

ENVIRONMENTAL ANALYSIS REPORT

PLACEMENT OF THE BAR X, COLCORD,
YOUNG AND HAIGLER CREEK ALLOTMENTS
UNDER MANAGEMENT

PLEASANT VALLEY RANGER DISTRICT
TONTON NATIONAL FOREST
SOUTHWEST REGION
FOREST SERVICE - USDA

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errata: page 19 - add after 6th paragraph

The expected outputs of goods and services are expressed in standard service wide terminology as per FSH - Management Information Handbook, 1309.11 (9/20/77).

<u>Output</u>	<u>Quantity</u>
Improved Watershed Conditions (by 1990)	0 M Acres
Maintained Watershed Conditions (by 1990)	0 M Acres
Retrogussed Watershed Conditions	31 M Acres
Improved Water Quality to Meet Minimum Standards (by 1990)	NONE
Soil Resource Improvement	0 M Acres

errata: page 21

Improved Watershed Conditions (by 1990)	0 M Acres
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I. INTRODUCTION

The nature of the decision to be made is to select a management alternative which will correct the unsatisfactory resource conditions induced by long term overgrazing and poor management of the Bar X, Haigler Creek, Colcord and Young Allotments hereinafter referred to as the Bar X.

The current term grazing permit for the Bar X Ranch provides for 468 cattle yearlong and all of the yearling progeny for 10 months. Until December 31, 1977, 10 horses yearlong had been permitted by Free Use Permit. Beginning January 1, 1978, 10 horses are included in the term permit in lieu of 10 cattle. Each of the allotments and the respective term permit numbers are shown below by kind, class, and season of use.

<u>Number Of Livestock</u>	<u>Kind Of Livestock</u>	<u>Class Of Livestock</u>	<u>Kind Of Permit</u>	<u>Period Of Use From</u>	<u>To</u>	<u>Grazing Allotment</u>
188	Cattle	Adult	Term	1/1	12/31	Bar X
107	Cattle	Yearlings	Term	1/1	10/31	Bar X
35	Cattle	Adult	Term	1/1	12/31	Colcord
163	Cattle	Adult	Term	1/1	12/31	Young
75	Cattle	Yearlings	Term	1/1	10/31	Young
82	Cattle	Adult	Term	1/1	12/31	Haigler C
25	Cattle	Yearlings	Term	1/1	10/31	Haigler C

Severe overgrazing and poor management have depleted not only the range resource, but wildlife habitat, soils, and watershed quality. The Range Analysis update, completed in 1978 reflects the lack of resource capability to sustain the current system of management. Several resource specialists have prepared reports based on thorough on-the-ground investigation concerning conditions on the Bar X. These reports were incorporated into the 1978 Range Analysis to determine grazing capability and improve management practices required to correct existing resource condition problems.

Since the 1940's, range inspections and range resource evaluations have described deteriorating range and soil conditions on the Bar X, Haigler Creek, Colcord and Young Allotments. The 1966 Range Analysis indicated an estimated capacity of 2,532 animal unit months (50% less than the currently permitted numbers). Rather than force a reduction in AUM's, an intensive allotment management plan was attempted which included a grazing system, non-use for resource protection (approximately 890 AUM's) and extensive juniper eradication. The management plan failed, primarily due to the lack of forage sufficient to support the numbers grazed and the desirable vegetative community. It became necessary to allow the livestock to scatter throughout the allotment and graze pastures actually scheduled for rest under the attempted management system. The juniper eradication program consisted of pushing the juniper trees with a crawler tractor, piling and burning them. Under continued overstocking, range and soil conditions continued to deteriorate despite the

effort to manage and eradicate juniper. The non-use agreement for resource protection dated 1/15/68 was discontinued when the current permittee, Mr. Glenn Hamilton, acquired the ranch. Significant unauthorized livestock use occurred and was detected in 1975 (339 AUM's) during Mr. Hamilton's tenure as permittee. This factor tended to further aggravate the declining resource condition.

A review of data collected in the past and a comparison with resource data collected from 1971 to 1978 portrays a resource steadily deteriorating as a direct result of severe overstocking and poor management. As the quality of range and soil conditions decline, grazing capacity also dwindles. With continued reduced grazing capacity, grazing utilization of available forage effectively increases resulting in further resource depletion.

The management alternative selected will not only have an impact on natural resources, but may have social, economic and political ramifications.

Any management action taken which, of necessity, includes reducing the term number of livestock permitted to graze on National Forest Land may be met by resistance from the permittee, local community and the ranching community of greater Gila County and, possibly, the livestock industry at large in Arizona.

Implementation of any alternative viewed as "adverse" action against the term permit numbers on the Bar X may result in inquiries by the Congressional Delegation and State Legislators. A continuation of the current management and stocking level will ultimately result in an irreversibly depleted range resource incapable of supporting an economic livestock operation.

Resource conditions of the Bar X are believed to be in a state that will respond to rangeland improvement as a result of proper stocking adjustment and management, designed to arrest further deterioration and reverse the downward trend of the resource conditions. Adaptation and implementation of an alternative that will allow reversal of the deterioration process will result in a negative, short term impact on the Bar X permittee. In terms of long-term productivity, economic viability of the ranch will be improved through management geared to and resulting in an improved range forage base and sustained yield.

II. EFFECTED ENVIRONMENT

The Bar X Ranch is currently comprised of four grazing allotments: Bar X, Haigler Creek, Young and Colcord. These allotments have been combined into one ranch unit and managed as a single operation since 1973.

The Bar X is quite variable in topography and type of terrain. Approximately 30% of the area is rolling, gently undulating slopes broken by several, minor drainages and canyons. The remainder of the ranch is quite steep and rocky. Rock bluffs, outcroppings and 70% to 90% slopes are common along Haigler Creek and Naegelin Rim.

Vegetative types found on the allotments are as follows: (1) pinyon juniper, (2) ponderosa pine, (3) grassland, (4) chaparral, and (5) riparian.

The local climate on the Pleasant Valley Ranger District is characterized by mild summers and winters. The average annual precipitation is 19.37 inches (Effects of Domestic Livestock Grazing on Water and Soils Resources of the Bar X Allotment - 1977). The highest peak of effective growing season precipitation occurs during July through September. Spring moisture is important although to a lesser degree, and is received during March through May. The month of June is normally dry and very warm. Weather records at the Pleasant Valley Ranger Station (see appendix) indicate that the precipitation average during the period July through September is 8.0 inches.

Winter and spring moisture are very important in the physiological development of cool season grasses such as western wheatgrass (Agropyron smithii), muttongrass (Poa fendleriana), Kentucky bluegrass (Poa pratensis), bottlebrush squirreltail (Sitanion hystrix), and plains lovegrass (Eragrostis intermedia). Important browse species such as mountain mahogany (Cercocarpus brevifloris) and ceanothus (Ceanothus spp.) rely on winter and spring moisture for leader growth. The moisture received during the summer is utilized most efficiently by warm season grass species such as sideoats grama (Bouteloua curtipendula), blue grama (B. gracilis), hairy grama (B. hirsuta), cane beardgrass (Andropogon barbinodis) and Aristida hamulosa.

The majority of the rangeland on the Bar X is in poor range condition with a downward trend (see 1978 Bar X Range Analysis, Appendix). In addition, small areas of fair as well as very poor range condition may be found with a downward trend also in evidence on these areas. The woodland/grassland areas at the lower elevation zones (5500-5900 feet) are rapidly deteriorating under current stocking levels. A prolonged history of overstocking and unsatisfactory management has depleted the range resource to a very critical point. Nearly all desirable cool season grasses such as bottlebrush squirreltail, muttongrass, and western wheatgrass have been eliminated from the plant community. At present, most areas still have an existing seed source of some desirable warm season range plants such as blue grama, hairy grama and sideoats grama. Therefore, protection from overgrazing for an extended period of time will cause range condition to improve. The pine type is severely

depleted of all vegetative ground cover. Ground cover is not adequate, composed predominantly of ponderosa pine needle-cast (1978 Bar X Range Analysis and Bar X Soils Report 1978). Grass and desirable forb species within the pine type are overgrazed severely, resulting in a deteriorated plant community in terms of desirable species composition. Under extreme utilization, the desirable species such as Kentucky bluegrass, pine dropseed (Blepharoneuron tricholepis) and western wheatgrass have been drastically reduced in density which in turn has reduced total effective ground cover needed to prevent excessive sheet erosion.

The overall browse resource is in poor condition as evidenced by excessive hedging which is due to overuse by livestock of the desirable browse species. Steep slopes and areas which would normally be ungrazed with proper stocking are currently utilized extensively because of the lack of sufficient forage in more accessible areas.

Soils within the Bar X have been adversely effected. The excessive utilization of grass by livestock has resulted in a loss of plant vigor and grass plant die-off. On most soil units, effective ground cover is currently less than the amount required to protect the soil, allowing massive sheet erosion. A lack of vegetative cover allows extensive, rapid moisture run-off, causing sheet erosion and gully erosion. Livestock trampling has also caused soil compaction, compounding the run-off problem affected by over utilization of grass. Extensive run-off has reduced plant available moisture in the soil. Watershed conditions are evaluated in the Forest Hydrologist's report, Effects of Domestic Livestock Grazing on Water and Soils Resources of the Bar X Allotment - 1977 (Appendix) and in the 1978 Soils Report - Bar X, (Appendix).

Wildlife habitat has been damaged significantly by the removal of herbaceous plant cover. The decrease in forage production induced by continuous overgrazing has greatly reduced the required cover for viable populations of game and non-game species of wildlife. The near elimination of cool season grasses from the plant community in the woodland zone by domestic livestock grazing has resulted in habitat without the diversity of plant species needed. The limitation of plant diversity in turn limits the diversity of wildlife species to be found.

Deer and cattle are in direct competition for browse. This is especially evident in the pine type, but is also a concern in the lower elevation, woodland areas. Wildlife habitat conditions are described and analyzed in the Wildlife Habitat Analysis of the Bar X Allotment and Sheep Driveway - 1977, (Appendix).

III. EVALUATION CRITERIA

Each of the alternatives described will be evaluated using the goals and objectives specified in the Bar X Range Analysis and the goals set forth for range, wildlife, watershed and soils in the Tonto National Forest Mission Statement, 1977 (Appendix).

Tonto National Forest Mission Statement:

The Tonto National Forest Range resource goals, which reflect the recommended R.P.A. Goals, emphasize a program which will (1) bring the range resource under proper stocking, (2) correct unsatisfactory watershed conditions, and (3) provide forage without impairing land productivity to the extent benefits are commensurate with costs.

Long term goals for the four allotments comprising the Bar X Ranch are as follows:

1. Reverse the downward trend in range condition.
2. Meet the physiological growth requirements of desirable range forage species to improve range condition.
3. Improve and enhance wildlife habitat.
4. Improve aquatic habitat along perennial streams.
5. Improve deteriorated watershed condition through increased litter accumulation, grass plant density and reduction of soil compaction by livestock trampling and raindrop impact.
6. Improve soil condition by controlling soil erosion and arresting the expansion of vertic soil* through an increase in litter and vegetative cover (effective ground cover).

Management objectives to be attained within a 10 year period following implementation of an improved management system:

1. Increase desirable forage production on the areas suitable for grazing from the current average of 200 pounds per acre to 600 pounds per acre (300%).
2. Increase desirable forage plant density and effective vegetative ground cover in critical areas within the juniper and grassland type from the current 20% (vegetation + litter) to 40% (vegetation + litter).

*Vertic soils in this instance are Udorthentic Chromusterts. They are high in content of montmorillonitic clays, which have a tendency to shrink and swell (churning process) when unprotected by adequate vegetative cover or have the top soil horizon eroded away. The process usually precludes the establishment or maintenance of desirable bunchgrasses native to the area.

3. Regenerate desirable riparian vegetation, both woody and herbaceous species, along major stream courses (currently, there is little or no reproduction).
4. Arrest the expansion of vertic (churning) soils and allow possible reclamation of existing vertic areas (Soil Unit 68).
5. Improve desirable browse vigor and provide for establishment of seedlings.
6. Provide adequate herbaceous cover and food for indigenous wildlife needs.
7. Improve plant community composition by allowing desirable cool season and warm season grass species to become reestablished (bottlebrush squirreltail, western wheatgrass, muttongrass, cane beardgrass and plains lovegrass).

The tests used to evaluate the feasibility of the alternatives considered are professional judgments and assessments based upon range resource inventories, wildlife habitat inventories, watershed condition reports, soil resource inventories, established research projects, other established range management systems, and commonly recognized and accepted ecological principles and relationships.

IV. ALTERNATIVES CONSIDERED

The process used in formulating the alternatives contained herein is that established in the Allotment Analysis Handbook, Southwestern Region, USFS, which includes updating vegetative type map, range condition map and grazing capability map; development of various alternative management plans; remeasurement and analysis of 3-step transects; remeasurement and analysis of paced transects; conducting production-utilization studies; preparation of a wildlife habitat analysis; preparation of a soils analysis; preparation of watershed and hydrologic analysis.

The alternatives developed for consideration originate from two pre-dominant sources: (1) the 1973 Bar X Range Analysis and (2) a 1977 Management Proposal presented by Glenn Hamilton, Bar X Permittee.

The two alternatives (#1 and #2) presented by the 1973 Bar X Range Allotment Analysis are the products of an in-depth inventory and assessment of a broad spectrum of resources as influenced by current overgrazing on the allotment. Each is designed to provide for utilization of the productive potential of the land.

The third alternative is a modification of alternative #2 and merely eliminates capital investments as described in alternative #2.

Alternative #4 as proposed by the permittee, Mr. Hamilton, presents the stocking limits and management level that he is voluntarily willing to implement.

Alternative #5 provides a grazing capacity and management system that does not incorporate soils data in determination of grazing capability.

Alternative #6 was developed to indicate the predicated results and effects of disregarding the information provided by the 1978 Bar X Range Analysis.

V. ALTERNATIVE DESCRIPTION

Alternative 1

Close the Bar X, Haigler Creek, Young and Colcord Allotments to Grazing

The Soil Survey data indicates that under current management and stocking, effective ground cover has been reduced sufficiently to allow soil loss in excess of 5 tons per acre. This erosive condition is quite extensive and is found throughout the Bar X with few exceptions.

At present, the Bar X contains a total of 742 acres of Full Capacity* range. These acres are located primarily in soil unit 68 which contains 30% Udorthentic Chromusterts (Vertic Soils) and are essentially barren. This fragile soil condition warrants an allowable grazing use percentage of 20% in order to provide potential for improved plant vigor and litter accumulation. The estimated capacity for the Bar X, incorporating soils data and the Production-Utilization data from the 1973-75 studies, is 30 AUM's. Grazing 30 AUM's on the Bar X Allotments is considered neither physically nor economically feasible. The Full Capacity areas are widely scattered over the four allotments which comprise a gross area of 31,000 acres. Implementing the indicated stocking rate of 30 AUM's will, in effect, close the Bar X to grazing.

*Three categories of grazing capability are outlined in the Allotment Analysis Handbook R-3 1978; Full Capacity range is terrain which is presently stable because effective ground cover is holding soil loss to an acceptable level. Potential Capacity is terrain presently undergoing accelerated erosion because it does not have sufficient ground cover to protect the soil. Those soils have the potential to recover. No Capacity is terrain which is incapable of being grazed by domestic livestock on a sustained-yield basis under reasonable management goals.

After an extended period of no grazing, when adequate ground cover is accumulated to hold soil loss to an acceptable level, the areas currently classified as Potential Capacity (PC) range could be reclassified as Full Capacity (FC) range. This would allow the range to be opened to livestock grazing at a predetermined stocking rate, which would be of sufficient numbers to offer an economically prudent opportunity.

Alternative 2

Graze the Bar X, Haigler Creek, Young and Colcord Allotments with Numbers and Season of Use Specified by the Production-Utilization Studies with Additional Range Improvements - 210 AUM's (17 CYL).

Reduce stocking to 210 AUM's as determined by the Production-Utilization Studies conducted in 1973, '74 and '75 (17 cattle yearlong).

This alternative entails allocating capacity on those areas determined to be Potential Capacity areas. Selection of this alternative involves the risk of failing to reduce soil loss to an acceptable level (two tons per acre on most soils). (Bar X Soils Report - 1977 and 1978 Bar X Range Analysis.)

This alternative requires developing an on-the-ground implementation of an intensive grazing management system which goes beyond just meeting the physiological growth requirements of the existing grass plants. Actual forage utilization must be low enough to provide opportunities for grass seedling establishment, litter accumulation, an overall increase in desirable forage plant density, and an improvement in range condition.

The proposed management system in this alternative to be implemented on the Bar X is a variation of the Santa Rita Three Pasture System. The system provides for spring-summer rest two years out of three. Research at the Santa Rita Experimental Range near Tucson indicates that this system will provide the fastest range condition improvement and incorporates opportunities to provide rest for pastures during implementation of non-structural range improvement, (Responses of Semi-desert Grasses to Seasonal Rest, Martin, S. Clark - Journal of Range Management - May 1973, pg. 165-170.)

Since the Bar X, Haigler Creek, Colcord and Young Allotments have more than an adequate number of fences, pastures, and developed and natural stock waters, several units have been combined to provide three major grazing units of similar grazing capacity. These units are combined as follows:

- *Unit #1 - Bar X, Oxbow, West Hole and +Y
- *Unit #2 - Grasshopper, Windmill
- *Unit #3 - Dry Creek, Round Mountain, Steer

*See attached management plan map (appendix).

In the process of combining pastures and forming major grazing units, several livestock management benefits are provided. Each major grazing unit is composed of at least two pastures which will allow management alternatives such as bull pastures, weaning pastures, horse pastures, or specialized breeding pastures.

The proposed system of management would follow this grazing schedule:

Year (1)			Year (2)	
<u>Unit</u>	<u>Spring Summer</u>	<u>Winter</u>	<u>Spring Summer</u>	<u>Winter</u>
#1	Graze	Rest	Rest	Graze
#2	Rest	Graze	Rest	Rest
#3	Rest	Rest	Graze	Rest

Year (3)			Year (4)	
<u>Unit</u>	<u>Spring Summer</u>	<u>Winter</u>	<u>Spring Summer</u>	<u>Winter</u>
#1	Rest	Rest	Graze	Rest
#2	Graze	Rest	Rest	Graze
#3	Rest	Graze	Rest	Rest

The proposed system of management is not possible and will not produce the positive benefits needed unless stocking is drastically reduced. If the adjustment in numbers is prolonged over time, in excess of five years, another system may be needed in the interim period.

The proposed grazing system will accomodate several types of livestock management opportunities such as a cow-calf operation, a yearling operation (seasonally) or a cow-calf-yearling operation with only minor adjustments in livestock movement dates.

Non-structural range improvement on the Bar X is drastically limited by soil sensitivity and erosion hazard. Any proposed treatment of the range must not cause significant soil disturbance. Since most of the areas suitable for mechanical juniper control were treated in the late 1960's additional pushing or bulldozing juniper, chaining, cabling, or major soil scarification for seeding are all significant disturbances which the soil resource cannot tolerate. Vegetation manipulation must be limited to the following items: broadcast burning in the juniper and oak type upon accumulation of enough fine fuel to carry fire, broadcast burning in the grassland areas to maintain the grassland type, herbicidal treatment (by hand) of

alligator juniper (Juniperus deppeana), and broadcast seeding.

Proposed non-structural range improvement work includes:

(1) broadcast burning of 2,278 acres to maintain grassland-savannah and (2) juniper control on 574 acres. The proposed juniper control could be conducted via a Cooperative Agreement with the permittee to cut juniper with a chainsaw and remove all material over a three inch diameter from the site. Upon completion, each stump would be treated with an herbicide such as pelleted picloram to prevent re-sprouting.

Adequate structural range improvements exist on the allotment, but will require some heavy maintenance to ensure their effectiveness.

Alternative 3

Graze the Bar X, Haigler Creek, Young and Colcord Allotments with the Numbers and Season of Use Specified by the Production-Utilization Studies - 210 AUM's Without Additional Range Improvements (17 CYL).

This alternative is similar to alternative #2 with the exception that capital investments are not made to develop additional improvements.

The estimated grazing capacity is the same as in alternative #2 (210 AUM's) but through time, grazing capacity can be expected to decline as juniper invasion increases due to an absence of maintenance measures.

The proposed grazing system is identical to that proposed in alternative #2.

Additional structural range improvements such as water development and cross fencing are not needed. The implementation of the 1966 Bar X Management Plan provided for adequate water development and cross fencing. The existing improvements with maintenance will provide the opportunity for intensive range management under proper stocking.

Alternative 4

Permittee's Proposal - Bar X Range Management Proposal - 1977

This proposal (see appendix) involves reducing the base livestock herd to 200 cows and 16 bulls, improving livestock husbandry practices, eliminating yearlong carryover, developing a grazing rotation system and allowing the term grazing permit to remain as currently recorded, 468 cattle yearlong and 207 yearlings from January 1 to October 31. In addition to grazing 216 adult cattle yearlong on the Bar X, this alternative provides for grazing approximately 500 head of steers averaging four hundred pounds for five months (June 1 to October 31). The number of yearlings would be deter-

mined on an annual basis in "relation to feed availability and range condition".

The proposal by Mr. Hamilton does not present a specific grazing system or type of rotation. It does indicate the need to provide "periodic physiological rest to the forage species to initiate range improvement".

The alternative involves some erosion control work, earthen stock dam construction and pinyon-juniper control work, but costs and acreages involved are not illustrated (see appendix).

Alternative 5

Graze the Bar X, Haigler Creek, Young and Colcord Allotments with Numbers of Livestock and Season of Use Specified by the Production-Utilization Studies - 710 AUM's, Improved Management and Additional Range Improvements (59 CYL).

Soils data not utilized in determination of grazing capability.

Selection of this alternative involves a risk of failure, because grazing capacity is based on some areas identified as Potential Capacity and No Capacity sites in the 1973 Bar X Allotment Analysis as adjusted by the Bar X Soils Report 1978.

This alternative is similar to alternative #2 in that the grazing system and proposed non-structural range improvement program are identical. Adequate structural improvements exist on the allotment but will require some heavy maintenance to ensure effectiveness.

Alternative 6

Take No Action - continue the present stocking level, level of management. 468 CYL and 207 Yearlings 10 months.

The current grazing system provides yearlong rest in alternative years for the pine type ranges. Each pasture in the Woodland Zone is grazed during the year with a deferment system which provides seasonal deferment July through September for some pasture units. The current stocking rate is too high to enable implementation of a grazing system that will provide resource protection and a favorable adjustment of range condition and trend.

This alternative precludes any capital investments for structural and non-structural range improvement because the level of overstocking will pre-empt the possibility of successful implementation of any management system with respect to sustained yield resource production and protection and, hence, livestock production will eliminate itself over time.

VI. EFFECTS OF IMPLEMENTATION

Alternative #1 - Close to Grazing

Direct Effects

The "close to grazing" alternative will fulfill the goals and objectives outlined in the 1978 Bar X Range Analysis and meets the Tonto National Forest Mission Statement requirements. The primary alternative indicated in that analysis is closure to livestock grazing because of excessive soil loss currently occurring on 97% of the land within the Bar X. (See 1978 Bar X Range Analysis, and Bar X Soils Report - 1978.)

Watershed conditions, which are closely associated with soils condition, will respond positively through increased plant density and litter accumulation. The primary watershed problem is the lack of vegetative ground cover to protect the soil. (See Effects of Domestic Livestock Grazing on Soil and Watershed Conditions on the Bar X Allotment - 1978.)

Range condition will improve through improved plant vigor, improved species composition, improved species diversity, and increased plant density.

The wildlife habitat in the area will improve through increased herbaceous cover, browse availability, improved riparian conditions and increased herbaceous food production. (See Wildlife Habitat Conditions on the Bar X Allotments and Heber-Reno Sheep Driveway - 1977.)

The implementation of this alternative will result in an unavoidable adverse economic impact on the Bar X permittee through the elimination of cattle grazing on the Bar X as an income opportunity. Under current market conditions, the sale of livestock and the base property would nearly redeem the original investment in the ranch operation. This alternative will undoubtedly result in a loss of employment for one or possibly two people currently working on the Bar X.

Sociological impacts within the community of Young will be minimal with the exception that Forest Service - grazing permittee relationships may be strained.

A minor loss of income to the United States Treasury will result through lost grazing fees.

Selection of this alternative and it's subsequent implementation will provide the protection necessary to insure long-term productivity of the land. After a period of closure (approximately 20 years) to livestock grazing, when resource recovery has occurred, the area could be reopened to grazing under proper stocking and management.

This alternative does not irreversibly or irretrievably commit natural resources. Livestock grazing under any form or intensity will risk continued resource deterioration and possibly become an irreversible loss of the resource due to soil loss.

This alternative will result in several indirect effects, due to changes in the plant community, ie. increased plant density, species composition change.

As improved or enhanced wildlife habitat will result in an improved population of wildlife. increased herbaceous cover will result in an increase in rodent, jack rabbit, and cottontail rabbit populations. Other species of wildlife such as predatory mammals and raptors will increase in proportion to availability of prey.

An improvement in wildlife habitat and populations could result in improved recreational opportunities of hunting and wildlife observation.

The protection of riparian zones and upstream watersheds will result in improved cover and food for both fish and wildlife. As a result, Laigler Creek could once again become a significant fishery in this area providing increased recreational opportunities to the public.

Increased grass cover and subsequent accumulation of litter will result in a greater fire hazard. This effect is not considered an adverse effect in that the use of fire as a management tool may be desirable in some areas of the woodland zone. The accumulation of fine fuels in the woodland and grassland types will greatly improve opportunities for management and vegetation manipulation with fire. The pine type will not be affected by this alternative in terms of effects in fire hazard or buildup of fine fuels.

This alternative will not have an impact on timber resources, mineral resources or transportation systems. The Bar X does not contain any wilderness areas or areas inventoried in RARE II

Expected Outputs and Expenditures

The expected outputs of goods and services are expressed in standard service wide terminology as per FSH - Management Information Handbook - 1309.11 (9/20/77):

<u>Output</u>	<u>Quantity</u>
Improve Watershed Condition (by 1990)	31 M Acres
Maintained Watershed Condition	0 Acres
Retrogressed Watershed Condition	0 Acres
Grazing Use-Livestock (AUM's)	0 AUM's
Improved Water Quality to Meet Minimum Standards (by 1990)	7.8 M Ac.Ft. (es
Soil Resource Improvement	31 M Acres

This alternative does not require capital investments for implementation and would be considered cost effective from a public dollar investment stand point.

Alternative #2 - Graze with the Number of Livestock and Season of Use Specified by the Production-Utilization Studies with Additional Range Improvements - 210 AUM's (17 CYL) and Improved Management.

Direct Effects

Since this alternative requires that grazing capacity be assigned to Potential Capacity range, an unacceptable amount of sheet erosion may continue. Potential Capacity classification indicates a lack of effective ground cover to protect the soil from erosion. The use of soils data in the 1978 Bar X Allotment Analysis reflects the lack of good ground cover, and the very high probability of continued unacceptable soil loss through sheet erosion and gullyng under any grazing alternative.

Incorporating an allowable use figure of 20% forage utilization by weight on critical areas should provide for the physiological requirements of desirable forage plants and provide an opportunity for range condition improvement.

Wildlife cover will be improved over the existing situation by leaving 80% of the forage production; however, if sheet erosion continued because of a denuded watershed, aquatic habitat for wildlife and fisheries cannot be expected to improve, (Potential Capacity sites).

The goals and objectives considered in evaluation of this alternative will not be completely fulfilled through its implementation, although the possibility of limited long-term resource recovery does exist.

This alternative provides grazing capacity for 17 cattle on a year-long basis. Grazing 17 cattle on 31,000 acres of rugged, forested terrain may not be a prudent economic endeavor in regard to maintenance of improvements and labor requirements. The implementation of this alternative will result in an unavoidable adverse economic impact on the Bar X permittee through the elimination of cattle grazing on the Bar X as an income opportunity. Under current market conditions, the sale of livestock and the base property would nearly redeem the original investment in the ranch operation. The implementation of this alternative may result in a loss of employment for a resident ranch foreman.

Sociological impacts within the community of Young will be minor with exception that Forest Service-grazing permittee relationships may be strained.

Indirect effects anticipated from implementation of this alternative include some increase in populations of wildlife directly and indirectly dependent on herbaceous cover and/or food. Increased recreational opportunities such as hunting and wildlife observation could be expected.

Improved riparian conditions may result in increased fishing opportunities in Haigler Creek.

The possibility of increased grass cover will result in an increase of fine fuels. The accumulated fine fuels could be utilized in control burning to enhance rangeland productivity and control woody plant invasion.

This alternative will not have an impact on timber resources, mineral resources or transportation systems. Wilderness and inventoried RARE II areas are not located in the four allotments.

Expected Outputs and Expenditures

The expected outputs of goods and services are expressed in standard service wide terminology as per FSH - Management Information Handbook, 1309.11 (9/20/77):

<u>Output</u>	<u>Quantity</u>
Improved Watershed Conditions (by 1990)	29 M Acres
Maintained Watershed Conditions (by 1990)	2 M Acres
Retrogressed Watershed Conditions	0 Acres
Grazing Use-Livestock (AUM's per year)	210 AUM's
Improved Water Quality to Meet Minimum Standards (by 1990)	Unknown
Soil Resource Improvement	29 M Acres

The capital investments included in the alternative are not cost effective (cost/benefit). The investment of each dollar invested yields a return of twenty-six cents (1.00/.26). The overall capital investment proposal in this alternative has an estimated net present worth of \$-40,700. The calculations were based on a \$5.00 value of an AUM with a 10% discount rate. A detailed cost effectiveness analysis for this alternative is contained in the 1978 Bar X Range Analysis.

Since the 1978 Bar X Range Analysis and Bar X Soils Report indicate that most of the Bar X is not capable of sustained grazing without risk of further excessive soil loss, long-term productivity may decline as a result of the implementation of this alternative.

The continuation of livestock grazing on the Bar X under any intensity will risk continued resource degradation and possibly become an irreversible resource loss due to the probability of continued, excessive soil loss.

Alternative #3 - Graze the Bar X, Colcord, Young and Haigler Creek Allotments with the Number of Livestock and Season of Use Specified by the Production-Utilization Studies Without Additional Range Improvements - 210 AUM's (17 CYL) and with Improved Management.

Direct Effects

The initial effects of implementation of this alternative will be nearly identical to those described in the evaluation of Alternative number two. However, two major differences are inherent:

1. The lack of control of juniper invasion on 574 acres will most likely retain range condition in the poor category.
2. A prescribed burn of 2,278 acres was proposed in alternative number two in order to control future juniper invasion. Without this control work, range condition, forage productivity and grazing capacity may diminish. The use of herbicides currently appears to be very limited because of possible adverse environmental impacts. These possible effects are assumptions based on the apparent plant community successional stage found in the general area of Young. The two basic assumptions are: (1) overgrazing has reduced the

grass plant community's ability to "out compete" woody plant invasion and (2) the absence of fire in recent time (1880 through 1978) has allowed juniper to invade more rapidly with the reduced grass plant competition. As discussed in the effect of implementation of alternative number two, a high risk of unacceptable soil loss will be expected with the implementation of this alternative. The conclusion is based on the empirical model developed from the Universal Soil Loss Equation program utilized in the Bar X Soils Report

This alternative will result in a short term loss of cattle based income opportunity on the lands involved.

Indirect effects anticipated from implementation of this alternative are similar to those identified in alternative number two. These include, possible increase in wildlife populations, improved fisheries, and subsequent improved recreational opportunities.

The anticipated increase in grass cover will result in increased fine fuels to carry fire.

This alternative will not have an impact on timber resources, mineral resources, transportation systems, wilderness resources or inventoried roadless areas.

Expected Outputs and Expenditures

The expected outputs of goods and services are expressed in standard service wide terminology as per FSH - Management Information Handbook 1309.11 (9/20/77):

<u>Output</u>	<u>Quantity</u>
Improved Watershed Conditions (by 1990)	29 M Acres
Maintained Watershed Conditions (by 1990)	1 M Acres
Retrogressed Watershed Conditions (by 1990)	1 M Acres
Grazing Use-Livestock (AUM's per year)	210 AUM's
Improved Water Quality to Meet Minimum Standards (by 1990)	Unknown
Soil Resource Improvement	28 M Acres

The prediction is based on the assumption that juniper canopy cover can be expected to increase approximately 15% in the future and thereby reduce forage production by a similar proportion. (Paulsen, H.A., USDA Forest Service, Research Paper RM-154, 1975.)

Long-term productivity may be expected to decline as a result of implementation of this alternative because of a gradual decline in forage productivity and very possible, continued, excessive soil loss.

The continuation of livestock grazing on the Bar X under any intensity will risk continued resource degradation and possibly become an irreversible resource loss due to the probability of continued, excessive soil loss.

Alternative #4 - Permittee's Proposal - Bar X Range Management Proposal, 1977.

Direct Effects

The alternative as presented by Mr. Hamilton, represents a voluntary, temporary and flexible reduction in AUM's of 38%. However, the proposal states that the adjustment in stocking would not be reflected in an adjustment of livestock numbers in the Bar X, Colcord, Young and Haigler Creek term grazing permit. The implementation of this alternative will result in an unavoidable adverse economic impact on the Bar X permittee through the reduction of cattle grazing on the Bar X as an income opportunity. Under current market conditions, however, the sale of livestock and the base property could nearly redeem the original investment in the ranch operation, if the permittee elected to do so.

The proposed reduction in grazing use is not nearly enough to allow accomplishment of any of the goals and objectives specified in the allotment analysis. In addition, the use of convenience non-use to develop flexible stocking rates (as proposed) does not provide the needed stability of numbers required to ensure that a reversion to maximum permitted numbers does not occur prior to a time when the resource condition has improved sufficiently to sustain this grazing use. Adaptation of convenience non-use in such cases is prohibited by Forest Service Regulations (FSM 2231.71 and 2231.72).

If the flexibility in stocking (yearlings) element of the alternative was eliminated, the Bar X would still be overstocked by 86%.

2592 AUM's (Proposed) - *30 AUM's = $2562 \div 30 = 85\%$

*Capacity derived from the Analysis

The grazing permit would remain over obligated by 235%.

Under this intensity of overstocking, continued excessive soil loss is inevitable with concomitant continued degradation of wildlife habitat and watershed deterioration and a continued downward trend in range condition. Forage production will continue to diminish resulting in a further decrease in grazing capacity as well as potent for resource condition recovery. As forage production decreases, livestock will tend to consume more of the desirable browse species intensifying the current competition with deer.

Plant community composition will deteriorate further by a gradual decline in density of decreaser species such as sideoats grama which is a preferred warm season grass.

As a consequence of top soil loss through sheet erosion, areas of vertic soil activity can be expected to expand; a phenomenon which may not be reversible in terms of less than 10,000 years.

This alternative will result in a deteriorated wildlife habitat which, in turn, will result in a declining wildlife population. This will further provide decreased recreational opportunities for hunter and wildlife observers. Further deterioration of aquatic habitat along Haigler Creek will result in decreased fish survival and decreased fishing opportunities.

This alternative will not affect fire management, transportation systems, wilderness or inventoried roadless areas, mineral resources and timber resources.

The unavoidable adverse effects resultant from implementation of this alternative are discussed in the Direct and Indirect Effects section.

Implementation of this alternative will sacrifice long-term productivity in favor of the short term grazing use. Potential land capability to support both grazing, wildlife, and other uses will continue to decline. Continuation of range, wildlife habitat, watershed and soil degradation by overgrazing will ultimately result in an irreversible and irretrievable loss of forage, wildlife, soil and water resources.

Alternative #5 - Graze the Bar X with Numbers of Livestock and Season of Use Specified by the Production-Utilization Studies - 710 AUM's (59 CYL) Improved Management and Additional Range Improvements - Soils Data not Utilized in Determination of Grazing Capability.

Direct Effects

Without the use of soils information in determination of grazing capability, the risk of continued excessive soil loss is extremely high. The grazing capacity in this alternative is not only allocated on Potential Capacity areas, but also on some No Capacity sites (up to 50% slopes). The information and data derived from the Soil Survey of the Bar X and adjoining Sheep Driveway indicates that stocking rates of this high level would allow continued deterioration of the watershed, continued excessive soil loss and, consequently, deteriorated aquatic habitat.

The effects of implementation are uncertain concerning reversal of the downward trend in range condition. Range condition will probably stabilize at the present condition class rather than improve substantially. Plant density and productivity will also probably stabilize at present levels. The regeneration of riparian vegetation and the arrestation of vertic soil activity will probably not occur. The very great possibility of adverse environmental impact indicates the amount of risk to be assumed upon implementation of this alternative.

Wildlife habitat and browse conditions should improve somewhat from implementation of this alternative. The predominant reason for improvement will be the rest from livestock grazing specified in the management plan. Herbaceous cover and food in the rested pasture will be available for wildlife use. By following the proposed grazing schedule and providing rest to certain pastures, actual use of available forage may be extremely heavy on grazed pastures. Extreme utilization (65%+) every third year may adversely affect watershed, soil and range conditions during and following this use.

The permittee's rejection of this alternative will undoubtedly be as intense as would be anticipated for the implementation of alternatives #1, #2, and #3. This alternative will result in a loss of short-term income opportunities compared to current opportunities with present livestock numbers; yet it presents a greater immediate appearance of optimism for sustaining a long-term, economic livestock opportunity as compared with the current status.

The 1978 Bar X Range Analysis and 1977 Bar X Soils Report indicate that continuation of high intensity grazing will allow current soil loss to continue at the projected rate of 5 to 20 tons per acre/per year.

Since the overall effects are uncertain or possibly negative for this alternative, indirect effects are even more difficult to project. A slight improvement in wildlife habitat should be reflected in wildlife populations and somewhat improved recreational opportunities. However, if soil erosion continues at an unacceptable level, aquatic habitat will remain in a degraded state.

The alternative will have minimal effects on fire management.

The expected outputs of goods and services are expressed in standard service wide terminology as per FSH - Management Information Handbook, 1309.11 (9/20/77).

<u>Output</u>	<u>Quantity</u>
Improved Watershed Conditions (by 1990)	0 Acres
Maintained Watershed Condition (by 1990)	15 M Acres
Retrogressed Watershed Conditions (by 1990)	15 M Acres
Grazing Use-Livestock (AUM's per year)	710 AUM's
Improved Water Quality to Meet Minimum Standards (by 1990)	0
Soil Resource Improvement	0 M Acres

The capital investments included in the alternative are not cost effective (cost/benefits) return on each dollar invested yields only twenty-six cents (1.00/.26). The overall capital investment proposal has an estimated net present worth of \$-40,700. The calculations are based on \$5.00 value of an AUM with a 10% discount rate. A detailed cost effectiveness analysis for this alternative is contained in the (1978 Bar X Range Analysis).

Since the 1978 Bar X Range Analysis and Bar X Soils Report indicate that most of the Bar X is not capable of sustained grazing without further excessive soil loss, long-term productivity may well decline as a result of the implementation of this alternative, the gradual loss of natural resources may in turn become both irreversible and irretrievable.

Alternative #6 - Take No Action - Continue Grazing at Present Stocking Level and Level of Management 7065 AUM's (468 CYL and 207 Yearlings 10 Months).

Direct Effects

Implementation of this alternative will allow continued accelerated resource deterioration. Range and wildlife habitat condition will continue to rapidly deteriorate. Soil and watershed conditions will also continue to rapidly deteriorate.

None of the evaluation criteria established will be fulfilled.

The major effect of implementation will be the continued massive soil loss due to sheet erosion. Effective ground cover can be expected to decrease. Soil losses projected by the Universal Soil Loss Equation Program will range from 5 tons per acre to over 20 tons per acre on most sites. Grazing capacity will decline at a faster rate because of plant die-off. As grass plants die off, cattle diets will shift to browse species such as turbinella oak, ceanothus, and mountain mahogany resulting in increased cattle-deer competition for forage. Even after grass availability has decreased drastically, livestock will continue to survive on woody vegetation and occasional annual species such as filaree (Erodium cicutarium) and Indianwheat (Plantago spp.). This shift in cattle diet from grass species to woody species has already begun and is becoming significant. Over time, with a decreasing diet, death loss and poor calf crops would decrease the economic viability of cattle ranching.

Deteriorated watersheds will undoubtedly yield low quality water.

Decreased plant cover will result in deteriorated wildlife and aquatic habitat and will be reflected in decreased recreational opportunities.

Unavoidable adverse effects are described in the Direct Effects section.

The expected outputs of goods and services are expressed in standard service wide terminology as per FSH - Management Information Handbook, 1309.11 (9/20/77).

<u>Output</u>	<u>Quantity</u>
Improved Watershed Conditions	0 M Acres
Maintained Watershed Conditions	0 M Acres
Retrogressed Watershed Conditions	31 M Acres
Grazing Use-Livestock (AUM's per year)	7065 AUM's
Improved Water Quality to Meet Minimum Standards (by 1990)	None
Soil Resource Improvement	0 M Acres

The extreme overstocking involved in this alternative precludes capital investment in range improvements.

This alternative places a short-term use (grazing) as a priority over long-term productivity (sustained yield). Long-term productivity will decline rapidly and as a result will, over time, preclude further grazing and other beneficial uses of the range resource and National Forest Lands involved.

The continuation of present management and overgrazing will over a short period of time irreversibly and irretrievably destroy the range resource due to excessive plant and soil loss.

VII. EVALUATION OF ALTERNATIVES

The six alternatives present a broad spectrum of options and management direction. The permittees proposal (Alternative #4) and the "take no action" (Alternative #6) alternatives are quite similar in that they are both environmentally unsound management proposals. Alternative #4, even with modification by eliminating the option of variable stocking with yearlings, will result in continued environmental degradation.

The "take no action" alternative (#6) provides no opportunity for resource improvement, rather it will allow accelerated resource deterioration to proceed to a point where the land's capability to sustain grazing, wildlife, watershed values and overall long-term productivity is lost.

SUMMARY OF ENVIRONMENTAL EFFECTS OF THE VARIOUS ALTERNATIVES

Evaluation Criteria	Alt. #1 Close to Grazing	Alt. #2-210AUM Capacity based on Full Capacity plus Potential Cap. Range + R. Impts.	Alt. #3-210AUM Capacity based on Full Cap. plus Potential Cap. range-No impts.	Alt. #4-Per- mittee Proposal Variable stock- ing rates.	Alt. #5-710AUM Capacity based on FC, PC and No Capacity sites.	Alt. #6 Full No Action 7005 AUM
Goals-						
Reverse downward trend in range condition	3	3	2	0	1	0
Meet physiological growth req. of forage species to improve range condition.	3	3	2	0	1	0
Improve and enhance wildlife habitat	3	2	2	0	2	0
Improve aquatic habitat	3	2	2	0	1	0
Improve watershed conditions	3	2	1	0	0	0
Improve soil conditions & reduce erosion	3	1	0	0	0	0
Objectives-						
Increase forage production by 400 lb/a	3	2	2	0	1	0
Increase forage plant density to 40%	3	2	1	0	1	0
Regenerate riparian vegetation	3	2	2	0	1	0
Forest expansion of vertic soils	3	1	1	0	1	0
Improve browse conditions	3	2	2	0	2	0
Provide herbaceous cover & food for wildlife	3	2	2	0	2	0
Improve plant community species composition	3	1	1	0	0	0
Total	39	25	20	0	13	0

Key: 3 = Totally satisfies evaluation criterion
 2 = Partially satisfies evaluation criterion
 1 = Effect uncertain or no effect
 0 = Negative effect or continued degradation

VIII. IDENTIFICATION OF THE PREFERRED FOREST SERVICE ALTERNATIVE

The Forest Service preferred alternative is Alternative #5, the alternative which provides 710 AUM's based on Production-Utilization Studies conducted from 1973 to 1975.

This alternative presents some opportunity for resource improvement, but involves some degree of risk in that some established resource management objectives and goals may not be met. Grazing 710 AUM's under improved management represents the upper limit of grazing pressure that the range resource can perhaps withstand without further degradation while maintaining grazing as one of the uses of the land.

Implementation of this alternative will most likely be met with resistance by the grazing permittee as would selection of any alternative other than the permittee's own proposal (Alternative #4) or Alternative #6.

IX. MANAGEMENT REQUIREMENTS AND CONSTRAINTS

The Bar X, Young, Colcord and Haigler Creek term permit number 12-429 will be reduced to 710 AUM's (59 CYL). The reduction in permitted livestock will be accomplished in annual increments with 20% of the current term numbers being removed per year via the following schedule.

Year 1	468 Cattle	1/1 to 12/31
	207 Yearlings	1/1 to 10/31
Year 2	374 Cattle	1/1 to 12/31
	166 Yearlings	1/1 to 10/31
Year 3	280 Cattle	1/1 to 12/31
	125 Yearlings	1/1 to 10/31
Year 4	186 Cattle	1/1 to 12/31
	84 Yearlings	1/1 to 10/31
Year 5	92 Cattle	1/1 to 12/31
	43 Yearlings	1/1 to 10/31
Year 6	59 Cattle	1/1 to 12/31

A management plan will be developed and implemented utilizing the following basic management direction and guidelines.

The proposed management system in this alternative to be implemented on the Bar X is a variation of the Santa Rita Three Pasture System. The system provides for spring-summer rest two years out of three. Research at the Santa Rita Experimental Range near Tucson indicates that this system will provide the fastest range condition improvement and incorporates opportunities to provide rest for pastures during implementation of non-structural range improvement, (Response of Semi-desert Grasses to Seasonal Rest, Martin, S. Clark - Journal of Range Management - May 1973, pg. 165-170).

Since the Bar X, Haigler Creek, Colcord and Young Allotments have more than an adequate number of fences, pastures, and developed and natural stock waters, several units have been combined to provide three major grazing units of similar capacity. These units are combined as follows:

- *Unit #1 - Bar X, Oxbow, West Hole and +Y
- *Unit #2 - Grasshopper, Windmill
- *Unit #3 - Dry Creek, Round Mountain, Steer

In the process of combining pastures and forming major grazing units several livestock management benefits are provided. Each major grazing unit is composed of at least two pastures which will allow management alternatives such as bull pastures, weaning pastures, horse pastures, or specialized breeding pastures.

The proposed system of management would follow this grazing schedule

Year (1)			Year (2)	
<u>Unit</u>	<u>Spring Summer</u>	<u>Winter</u>	<u>Spring Summer</u>	<u>Winter</u>
#1	Graze	Rest	Rest	Graze
#2	Rest	Graze	Rest	Rest
#3	Rest	Rest	Graze	Rest
Year (3)			Year (4)	
<u>Unit</u>	<u>Spring Summer</u>	<u>Winter</u>	<u>Spring Summer</u>	<u>Winter</u>
#1	Rest	Rest	Graze	Rest
#2	Graze	Rest	Rest	Graze
#3	Rest	Graze	Rest	Rest

*See attached Management Plan Map (appendix)

The proposed system of management is not possible and will not produce the positive benefits needed unless stocking is drastically reduced. If the adjustment in numbers is prolonged over time, in excess of five years, another system may be needed in the interim period.

The proposed grazing system will accomodate several types of livestock management opportunities such as a cow-calf operation, a yearling operation (seasonally) or a cow-calf-yearling operation with only minor adjustments in livestock movement dates.

Non-structural range improvement on the Bar X is drastically limited by soil sensitivity and erosion hazard. Any proposed treatment of the range must not cause significant soil disturbance. Since most of the areas suitable for mechanical juniper control were treated in the late 1960's, additional pushing or bulldozing juniper, chaining, cabling, or major soil scarification for seeding are all significant disturbances which the soil resource cannot tolerate. Vegetation manipulation must be limited to the following items: broadcast burn in the juniper and oak type upon accumulation of enough fine fuel to carry fire, broadcast burning in the grassland areas to maintain the grassland type, and possibly herbicidal treatment (by hand) of alligator juniper, and broadcast seeding.

Proposed non-structural range improvement work includes: (1) broadcast burning of 2,278 acres to maintain grassland-savannah and (2) juniper control on 574 acres. The proposed juniper control could be conducted via fuelwood removal projects. (See attached cost benefit analysis.)

Visual resource and cultural resource input along with rare and endangered plant consideration will be requested in the development of project plans.

Adequate structural range improvements exist on the allotment, but these will require some heavy maintenance to ensure their effectiveness.

The Heber-Reno Sheep Driveway is not included within the Bar X (4 Allotments) and will not be included in the management system as per Mogollon Rim Land Use Plan, 1977.

X. CONSULTATION WITH OTHERS

The following individuals and organization representatives were consulted concerning the resource problems on the Bar X: (Other than Forest Service specialists.)

Pete Jacoby	Range Management Specialist Extension Service University of Arizona Tucson, Arizona
Jack Davis	Area Game Manager Arizona Game & Fish Star Valley, Arizona
Mike Yeager	Regional Supervisor - R-5 Arizona Game & Fish Phoenix, Arizona
Gary Lamonica	Arizona Wildlife Federation Phoenix, Arizona
Steve Galliziolli	Research Director Arizona Game & Fish Phoenix, Arizona
Glenn Hamilton	Bar X Permittee Peoria, Arizona
Barry Freeman	Bar X Permittee's Management Consultant American Ag. International Tucson, Arizona