would be developed to include a 10 to 15 vehicle parking area, a two-seat toilet facility, a turnaround suitable for a school bus or 55' recreational vehicle, a host site without hook-ups suitable for a 55' RV, a dumpster, and up to five picnic tables. A high level of interpretation of the area's botanical significance would be provided. The trailhead would be hosted as much as possible to increase public health and safety and decrease violations of user restrictions.

Trail 4, would remain open for hikers and horses. The existing social trail in the creek bottom would be developed as a new interpretive trail to provide access for public education and enjoyment of riparian vegetation. The interpretive trail would be open to hikers and horses but not to mountain bike travel.

The Big Bug Mesa trailhead at the end of Road 103A would only be developed to have parking for up to five vehicles. Minimal

interpretative and regulatory signing would be installed. Current maintenance standards would continue on Road 103A.

4. The fire management strategies would be the same as those presented in Alternative 1.

E. ITEMS COMMON TO ALL ACTION ALTERNATIVES

All alternatives include proper-use monitoring of perennial grasses and browse per AMP Amendment #3 plus 20% utilization limit on woody shoots under 5' high.

All alternatives include the Poland Prescribed Burn planned in the Big Bug Allotment AMP.

Management-ignited prescribed fire would be held by natural barriers, existing roads, trails, fence-line clearings, and low-impact hand-line construction. Prescribed burning would avoid private land when the landowner so desires. Private lands predicted to be left unburned include patented claims associated with the Butternut Mine in Sections 5-8, Bradshaw property in Section 5, patented claims upstream from Goswick's property in Big Bug Creek, and most of Goswick's property. Prescribed burning would burn through interspersed private land when the landowner desires it as evidenced by coordination and involvement in developing the prescribed burning plan for the area (predicted to apply in the northeast corner of Section 6 on southwest extreme of Goswick property). The State Land Department would be consulted when private land is burned.

The Poland Prescribed Burn mapped in the Big Bug AMP would still be carried out, with modifications made to account for recent development of private land near the Butternut Mine in Sections 5-8.

Riparian strip, associated tree-form chaparral, and conifers would have management-ignited prescribed burning designed to reduce future "stand-replacement" fire.

All new fences constructed would have a smooth bottom wire at least 18 inches from the ground and total height no greater than 44 inches. These requirements facilitate movement of wildlife across or underneath fences.

All improved waters would be made usable for small wildlife by access and escape ramps.

Surveys for threatened, endangered, or sensitive species are ongoing. New findings would be evaluated for effects of planned actions with avoidance or mitigation prescribed as needed.

All alternatives would meet Forest Plan direction for Heritage Resources including survey before implementing ground disturbing developments. If resources are located during survey, appropriate protection would be provided through avoidance or mitigation.

All alternatives would adhere to established Visual Quality Objectives as defined in the Forest Visual Resource Inventory. The Visual Quality Objectives range from Partial Retention to Modification. (ref. Ag Man. No. 462, The Visual Management System).

If re-vegetation were later determined necessary to meet the goals of an alternative, seeding would be considered on the merits of meeting site objectives, and would involve native plant species only, preferably from a local seed source.

F. MONITORING

Alternatives 1, 2, and 4, the action alternatives, include monitoring beyond that done under the Allotment Management Plan. Monitoring would involve continued evaluation of the area's botanical potential and the movement toward that potential. Monitoring to assess environmental effects of recreational use would be conducted periodically.

Water quality sampling would occur as a baseline with an interval of at least 1 sample per 10 years. Baseline and periodic monitoring of riparian vegetation and photo points would be used. Monitoring according to Region 3 protocol would be conducted for the northern goshawk and the Mexican spotted owl.

G. ALTERNATIVES NOT FULLY DEVELOPED

The Forest Service interdisciplinary team considered the following alternatives which were not fully developed:

1. Designation of a Botanical Area boundary other than the canyon rim, such as the full upper Grapevine watershed. In this case, the north, south, and west watershed boundaries would lie on the flat mesa tops and would be difficult to locate and protect. Physical features are substantially different than the well defined area bounded by the canyon rims.
2. Designation as a Research Natural Area. Research Natural Areas (RNA's) are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands (FSM 4063). The Grapevine area does not meet the pristine condition that is a goal: "Whenever possible proposed areas should show no evidence of major disturbances by humans, such as livestock grazing or timber cutting for the past 50 years..., and natural conditions are maintained (in RNA's) insofar as possible ... by allowing natural, physical, and biological processes to prevail without human intervention..." (FSM 4063.2).
3. Recreation development at a level higher than Alternative 4. This could involve recreation developments including developed campgrounds anywhere in the Grapevine watershed, which extends nearly to Highway 69. This level of development was not fully analyzed due to probable adverse effects on the proposed Botanical Area and higher priorities for such development elsewhere. There is no evidence of strong enough demand for major recreation developments in the Grapevine watershed.
4. Alternative 4 with an alternate trailhead location. Grapevine Corral (Sec 7, center of south 1/2) and the Butternut Mine-junction (Sec 7, NE 1/4) area were each examined for potential trailhead locations. Use of either location would save road re-construction costs by shortening the amount rebuilt. Neither option, however, met the intent of Alternative 4 to enhance interpretative opportunities. This option would discourage many of the users Alternative 4 was intended to serve. It would require

either converting part of Road 87A to a trail, thus removing current access, or leaving the road open beyond the trailhead.

5. Other fencing options considered but not developed include:
- a. Construct the fences which create the Grapevine and Bootlegger Units PLUS riparian strip fence. Close Grapevine to grazing, allow trailing (actively driven) cattle through Grapevine, and allow grazing of the Bootlegger Unit.
 - b. Construct the Grapevine-Mesa, Bootlegger-Mesa, and Bootlegger-Grapevine fences without the riparian strip fence, with grazing/trailing per part a (above).
 - c. Construct a riparian strip fence only. Allow grazing of Botanical Area outside the strip as part of the Mesa Unit.
 - d. Construct a boundary and riparian corridor fence in stages if required to protect riparian values.
 - e. Construct Grapevine-Mesa fence and riparian strip fence. Allow limited winter grazing in Bootlegger and Grapevine Units.

None of these options would meet the resource objectives as well as the ones displayed in Alternatives 1, 2, and 4.

TABLE 1. GRAPEVINE BOTANICAL AREA ALTERNATIVE SUMMARY

DETAILS OF ALTERNATIVES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Items from Original Proposed Action in BOLD.----	Proposed Actn	-----	Existing Condition	-----
DESIGNATION OF BOTANICAL AREA (BA)	Yes	Yes	No--no change	Yes
LIVESTOCK MANAGEMENT IN BA & AREA DOWNSTREAM:				
Graze permitted cattle in Grapevine BA	No	Yes--as part of Mesa Unit	Yes--as part of Mesa Unit	No
Trail cattle thru Grapevine BA (upper creek)	No	Yes + nat. drift	Yes + nat. drift	No
Graze permitted cattle in Bootlegger area	No	Yes--w/Mesa Unit	Yes--w/Mesa	No
Trail cattle thru Bootlegger area to Mesa	Yes	Yes + nat. drift	Yes + nat. drift	Yes
Reconst. Coyote Spring and add waterlot	Yes	Optional	spring only	Yes
Const. Grapevine-Mesa fence on W and S rims	Yes--FS/co-op	Possibly-FS/perm	No	Yes--FS/coop.
Const. Bootlegger-Mesa fence	No	Possibly-FS/perm	No	No
Const. riparian strip fence (2/3 mile strip)	No	Possibly-perm.	No	No
New-fence routine-maintenance responsibility	Permittee	Permittee	Permittee	Permittee
RECREATION ACCESS AND DEVELOPMENT:				
Reconst. 2.6 mi Tr 4 (existing tr to saddle)	Yes	Yes	No	Yes
Extend Trail 4 to Rd 103A (1.5 mi new const)	No	Yes	No	Yes
Reconst. social trail in the creek bottom	Yes	Yes	No	Yes
Motorized use of Trails 4, 304, 9432 below rim	No	Yes	Yes	No
Mtn. bike use of Trails 4, 304, 9432 below rim	No	Yes	Yes	No
Overnight B.A. stay limit per 30-day period	Day use only	3 nights	14 nights	Day use only
Reconst. Rd. 87A to accommodate school buses	No	No	No	Yes
Reconst. trailhead, Road 87A-Trail 4 junction	Yes	Yes	No	Yes
Reconst. trailhead at end of Road 103A	No	Yes	No	Yes
Desig. Dev Rec Site, G.Corral to E. BA bound.	No	No	No	Yes
Allow camping at trailhead(s)	Yes	Yes	Yes	No--host only
FIRE MANAGEMENT STRATEGY:				
management-ignited fires (by Forest Service)	Grapevine prescrib.burn	AMP-planned Poland Burn	AMP-planned Poland Burn	Grapevine prescrib.burn
lightning ignitions	Managed *	Suppressed	Suppressed	Managed *
people-caused ignitions	Managed *	Suppressed	Suppressed	Managed *
* if within prescription. Burning prescriptions	would be designed to meet vegetation management objectives.			

CHAPTER 3--ENVIRONMENTAL CONSEQUENCES

This chapter shows the present condition (i.e. the affected environment) within the project area and the changes that can be expected from implementing the action alternatives or taking no action at this time. The no-action alternative sets the environmental baseline for comparing effects of the action alternatives.

The major issues (see Chapter 1) define the scope of environmental concern for this project. The environmental effects (changes from present baseline condition) that are described in this chapter reflect the identified major issues.

A. RELATIONSHIP BETWEEN LIVESTOCK MANAGEMENT AND VEGETATION CONDITIONS1. Existing vegetation conditions

The following vegetation types are found in the study area:

Woodlands on Basalt Mesas	125 acres
Chaparral	380 acres
Mixed Conifer	275 acres
<u>Perennial Riparian</u>	<u>100 acres</u>
TOTAL	880 ACRES

Areas on the north and south of the canyon are generally flat basalt caps. To the south and west, Big Bug Mesa is dominated by dense, immature ponderosa pine. Some has been recently thinned through a timber sale. Understory herbaceous vegetation is spotty and consists mainly of a perennial cool and warm-season grass, bottlebrush squirreltail, (Sitanion hystrix). Large alligator junipers (Juniperus deppeana) are common especially on the shallower soils of the mesa, near the edges.

North of Grapevine Creek is "Rocky Mesa." It consists of an open stand of juniper, grass, brush, and stunted ponderosa pine (Pinus ponderosa).

As described by the Zone Botanist in October, 1992, the Grapevine Springs area contains 100-foot tall, 30-inch diameter Arizona alders (Alnus oblongifolia), large mature boxelder (Acer negundo) and bigtooth maples (Acer saccharum ssp. grandidentatum), and old 30 to 50-inch Douglas-fir (Pseudotsuga menziesii var. glauca) and white fir (Abies concolor). Shoots on the boxelders elongated three to four feet in the 2.5 years that cattle were not in the area. Gambel oak (Quercus gambellii) and Arizona walnut (Juglans arizonica) also grow here. Numerous foot-tall sprouts of gambel oak occur just below the falls area. Shrubs in this area include chokecherry (Prunus virginiana), snowberry (Symphoricarpos sp.), Arizona rose (Rosa arizonica), and one very old decadent elderberry (Sambucus sp.) at the edge of the amphitheater formed at the base of the falls. Herbaceous understory species include: columbine (Aquilegia chrysantha), monkshood (Aconitum columbianum), bricklebush (Brickellia sp.), poison ivy (Toxicodendron rydbergii), bromegrass (Bromus sp.), ferns, American hop (Humulus lupulus), and Canada violets (Viola canadensis), with ferns and alumroot (Heuchera sp.) on the lava cliffs.

Slightly downstream from this spring on the terrace beside the main channel of the creek, numerous four-inch tall boxelder seedlings were also noted to be growing. These appeared to be less than two years old. Douglas-fir regeneration two to four feet tall is occurring in some

locations on the terraces, while alder regeneration 10-foot tall also occurs along edges of the creek and in the channel itself. Suckering of aspen (Populus tremuloides) has occurred in a localized area where these trees are growing. There is a stand of young alders 45-foot tall about 1.5 miles downstream from the springs. This stand may have become established during a period of channel downcutting about 24 years ago following heavy snow melt.

With the exception of the alder regeneration, the regeneration observed during October 1992 (reported above) represents changes which have occurred since the July 18, 1989 report. Cattle were not in this pasture between late 1989 and early 1992. Some use occurred during the fall of 1992. No use occurred in 1993 or 1994 until November 1994. The vegetative recovery seen between 1989 and 1994 could easily be reversed if livestock were allowed to use the area before seedlings and sprouts have achieved sufficient growth and maturity to withstand and keep ahead of associated livestock use (browsing and trampling) impacts.

In 1989, there was almost no regeneration of the dominant tree species in the riparian area due to heavy browsing by livestock. Heavy browsing on the understory herbs and shrubs and heavy trampling were also noted at that time.

Many of the herbs and shrubs mentioned above could also grow in the riparian community along the creek but are growing only adjacent to the springs where the rockiness affords them some protection from the impacts of cattle. Where the water from springs flows through more silty soils, much trampling from cattle was evident. The presence of this regeneration suggests that the riparian community has the resilience to initiate recovery from heavy livestock pressure.

Continuous yearlong grazing in the past changed the structure and composition of the plant community in the analysis area by reducing the abundance of some species, and allowing other species to increase. Field visits to the area in the spring of 1994 revealed that recovery and regeneration is occurring throughout the area. As natural processes are re-established and livestock grazing is excluded, the diversity in the composition and the density of plants is being restored. The prevalence of herbs and shrub species in the lower portion of the project area is increasing.

2. Effects of alternative grazing strategies on vegetation conditions

Alternative 1 would provide a high degree of riparian vegetation recovery. Young seedlings and saplings of broadleaf trees and shrubs and associated herbs within the proposed Botanical Area would grow without effects of livestock grazing and trampling. With the elimination of trampling by livestock, recovery of cryptogams, mosses and lichens on the soil surface would occur. This would enhance nutrient cycling, water retention ability and lead to decreased erosion. The cryptogamic crusts would also provide micro-niches for establishment of additional seedlings. Grazing effects would be limited to those associated with stray cattle in the area.

Alternatives 2 and 3 would provide slower recovery and riparian seral stage would be expected to remain somewhat lower. This would occur as some plants lose their overwintering buds to grazing, with resultant loss

of spring shoot growth. The current lack of at least 10% seedling and saplings of broadleaf trees and shrubs would be only partially mitigated by managed grazing. The diversity of herbaceous species would not soon reach the potential expected for this Alder-Arizona walnut community. Trampling would continue to occur.

Alternative 4 would provide the same level of riparian protection as Alternative 1.

Burning in Alternatives 1, 3, 4 would rejuvenate browse species and temporarily increase space and nutrients for herbaceous species in the uplands. However, soil characteristics are likely to severely limit establishment of perennial grasses, based on results of nearby 1988 burning. Alternatives 1 and 4 contain more burning than Alternative 3. Alternative 2 would rely on wildfire escape for rejuvenation.

3. Range analysis condition and trend summary

Only the riparian corridor and top of Big Bug Mesa were classified in the most recent (1988) range analysis as having capacity for grazing. However, evidence of past use of the north and south slopes plus the Rocky Mesa top is apparent. Their no-capacity classification was based on these areas not being able to sustain grazing without soil damage.

Condition class and trend are available only for the full-capacity areas. In the key riparian area, trend was upward. Big Bug Mesa was stable.

The following information is summarized from the 1988 Range Analysis for the Big Bug Grazing Allotment which includes the analysis area.

FACTOR	RIPARIAN AREA (Grapevine Ck)	NORTH SLOPE (N.facing)	SOUTH SLOPE (S.facing)	BIG BUG MESA S of canyon	ROCKY MESA N of canyon
VEGETATION	AZ alder AZ walnut CA buckthorn, white fir, Douglas-fir, boxelder	ponderosa pine, Gambel oak, white fir, Douglas-fir, NM locust	shrub live oak, mtn. mahogany, squawberry	bottlebrush, squirreltail, snowberry, alligator juniper, Gambel oak	sideoats grama, mtn mahogany, alligator juniper, shrub live oak, p.pine
RANGE CAPACITY	Full capacity	No capacity	No capacity on upper slopes, poten- tial capacity on lower (needs burn)	Full capacity	No capacity
CONDITION	Fair	NA	NA	Poor	NA
TREND	Up	NA	NA	Stable	NA

The proposed Botanical Area is currently within the large Mesa Unit. With the exception of a 5-acre enclosure, the proposed Botanical Area is open to managed grazing. Per AMP Amendment #3, grazing occurs in the Mesa Unit's lower areas two winters in a row (approximately November-April). Two full years of recovery rest follow when the herd goes to other parts of the allotment. During the two summers of use, the AMP Amendment #3 commits the permittee to keep the bulk of cattle in the high elevations. Compliance checks are part of Amendment #3, as is proper-use monitoring of herbaceous and woody vegetation. Evidence of overutilization first triggers more intensive management to avoid key areas, then removal or reduction of stock in the unit, and as a last resort, removal of cattle from the Allotment.

AMP Amendment #3 would be supplemented by the decision on the Grapevine Botanical Area.

4. Effects of alternatives on grazing permittee.

Alternatives 1 and 4 would allow neither grazing nor driving cattle through upper Grapevine, nor grazing of Bootlegger. The upper two thirds of Grapevine, approximately 2600 acres, would be closed to grazing. The previous permittee has reported there would be a greater strain on the herd involved with alternate routes. Both alternatives include trailing cattle through the Bootlegger-Grapevine Unit on established roads to the Coyote Springs Trail only with NO DRIFTING ALLOWED.

There would be no loss in permitted livestock numbers related to this change. A negligible amount of "full-capacity" grazing land lies within the proposed no-grazing area, the Grapevine Unit. This means that virtually none of the permitted numbers were based on acreage within the Bootlegger-Grapevine Unit. The only full-capacity land was the narrow riparian strip. Proper-use utilization levels specified in the current AMP have much more effect on the actual numbers or length of grazing.

Alternative 2 and 3 would accommodate permittee's desire to manage for riparian improvement without relying on more fences to control stock. They allow the most land to be grazed. The entire Grapevine watershed would be grazed. These alternatives may potentially lead to fence construction and water development if riparian resource objectives are not being met.

5. Summary of grazing value for livestock

In the 1988 Range Analysis for the Big Bug Allotment Management Plan, most of upper Grapevine was classified as no-capacity range. No-capacity range is classified as non-suitable. This does not mean that the area has not been used for grazing. Areas high on the steep, north-facing slope show signs of past utilization by livestock. It does mean that such lands were not used in a calculation of livestock numbers in previous planning.

The interdisciplinary team classed the riparian strip as a low suitability grazing value rating. The factors considered were: full-capacity for grazing (from Range Analysis), moderate productivity for grazing, ability to fully meet Forest Plan emphasis, and high marginal cost to manage to Forest Plan standards and guidelines

(high-cost fence construction and/or frequent monitoring and high management costs for permittee to avoid over-utilization).

All potential-capacity acres were classed as a low suitability grazing value rating. They are gentler, browse-covered slopes with potential capacity pending prescribed fire to open up dense browse. The factors leading to this rating were: moderate productivity, fully meets Forest-Plan emphasis, high marginal cost to manage (prescribed burning cost). A few acres of potential-capacity lie within the proposed Botanical Area.

About 50 acres of full-capacity range on Big Bug Mesa lies within the proposed Botanical Area. It classes as a moderate suitability grazing value rating. Factors were moderate productivity, ability to fully meet Forest Plan emphasis, and low marginal cost to meet Forest Plan standards and guidelines. This area consists of pine and browse species on the south-facing slope of the north fork of Grapevine.

Alternatives 1 and 4 would close all areas previously described as the potential Grapevine and Bootlegger Units to grazing. Just over 50% of the closed area is classed as non-suitable. About 40% is low suitability browse. About 5% is low-suitability riparian. About 2% is moderate-suitability pine-browse.

Alternatives 2 and 3 would leave all areas previously described as the potential Grapevine and Bootlegger Units open to managed grazing.

B. RELATIONSHIP BETWEEN RECREATION ACCESS & USE AND VEGETATION CONDITIONS

1. Existing Recreation Conditions

The area is described by the "Semi-Primitive, Motorized" setting along the Recreation Opportunity Spectrum. It is characterized by a predominantly natural or natural-appearing environment. Concentrations of users is low, but there is often evidence of other users. There are minimal on-site restrictions. There is a moderate probability of experiencing: isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. There are opportunities to have a high degree of interaction with the natural environment. Most of the area is within 1-2 miles of primitive roads or trails used by motor vehicles.

There is no documented recreation use data for the proposed Botanical Area. Most signs of use occur downstream from the proposed Botanical Area or above it on Big Bug Mesa. Legal harvest and theft of fuelwood, off-road vehicle use, camping, and hunting are apparent. Within the proposed Botanical Area, there are a few sub-standard trails and occasional signs of past camping (i.e. rock fire rings). Two estimates of use of the proposed Area itself were made. The interdisciplinary team estimated that use is no more than an average of 10 people per month. A permittee who has worked the area since the 30's, estimates use at one per month. The team judged there to be an insignificant difference in effects from these estimates and used the estimate of 10 as a baseline.

There is a 2.8 mile infrequently maintained trail (Trail 4) in the Grapevine Creek drainage. From the end of Road 87A, the trail follows the creek bottom for a little over one mile. It then climbs out of the bottom and crosses the south-facing, chaparral-covered slope for another mile and a half. At the 1992 cattle enclosure, the trail drops back into the creek. It then winds into the junction of the two forks of Grapevine Creek and then climbs up the North Fork to the saddle overlooking Big Bug Creek. There are also a number of obscure cattle trails.

Where Trail 4 climbs out of the creek bottom, another unmaintained trail continues to follow the creek. Currently, the lowest 1/3 mile of Trail 4 is still used as a road. Beyond there, occasional motor bike use occurs for about 1/8 mile. Motorized use of the upper portions of the trail is limited by lack of clearing and rock obstructions. There is no evidence of motor use on Trail 9434, probably related to impassable rimrock. The lowest 1/8 mile of Trail 304 is currently used as a road. The balance is a rocky stream bottom not passable by motorized vehicles. No motorized use is apparent in these upper reaches.

An estimated seven percent of the riparian habitat is suitable for campsites, and most campsites are within one hundred feet of the creek or springs. Most of the area outside of the drainage bottom is unsuitable due to steep slopes. Environmental effects of camping, however, extend beyond the campsite perimeter, i.e. firewood gathering, human waste deposition, and trails between campsites.

2. Heritage resources

General reconnaissance shows evidence of early-settlement era use. A noticeable amount of circa 1910, riveted, "barber-pole" steel water pipe lies between one of the Grapevine Springs (on south facing slope near the enclosure) and the proposed trailhead, in the inaccessible portions of the creek. It dates to an attempt by the town of Mayer to obtain municipal or industrial water (personal communication, George Goswick to Alan Kelso, June 3, 1995). Ruins of a log structure were found during one heritage survey. Portions of the Trail 4 probably date to this time. No other heritage resources have been identified.

3. Effects of recreation use on vegetation conditions

Alternative 1's effects are based on a interdisciplinary team estimate of a 100% increase in visitor use (20 people/month) due strictly to the designation of the area. Due to longer stays and a different form of use than day users, overnight campers were judged to have a substantially higher per-capita effect on the environment than day users. Effects are based on most users not setting up a camp.

Some overnight camping would probably continue. The camping opportunities along Grapevine creek are unique and attractive for the Bradshaw Mountains. The interdisciplinary team estimated that less than 5% of of users would ignore camping restrictions.

Still, the prohibition on overnight camping would contribute to the current upward trend in riparian condition brought about by improved grazing practices. Over time, the area would achieve 10% in seedlings and saplings for broadleaf trees and shrubs which is recommended in the

Prescott Forest Plan. Excluding overnight camping would lead to less trampling of plants than in Alternatives 2 and 3 which allow camping or Alternative 4 which would greatly increase day use. Less trampling of plants would lead to development of plants with strong root systems that are necessary to hold streams and riparian zones together. There would be less trampling of shrub and tree regeneration. As streamside vegetation increased, the channel would probably aggrade and the water table would rise. This would permit the water to reach the root zone of plants on former terraces, leading to a change in species composition and community structure of the vegetation on the terraces (becoming dominated by typical riparian species).

Riparian vegetation provides important biological and physical effects on the functions and processes of the stream, as well as organic material for food sources, shade, cover, and large woody debris that influence channel morphology. Since most campfires would be eliminated, there would be a greater retention in woody debris accumulation, which decomposes to form humus, providing microsites for seedling establishment and habitats for small animals.

Soil compaction, which is most acute in the core of frequently-used campsites, would not increase with the small increase in day use. Many riparian species are more sensitive than non-riparian species to impacts because of their more delicate stems and roots, which require uncompacted soils to provide as much aeration as possible under high moisture conditions. Stream bank stability would be enhanced by fewer long-term recreation users on stream banks or within the stream. On rare occasions people may move rocks to form pool areas for water-play, thus destroying streamside habitats.

Alternative 1 would improve the existing social trail from Trail 4 along the creek bottom. The presence of a developed trail for hikers would reduce cross-country travel by users drawn to the creekside by the presence of water. This would contribute to fewer recreation effects on riparian conditions. However, there would still be minor impacts from social trail development. Minor soil and vegetation loss would occur.

Access to the Botanical Area would continue to be hampered by the poor quality of Road 87A. This would also lessen recreation effects. Travel to the botanical area would be discouraged due to lack of marketing the area, the need for a high-clearance vehicle or a long, shadeless walk through the chaparral, and potential for damage to vehicle bottoms and tires.

Alternative 2's effects are also based on an increase of monthly average use from 10 to 20 visitors. About 10% of the users would be predicted to camp within the Botanical Area.

Alternative 2's camping would marginally deteriorate riparian condition and slow recovery of the ecosystem functions and processes. Some trampling of shrub and tree regeneration would occur. There would be a net decrease in woody debris accumulation since most overnight users would collect the down woody material to build campfires.

Soil compaction, which is most acute in the core of frequently used campsites, would continue. Decreased survival of plants, direct trampling of small plants and roots of larger plants, damage due to broken branches, loss of perennial vegetative cover, and introduction of

non-native plant species would continue. Motorcycles and ATV's on Trail 4 would continue to create soil disturbance. Erosion and disturbed soil would encourage non-native, disturbance-loving species (such as Bromus spp.) and native early-seral species.

Alternative 2 provides slightly less effects of camping than Alternative 3 due to a short, 3-night stay limit. However, access difficulty would make enforcement of this limit difficult if long stays occurred.

Alternative 2 would improve the existing social trail. This trail would allow day users to reach the creek bottom, and some social trails would develop in the riparian area. Although this trail would not be open to motorized use, some trail vehicle users would probably use the trail. Because of the remoteness, enforcement would be difficult.

As in Alternative 1, access would continue to be hampered by the poor quality road. This would reduce recreation effects.

Effects from Alternative 3, (no action), are based on little or no increase in use. No marketing would be focused on the area. A use rate of 10 visitors in an average month would hold. Less than 5% of visitors would be expected to camp overnight in the area. These few campers would have a disproportional effect, however, as mentioned below.

Alternative 3 would permit overnight camping with a 14-day stay limit. There would be potential for severe impact to regeneration of woody species and herbaceous ground cover. Camping could contribute to the deterioration of riparian condition and delay restoration of ecosystem processes and functions. Even though camping would continue, woody debris accumulation would exceed use for firewood. Lack of publicity would lead to little or no increase in camping.

Soil compaction would be expected to continue at current levels, that is, in some streamside areas close to trails and on campsites. Effects described in Alternative 2 would occur at a slightly higher level. These effects would be less than those of Alternative 4's heavy day use.

Alternative 3 provides the least chance to control the effects of long-term camping due to allowing the traditional 14-day stay limit.

Alternative 3 would not improve the existing social trail from Trail 4 along the creek bottom. The lack of a developed trail would discourage some day users, especially equestrians and mountain bike riders due to difficulty of getting through rocks and downfall. However, cross-country travel and social trails would continue as users attempt to reach the creekside, drawn by the presence of water.

Access would continue to be hampered by the poor quality road. This would reduce recreation effects relative to Alternative 4.

In Alternative 4, the primary objective would be to provide improved access, a high level of interpretation, and more comfortable facilities for nature-study groups. Enhanced access and facilities would likely lead to the area being aggressively promoted and signed to draw various user groups to the area. These features and the associated increased use would increase environmental effects on the Botanical Area.

Alternative 4's reconstruction of Road 87A between the Butternut Mine turnoff and the trailhead would accommodate passenger cars and full-size school buses during dry weather. Consequently, human use of the Botanical Area would be both increased and oriented toward an average group size larger than present. This increased human trampling of the area would offset the benefits to vegetation from cattle removal. It would result in a lower probability of successful restoration of the natural ecosystem processes and functions of the proposed Botanical Area.

Comparison with other National Forest attractions was used to estimate effects of improving access to Grapevine. The Lynx Creek Ruin trail, near Prescott, provides an interpretive opportunity similar to the proposal in Alternative 4. Use at the Lynx Creek Ruin, which includes school groups, was approximately 850 people between May 30, 1994 and June 22, 1994. The Lynx Creek Ruin is five miles from Prescott, is accessible by a paved road, and the trail is .75 mile long.

Fossil Springs, a Coconino National Forest Botanical Area, is 75 miles from Flagstaff and 110 miles from Phoenix, accessible by 10-25 miles of dirt roads and 3-4 miles of hiking on a closed dirt road. It has approximately 850 visitors per month. The type and number of users is causing serious impacts to the natural resources (Personal communication, Larry Larson, Outdoor Recreation Planner, Beaver Creek District, Coconino National Forest to Barbara Phillips, Zone Botanist, May, 1995).

Surveys at Fossil Springs show 85% of the users are from the greater Phoenix area, not local. Use is reported as mostly Boy Scouts. Use is calculated at approximately 5000 recreation visitor days (RVD) per year (one RVD is one person for 12 hours). 65% of use is overnight and most of the effects are related to that type of use. Documented disturbance includes human waste disposal problems, fire rings and compacted areas, tree carving and chopping, soil displacement, manure from stock, numerous social trails, and trampling and loss of vegetative ground cover. Effects on the stream include dam building, rock digging, collapsing of banks, water turbidity, and loss of aquatic vegetation. Conditions have deteriorated between 1988 and 1993 inspections. There is little to no Forest Service presence.

The proposed Grapevine Spring trailhead on Road 87A would be 26 miles from Prescott, including three miles of graded and drained dirt road and four miles of trail. Because of more difficult accessibility, casual use of Grapevine Springs would be less than use at Lynx Creek Ruin. However, use would increase over time as knowledge of the area and central Arizona population increase.

The proposed trailhead would be three miles from Hwy 69. Because of this distance, and because there are no other developed recreation sites in the area, the Grapevine Springs trail would be a destination recreation site. That is, most visitors would have planned ahead to visit the site. A few would be attracted by highway signs. Most of those who planned to visit would do so because of marketing, word-of-mouth, or as part of an organized group.

Based on the two examples above and adjusting for Grapevine, use would be predicted to rise from 1-10 visitors per month to approximately 100/month. Nearly all the use would be day use. About 1-2% (5

people/month) would be expected to violate the no-camping restriction due to the improved access and publicity. Use would be concentrated during the growing season.

Besides making it possible for large groups (40-80 people at one time) to fairly easily reach the trailhead, Alternative 4 would improve the social trail in the stream bottom. This would result in a greater human effect on riparian condition than Alternatives 1,2, and 3. Although trail designs would encourage people to confine their travel to the designated trails, numerous social trails would result.

Trails would be widened and eroded more rapidly by use. A zone of soil compaction would extend beyond the original trail tread. Direct trampling of small plants and tree-root losses associated with compaction would occur at a much higher level than in Alternatives 1, 2, and 3. Other impacts such as damage to trees and shrubs due to broken branches, loss of perennial vegetative cover, and introduction of non-native plant species also would occur with increased numbers of people.

Riparian conditions would be adversely affected by increased visitation. The springs would be especially sensitive to human impacts. People would go to springs and waterfalls in box canyons and shelves where cattle cannot go. People would collect plants and break them inadvertently, causing impacts similar to browsing by cattle. Many riparian herbaceous plants require shade and are influenced by removal of branches of overstory plants. Level areas currently used for gathering and picnics would experience increased use. Although Trail 4 would not be open to motorized use, some motorized-vehicle users would probably use the trail. Because of the remoteness of Grapevine Creek, enforcement would be difficult. Some additional vegetation disturbance would occur from this use. However, some unauthorized motor use would be prevented during times when the trailhead host position is filled.

Exploration of the creek bottom would also be greatest near the picnic areas. Environmentally destructive behaviors which may be higher in Alternative 4 include carving or cutting on trees, overturning, rolling or throwing of rocks and extensive off-trail foot traffic. Soil compaction would increase in high use areas.

The elimination of overnight camping in this alternative would moderate the increased effects from human use. There would be a net increase in woody debris accumulation since most campfires would be eliminated.

In the area open to and accessible to buses and cars, that is, between Highway 69 and the 87A trailhead, the day-use-only limitation would help retain the current low level of vegetation disturbance, wildlife-tree loss, erosion, and scenery degradation along the wooded part of the road. It would otherwise likely become attractive for illegal fuelwood cutting, off-road travel, and new car-camping, on-Forest-habitation, or drinking-party spots. Such impacts are ubiquitous on Prescott National Forest areas with similar road quality, access to urban areas, and tree cover. Active enforcement is only marginally successful at mitigating the adverse effects of these uses until an area is restricted to day use. The chaparral portions of the road would not be expected to have enough attraction for such uses to cause noticeable resource damage. These areas would be outside the designated site and remain open for overnight use.

The day-use-only limit between the trailhead and the Botanical Area would reduce adverse effects from camping in the riparian area. It would increase the ability of the trailhead host and law enforcement people to enforce the Botanical Area camping prohibition. They would not have to differentiate between backpackers going into the "portal zone" vs. the Botanical Area itself.

C. EFFECTS ON THREATENED, ENDANGERED & SENSITIVE (TE&S) PLANT AND ANIMAL SPECIES

1. Existing TE&S situation

The northern Goshawk, a Regional-Forester-sensitive species, was observed in the Grapevine Creek riparian area in October 1992. The riparian habitat along Grapevine Creek and the mixed-conifer forest habitat on the north-facing slope is suitable habitat for the goshawk.

The Mexican spotted owl (MSO) is listed as threatened by the Fish and Wildlife Service (FWS). Most of the project area is within critical MSO habitat. The area near the springs provides excellent roosting, nesting and foraging habitat, important primary constituent elements of critical habitat. A pair of spotted owls is known to nest within 1/2 mile of the planning area.

The habitat in the planning area does not appear to meet the habitat requirements for the southwestern willow flycatcher, an endangered riparian dependent migratory bird.

The project area does not appear to have suitable habitat for the endangered Hualapai Mexican vole.

While habitat exists within the planning area for the lowland leopard frog, a species designated as sensitive, none have been observed by Bradshaw District personnel during several visits.

Other animal species on the Regional Forester's Sensitive List that could possibly occur but for which no information is available include the occult little brown bat, Western red bat, sharp-shinned hawk, zone-tailed hawk, flammulated owl, American redstart, and Arizona Bell's vireo.

Past livestock grazing has eliminated regeneration of both overstory and understory riparian plant species which, in turn, has decreased the structural diversity of the riparian zone vegetation. This decrease in vegetation structural diversity has resulted in a decrease in wildlife habitat quality.

At the present time there are no federally listed Endangered, Threatened or Regional-Forester sensitive plant species known in the area. There does not appear to be potential habitat for any of these species.

Riparian habitat is critical wildlife habitat in the arid southwest. Of the ten threatened, endangered, or sensitive species known to occur or potentially occurring in the planning area, three are extremely dependent on riparian habitat: leopard frog, red bat, and Arizona Bell's vireo. The zone-tailed hawk prefers riparian habitat for nesting. Riparian habitat is identified in the MSO Recovery Plan (MSO

RP) and Prescott National Forest Plan Amendment as restricted habitat requiring special management considerations and guidelines.

2. Effects of alternatives on TE&S habitat

Alternative 1 would improve riparian and associated upland habitat conditions with livestock grazing eliminated from the proposed botanical area. Improvement would be evidenced by reestablishment of grasses and forbs as vegetative cover, stabilization of streambanks, transformation of intermittent flows to perennial flows and reduction of sediment loads. The abundance and diversity of wildlife in protected riparian areas can be much greater than in contiguous areas still grazed by livestock. An increase in wildlife riparian habitat quality would therefore improve habitat conditions for threatened, endangered and sensitive species dependent upon those riparian habitats.

Recreational use may be slightly increased due to the minimal improvements (trailhead signing); however, this recreational use is not expected to have a detrimental impact on threatened, endangered or sensitive species or their habitat. Restrictions on overnight camping in the riparian area should diminish the probability of negative environmental effects from recreationists therefore lessening potential effects to threatened, endangered or sensitive species and their habitat.

The proposed "prescribed natural fire" management strategy would be a beneficial way to re-establish fire as a part of the ecosystem. Certain plant species depend upon fire to complete their life cycles.

Alternative 2 would continue grazing by livestock, with restrictions on season, duration, and intensity of use. However, it would still likely result in a decrease in the rate of improvement of riparian habitat relative to Alternatives 1 and 4, due to the risk of livestock accessing and remaining for extended periods in the riparian zone. Even a small number of cows in the riparian zone for a short period of time could have detrimental effects to the sensitive spring areas and associated habitat. There is a risk under this alternative that threatened, endangered or sensitive species habitat quality could be degraded before monitoring revealed the need to build additional fencing. Lag time between monitoring and fence completion also increases the risk of detrimental effects.

Overnight camping in the riparian zone would be allowed and the stream-bottom trail into the riparian area would be improved. The increase in potential impacts to vegetation and soils from camping and increased trail-hiking impacts in the riparian area could contribute cumulatively to the potential negative effects of livestock grazing, further increasing the probability of negative effects to threatened, endangered, or sensitive species and their habitat.

Continuing the current fire suppression management strategy would postpone re-establishing fire in the ecosystem and increase the risk of inevitable catastrophic fire. Such a fire could have serious negative impacts to many species and their habitat. A stand replacing fire in

the riparian zone could wipe out entire populations of small, less mobile animals such as frogs, mice and insects. The Prescott National Forest is within the Basin and Range - West Recovery unit (RU) for the MSO. "The primary threats to spotted owls within this RU are catastrophic wildfire, recreation and grazing." (MSO Recovery Plan, USDI, USFWS, Volume I, Part III, page 101).

Alternative 3 would have similar effects to threatened, endangered or sensitive species and their habitat as that described for Alternative 2. The probability of success in achieving improvement in riparian conditions under this Alternative would likely be less than in either Alternatives 1, 2, or 4 due to the lack of a special Botanical Area designation, the risk of livestock concentrating in the riparian area, and a delay time for construction of additional fences, if proven necessary. The effects of disturbance to threatened, endangered or sensitive species or their habitat from recreationists would be similar to that in Alternative 2, though lessened slightly due to the absence of an improved trail accessing the riparian area.

Continuing the current fire suppression management strategy would have the same effects as those described above in Alternative 2.

Alternative 4 would have offsetting effects on the riparian habitat. While the exclusion of livestock, including trailing, from the Botanical Area would greatly improve the riparian habitat, improved and increased recreational access to the area could have detrimental effects to the habitat.

The increased visitation from upgrading the canyon-bottom social trail for interpretation could have substantial negative impacts to the riparian habitat. Not only would the actual plants be lost to trail construction, but the displacement of wildlife from the habitat by recreationists would further deteriorate the availability and capability of the habitat. Although this trail would not be open to motorized use, some vehicle users would probably use the trail. Because of the remoteness, enforcement would be difficult.

Development of a trailhead with parking space for up to 15 vehicles, a bus turn-around, picnic tables, and toilet facilities would provide access for many more different types of recreationists than Alternatives 1, 2 and 3. Negative impacts from pets, social-trail development, soil compaction, noise, and some forms of litter would have detrimental effects on the capability of the habitat for most plant and animal species, including threatened, endangered, or sensitive species. The sporadic and fluctuating levels of use in the area would disrupt and displace wildlife from using the habitat. Spring and summer recreation use would conflict with critical breeding and reproductive seasons for plant and animal species. Substantially increased recreational levels especially during the summer breeding season may preclude use of the habitat by Mexican spotted owls dispersing from nest sites.

The riparian and mixed conifer habitat within the Proposed Grapevine Botanical Area provide several primary constituent elements of MSO habitat, including nesting, roosting, foraging and dispersal habitats. The negative effects to riparian habitat for Alternative 4 discussed on pages 25-27 under "3. Effects of recreation use on vegetation conditions" would in turn be negative effects to components

of MSO habitat. Key habitat components include herbaceous understory, broad-leaved overstory, and streamside plants that provide habitat for prey species such as small mammals, birds and reptiles.

Riparian areas are preferred locations for recreation activities because of aesthetics and activities associated with water. Riparian areas tend to be cooler, have lots of shade, and are pleasant places to spend time.

Riparian areas are VERY important habitats for many plant and animal species because of the water and unique plants and animals associated with the water. Existing riparian habitat is limited due to inherently limited water across the landscape.

Recreation activities impact wildlife habitat as well as the animals. Loss of suitable, quality habitat due to trampling of plants and compacting of soil directly impact the habitat. Displacement from habitat due to human presence leads to a shift in movement patterns along and across riparian corridors.

Riparian habitat is critical for many plant and animal species. With a high proportion of the limited available habitat degraded, low habitat quality may impact populations of species. Species dependent upon riparian habitat include garter snakes, leopard frogs, aquatic insects, cavity nesting birds, animals species associated with broadleaved trees species, NOT TO MENTION the PLANTS themselves.

Degraded riparian habitats lead to less prey available for predators of all sizes from insectivores to carnivores.

A change in the level, pattern and type of use of trails and roads in TE&S species' habitat may exceed tolerable levels and preclude use of the habitat by those species.

Suitable nesting and roosting habitat for Mexican spotted owls occurs in mixed conifer stands and coniferous stringers in relatively narrow bands often along drainage bottoms or riparian areas. Existing nesting and roosting habitat is limited by the vegetation types and topography.

A substantial increase in recreational activity would reduce the effective use of the habitat by MSO's.

The Mexican spotted owl is a nocturnal animal that rests during the day. Flushing from the roost away from noise of large groups of hikers or pets is an energy expenditure additional to natural disturbances. Raptors have been shown to shift territory centers and expand home ranges in response to increased human activity. Since most of the existing nesting/roosting habitat on the Bradshaw Ranger District is occupied by MSOs, there is NO alternative habitat available for MSO's to shift their territories.

Increased recreational activity brings with it the increased risk for human-ignited fires. The proposed management-ignited prescribed burning strategy in Alternative 4 would complement the recreational developments in this alternative. Prescribed burning would reduce the risk and associated damage of catastrophic fires. The management-ignited burning strategy would provide for early, mid, and late seral stages in all habitat types to ensure habitat diversity.

Other natural processes such as insect infestations and diseases are also necessary for natural succession to proceed. An example would be white fir habitat succeeding to late seral. Insect infestations or disease (such as root rot) in white fir, causing death and decay, open the canopy, allowing early seral stage broad-leaved deciduous trees to become established. The Regional Forester-sensitive plant species Arizona bugbane, Cimicifuga arizonica, would be much more likely to occur in a habitat such as this.

Due to its limited habitat and numbers, the wildlife resource of concern most impacted by past, present and near future activities is probably the Mexican spotted owl.

With growing populations in Prescott and Phoenix, more people will seek recreation opportunities on National Forest lands. With its shade and cool temperatures, the Grapevine Botanical Area is a pleasant setting for various types of recreating.

While Mexican spotted owls have habituated to present levels of activity on both private and public lands, a change in the type, pattern and level of activities in an area may preclude the use of the area by the owls.

Recreation is listed as the second leading threat to Mexican spotted owl habitat in this, the Basin & Range - West, recovery unit.

"Recreational activities may affect Mexican spotted owls directly by disturbing nests, roosts, or foraging sites. Disturbance may occur indirectly through altered habitat caused by trampling of vegetation, soil damage, or both. Developing new recreation facilities or expanding existing facilities, such as campgrounds and trails, may alter spotted owl habitat and habitat use and perpetuate disturbance impacts caused by recreation."

"If a given recreational activity does not cause habitat alteration, the Team assumes that activity generally has relatively low impact potential with respect to spotted owls. However, exceptions may exist in local situations or certain RUs where the level of recreational activities is high. Essentially, the determining factor of an activity's impact on spotted owls is a combination of its location, intensity, frequency, and duration rather than simply its character." (Recovery Plan for the Mexican Spotted Owl, December 1995, Volume I, Part II, page 73).

Increased recreation pressures on the National Forest System Land indicate the potential for a high magnitude of participation which, in turn, will cause more displacement of animals, destruction of habitat, and increased threat from fire. All of these effects are likely to occur with the level of recreation development proposed in Alternative 4.

Considering the current and reasonably foreseeable future demands for recreation on National Forest Lands, locations of proposed projects must be designed to minimize impacts to limited habitats and the species that depend upon them.

Private land ownership of MSO habitat is also another important factor affecting the quantity and quality of available habitat for MSO. In the Bradshaw Mountain MSO habitat, 15 % of the ponderosa forest type which contains suitable nesting and roosting habitat is privately owned. A recent trend in private land ownership is sub-dividing parcels and putting in additional homesites. As more homes are put in on private land, less habitat is suitable for nesting and roosting. Managers of federal lands must consider activities on adjacent lands when determining cumulative effects to resources.

The other key resource heavily impacted by cumulative effects is riparian habitat. Recreationists are drawn to riparian areas for the shade, cool temperatures, aesthetics, and wildlife. Other forest users are drawn to them for minerals, water, and livestock grazing.

Trampling plants, compacting soil, clearing brush, and displacing wildlife are the most common impacts from riparian area users. The habitat is directly degraded and the animals are indirectly displaced. As more riparian areas become more easily accessible, there are fewer high quality, undisturbed riparian areas available for all riparian dependent plant and animal species, including threatened, endangered, and sensitive species.

D. EFFECTS ON FIRE HAZARD AND RISK

1. Fire history and existing natural-fuel loads

There are four major habitat types:

- a. Mature chaparral on the south facing slope is in a late seral stage. There is little herbaceous ground cover. The chaparral has not been burned in recorded history but is likely to have been burned at approximately 25-40 year intervals before active fire suppression began in the 1900's. There is a large buildup of dead woody material in this chaparral, making it highly flammable during dry periods. Fuels are continuous.
- b. Ponderosa pine with New Mexico locust and Gambel oak on the north-facing slope is in a mid-seral stage in most areas and has pockets of old-growth. There is little herbaceous ground cover. There is evidence of both frequent surface fires which thinned the stand and less frequent crown fires which killed pines 5-10 acres at a time. The latter areas are now dominated by immature Gambel oak. Fuels are generally light, about 5-10 tons per acre, including duff and litter. Large fuels (old logs and snags) do exist and are well scattered.
- c. White fir, Douglas-fir, and mixed conifer (pine-firs) on the lower north slope and in the area around the springs are in a late-seral stage. There is little herbaceous ground cover. In this moist habitat type, fires have occurred infrequently. Fuel loading is very high, due to large fallen logs and numerous large snags. Tons per acre exceeds 100 with fuels being fairly continuous. "Ladder" fuels, that is, young trees under older trees, are the norm.

- d. Arizona alder-Arizona walnut with aspen, white fir, Douglas-fir, California buckthorn, and boxelder are in a late-seral stage in the upper reaches of the riparian zone. In the lower reaches, young alder (10-20 years old, generally) and alligator juniper dominate. Here the seral stage is early-to-mid seral. In both reaches, herbaceous vegetation is generally lacking. Fires occurred infrequently in this moist riparian habitat and were probably spotty and associated with frequent fires in adjacent drier sites in pine and chaparral. Fuel loading in the upper reaches is similar to the fir-dominated areas described above. In the lower reaches, fuels are negligible and the riparian strip is only a few feet wide.

2. Effects on Existing Fire Hazard (fuel accumulation)

Alternatives 1 and 4--With the strategy of both prescribed natural fire and management-ignited fire, these alternatives have the best chance for creating the mosaic. Once prescribed burning is accomplished, the risk of stand-replacement fire is substantially reduced until fuels re-accumulate.

In the chaparral, it could take 25+ years for fuels to re-accumulate, assuming little or no followup livestock browsing, a total topkill of brush species and juniper in the burned areas, and 40% unburned areas. New fuel would accumulate as the burned plants regenerated.

In the ponderosa pine, the hazard would be reduced for about 5 years, assuming a separate burn which slightly reduced pine stocking, increased deciduous oak sprouting, removed large dead material and some snags, and eliminated most of the pine-needle litter layer. A 5-year follow-up burn, which consumed most of the previously killed trees but killed few additional trees, would decrease the chance of a stand-replacement fire for about 10 years.

In the fir-dominated areas and major riparian areas, hazard would be reduced for 100+ years, assuming a fairly hot fire which would consume most existing dead material in the spots that actually burned. A mosaic pattern of no-burn and hot-burn areas in the fir habitat type is the most likely scenario (rather than total loss of the fir) since the prescription would be tailored to the adjacent, drier, pine-oak sites which make up most of the north slope.

Alternatives 2 and 3--With the strategy of suppression of fires, there is less chance of reaching the mosaic situation described above. The greater disturbance related to overnight camping and motorized use on Trail 4 would lead to increase in non-native plant species such as annual bromes and early-seral native species. These plants would provide more continuous ground cover than normal for the area, leading to fuels build-up. There is a corresponding increase in the chance for no change in overstory vegetation and the eventual stand-replacement fire. A stand replacement fire would have the highest risk of adverse cumulative effects on downstream resources such as riparian habitat, roads and other developments, and private land and development.

Alternatives 1 and 4 would be more likely to avoid stand-replacement fire in the middle reaches of Grapevine Creek due to including the management-ignited prescribed burns and prescribed natural fires.

3. Effects on Ignition Risk

The risk of human-caused fires varies by alternative due to the difference in camping restrictions and recreation development-predicted use. Alternative 1 has the least ignition risk due to the low level of development and the prohibition of overnight camping.

Alternatives 2 and 3 each have a similar ignition risk. Their risk is higher than Alternative 1 due to overnight camping being allowed. However, the low level of recreation development makes Alternatives 2 and 3 overall lower risks than Alternative 4.

Alternatives 1, 2, and 3 present a minimal ignition risk, primarily due to limited access for users. The fire management strategy in these alternatives would not greatly affect recreation use of the area unless a catastrophic fire occurred due to lack of prescribed burning. Natural fire occurrence would be expected to be infrequent.

Alternative 4 has the highest ignition risk. Although it has the same prohibition on overnight camping within the Botanical Area as Alternative 1, its level of other recreation developments and access would substantially increase "recreation visitor days" and possibly attract a number of users less knowledgeable of fire-prevention techniques. The presence of a trailhead host could reduce this increased risk but not to the level expected in Alternatives 1, 2, and 3.

In recognition of this increased risk, Alternative 4 includes management-ignited prescribed fire in addition to prescribed natural fire. Such burning would somewhat reduce the increased risk but not eliminate it, especially in fine fuels such as pine needles and grass.

Management-ignited prescribed fire in Alternative 4 would have the greatest effects on recreation use. Casual hikers would be discouraged from using a recently burned area. Teachers and naturalists, on the other hand, might be encouraged to use the prescribed fire area as a laboratory for the study or explanation of fire ecology. This type of group use might increase.

E. EFFECTS ON WATER QUALITY IN THE PROPOSED BOTANICAL AREA

1. Existing water quality

Water quality was measured in 1994, during a period of no livestock use. Quality was very high. Although no grazing-season measurements have been made, the Forest hydrologist predicts an increase of fecal matter and urea.

2. Effects of alternatives on water quality in the proposed BA

In Alternative 1 water quality could be enhanced by less disposal of human and animal waste since overnight camping and grazing is prohibited. With grazing prohibited, there would be no cattle-induced compaction or erosion, thereby maintaining the current water quality.

Water quality would remain generally very high, the highest of the alternatives.

In Alternatives 2 & 3, streambank stability could be adversely affected due to continued recreation and livestock use on stream banks or within the stream. The potential for water-quality degradation would be higher than Alternatives 1 and 4 due to disposal of human and animal waste related to potential overnight camping. Contamination associated with grazing would remain. Overall water quality would be lower than Alternatives 1 and 4.

In Alternative 4, contamination associated with overnight camping could actually increase, in spite of the day-use-only limitation because improved access would likely lead to increased camping. The much heavier day-use load would also add a pollution source. Some of the contamination would be human waste. Increased trail and campsite erosion would increase stream turbidity. Water contamination associated with grazing would be eliminated except for stray stock.

F. COSTS OF FIRE MANAGEMENT, ROAD, FENCE, AND RECREATION FACILITY CONSTRUCTION

1. Existing management costs

Exact management costs of this specific area are not tracked. The primary site-specific cost to the government is yearly grazing-permit-compliance monitoring including photo-point work, roughly \$200 a year. Very occasional, unscheduled costs are incurred in Grapevine for fire suppression or law enforcement. There is little to no Forest Service expenditure for road and trail maintenance in the area. In 1992, the Forest Service constructed an enclosure in riparian and nearby upland areas when the unfeasibility of the riparian strip fence became apparent. The trail was cleared for horse packing.

Permittee costs are typical of those on the rest of the allotment. The major cost anticipated from AMP Amendment #3 is on-ground time to move cattle from key areas to avoid over-utilization. There are few reported conflicts between recreationists and cattle grazing which would lead to unusual costs for either the permittee or the Forest.

All alternatives will include the cost for the Poland Prescribed Burn; approximately \$26,000 for 1288 acres.

2. Predicted project costs. See table on Page 37. Cost calculations were limited to the pivotal ones of new construction. Two codes were used for other management factors. "NO CALC" (not calculated) was used where some cost may be incurred by Forest Service, permittee, etc., and the cost was judged to be insignificant or not reliably predictable, such as fire management. NA (not applicable) was used where no cost would be incurred by the management action on that line.

- a. Alternative 1 would include costs for two adjacent fences, Coyote Springs reconstruction and waterlot, Trail 4 and spur trail reconstruction, a primitive trailhead, and prescribed burning. It has a total cost similar to Alternative 2 but costs are for different items.

Table 2. Grapevine Botanical Area Cost Comparison Table

DETAILS OF ALTERNATIVES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
DESIGNATION OF BOTANICAL AREA (BA)	Yes	Yes	No	Yes
LIVESTOCK MANAGEMENT IN BA & AREA DOWNSTREAM				
Graze permitted cattle in Grapevine BA	NA	\$1000	\$200	NA
Trail cattle thru Grapevine BA (upper creek)	NA	NO CALC	NO CALC	NA
Graze permitted cattle in Bootlegger area	NA	NO CALC	NO CALC	NA
Trail cattle thru Bootlegger area to Mesa	NO CALC	NO CALC	NO CALC	NO CALC
Reconst. Coyote Spring and add waterlot	\$8000	NO CALC	\$6M, spr only	\$8000
Const. Grapevine-Mesa fence on W rim	2.2 MI.=\$9000	2.2 MI.=\$9000	NO CALC	2.2 MI.=\$9000
Const. Bootlegger-Mesa fence on E & S sides	NA	2.0 MI.=\$8200	NO CALC	NA
Const. riparian strip fence (2/3 mile strip)	NA	NO CALC	NO CALC	NA
New-fence routine-maintenance responsibility	NO CALC	NO CALC	NO CALC	NO CALC
RECREATION ACCESS AND DEVELOPMENT				
Reconst. 2.6 mi Tr 4 (existing tr to saddle)	\$21,000	\$21,000	NA	\$21,000
Extend Trail 4 to Rd 103A (1.5 mi new const)	NA	\$18,000	NA	\$18,000
Reconst. social trail in the creek bottom	0.5mi=\$6000	0.1 mile = \$1000	NA	0.5 Mi.=\$6000
Motorized use of Trails 4, 304, 9432 below rim	NA	NO CALC	NO CALC	NA
Mtn. bike use of Trails 4, 304, 9432 below rim	NA	NO CALC	NO CALC	NA
Overnight B.A. stay limit per 30-day period	NO CALC	NO CALC	NO CALC	NO CALC
Reconst. Rd. 87A to accommodate school buses	NA	NA	NA	\$142,000
Reconst. trailhead, Road 87A-Trail 4 junction	\$35,000	\$40,000	NA	\$111,000
Reconst. trailhead at end of Road 103A	NA	\$15,000	NA	\$11,000
Desig. Dev Rec Site, G.Corrall to E. BA bound.	NA	NA	NA	NO CALC
Allow camping at trailhead(s)	NO CALC	NO CALC	NO CALC	NO CALC
FIRE MANAGEMENT STRATEGY: management-ignited fires (by Forest Service)	1473 acres, \$29,000	1288 acres, \$26,000	1288 acres, \$26,000	1473 acres \$29,000
lightning ignitions	NO CALC	NO CALC	NO CALC	NO CALC
people-caused ignitions	NO CALC	NO CALC	NO CALC	NO CALC
TOTAL CONSTRUCTION COSTS	\$111,000	\$139,200	\$32,200	\$355,000

- b. Alternative 2 would incur costs for Trail 4 and spur trail reconstruction and extension of Trail 4. It would have higher cost trailhead construction than Alternative 1 due to higher level of interpretation. Alternative 2 would require much more intensive monitoring efforts by Forest Service personnel to ensure riparian objectives are being met, approximately \$1000.
- c. Alternative 3 would incur only spring reconstruction costs. This is the lowest cost alternative.

Alternatives 2 and 3 could incur costs for 2 to 3 fences if objectives were not met without them. These costs were not shown in the table since there are a number of scenarios described in the alternatives. Costs could exceed Alternative 1 by about \$20,000 if the Bootlegger-Grapevine fence and spring development became necessary.

- d. Alternative 4 would incur costs of 2 fences, trail reconstruction and extension, Coyote Springs reconstruction and waterlot, road reconstruction, trailheads, and prescribed burning. It is the highest cost alternative.

Alternative 4 would incur substantially higher law enforcement and host-support costs than other alternatives. These costs were not estimated.

- 3. In Alternatives 1 and 4, management-ignited prescribed burning would be a major investment which should reduce future wildfire costs. The management-ignited costs are displayed. The possible reduction of wildfire costs are not predictable. Alternative 2 burns a smaller area in a lower-hazard area and would be expected to have less effect on reducing future wildfire-management costs.
- 4. Livestock management costs (other than structures) would be higher in Alternatives 2 and 3. These alternatives rely on on-the-ground management by the permittee and higher levels of monitoring for utilization of plants by the Forest Service.
- 5. The cost-comparison table follows:

CHAPTER 4. LISTING OF AGENCIES AND PERSONS CONSULTED

The Grapevine Botanical Area Analysis was initiated by a letter from the Arizona Nature Conservancy dated July 18, 1989. Subsequent to that The Nature Conservancy wrote an additional letter on May 7, 1991. The analysis process began with the Project Initiation Letter from District Ranger John W. Holt to Jeff Whitney, Interdisciplinary Team Leader on August 21, 1992.

Public involvement on the Grapevine project was sought on October 14, 1992 with a letter to 60 interested people and organizations, giving them an opportunity to comment on the proposal. The proposed action details at that time are summarized at the start of Chapter Two of this document. The original proposed action is not reflected in an alternative. A complete listing of those contacted can be found in the project record. Three local newspapers were also contacted to foster public involvement.

During scoping activities, 14 individual responses were received. These can be found in the project record. In response to the comments received from the grazing permittee, several meetings were held with them and their consultant. Scoping activities did not surface any additional issues to be analyzed. All comments received were incorporated into the analysis and any concerns were addressed in the document. A summary of comments follows. Forest Service response is in () immediately following.

Arizona Wildlife Federation Contact: "We like the area and believe it should be designated. We believe your proposal is correct and have no additional suggestions." (Alt. 1, 2 & 3 reflect this comment)

Prescott College Contact: "I am writing to enthusiastically endorse your proposal to designate the area around Grapevine Creek as a Botanical Area. There are few conservation actions we can take in the Southwest which are more important to our native biological diversity that preserving the healthy riparian systems that remain." (Alt. 1, 2 & 3)

Breezy Pines Homeowner Contact: Concerned that "anything to happen which would permit destruction of this place which she feels is very special." Malcolm Hamilton of the interdisciplinary team explained the proposal to her over the phone and she felt better about the proposal. (Alts. 1-3 would make little change to the area's character.)

President, Yavapai Trails Association: "The proposed Botanical Area appears to be a positive addition to the Bradshaw District. We note that a recreational trail will be developed to connect two trailheads; this should certainly satisfy non-motorized trail users." (Alt. 4)

Vice President, Arizona Riparian Council: "ARC supports the designation of the Grapevine Creek parcel of land as a Botanical Area, and supports management activities that will enhance the scientific and ecological values of the area, including total rest from grazing, prohibition of motor vehicles, and installation of educational signs. The riparian association along Grapevine Creek is indeed unusual and important, in that there exist few other sites dominated by the combination of Alnus oblongifolia and Juglans major." (Alt. 1 & 4)

Red Rock, Sunset, and Northstar Mining claim holder and local resident: "the nearest neighbors to your proposed area, are in agreement with your plan providing your commitment to no overnight camping becomes an enforceable item. Only very primitive wilderness trails are made in limited

numbers, say 5 maximum--also no new roads or trails into the area shall be in the plan!" (Alt. 1)

Private Individual Contact: "I am writing to express my support for the designation of the designation of the Grapevine Springs area as a Botanical Area. I am pleased to learn that you are going to submit a proposal to withdraw this area from mineral entry as well. Erecting fences to limit motor vehicles and cattle is also an excellent idea for this unique area. Nearly all of springs and creeks on the Prescott National Forest are rich and valuable resources, both in biological diversity and in the beauty they afford people. Unfortunately, these areas are also the most prone to over-use and abuse in many cases. I applaud your proposal to protect Grapevine Springs." (Alt. 1)

Arizona Game and Fish Dept. Contact- Habitat Program Manager, Kingman Region: "We support the Forest Service efforts to protect riparian area in upper Grapevine Creek. We believe permanent, year-round restriction of cattle grazing will benefit wildlife resources and offer the following comments to ascertain protection of the resources: If livestock are driven through ... F.S should provide close supervision to assure minimal impacts to the riparian area. (Alt. 1 & 4)

...reroute trail to protect all riparian areas and suitable spotted owl habitat. (Alts. 2 & 4)

All fences should be constructed to follow standard wildlife guidelines (All alts.)

We support designation as a Botanical area with the caveat of permitting some forms of research which will not be damaging to the resources. With this designation, research will be allowed, yet the area will be protected from future grazing regimes of an experimental nature. (Nothing in any alt. would preclude research.)

We also support construction of a hiking trail of minimum specifications. This will allow public access for recreationists, and will discourage informal trail development and habitat disturbance. If impacts from heavy visitor use becomes significant, we would appreciate the opportunity to be involved in the decision making process to solve that issue. We believe walk-in hunting is a valid recreational pursuit within this area and suggest no limitation of public access other than the restriction of day-use only. If interpretive signs are constructed, we suggest hunting rights be indicated as an allowable activity, but overnight camping should be restricted." (Alts. 1,2,4)

Yavapai County Sheriff's Office Contact: "...I can see no reason not to support this proposal." (Alt. 1)

The Nature Conservancy, Arizona Chapter Contact: "...The Nature Conservancy has been supportive of this designation ever since the area was identified in the Prescott Forest Plan in 1989 as a site with unusual riparian habitat values. We strongly support your current proposal to complete the Botanical Area designation for Grapevine Springs. (All action alternatives: 1,2,& 4)

As discussed in the review of background information pertinent to the proposed designation, Grapevine Springs is an excellent example of Alder-Arizona Walnut riparian forest, and it is one of the best riparian areas on the Prescott Forest. For a more detailed description of the

habitat values of the area I would refer you to a description of Grapevine Springs that I sent to the Bradshaw District in July, 1989. I don't have any new information to add at this time. (Existing Condition)

One of the major issues regarding designation and management of Grapevine Springs as a Botanical Area is grazing, particularly the use of Grapevine Springs canyon as a route to drive stock between the top of Big Bug Mesa and the Bootlegger pasture below. Having visited the area with the ranchers who use the allotment, I recognize that Grapevine is the only practical route between these two pastures. One advantage of Botanical area designation is that it does not require an 'all or nothing' approach to management; rather it identifies a management emphasis but permits flexibility in the management prescription for the area. I agree with your recommendation that the Grapevine Springs Botanical Area remain accessible as a trail route for livestock between these two pastures, but that it be removed from the actively grazed part of the allotment. (The interdisciplinary team initially analyzed this option for livestock management. They did not carry it through a final alternative because of the level of risk of failure and high monitoring costs above. This idea is best reflected in Alternative 2 which allows managed use of the riparian area, subject to use being curtailed if adverse effects pass acceptable levels.)

Prescott National Forest Friends Contact: "Grapevine Springs is a unique riparian area with a wonderful alder community and we fully support your efforts to designate it as a Botanical Area." (Alts 1,2,4)

Our primary concern is that the PNF continue to emphasize protection (and appropriate research) over public use. (Alts 1,2,3) While it may be appropriate to build a trail through the area to minimize informal trail creation, we urge the PNF to monitor resource conditions in the area. If public use is leading to un-acceptable impacts, public use of the area should be further restricted in favor of protection of the area and of the plant and animal species that call the area home. We hope you will include such a monitoring provision in any Forest Plan amendment you propose. (Alts. 1,2,4 and Monitoring Section)

In addition, we urge caution in the building of a trail down to Grapevine Springs from on top of Big Bug Mesa. Our concern is for the possibility of increased soil erosion from the development of a trail off the edge of the Mesa. (Alts. 1 & 2)

We ask that the use of the Botanical Area for driving cattle from the Bootlegger Unit to the top of the Mesa be monitored carefully to ensure that it is in compliance with the provisions of the Botanical Area designation and to ensure that the resources around the Springs are not unduly damaged." (Alts. 2 & 3)

Private Individual Contact: "I am encouraged by your desire to designate the Grapevine Springs area as a botanical area. I hope that this action will help preserve this very unique riparian ecosystem. (Alts. 1,2,4)

I wholeheartedly support any effort to protect this area from the ranchers and miners and I will offer my services to help implement any improvement you may have planned for the area. We, of course, are concerned for the security of our own property to the north of Grapevine Springs from hikers, campers and hunters who may wander by, so I hope that ANY new access to this area will be limited (NO ROADS!!!) and that camp fires will be prohibited." (Alt. 1)

Goswick Cattle Co. Contact, Big Bug Allotment: "I appreciate the opportunity to review the proposal for designation of 850 acres of the Grapevine Area of the Big Bug Allotment as a 'botanical area'. I thought the matter had been settled by Amendment No. 1 to the Big Bug Allotment Plan which was approved by you on 9-23-91 and 'agreed to' by me. The amendment states that 'The proposed fences east and south of Grapevine Springs will be reduced to riparian fencing from just above the fork of Grapevine Creek to roughly 2-3 mile downstream from Grapevine Springs. This fencing has already been done but on a smaller area. (Comments reflected in Alts. 2,3. Amendment #1, as well as Amendment #3 of the Big Bug AMP, can be superseded by a decision on the Grapevine Botanical Area since it is a decision subject to NEPA. A grazing permit modification may be necessary.)

I submit that the plant community is not unusual and the principal reason for the absence of the other co-dominants is microclimate which is controlled by elevation and topography. These co-dominant can be found at lower elevations of Grapevine Creek and similar streams. The Walnut-Alder Association is found on numerous sites in the Bradshaw mountains. Similar topographically and climatically to the Grapevine area. (The interdisciplinary team addressed the unusual character of Grapevine Creek in Part 1 of the EA. The view that Grapevine Creek does not merit designation is in Alt. 3, no action)

I suggest that because of AMP Amendment No. 1, discussion for the designation of the larger botanical area be delayed until the expiration date of the present term permit of the Big Bug Allotment, and that during this period, vegetation within the fenced area be monitored to determine whether complete protection from grazing results in beneficial changes in the riparian community. (Alt 3)

In the meantime we will carefully graze our cattle in accordance with the annual grazing schedules. We further recommend that bull grazing not be prevented in either the Grapevine or Bootlegger units. As you know, range bulls should not create safety problems for hikers." (Alt. 2 would remove the restriction on bull grazing found in the original 1990 AMP. This change was based on lack of reported or Forest Service-experienced conflicts since the original writing in 1990. Alt. 3 is no-action; the restriction would remain. Alts. 1 and 4 do not have grazing in the area.)