

ENVIRONMENTAL ASSESSMENT
FOR
PROPOSED COORDINATED RESOURCE MANAGEMENT
ON THE
YAVAPAI PROJECT AREA

Chino Valley Ranger District
Prescott National Forest

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I. PROJECT SCOPE

Purpose and need

In May 1990, Arizona Department of Environmental Quality(ADEQ), Soil Conservation Service(SCS), Chino Winds Natural Resource Conservation District, Cocopai Resource Conservation and Development Office, Dr. Fred Ruskin, and Prescott National Forest proposed to develop a demonstration area for best management practices for grazing on the Yavapai project area. The proposed demonstration area would be selected after coordinated resource management was developed for the area. Completion of coordinated resource management on the Yavapai Allotment is also a need in the Prescott Forest Plan.

Nature of the decision

The Chino Valley District Ranger, in cooperation with Yavapai Partnership and the Soil Conservation Service, will decide whether or not to approve a plan for coordinated resource management for the Yavapai Allotment area and whether or not to implement a demonstration area for grazing best management practices to minimize nonpoint pollution.

If adopted, the coordinated resource management plan will include:

- Number and location of wildlife, watershed, and range structural improvements such as fences, waters, and erosion control structures
- Modifications of existing structural improvements
- Number and location of wildlife, watershed, and range vegetation projects such as watershed restoration and fuelwood harvest
- Renewal of term grazing permit
- Livestock grazing treatment plan
- Demonstration area for grazing best management practices

The Prescott Forest Supervisor, in cooperation with Yavapai Partnership and the Soil Conservation Service, will decide whether or not to include the following in the plan for coordinated resource management for the Yavapai Allotment area if approved:

- Changes, if any, in use designations for roads and trails, schedule for reconstruction of roads and trails, and schedule for construction of new roads and trails
- Changes, if any, in road maintenance levels
- Road maintenance agreement
- Cooperative fire management agreement

Desired future condition

A model coordinated resource management plan is in place and is being implemented through the cooperative efforts of Yavapai Partnership, Soil Conservation Service, Arizona Game and Fish Department, Arizona Department of Environmental Quality, Forest Service, and many other interested publics and partners. The Demonstration Area for Grazing Best Management Practices is well known and is visited regularly by groups wishing to see an on the ground example of grazing treatments that support state water quality goals. Both the private and public land is managed with equal care and in an integrated fashion. Forest Plan and Yavapai Partnership goals and objectives are being

met. Management of the Yavapai area complements the Juniper Mesa Wilderness goals.

The Yavapai Partnership operation is a sound private business operation and a demonstration showplace for good cattle, horses, and land stewardship. Ungulate capacity has been increased and numbers are in balance. Cooperative road maintenance and fire management agreements have been implemented. A well signed transportation system is in place and meeting the need for both private and public access. Management and protection of cultural resources is provided in all project activities.

All land units show improving ecological health. Forest and Woodlands have a diversity of successional classes with robust understory communities. Grasslands are increasing in diversity of grasses, forbs, and shrubs. Alluvial bottoms, meadows, and other high productive areas have increasing ground cover, reduced soil erosion, rising water tables, and increasing organic matter.

Wildlife habitat needs are being met. Cover, forage, and water needs for emphasis species are being met for the population levels described in the Arizona Wildlife and Fisheries Comprehensive Plan. Threatened, Endangered, and Sensitive species habitat is improving.

Project objectives

1. Improve habitat capability for emphasis wildlife species including turkey, antelope, Abert squirrel, mule deer, elk, waterfowl, and band tail pigeon. Population goal for turkey is 150 birds on the project area. Mule deer goal is a population with a buck: doe ratio of 20:100 and a fawn:doe ratio of 45:100. Antelope goal is a population of 160 animals with a buck:doe ratio of 25:100 and a fawn:doe ratio of 35:100. Population goal for elk is 50 animals on the project area.
2. Improve ground cover around permanent water to a minimum of 50%. Increase aquatic occurrence to 50% of the edge of open water. Improve ecological status of riparian vegetation to 80% of potential.
3. Improve horizontal diversity of vegetation. Achieve a minimum of 50-60% of potential range site with an upward trend on Grassland/shrub areas. Obtain balanced diversity in Woodland equal to 25% early seral ecological status; 25% mid seral ecological status; 25% late seral ecological status; and 25% potential ecological status.
4. Increase distribution and dependability of available water sources for livestock and wildlife.
5. Improve economics of Yavapai Partnership operation.
6. Establish Grazing Best Management Practices and a Demonstration area which includes:
 - Meadow seeding and water distribution to increase productivity and ground cover.
 - Adding troughs, pipelines, and fences to increase dependable water, allow better distribution of livestock use and wildlife movement, and provide flexibility in scheduling grazing treatments.

- Treat Pinyon/Juniper to increase vegetative ground cover
 - Develop coordinated resource management plan.
 - Provide educational opportunities.
7. Maintain or improve habitat for potentially occurring Threatened, Endangered, and Sensitive species and non-game species including Ferruginous hawk, Lowland leopard frog, Canyon tree frog, tiger beetle, speckled dace, Arizona cliffrose, Murphy's agave, Ripley's buckwheat, Mearns sage, narrow headed and Mexican garter snake, Many leafed potentilla, Occult little brown bat, Spotted bat, and California leaf-nosed bat. Manage furbearers to provide recreational opportunities and allow predators to play their natural role in the ecology of the area.
 8. Maintain existing diversity in Ponderosa pine Forest and achieve at least 15% old growth.
 9. Increase law enforcement to prevent deprecative behavior.
 10. Validate road and trail use designations, reconstruction schedule, construction schedule, and road closure schedule that will serve public and private access. Validate maintenance levels and develop agreement for road maintenance.
 11. Identify cultural resources and protect from ground disturbing activities.
 12. Improve watershed condition by increasing ground cover to at least 50%. Reduce soil erosion on all lands with special emphasis on lands less than 15% slope. Provide for capture, storage, and safe release of precipitation.
 13. Develop cooperative fire management guidelines for both private and FS land.
 14. Bring all wildlife, watershed, and range structural improvements to acceptable standards
 15. Develop needed wildlife, watershed, and range structural improvements and remove unneeded structures.
 16. Locate land lines needed for project structural and nonstructural improvements.
 17. Manage grazing use by wildlife and livestock within carrying capacity and in accordance with Arizona Wildlife and Fisheries Comprehensive Plan.

Issues

A. Present wildlife habitat condition needs improvement across most of the area. Present habitat diversity may be inadequate to support management emphasis species. The Grasslands are predominately blue grama monoculture. The Pinyon/Juniper plant types, particularly on the mesa tops and on basalt soil types are dominated by uniform stands of minimum horizontal diversity. The Gambel Oak component is declining in the transition zone between ponderosa pine and woodland areas and is being removed in some areas.

Antelope fawning success is very low. Cover and other factors in area attributes need improvement to protect fawns from predation. There is also competition for forage which may be affecting the nutritional level for does and reducing fawning success.

Lack of forage, water, and vegetative cover, particularly during drought periods, is detrimental to all ungulates and turkey.

B. Habitat for Threatened, Endangered, and Sensitive plant and animal species may be affected.

C. Watershed condition needs improvement to reduce nonpoint source sediment and increase the capture, storage and safe release of precipitation on the watershed. Percentage of bare soil is high around waters, and other areas on slopes less than 15%. Some gullies are present in the bottoms due to lack of ground cover, poor installation of improvements, and lack of improvement maintenance. Some poorly located and maintained roads are causing soil erosion. Gully erosion on some Ponderosa Pine areas have resulted in meadows drying out.

D. Grazing management needs improvement. There is uneven and overutilization of forage in many pastures. Lack of dependable waters limit opportunity to schedule recovery rest treatments. Some structural improvements need maintenance and upgrading to meet standards.

E. Private and public access need improvement and coordination. Road Access Travel Management decision needs validation and revision as appropriate. The present use designation for the utility corridor needs review. Coordination of road maintenance is lacking.

F. The checkerboard landownership pattern affects public and private access, control of fuelwood cutting, coordination of road and trail management, fire management coordination, location and financing of range improvements, and overall land management coordination.

G. Law enforcement needs improvement including prevention of game violations, wood product poaching, ORV damage, theft and damage of private property, livestock poaching, and cultural resource damage.

II. ALTERNATIVES

Alternative development

Project scoping began on 5/29/90. The "Range Suitability" process developed in May 1990 in cooperation with Prescott National Forest Friends, Prescott Audubon Society, and other forest users was used to develop a map of the project area delineating Low, Moderate, and High grazing suitability as well as areas Unsuitable for grazing. As a result of scoping, the interdisciplinary team developed nine alternatives. Further work from 6/5- 7/26/90 expanded the alternatives until fourteen basic alternatives were determined. Seven of the basic alternatives considered demonstration areas in either the Big Chino or Trout Creek area making a total of nineteen alternatives. This was later reduced to a total of twelve alternatives by considering only the alternatives that included a demonstration area in the Big Chino area.

Alternatives dropped from detailed study

On 8/14/90, two alternatives were dropped since they duplicated other alternatives after adding both demonstration area options to the intensive management alternatives. Later alternatives including the Trout Creek Demonstration Area was dropped because it did not meet the goals and objectives of the cooperating landowner, it did not include a sufficient variety of grazing practices, did not allow for expansion in future years, and was not readily accessible for educational visits.

Alternatives considered in detail

Alternative A

This is the no action alternative which includes continuing with current activities with no change.

Fuelwood cutting would continue on private land at the current rate. Nonstructural vegetative treatments would not be scheduled on National Forest land.

Existing structural improvements would be retained but not upgraded to meet current standards. Development of selected pipelines and tricktanks would continue on private land.

Landownership pattern would remain the same. Project landlines would be needed for the private land fuelwood projects.

Current use and maintenance level designations for roads and trails would continue. Current maintenance, construction, reconstruction, and closure schedules would continue. A coordinated maintenance agreement would not be developed.

The whole project area is open to dispersed recreation use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

Current fire suppression strategies would continue with no coordinated fire suppression agreement.

Continue with current grazing permit which allows for 1810 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land. Continue with grazing strategies which are primarily continuous use with seasonal movement to the higher country in Turkey Creek and Pine Springs in the summer.

No Demonstration Area for grazing best management practices would be developed under this alternative.

Alternative B

This alternative excludes grazing from the National Forest sections. As a result the current private livestock enterprises would no longer be feasible and there would be the potential for alternate land uses including development for summer homes and other real estate ventures.

Fuelwood cutting for vegetative improvement might be discontinued on the private land. Nonstructural vegetative treatments would be scheduled on National Forest land as needed to maintain diversity for emphasis wildlife.

Existing structural improvements on private land might be abandoned except as compatible for real estate development. Key water developments and other needed structures on National Forest land would be developed and maintained for wildlife, watershed, and recreation. Property boundaries would need fencing to implement no grazing on National Forest land.

Landownership pattern would remain the same. Property landlines would need to be surveyed prior to fence construction.

Current use and maintenance level designations for roads and trails would change as alternate land uses including real estate development are implemented. Current maintenance, construction, reconstruction, and closure schedules would need to be replanned. A coordinated maintenance agreement would need to be developed with the alternate land use interests. There would be a need for reciprocal rights-of-way under this alternative.

The National Forest land would remain open to dispersed recreation use under this alternative subject to access across private holdings. Dispersed recreation use on private land would be curtailed as alternate land uses including development are implemented.

Current fire suppression strategies would need to be replanned to account for the additional interface with developed private land.

No Demonstration Area for grazing best management practices would be developed under this alternative.

Alternative C

This alternative considers only those items specifically scheduled in the Prescott National Forest Plan.

Fuelwood cutting would continue on private land at the rate determined to be compatible with wildlife diversity needs. Up to 770 acres of Pinyon/Juniper retreatment and 431 acres of Pinyon/Juniper fuelwood sales will be scheduled on National Forest land where needed to provide for wildlife diversity needs.

Existing structural improvements will be upgraded to meet current standards. There is no investment in additional structures.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would need to be surveyed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would continue. Current maintenance, construction, reconstruction, and closure schedules would continue. A coordinated maintenance agreement would not be developed.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

Current fire suppression strategies would continue with no coordinated fire suppression agreement.

Livestock would graze in the Cienega, New Water, and Summer/Winter herd units. Each herd unit would use a modified deferred grazing system depending on forage availability, availability of water, accessibility, and wildlife needs. A term grazing permit would be issued which allows for 861 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land.

No Demonstration Area for grazing best management practices would be developed under this alternative.

Alternative D

This alternative considers those structural and nonstructural improvements associated with the Demonstration Area for grazing best management practices and other project objectives as well as those items specifically scheduled in the Prescott National Forest Plan.

Fuelwood cutting would continue on private land at the rate determined to be compatible with wildlife diversity needs. Up to 770 acres of

Pinyon/Juniper retreat will and 431 acres of Pinyon/Juniper fuelwood sales would be scheduled on National Forest land where needed to provide for wildlife diversity needs. Additional acreage of Pinyon/Juniper treatment or retreatment would be scheduled as needed to meet vegetation management objectives of the Demonstration Areas.

Existing structural improvements will be upgraded to meet current standards. Additional structures associated with the Demonstration Area would be scheduled for construction.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would be needed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would be changed as needed for the Demonstration Area. Current maintenance, construction, reconstruction, and closure schedules would change as needed for the Demonstration Area. A coordinated maintenance agreement would be developed as needed for the Demonstration Area.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

Current fire suppression strategies would continue with no coordinated fire suppression agreement.

Livestock would graze in the Cienega, New Water, and Summer/Winter herd units. Each herd unit would use a modified deferred grazing system depending on forage availability, availability of water, accessibility, and wildlife needs. A term grazing permit would be issued which allows for 939 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Alternative E

The theme of this alternative is to intensify management and investment in structural and nonstructural improvements to accomplish project objectives on the Demonstration area for grazing best management practices and other project objectives on sites capable of high herbaceous production.

Fuelwood cutting and other vegetation treatment would be scheduled on the Demonstration Area as well as on other highly productive sites where needed

to provide for wildlife diversity and other project objectives. Prescribed fire would be used if needed to meet project objectives. Existing structural improvements will be upgraded to meet current standards. Additional structures associated with the Demonstration Area as well as on other highly productive sites would be scheduled for construction.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would be needed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would be validated and changed as needed to meet private and public access needs. Current maintenance, construction, reconstruction, and closure schedules would be changed to reflect changes in use and maintenance level designations. A coordinated maintenance agreement would be developed for the Yavapai area.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

A coordinated fire suppression agreement would be developed.

Livestock would graze in the Cienega, New Water, Deep Well, and Summer/Winter herd units. The Cienega, New Water, and Deep Well herd units would use a best pasture rotation depending on forage availability, availability of water, accessibility, and wildlife needs. The Summer/Winter herd unit would use a deferred grazing system. A term grazing permit would be issued which allows for 1016 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Alternative F

The theme of this alternative is to intensify management and investment in structural and nonstructural improvements on the demonstration area for grazing best management practices and all other areas where project objectives can be met.

Fuelwood cutting and other vegetation treatment would be scheduled on the Demonstration Area and other areas where needed to provide for bio-diversity and other project objectives. Ignited prescribed fire would be used if needed to meet project objectives.

Existing structural improvements will be upgraded to meet current standards. Additional structures to meet project objectives would be scheduled for construction.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would be needed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would be validated and changed as needed to meet private and public access needs. Current maintenance, construction, reconstruction, and closure schedules would be changed to reflect changes in use and maintenance level designations. A coordinated maintenance agreement would be developed for the Yavapai area.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

A coordinated fire suppression agreement would be developed.

Livestock would graze in the Cienega, New Water, Deep Well, Sullivan, and Summer/Winter herd units. The Cienega, New Water, Deep Well, and Sullivan herd units would use a best pasture rotation depending on forage availability, availability of water, accessibility, and wildlife needs. The Summer/Winter herd unit would use a deferred grazing system. A term grazing permit would be issued which allows for 1170 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Alternative G

This is the same as Alternative F except ownership is consolidated by exchange with National Forest land to the south and private land to the north.

Fuelwood cutting and other vegetation treatment would be scheduled on the Demonstration Area and other areas where needed to provide for bio-diversity and other project objectives. Ignited prescribed fire would be used if needed to meet project objectives.

existing structural improvements will be upgraded to current standards. Additional structures to meet project objectives would be scheduled for construction.

Wildlife inventories and studies would be conducted as programmed and funded.

Current use and maintenance level designations for roads and trails would be validated and changed as needed to meet private and public access needs. Current maintenance, construction, reconstruction, and closure schedules would be changed to reflect changes in use and maintenance level designations. A coordinated maintenance agreement would be developed for the Yavapai area.

Livestock would graze in the Cienega, New Water, Deep Well, Sullivan, and Summer/Winter herd units. The Cienega, New Water, Deep Well, and Sullivan herd units would use a best pasture rotation depending on forage availability, availability of water, accessibility, and wildlife needs. The Summer/Winter herd unit would use a deferred grazing system. A term grazing permit would be issued which provides for a variable number of 1170 cattle yearlong on the Yavapai Allotment which is grazed in conjunction with the private land.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Alternative H

This is the same as Alternative A except for adjustment of the stocking level to the 1979-1989 average level.

Fuelwood cutting would continue on private land at the current rate. Nonstructural vegetative treatments would not be scheduled on National Forest land.

Existing structural improvements would be retained but not upgraded to meet current standards.

Landownership pattern would remain the same. Project landlines would be needed for the private land fuelwood projects.

Current use and maintenance level designations for roads and trails would continue. Current maintenance, construction, reconstruction, and closure schedules would continue. A coordinated maintenance agreement would not be developed.

The whole project area is open to dispersed recreation use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

Current fire suppression strategies would continue with no coordinated fire suppression agreement.

Reissue a term grazing permit for 1070 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land. Continue with grazing strategies which are primarily continuous use with seasonal movement to the higher country in Turkey Creek and Pine Springs in the summer.

No Demonstration Area for grazing best management practices would be developed under this alternative.

Alternative I

This is the same as Alternative F except for excluding grazing in the Turkey Creek and West pastures. Selection of the pastures for grazing exclusion would be revised each year as determined by monitoring. Wildlife leave areas would provide an opportunity to monitor livestock rest treatments.

Fuelwood cutting and other vegetation treatment would be scheduled on the Demonstration Area and other areas where needed to provide for wildlife diversity and other project objectives. Ignited prescribed fire would be used if needed to meet project objectives.

Existing structural improvements will be upgraded to meet current standards. Additional structures to meet project objectives would be scheduled for construction. Fences to exclude grazing from wildlife leave areas would be constructed.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would be needed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would be validated and changed as needed to meet private and public access needs. Current maintenance, construction, reconstruction, and closure schedules would be changed to reflect changes in use and maintenance level designations. A coordinated maintenance agreement would be developed for the Yavapai area.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienega ranch facilities, and New Water ranch facilities.

A coordinated fire suppression agreement would be developed.

Livestock would graze in the Cienega, New Water, Deep Well, Sullivan, and Summer/Winter herd units. The Cienega, New Water, Deep Well, and Sullivan

herd units would use best practices including riparian availability, availability of water, accessibility, and wildlife needs. The Summer/Winter herd unit would use a deferred grazing system. A term grazing permit would be issued which allows for 1120 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Alternative J

This is the same as Alternative F except that all wildlife needs would be met before livestock grazing would be considered. This alternative would provide at least 8 inches of herbaceous cover in antelope fawning areas from April to June each year.

Fuelwood cutting and other vegetation treatment would be scheduled on the Demonstration Area and other areas where needed to provide for wildlife diversity and other project objectives. Ignited prescribed fire would be used if needed to meet project objectives.

Existing structural improvements will be upgraded to meet current standards. Additional structures to meet project objectives would be scheduled for construction. Fences to exclude grazing from wildlife reserve areas would be constructed. Waters would be developed in antelope fawning areas to provide at least 2 waters per square mile. Water would also be developed for turkey nesting areas to provide stable water from April to June.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would be needed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would be validated and changed as needed to meet private and public access needs. Current maintenance, construction, reconstruction, and closure schedules would be changed to reflect changes in use and maintenance level designations. A coordinated maintenance agreement would be developed for the Yavapai area.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

A coordinated fire suppression agreement would be developed.

Livestock would graze in the Cienega, New Water, Deep Well, and Summer/Winter herd units. The Cienega, New Water, Deep Well, and Sullivan herd units would use a best pasture rotation depending on wildlife needs. The Summer/Winter herd unit would use a deferred grazing system. A term grazing permit would be issued which allows for 796 cattle yearlong on the Yavapai Allotment which is 49% National Forest and 51% private land.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Alternative K

This is the same as Alternative E except for the management of the livestock operation under a Time Control Permit.

Fuelwood cutting and other vegetation treatment would be scheduled on the Demonstration Area as well as on other highly productive sites where needed to provide for wildlife diversity and other project objectives. Ignited prescribed fire would be used if needed to meet project objectives.

Existing structural improvements will be upgraded to meet current standards. Additional structures associated with the Demonstration Area as well as on other highly productive sites would be scheduled for construction. Additional electric fences may be used to subdivide grazing units to meet vegetation management objectives.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would be needed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would be validated and changed as needed to meet private and public access needs. Current maintenance, construction, reconstruction, and closure schedules would be changed to reflect changes in use and maintenance level designations. A coordinated maintenance agreement would be developed for the Yavapai area.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

A coordinated fire suppression agreement would be developed.

Livestock would graze in the Cienega, New Water, Deep Well, and Summer/Winter herd units. Each herd unit would be scheduled using a HRM biological plan and control chart. The term grazing permit would be

Alternative E. Initial stocking would be no greater than 1397 cattle yearlong for the Yavapai Allotment which is 51% private and 49% National Forest. Annual stocking would be determined by the Yavapai Strategic Team after review of current monitoring results.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Alternative L

This is the same as Alternative F except for the management of the livestock operation under a Time Control Permit.

Fuelwood cutting and other vegetation treatment would be scheduled on the Demonstration Area and other areas where needed to provide for wildlife diversity and other project objectives. Ignited prescribed fire would be used if needed to meet project objectives.

Existing structural improvements will be upgraded to meet current standards. Additional structures to meet project objectives would be scheduled for construction. Additional electric fences may be used to subdivide grazing units to meet vegetation management objectives.

Wildlife inventories and studies would be conducted as programmed and funded.

Landownership pattern would remain the same. Project landlines would be needed for the vegetation treatment projects.

Current use and maintenance level designations for roads and trails would be validated and changed as needed to meet private and public access needs. Current maintenance, construction, reconstruction, and closure schedules would be changed to reflect changes in use and maintenance level designations. A coordinated maintenance agreement would be developed for the Yavapai area.

The whole project area is open to dispersed recreational use except for the private holdings around the ranch headquarters, Cienaga ranch facilities, and New Water ranch facilities.

A coordinated fire suppression agreement would be developed.

Livestock would graze in the Cienega, New Water, Deep Well, Sullivan, and Summer/Winter herd units. Each herd unit would be scheduled using a HRM biological plan and control chart. The term grazing permit would be modified with the time control clauses and a backup plan as shown in Alternative F. Initial stocking would be no greater than 1397 cattle

yearlong for the ravar Allotment which is 51% private and 49% National Forest. Annual stock would be determined by the Ya. Pai Strategic Team after review of current monitoring results.

A Demonstration Area for grazing best management practices would be developed in either the Big Chino Watershed and would include the following improvements:

- 17.0 miles of pipeline with drinkers
- 10 Acre meadow improvement
- 927 Acres of Pinyon/Juniper treatment
- 25.5 miles of electric fence
- 8 wells with storage

Table 1. Alternative Comparison(continued)

Descriptive Category	G	H	I	Alternatives			Ref Doc #
				J	K	L	
Yavapai Part							
Economics:(B/C)	M/H	M/L	M/H	L/H	H/H	H/H	70
Law enforcement activity:	CURRENT	CURRENT	SLIGHT INCREASE	SLIGHT INCREASE	SLIGHT INCREASE	SLIGHT INCREASE	62
Fire mgmt strategy:	CURRENT HIGH	CURRENT HIGH	COOP AGRM	COOP AGRM	COOP AGRM	COOP AGRM	62
Visual Qual:	IMPACT	IMPACT	IMPACT	IMPACT	IMPACT	IMPACT	53
Dispersed rec opportunity:	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	53
Cost - \$M:							
FS	619	152	377	377	289	351	49,52,55,63
Permittee	65	22	65	65	65	85	64
ASCS	20	20	20	20	5	20	55
AGFD	6	6	6	6	6	6	66
Other	10	4	10	10	8	10	55
ADEQ	90	0	90	90	90	90	55

Table 1. Alternative Comparison(9/21/90)

Descriptive Category	Alternatives					
	A	B	C	D	E	F
M acres with perm water for:						
large wildlife	80	10	88	91	101	101
small wildlife	9	5	24	40	43	47
livestock	88	00	88	91	96	101
New / Reconstructed structural improvements:						
Miles fences	0	0	0	0	9	17
# waters	1	0	1	8	16	20
# water spread	0	0	5	5	5	5
# erosion str.	0	0	4	4	4	4
Acres non-structural improvements:						
Erosion con	0	0	0	462	462	462
Seeding	0	0	0	6000	6030	6030
Veg treatment	6489	0	530	1457	3154	4529
Roads:						
Miles/sq mile	.07	2.63	.07	1.07	1.07	1.07
Miles open	220.79	83.67	220.79	40.96	40.96	40.96
Miles closed	33.80	N/A	33.80	6.35	6.35	6.35
Pvt access	83.67	83.67	83.67	40.96	40.96	40.96
Maint	0	0	0	0	0	0
Miles trails:	25.65	15.65	25.65	25.65	25.65	25.65
Miles of proj land line:	0	304	6	6	6	16
Landownership pattern:	CHECK	CHECK	CHECK	CHECK	CHECK	CHECK
M AUM livestock stocking rate:	29	0	14	14	16	19
Grazing system:	CYL	NONE	CYL	BP-C	BP-R	BP
M AUM total carrying cap:						
Current	24	24	24	24	24	24
Potential	16	27	24	24	24	24
M AUM total use:	26	41	18	19	20	23

TABLE 1. ALTERNATIVE COMPT ISOD (CONTINUED)

Descriptive Category	A	B	C	D	E	F
Yavapai Part Economics: (B/C)	<u>H/L</u>	<u>L/L</u>	<u>L/L</u>	<u>L/M</u>	<u>M/M</u>	<u>M/H</u>
Law enforcement activity:	CURRENT	INCREASED	CURRENT	CURRENT	SLIGHT INCREASE	SLIGHT INCREASE
Fire mgmt strategy:	CURRENT HIGH	INCREASED RISK HIGHEST	CURRENT LOW	CURRENT MEDIUM	COOP AGRM MEDIUM	COOP AGRM HIGH
Visual Qual:	IMPACT	IMPACT	IMPACT	IMPACT	IMPACT	IMPACT
Dispersed rec opportunity:	HIGH IMPACT	HIGHEST IMPACT	LOW IMPACT	MEDIUM IMPACT	MEDIUM IMPACT	HIGH IMPACT
Cost - \$M:						
FS	<u>77</u>	<u>368</u>	<u>109</u>	<u>204</u>	<u>279</u>	<u>377</u>
Permittee	<u>20</u>	<u>0</u>	<u>20</u>	<u>45</u>	<u>45</u>	<u>65</u>
ASCS	<u>20</u>	<u>0</u>	<u>20</u>	<u>5</u>	<u>5</u>	<u>20</u>
AGFD	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
Other	<u>4</u>	<u>0</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>10</u>
ADEQ	<u>0</u>	<u>0</u>		<u>90</u>	<u>90</u>	<u>90</u>

Table 1. Alternative Comparison(continued)

Descriptive Category	G	H	I	Alternatives J	K	L	Ref Doc #
M acres with perm water for:							
large wildlife	101	80	101	101	96	101	57
small wildlife	47	8	47	47	43	47	57
livestock	101	88	101	101	96	101	55
New / Reconstructed structural improvements:							
Miles fences	17	0	17	17	17	25	55
# waters	20	1	20	20	20	28	55
# water spread	5	5	5	5	5	5	64
# erosion str.	4	4	4	4	4	4	64
Acres non-structural improvements:							
Erosion con	462	0	462	462	462	462	63
Seeding	300	0	5000	6030	6030	6030	57
Veg treatment	4529	6489	6489	4529	3154	5429	51
Roads:							
Miles/sq mile	1.07	1.07	1.07	1.07	1.07	1.07	49
Miles open	40.96	40.96	40.96	40.96	40.96	40.96	49
Miles closed	6.35	6.35	6.35	6.35	6.35	6.35	49
Pvt access	40.96	40.96	40.96	40.96	40.96	40.96	49
Maint	0	0	0	0	0	0	49
Miles trails:	25.65	25.65	25.65	25.65	25.65	25.65	52
Miles of proj land line:	16	0	16	16	6	6	49
Landownership pattern:	CHECK	CHECK	CHECK	CHECK	CHECK	CHECK	52
M AUM livestock stocking rate:	19	17	18	13	22	22	56
Grazing system:	BP	CYL	BP	BP	TC	TC	47
M AUM total carrying cap:							
Current	24	24	24	24	24	24	56
Potential	24	20	24	24	24	24	56
M AUM total use:	23	21	22	17	20	23	56

Table 1. Alternative Comparison(continued)

Descriptive Category	G	H	I	Alternatives			Ref Doc #
	M/H	M/L	M/H	L/H	H/H	H/H	
Yavapai Part Economics:(B/C)	<u>M/H</u>	<u>M/L</u>	<u>M/H</u>	<u>L/H</u>	<u>H/H</u>	<u>H/H</u>	<u>70</u>
Law enforcement activity:	CURRENT	CURRENT		SLIGHT INCREASE	SLIGHT INCREASE	SLIGHT INCREASE	SLIGHT INCREASE
Fire mgmt strategy:	CURRENT	CURRENT	COOP ACRM	COOP ACRM	COOP ACRM	COOP ACRM	<u>62</u>
	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
Visual Qual:	IMPACT	IMPACT	IMPACT	IMPACT	IMPACT	IMPACT	53
Dispersed rec opportunity:	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	HIGH IMPACT	53
Cost - \$M:							
FS	<u>619</u>	<u>152</u>	<u>377</u>	<u>377</u>	<u>289</u>	<u>351</u>	49,52,55,63
Permittee	<u>65</u>	<u>22</u>	<u>65</u>	<u>65</u>	<u>65</u>	<u>85</u>	64
ASCS	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>5</u>	<u>20</u>	55
AGFD	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	66
Other	<u>10</u>	<u>4</u>	<u>10</u>	<u>10</u>	<u>8</u>	<u>10</u>	55
ADEQ	<u>90</u>	<u>0</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	55

IV. MITIGATIONS COMMON
TO
ACTION ALTERNATIVES

Parts of applicable chapters of the Soil and Water Conservation Practices Handbook have been pulled out for application on the Yavapai Ranch Allotment Management Plan.

22.1 Range Analysis, Allotment Management Plan, Grazing Permit System and Permittee Operating Plan

Objective: To manage rangelands through IRM and insure they are meeting Forest Land Management Plan objectives.

22.2 Controlling Livestock Numbers and Season of Use

Objective: Safeguard water and soil resources under sustained forage production utilization and managed forage utilization by livestock to maintain healthy ecosystems for all resource objectives.

22.3 Controlling Livestock Distribution

Objective: To manage sustained forage production and forage utilization by livestock while protecting soil and water resources and maintaining healthy ecosystems for wildlife and other resources.

22.4 Rangeland Improvements

Objective: To improve, maintain or restore range resources, including soil and water through the use of rangeland improvements.

22.5 Determining Grazing Capability of Lands

Objective: To maintain or improve soil stability, soil productivity, and water quality.

23.5 Protection of Water Quality within Developed and General Forest Recreation Areas

Objective: To comply with Federal and State water quality standards by regulating the discharge and disposal of pollutants.

23.6 Location of Pack and Riding Stock Facilities

Objective: To avoid unacceptable soil erosion loss and degradation of water quality from pack and riding stock facilities.

23.7 Management of Off-Road Vehicle Use

Objective: To manage Off-Road Vehicle (ORV) use to prevent unacceptable soil erosion and adverse effects on water quality.

23.8 Public Awareness

Objective: To comply with Federal and State water quality standards by enlisting public participation in the implementation of soil and water conservation practices directed at the impacts resulting from recreation use of the National Forests.

25.1 Watershed Restoration

Objective: To reduce the potential for nonpoint source pollution by improving hydrologic function, soil stability and soil productivity.

25.3 Protection of Wetlands and Riparian Areas

Objective: To avoid adverse impacts, including impacts to water quality, associated with disturbance or modification of wetlands.

25.5 Control of Activities Under Special Use Permit

Objective: To protect surface and subsurface water quality from physical, chemical, and biological pollutants resulting from activities that are under special use permit.

25.6 Water Quality Monitoring

Objective: To verify the effectiveness of Best Management Practices through the collection of representative water samples.

25.7 Soil Moisture and Wetland Limitations for Equipment Operation Vehicle Use

Objective: The objective of this measure is to prevent compaction, rutting and gullyling which may result in site degradation, sediment production, and turbidity.

25.8 Slope Limitations for Equipment Operation and Vehicle Use

Objective: The objective is to reduce erosion and associated sediment production by limiting equipment and vehicle use on steep slopes.

25.9 Revegetation of Surface Disturbed Areas

Objective: To comply with State and Federal water quality standards by minimizing soil erosion through the stabilizing influence of vegetative ground cover.

25.10 Contour Disking, Contour Furrowing, harrowing, Ripping and Contour Terracing

Objective: The objective of these practices is to reduce on-site soil losses and associated sediment production by reducing overland flow.

25.11 Evaluation of Cumulative Watershed Condition Effects

Objective: To protect the beneficial uses of water from adverse effects of multiple land management activities.

25.12 Soil Quality Monitoring

Objective: To assure that management practices do not allow significant or permanent impairment of the productivity of the land.

26.2 Control of Sedimentation from Wildlife Habitat Improvements

Objective: To minimize sediment production resulting from soil movement associated with construction of wildlife habitat improvement structures.

27.1 Water Resources Protection on Locatable Mineral Operations

Objective: To comply with State and Federal water quality standards and prevent water quality degradation by physical and chemical pollutants resulting from locatable mineral exploration, development, production, and associated activities.

27.4 Mined Land Reclamation

Objective: To reduce on-site soil loss to within tolerable soil loss limits and protect surface and groundwater quality from toxic substances through reclamation of mined lands.

31.1 Fire and Fuel Management Activities

Objective: To reduce public and private losses which result from wildfires and/or subsequent flooding and erosion, by reducing the frequency, intensity, and destructiveness of wildfire.

31.2 Consideration of Water Quality in Formulating Fire Response

Objective: To provide for water and soil resource protection while achieving management objectives through the use of prescribed fire.

31.3 Protection of Water Quality from Prescribed Burning Effects

Objective: To maintain soil productivity, minimize erosion, and prevent detrimental amounts of ash, sediment, nutrients and debris from entering water bodies.

41.1 Erosion Control Plan

Objective: To minimize erosion and sedimentation through effective planning prior to initiation of construction activities and through effective contract administration during construction.

41.2 Timing of Construction Activities

Objectives: To comply with State and Federal water quality standards.

41.3 Road Slope Stabilization

Objective: To prevent on-site soil loss from exposed cut slopes, fill slopes, and spoil disposal areas.

41.4 Dispersion of Subsurface Drainage from Cut and Fill Slopes

Objective: To minimize the possibilities of cut or fill slope failure and the subsequent production of sediment.

41.5 Control of Road Drainage

Objective: To minimize the erosive effects of concentrated water flows caused by road drainage features. To disperse runoff from disturbance within the road clearing limits. To lessen the sediment load from roaded areas. To minimize erosion of the road prism by runoff from road surfaces and from uphill areas.

41.10 Diversion of Flows Around Construction Sites

Objective: To ensure that all stream diversions are carefully planned. To comply with State and federal water quality standards. To restore stream channels to their natural grade, condition, and alignment.

41.11 Streamcrossings on Temporary Roads

Objective: To keep temporary roads from unduly degrading water quality, damaging streams, disturbing channels or impeding fish passage, so that State and Federal water quality standards are complied with.

41.15 Water Source Development Consistent with Water Quality Protection

Objective: To supply water for roads and fire protection while maintaining existing water quality. To comply with State and Federal Water quality standards.

41.16 Maintenance of Roads

Objective: To maintain roads in a manner which provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities (all of which can cause sedimentation and erosion).

41.17 Road Surface Treatment to Prevent Loss of Materials

Objective: To minimize sediment production and erosion from road surface materials. To comply with State and Federal water quality standards.

41.18 Traffic Control During Wet Periods

Objective: To reduce road surface disturbance and lessen sediment washoff from disturbed road surface.

41.20 Obliteration of Roads

Objective: To reduce sediment generated from un-needed roads, roads that run in streambeds and roads that are located in streamside management zones by closing them to vehicle use and restoring them to productivity.

Other mitigations common to all action alternatives.

No fuelwood activities will be conducted within .25 mile of deer fawning areas during the May and June.

One brush pile/acre will be left in fuelwood areas to provide cover for small game.

At least two down logs/acre with a minimum of 9" diameter and 8 feet long will be left in fuelwood areas as small mammal corridors and to retain sediment.

A minimum of 1 snag/acre plus an equal number of large green tree replacements will be left in fuelwood treatment areas with a minimum dbh of 9" and a minimum height of 10 ft.

Gates to water units will be left open in all pastures when cows are not present to provide easy access for wildlife.

All new fences constructed in antelope habitat will have a smooth bottom wire at least 18" off the ground.

All watering areas will be open to wildlife with appropriate escape ramps.

Any new riparian areas created by piping water from the cienaga spring and irrigation will be brought to full potential.

At the time of implementation of specific projects the Environmental Analysis will be reviewed to determine that it is up to date and that no further surveys need to be conducted for Threatened, Endangered, or Sensitive species.

No Gambel Oak will be removed to insure a healthy gambel oak component important to band-tailed pigeon and cavity nesters.

Alternatives

Criteria	A	B	C	D	E	F
% Potential of grassland:						
Around water	10	12	10	10	14	15
0-15% slopes	20	30	29	30	32	33
> 15% slopes	30	40	40	40	40	40
Aquatic habitat:						
% of occupied edge	44%	20%	59%	44%	75%	75%
Width - ft	10"	0	10"	0	0	0
Waterfowl quality	Poor	fair	poor	fair	fair	good
Riparian Potential:						
Ditch	Mod	Low	Mod	NA	NA	NA
Springs	Low	Mod	Low	Low	Low	Low
Woodland diversity:						
Acres early	17899	11377	11907	12834	13761	15136
% early	22%	14%	15%	16%	17%	19%
Acres mid	6453	6453	6453	6453	6453	6453
% mid	8%	8%	8%	8%	8%	8%
Acres late	Potential and late have been combined					
% late						
Acres pot	55097	61586	61056	60129	59202	59202
% pot	70%	78%	77%	76%	75%	75%
TES habitat:	decline	decline	maintain	maintain	maintain	improve
Habitat capability index:						
Deer Summer	.904	.906	.876	.874	.888	.859
Deer Winter	.986	.925	.954	.952	.979	.957
Elk Summer	.435	.471	.441	.442	.366	.491
Elk Winter	.866	.925	.882	.428	.931	.960
Antelope	.435	.352	.467	.465	.418	.407
Turkey Summe	.029	.029	.029	.029	.029	.031
Turkey Winte	.359	.417	.357	.360	.396	.409
Abert Squirr	.028	.028	.028	.028	.028	.030

Table 2. Wildlife criteria alternative comparison(continued)

Criteria	A	B	C	D	E	F
Population densities:						
Deer	low	high	med	med	med	med
Elk	low	low	low	low	low	low
Antelope	low	med	low	low	high/med	high/med
Turkey	low	med	med	med	med	med
Abert Sq	low	low	low	low	low	low
SCS habitat rating:						
Deer	.45	.63	.63	.63	.64	.69
Antelope	.42	.7	.53	.59	.59	.67
Antelope fawning area rating:						
poor	poor	poor	poor	good	good	good
Habitat capability:						
Band Pigeon	low	low	low	low	low	med
Raptors	low	low	low	med	med	med
PJ/snags	med	low	med	high	high	high
Pine snags	low	low	low	low	low	med
Fragmentation index:						
high	high	high	high	med	med	low
Cover/forage ratio:						
Big Chino WS	30/70	30/70	30/70	30/70	30/70	30/70
4 Trout Ck WS	44/56	50/50	50/50	50/50	50/50	50/50

Table 2. Wildlife criteria alternative comparison(continued)

Criteria	G	H	I	Alternatives	K	L	Ref
	J						Doc #
% Potential of grassland:							
Around water	15	10	15	15	25	25	58
0-15% slopes	33	20	33	33	35	40	58
> 15% slopes	40	33	40	40	42	42	58
Aquatic habitat:							
% of occupied edge	75%	44%	75%	90%	75%	75%	68
Width - ft	0	10"	0	0	0	0	68
Waterfowl quality	good	poor	good	good	fair	good	68
Riparian potential:							
Ditch	NA	Mod	NA	NAd	NA	NA	72
Springs	Low	Mod	Low	Mod	Low	Low	72
Woodland diversity:							
Acres early	15136	17866	15136	15136	13761	15136	68
% early	19%	22%	19%	19%	17%	19%	68
Acres mid	6453	6453	6453	6453	6453	6453	68
% mid	8%	8%	8%	8%	8%	8%	68
Acres late	Late and Potential are combined				—	—	—
% late					—	—	—
Acres pot	59202	55097	59202	57827	59202	57827	68
* pot	75%	70%	75%	73%	75%	73%	68
TES habitat:	improve	decline	improve	improve	maintain	improve	68
Habitat capability index:							
Deer Summer	.859	.904	.859	.859	.888	.859	68
Deer Winter	.957	.986	.957	.957	.979	.957	68
Elk Summer	.491	.435	.491	.491	.366	.491	68
Elk Winter	.960	.866	.960	.960	.931	.960	68
Antelope	.407	.435	.435	.407	.418	.407	68
Turkey Summ	.031	.029	.031	.031	.029	.031	68
Turkey Wint	.409	.359	.409	.409	.396	.409	68
Abert Sq	.030	.028	.030	.028	.028	.028	68

Table 2. Wildlife criteria alternative comparison(continued)

Criteria	G	H	I	J	Alternatives K	L	Ref Doc #
Population densities:							
Deer	med_	med_	high_	high_	med_	med_	_68_
Elk	low_	low_	low_	low_	low_	low_	_68_
Antelope	high/med	low	high	high	high/med	high/med	_68_
Turkey	med_	low_	med_	high_	med_	med_	_68_
Abert Sq	low_	low_	low_	low_	low_	low_	_68_
SCS habitat rating:							
Deer	.67	.46	.69	.83	.64	.83	_58_
Antelope	.67	.42	.69	.98	.72	.72	_58_
Antelope fawn bed rating:							
good_	poor_	good_	good_	good_	good_	good_	_68_
Habitat capability:							
Band Pigeon	med_	low_	med_	med_	low_	med_	_68_
Raptors	med_	low_	med_	high_	med_	high_	_68_
P/J snags	high_	med_	high_	high_	med_	high_	_68_
Pine Snags	med	low_	med_	med_	med_	med_	_68_
Fragmentation index:							
	low_	high_	low_	low_	med_	low_	_68_
Cover/forage ratio:							
Big Chino WS	30/70	30/70	30/70	30/70	30/70	30/70	_68_
Trout Ck WS	50/50	44/66	50/50	50/50	50/50	50/50	_68_

VI. WILDLIFE EFFECTS

Affected environment

The Yavapai Ranch offers a diverse geographic and vegetative habitat potential for wildlife. The key game species focused on in this analysis are: antelope in the open grassland savannahs, mule deer and quail in the pinyon/juniper and shrubs lands, and turkey, abert's squirrel, and elk in the ponderosa pine areas. Nongame species include waterfowl, raptors, cavity nesters, and Threatened, Endangered, and Sensitive (TES) species. Currently wildlife habitat is not at its potential and could be improved. Grass species are essentially a blue grama monoculture and cool season grasses are lacking. In some areas the woodland has a bare ground understory and in other it contains closely cropped forbs and grasses. The steep rocky areas are 30-40 % shrubs with an overstory of Utah juniper, Alligator juniper, and Pinyon Pine. Dominant shrubs include cliffrose, turbanella oak, apache plum, manzanita, mountain mahogany, and skunk bush.

The area of highest concern is the New Water area which presently supports a herd of 35-40 antelope. The range condition is currently rated as poor in this area due to the high density of annual plants and bare ground.

There are approximately 2,840 acres of fawning and fawn bed habitat in the area. Conditions in the area before the summer rains were heavily grazed with minimum adequate cover for fawn bedding. Grass ground cover varied from 70% to 0%. Forbs in some areas were non exsistant and in others were the only vegetation present. The dominant forbs were an annual salt bush, a rabbit brush, snakeweed and a london rocket. Only the saltbush is palatable to antelope. On the north end of the New Water area juniper seems to be encroaching and an old travel corridor is closing. Vegetation height was <8" or greater than 2 1/2'. Fawn bed vegetation is reccommended at a minimum of 8" and no greater than 2 1/2'.

Desired future condition may be: increased clumping of vegetation between 8" and 2 1/2 ', especially in areas within 1/2 mile of water, during the spring (March-May); increased forb production which are palatable to pronghorn; fences in the area to standard with a smooth wire on the bottom; water more available; increased habitat area by eliminating young juniper/pinyon in the area.

There are two other pronghorn antelope herds which use the Yavapai ranch, the high and lonesome herd and the atkins herd. Neither of these herd is dependent solely on the ranch. Fawning success rates are 17-20%. Fawning success for a healthy herd is 45-60%. Juniper pushes in these areas have limited access to them by pronghorn. Permanent water is scarce and unavailable to them.

Mule deer herds are declining along the east side of the ranch. This area is mostly pinyon juniper woodland with chaparral understory. Limiting factors appear to be limited and unavailable water sources and forage during critical times of their life history. This area also has potential for improvement for quail.

There is a series of pine stringer habitat throughout the south west portion of the ranch. This habitat is important for elk, turkeys, owls, bats and

raptors. The Pine spring Juniper mesa has a gamma oak, piñon juniper understory. Happy camp area is a more open habitat with a series of "meadows" and piñon, juniper, and grass understory. Within the Ponderosa Pine areas there is a decline of grass and ground cover in the openings which limits the turkey populations through lack of available seed sources at critical times. Areas for improvement would be to encourage a greater brush/oak understory, decrease erosion and repair riparian areas. (Especially Pine and Mud springs). Pine springs area should be managed for old growth and should be closed to all wood gathering.

Snags are limiting in the pine stringer habitat. Pine springs area is the highest at 1 snag/ acre and happy camp area has very few snags. This creates a lack of good habitat for cavity nesters, turkey roosts, and raptor perches.

Wet areas such as seeps and stock ponds are scattered throughout the area. There is virtually no associated vegetation in these areas. Waterfowl are scarce, aquatic vegetation and animal life are also low. For site specific information see reference document 68.

The following narratives discusses the direct, indirect and cumulative effects of each alternative.

Alternative A: Under this alternative management would continue as it is presently. Vegetation around water areas would be virtually non existant. Fuelwood harvesting would continue at the current rate of approximately 927 acres/year. No new waters would be constructed, the general range condition would decline and the current blue grama monoculture would prevail. More annuals would occur, and less cool season grasses and forbs would be available as forage.

Direct and indirect effects:

The lack of vegetation around water would offer no cover to waterfowl. Predation would increase on small game trying to water by coyotes and raptors. Since antelope does like to bed their fawns within about 1/4 mile of water fawn bed sites would be limited and predation would also continue to be a limiting factor in the success of the antelope herds. Water temperatures would increase with no shade. There would not be a constant input of organic matter to maintain the health of the aquatic vegetation or fauna. The cienaga ditch contains obligate riparian species but is closely grazed and dries as it reaches the stock tank. This would continue to serve as a bathing and drinking spot for birds, small mammals and reptiles.

Table 2 indicates that woodland diversity would be greatest under this alternative, however that is considering the age classes only and not the canopy cover. Most of the areas harvested would be the potential woodland with the closest canopy cover since fuelwood harvests would not be planned considering wildlife. This would diminish the limited amount of thermal cover existing for big game. Forage availability or quantity would not increase in harvested openings due to the stocking rate proposed. The woodland diversity is also only considering the woodland and not the open grasslands already existing on the ranch. South facing woodlands are used by turkeys in the winter. The harvesting of woodlands may decrease the

wintering habitat potential for the turkeys if these sites are harvested. Harvesting activities will temporarily displace deer and turkey and may disturb them during rut or fawning season. Hiding cover for small mammals may increase if slash is left on the ground or in piles in harvested areas.

Three different rating systems were used to evaluate the deer and antelope populations and two were used for the elk, turkey and abert's squirrel. For an explanation of what variables were considered and rated see ref. doc. . The numbers were derived considering the condition at the end of a seven year period. Basically it is expected that forage, available waters, and hiding, thermal, nesting, and fawn bedding cover will be limiting. Fences will continue to limit mobility of big game. This will reduce reproductive success, increase predation of weakened exposed young and increase mortality during severe weather occurrences.

Cumulative effects

Although road density will not change under each alternative, the cover available along the roads will change. In Alternative A it is expected that the only cover will be pinyon/ juniper in unharvested and previously harvested or pushed areas and pine and oak in the pine areas. The cover in the grasslands will be minimal due to heavy grazing pressure. The use along the roads can cause displacement to available cover or the next topographical feature. Road use will have the biggest impact on antelope, in the New Water area causing them to run to the next topographical feature.

The forbs and grasses will be mostly warm season and annuals. Antelope fawning cover will mostly be rabbit brush and snake weed. This will cause a poor nutritional level in the does during the critical last trimester of pregnancy. When range conditions are poor antelope will abort fetuses to maintain a population level comparable with the available forage conditions. With inadequate cover the young that are born will be quickly predated on by coyotes. The Department of Arizona Game and Fish have a predator control program in the area for the next three years. Last years attempt to improve fawn survival proved to be unsuccessful. With limited cover and poor forage availability it will probably continue to be ineffective. Since fences are limiting movement of antelope, the other herds outside the ranch will not easily intermingle with the New Water herd. It is expected that eventually the herd will reach a population level which is no longer viable and will die out. The herds on the east side of the ranch do not use only the ranch and will be minimally impacted by the loss of nutritional forage on the ranch assuming that other areas maintain sufficient forage to maintain them.

Deer herds are expected to diminish and become unhealthy from increased stress from lack of forage, extreme temperatures, long travelling distances to waters and being forced to use the less preferred habitat for fawning. Fuelwood harvests will further produce stress from increased noise, dust and activity in deer habitat.

Raptor species diversity will probably be limited to habitat generalists such as red-tailed hawks and turkey vultures. As grass cover is limited prey is initially abundant and then declines. Habitat specialists such as the Ferruginous hawk and Goshawk hawk will not be able to maintain in an

area where prey in the specific environment is limited. The same is true of the cavity nesters. Few snags are available in unstricted areas. Therefore cavity nesters requiring large territories of undisturbed areas will not exist. Cavity nesters not dependent on specific types of snags such as the flicker will be more abundant.

The continued heavy grazing and increasing human population in the Chino Valley will continue to decrease the water table. Springs will run less and less water and seeps will dry up. This will eliminate the aquatic plants and insects the turkeys prefer to eat. It will also eliminate any possible riparian dependent species. The oak component will continue to decline due to fuelwood theft and a change in the water table. Species such as the band-tailed pigeon and spotted owl will be rare and decline with the oak component.

Fragmentation within the pine will not change by alternative. However, in the woodland the fragmentation will increase. Fuelwood will only be harvested on private land creating a checkerboard of woodland blocks of 640 acres. This could change the migration and travel corridors for wildlife.

Alternative B

In this alternative there would be no grazing. Although it is probable that the landowner would then section off and sell small ranchettes, this would not happen within the next seven years. Since reductions of permit numbers can be no more than 20%/year it is expected that it will take five years to implement no grazing on this allotment. No fuelwood harvest would occur and no new structures or structural improvements would be done.

Direct and Indirect effects:

A gradual decrease in permit numbers would improve ground cover and species composition of grasses. Vegetation around water would begin to increase which would improve the hiding and nesting cover for waterfowl. Once the cows were off waters would not be maintained and wells would not keep troughs full. This would reduce the amount and distribution of water available to wildlife. Fences would be changed to fence all Forest Service boundaries at Forest Service standards to allow mobility for big game. Turkey and quail population would be reduced to the areas where permanent water exists. The cienaga ditch would not be kept running. Habitat capability would increase for deer and turkey due to the improvement in forage and gradual increase in cool season grasses such as side oats grama, bluegrass and sitanian. Cover would be maintained since no fuelwood harvests would be conducted. At the end of the seven year period fawning cover for antelope would have increased along with nutritious available forbs. Increase human disturbance by surveyors, and prospective buyers would be offset by decreased activity by cowboys and cattle.

Cumulative effects:

Over time it is expected that the private sections would be sold off. This would dramatically increase road density and human activity. Wells would be drilled for each private ownership which would greatly lower the water table. The only permanent waters available for wildlife might be troughs for livestock. Seeps and springs would eventually dry up and with them a

decline in the turkey populations. Forest Service land probably would not have water available to use. The two wildlife trick traps would be maintained. Pine stands would be cut for housing sites, oak would be cut for firewood, and woodland would probably be cut for fuelwood and housing sites. Range condition on the private sections would be poor if people kept horses or a few cows on their ranchettes. Forest Service lands would not be grazed by cattle but would probably receive increased pressure from elk, deer, and antelope as the area is developed. The New Water herd would probably die out and the east side herds would move off of the ranch. Deer herds would maintain in the Forest Service lands and probably benefit from planted orchards on private lands.

Raptors would again be red-tailed hawks and turkey vultures. Snags would probably be felled for fire wood and to remove hazards along roads. A viable population of cavity nesters would not remain, however there would probably be an increase in birds adapted to more urban settings such as robins, jays and hummingbirds. There would be a large increase in dogs and cats to prey on the small mammals. Small rodents would probably increase with increased household food supplies.

Grasslands, woodlands, and pine stands would eventually be highly fragmented. The understories would probably be cut out and exotic plant species would be introduced. Animals dependent on large territories or multiple layered diverse stands would decline and disappear. The entire ecosystem would be drastically altered by planted species and habitat specific species would decline.

Alternative C

In this alternative the forest plan directive would be followed. This means that all existing structures would be brought to Forest Service standards. Fences in antelope habitat would have a smooth bottom wire 18" high. Fences in deer habitat would have a bottom wire of 16" high and the top wire would be no higher than 40". See ref doc. . for exact illustrations of fencing. All troughs would contain escape ramps for small game and be available for both wildlife and cattle. All gates at water lots would be left open when cows were not present to provide access for wildlife. In proposed fuelwood harvests 75 juniper snags/ 100 acres would be retained for cavity nesters. Ponderosa Pine would not be treated. Cows would be managed at a modified deferred grazing schedule. Stocking rates have been determined allowing for an increase in populations of big game to approximately half of potential. It would be about five years before stocking would reach the permit level. This would delay response time of the land to the reduced livestock impact. No new improvements would be installed.

Direct and Indirect effects

Under the modified deferred grazing schedule, bottomlands would be grazed heavier than steep rocky hillsides. Pastures may be grazed at the same time each year. This would include the turkey meadows in Happy Camp, the powerline meadow and the New Water area. There may or may not be an increase in cool season grasses such as sideoats and black grama.

The lack of availability of cool season grasses can lead to turkey populations dependent on seed head in the fall and green up in the spring. The spring forage is essential to survival of poult. The turkey nesting areas will have limited impact from the deferred grazing system because the cattle will be concentrated in the more open productive areas and turkey nests tend to be up on hillsides in areas with cover. However, they will graze in the open meadows and have better juvenile survival in pastures that are rested in the spring. This may not be the condition of important turkey areas under this alternative. The Mud springs fence will be repaired to maintain a wildlife trough. This will improve the availability of water in the area for turkeys and other birds and mammals.

Optimal antelope ranges are at a sub-climax which insures availability of a variety of annual and perennial forbs, cool and warm season grasses and low shrubs. During the last tri-mester of a does pregnancy it is important that plenty of nutritious forage is available in order to have a healthy fawn. During fawning season it is important that vegetation cover exists to hide fawns from predators. In this alternative a sub-climax condition will exist in the New Water area, however the variety of vegetation may not develop and cover may not be adequate during fawning season. The current trend of the antelope herds will continue with high predation and low reproductive success. Mobility will improve through the standardizing of fences and will improve the possibility that the herd will move off the ranch.

Deer populations may improve slightly as uplands will not be heavily impacted and with a reduction in herd number the browse availability will increase. However water will continue to be a limiting factor and the highly productive areas will be heavily grazed.

Cumulative effects

The largest change in this alternative in comparison to Alternative A is the decrease in stocking numbers. This will allow a lower risk factor in determining the reproductive success in all wildlife species. The stocking rates allow for an increase over time in big game populations. The deer are the most likely to benefit from the increased forage availability and improvement of fences. There will be more water sources available to antelope and small game through improvement of fences and escape ramps in water troughs.

The predation control program by the Arizona Department of Game and Fish will continue. Cover and forage may improve slightly in this alternative and in conjunction with the predator control program may improve fawning success slightly but not enough to act as a replacement factor and the herd will continue to decline just at a slower pace. The fawning areas in the New Water area will continue to get smaller as the pinyon and juniper come into the eroded areas and encroach into the grassland. Movement corridors will continue to grow in and the road coming into the New Water area will continue to displace antelope to the next topographical feature. The habitat capability for the Atkins well herd of antelope will continue to diminish as pinyon and juniper increase in the pushed areas.

There may be a slight increase in available prey for a raptor population due to livestock management, i snag retention. This increase is considered to be insignificant.

Pinyon and juniper snags will be retained in the fuelwood areas. The number retained are not sufficient to maintain a viable population of cavity nesters in the area due to the fact that deadwood gatherers will eventually take out all juniper snags left. The numbers of snags retained also do not compensate for snag replacement until such time as the stand can grow again.

The oak component will continue to decline at the current rate. Fragmentation of the woodlands will be low however grassland fragmentation will be high and fuelwood theft may create a fragmented woodland in some areas.

Alternative D

This alternative is similar to Alternative C except that a Best Management Practices Demonstration Area will be implemented in the Big Chino watershed. This will include additional water available through the drilling of two new wells and the piping of the cienaga ditch increased fencing and 927 acres of woodland treatment.

Direct and Indirect effects

The 927 acres of woodland treatment will be fuelwood harvests in late seral stage stand with a canopy of 40-70%. This will reduce the thermal cover in the area but will also diversify the 26050 acre stand by creating small openings and increasing grass and forb cover. It may increase deer use in the area but not significantly increase the habitat capability for the whole ranch.

The piping of the cienaga ditch will eliminate the riparian area associated with it. Species in this ditch are mostly sedges and watercress. No aquatic species were found to be living in the ditch. The ditch appears to be mostly used as a watering source and perhaps feeding area for birds and small rodents. The elimination of the ditch will be mitigated with drinkers however the associate vegetation will be gone. With the additional wells, pipelines and drinkers more water will be available in the area for wildlife. There will be an increase in ground disturbance and human impact with the installation of the improvements. As the area is a demonstration project there will be increased human activity in the area. This will displace deer during times of activity. Ten acres of meadow will be planted and irrigated. Irrigated pastures often offer a habitat for small rodents and wading birds.

Cumulative effects

Cumulative effects for this alterantive are the same in the Trout Creek Watershed as Alternative C. The livestock in the Big Chino watershed will be managed under a more intensive plan which will allow an improvement of the diversity of grasses and forbs in the watershed. With a greater diversity of vegetation it is expected that the diversity of wildlife species will also improve. Raptor populations may become more abundant as

their prey base increase. The redwood harvests in the demonstration area will leave sufficient logs to support a viable population of cavity nesters. Increased water distribution will improve distribution of Gambel's quail, deer, small mammals and other birds. If human activity increases in an area and is persistent and uses of roads increase significantly big game may be permanently displaced from fawning areas or foraging areas.

Alternative E

This alternative would be the same as D except that it would also include a more controlled livestock management on highly productive areas in the Trout Creek drainage. This would be the turkey meadows in Happy Camp, the powerline meadow and the New Water area. In these areas water would be developed for livestock and wildlife. All herds except the Summer/Winter herd unit would be on best pasture rotation systems. This will improve the grassland diversity through encouragement of cool season grasses. Herbaceous cover would improve in the meadows and New Water areas. A 100 acre study plot will be seeded in the New Water area with native legumes and grasses. The meadows will also be seeded to limit soil erosion and accelerate recovery of the areas. Permit numbers would be met in two to three years.

Direct and Indirect effects

The effects of this alternative in the Big Chino watershed are the same as Alternative D. In the Trout Creek watershed the condition of the bottomlands will increase. The seeding in the New Water area will have the effect of supplying an additional source of nutrition to the antelope. The seeding of the meadows will increase the variety of grasses and forbs available to turkey, deer, and elk populations. The happy camp meadows and seeps will be fenced to encourage cool and warm season grasses to establish. The grazing schedules proposed graze this area the same time each year. Deer herds are expected to increase with more controlled management in the bottomlands. Several waters will be established in the New Water area from existing pipe lines. This will help the distribution of possible antelope fawning beds. Each fall and spring at least one pasture in the New Water area will be deferred to maintain cover for the fawns.

Cumulative effects

With the increase in forage availability and cover in the New Water area it is expected that the health of the herd will improve and well as the health of the fawns. The predator control program by Arizona Game and Fish may have a good success rate as the fawns will have somewhere to hide and will be healthy and the does will be having fawns. With the fences standardized the herd will be able to interchange with other herds in the area and perhaps maintain a viable population. The increase in water will help the doe protect her fawn as they like to bed their fawns within a quarter of a mile of water. If there is no cover within the quarter mile or brush and trees obstruct her vision predation on fawns is higher. With a better distribution of water the does will have more choices as to where to bed their fawns for ultimate protection. Travel corridors and old pushes will be retreated to maintain the areas open for antelope use. This will also help prevent isolation of the herds and increase habitat.

Raptor populations will fluctuate with the prey available. With increase water areas more small mammals will be better distributed and may have an effect on raptor populations. As raptor nests tend to be associated with water, available nesting for raptors may also increase.

This alternative also may show an improvement in the areas around permanent waters which may lend itself to an increase in use by migratory waterfowl.

Alternative F

This alternative expands intensive management to the whole ranch. All grazing will be on best pasture rotation. All projects in Alternatives D and E will be implemented plus several snags will be created in the Ponderosa pine areas for cavity nesters, and mud springs will be turned into a seep to encourage the development of riparian obligate species. It will take one to two years for livestock numbers to reach permit levels.

Direct and Indirect effects

Cavity nesters in pine habitat would be managed at a viable population. Habitat capability for turkeys would increase with the development of additional seeps and associated vegetation. Waters would be developed on the east side of high and lonesome mesa to increase habitat utilization for deer. All other effects are the same as Alternative E

Cumulative effects

Livestock numbers are assessed to allow a increasing population of big game but only to about half of their potential. With best pasture rotation some flexibility occurs to allow for nutritional requirements of wildlife. However, under this alternative no flexibility exists to allow for critical years for livestock and wildlife such as times of drought or severe cold. During these times the wildlife would suffer. See Alternative E for additional cumulative effects.

Alternative G

This alternative is different from Alternative F only that land lines would change but the coordinated plan would remain in effect and be managed as in F. All effects are essentially the same as those in Alternative F.

Alternative H

This alternative is the same management principles as those applied in Alternative A except with slightly reduced permit levels to allow for an increasing big game herds. However only deer would increase as cover or forage values would not increase in the bottomlands or grasslands and elk would be controlled. All other effects are the same as those addressed in Alternative A

Alternative I

This alternative follows the same management theme as Alternative F however it reserves two pastures for wildlife. One of these pastures is in the New Water area and the other in Turkey Creek. If a need arises to change these pastures and reserve others it will be changed based on monitoring of wildlife use and needs. These will also be used as monitoring areas to compare the best pasture rotation system to a potentially late successional

pasture, illegal weeds, to now serve as grazing pastures for cattle and plants.

Direct and Indirect effects

The reserve areas will increase the diversity on the ranch by having some areas in late successional stages and others in earlier successional stages. This will increase the diversity of small mammals and birds as well. The reserve areas will also provide the flexibility to buffer wildlife population crashes during years of inclement weather.

Cumulative effects

There will be a greater potential for increase of wildlife populations due to the increase of available forage in these pastures. The presence of the reserve areas will also insure that sufficient forage and cover exist during fawning seasons. The reserve pastures will also help increase a diversity of species in the area and increase in raptor populations. As these areas will not be impacted by cattle decadent stands of brush and grass will probably grow. This may provide habitat for many insects, form mats as sponges of water retention and moist areas and provide nesting places and materials for ground nesting birds.

Alternative J

This alternative is also the same as Alternative F except that livestock numbers are decreased to allow for development of potential of wildlife populations. Livestock numbers would reach permit levels in five years.

Direct and Indirect effects

The health of antelope, deer, and elk herds would improve gradually as forage availability improved. Turkey populations would increase as poult success increased. Antelope herds would also increase. PJ retreatment areas would be rested before to establish a good grass cover for burns and rested afterwards to reestablish good grass growth. If wildlife needs arose with monitoring, pasture rotation would be altered to accommodate them.

Cumulative effects

Over time all populations would reach the potential of the land and habitat in limits of human impact and use. All wildlife populations would be increasing and stabilizing with natural fluctuations and the ability to recover from crashes. Diversity would increase on the ranch while natural predation and food chains restored themselves with a balance of predator to prey relationships. Impacts from cattle would be minimal and used to maintain sub climax pastures in antelope habitat.

Alternative K

This alternative is the same as Alternative E except that the bottom lands in the Trout Creek drainage would be under a time control grazing. The only difference in effects of this alternative in comparison to Alternative E is that recovery of these areas would be accelerated, assuming all wildlife and watershed objectives would be considered in estimating stocking rates.

Alternative L

This alternative is the same as Alternative F except that grazing will go from a best pasture rotation to a time control grazing system. Initial stocking rates are proposed at the current stocking rate, however it will be one or two years before the system is implemented. The current trends in range conditions and wildlife populations will continue until the time control grazing complete with a biological control chart is implemented.

Direct, Indirect and Cumulative effects

Range conditions will continue to decline which will also cause wildlife populations to decline until time control grazing is initiated. With the proposed stocking levels the improvement of the land will be slow. No wildlife projects will be initiated until the time control grazing management is in process except the standardizing of fences and water troughs. After time control is initiated test seeding will be of legumes as in Alternative F. Time control grazing has the flexibility to meet wildlife objectives, however how the biological control chart is set which will determine what happens on the ground. The minimum management will be Alternative F. It is assumed that anything done under this alternative will be more beneficial to wildlife than Alternative F.

Comparison of Alternatives

Waterfowl

Waterfowl using the Yavapai Ranch are migratory. Natural wetlands have been lost through modifications made to the land by man and through detrimental livestock-management practices. This has been mitigated somewhat by the construction of stock-water impoundments and vegetation which grows in them. There are several seasonal-stock ponds and three stock ponds with permanent water on the Yavapai Ranch. The stock pond associated with the cienega spring is the only pond which presently has any components of waterfowl habitat. Cattails, rushes and cottonwoods are present on one side of it. The rest of the ponds have been severely impacted by cattle and have virtually no vegetative cover over or around them. They presently have little value as waterfowl habitat. In alternatives D,E, and K ponds associated with the demonstration area, and areas that appear to have high waterfowl-habitat potential would improve. Under alternatives F,G,I,J, and L all waterfowl habitat on all ponds would improve.

Waterfowl identified on the sensitive species list for the Prescott National Forest are by species for the preferred alternative.

Raptors

Raptors are associated with virtually all terrestrial and fresh water habitats. Some species are highly specialized, such as the Goshawk which requires dense, multiple-story mixed-conifer forest. Other species have very general-habitat requirements, such as the red-tailed hawk which can be found in dense forests or arid-shrub lands.

The impact of livestock grazing on raptors can be either positive or negative. It is positive if it causes habitat change that creates an increase

nesting. For example, recovery of native grasslands can provide benefits to Ferruginous hawks by providing habitat for higher densities of mice, rats and reptiles. Most species of raptors are associated with water, either directly or indirectly. This is due in part both to higher prey bases which occur near water and to needs for bathing and drinking. Threats to raptors include timber harvesting, overgrazing by livestock, disturbance and harassment of nesting birds, chemical poisoning and electrocution by power lines. Alternatives A through C would show no significant change in the current status of the raptor populations. Alternatives C through L would include inventories to help establish population trends and to determine presence or absence of raptors on the Forest's sensitive species list. Alternatives D,E,F,G,I,J,K,L would improve raptor habitat through the development of additional water and by improving habitat for the prey species. Under these alternatives the powerline would be reviewed and determined if it is safe for raptors. The alternatives which best provide for diversity will show an increase in species richness and abundance in raptors. These are alternatives F, I, J, and L. Under all alternatives fuelwood sales on National Forest Lands would protect all snags (over 9" dbh) and potential raptor nesting areas. In Alternatives C,D,E,F,G,I,J,K, and L fuelwood cutting on private land would follow the same standards as on Forest Service Lands.

Raptors on the Forest's sensitive species list are addressed by species for the preferred alternative in the biological evaluation.

Cavity Nesters

On the Yavapai Ranch there are 28 pine snags and over five thousand acres of pine. About half of that is in a late seral class, although it has been thinned or treated in the past. Under past management practice the largest trees were taken out to let the smaller trees grow. This has effectively eliminated potential snags. Under alternatives F, J, and L snags would be created in the pine habitat to bring the habitat for cavity nesters up to a level which could support a viable population.

In the woodland habitat under all alternatives except A,B,C, and H all woodland snags would be maintained for cavity nesters. In alternative C snags would be maintained on FS land but not on private land. Currently the snags within the woodland are at a level to maintain a viable population of cavity nesters. In fuelwood harvests green replacement trees would be maintained to replace snags until the treated area reaches a late seral stage and can naturally recruit snags.

Conclusions:

Alternative J best meets the wildlife habitat issue because wildlife needs will be met before grazing will be considered. Forage will be reserved for potential and increasing wildlife populations. Grassland diversity will be improved through best pasture rotation structural improvements and seeding; Pinyon Juniper woodlands horizontal diversity will increase through fuelwood treatments. Increased law enforcement will reduce the declining Gamble Oak component. Alternative I next best the needs of wildlife by establishing approximately 10% of the land base in a wildlife reserve area, but does not reserve the rest of the forage for a potential wildlife population.

Alternatives G or H would also meet most of the concerns for habitat diversity except that forage would be reserved for the potential population of wildlife in the area. However forage is reserved for current wildlife use and an increase in population.

Alternatives C, D, & E in the area outside of the Demonstration area would limit wildlife populations and diversity since no new structures would be built and the potential for grassland diversity would be limited by the proposed modified deferred grazing system. Within the Demonstration area diversity would increase.

Alternative A and H least meet the concerns for habitat diversity because grazing management would be virtually identical to the current condition. Although alternative B excludes grazing from National Forest sections it would be detrimental to habitat conditions and diversity due to the potential of private development on deeded sections. This would show an increase in human disturbance, law violations and habitat fragmentation. The oak component may continue to decline with this alternative.

Alternatives K and L have the potential to provide for improved habitat diversity and conditions, assuming HRM biological control charts adhere to the wildlife project objectives. These alternatives offer the flexibility to use cattle as a tool to provide for wildlife needs, however under the proposed initial stocking rate no forage is reserved for potential or increasing wildlife populations. Although grassland diversity would increase the potential may not be reached in black grama communities, because black grama does not withstand intensive grazing.

Under Alternatives Db, E, F, G, I, and J waters would be constructed to provide water within a quarter mile of fawn bed sites and cover would improve which would increase fawn survival rates. Under the above mentioned alternatives with the exceptions of I & J, competition for forage would decrease slightly and possibly increase the nutritional levels of the does. Alternatives E, F, G, I, and J propose a trial seeding of mixed forbs and cool season grasses to alleviate some of the nutritional concerns. However alternatives I and J are the only alternatives which insure sufficient forage for the does during the critical third trimester of gestation.

Alternatives K and L have the potential to provide increased fawning success and forage levels if the HRM biological control charts are planned in such a way to provide for the requirements of the pronghorn does and fawns.

Alternatives J, K, and L have the potential to provide for extra forage, water and vegetation cover during drought for ungulates and turkey. The rest of the alternatives do not offer that flexibility.

Threatened, Endangered and Sensitive habitat issue

Proposed, Threatened, Endangered and Sensitive species (PETS) are generally species which are habitat specialists and sensitive to small amounts of degradation to their environment. Many of the species on the Prescott Forest sensitive list are either old or mature tree dependent or riparian dependent. If a land area is managed to maintain biological diversity the habitat for these species generally is not threatened.

Alternatives A, B, and W will show a general decline in biological diversity and will cause habitat fragmentation which can be detrimental to PETS. Under Alternatives C, D, and E habitat for PETS will be maintained and under F, G, J, and possibly K and L (depending on the biological control chart) habitat may be improved through improved grazing management, snag creation, increased prey base and better distribution of water.

Soil and water criteria alternative comparison (continued)
Alternatives

Criteria	A	B	C	D	E	F
Average % ground cover:						
Around water						
0-15% (bottom)	10	12	10	10	11	15
0-15% slopes	40	50	40	45	60	65
> 15% slopes	50	52	50	50	51	62
	72	80	72	72	76	76
Tons/acre on site soil loss:						
0-15% slope	1.9	1.5	1.9	1.8	1.6	1.3
15-40% slope	3.3	2.3	3.0	3.0	2.9	2.9
> 40% slope	3.8	3.2	3.8	3.8	3.5	3.5
Air quality Impacts:	VERY LOW*	LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW
Water quality, nonpoint source, Impacts:	HIGH**	LOW	MOD	MOD	MOD	MOD

Table 3. Soil and water criteria alternative comparison(continued)

Criteria	G	H	I	Alternatives			Ref Doc#
	J	K	L				
Average % ground cover:							
Around water	15	10	15	16	16	20	55
0-15% (bottom)	65	40	65	65	65	65	55
0-15% slopes	62	60	62	64	70	71	55
> 15% slopes	76	72	78	78	78	78	55
Tons/acre on site soil loss:							
0-15% slope	1.3	1.3	1.3	1.3	1.1	1.1	72
15-40% slope	2.9	3.0	2.7	2.7	2.7	2.7	72
> 40% slope	3.5	3.8	3.2	3.2	3.2	3.2	72
Air quality Impacts:	VERY LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW	VERY LOW	72
Water quality, nonpoint source, Impacts:	MOD	MOD	MOD	MOD	LOW	LOW	65

VIII. WATER, SOIL AND AIR EFFECTS

Currently, watershed condition in the Yavapai Allotment needs improvement in order to reduce non-point source sediment and to increase the capture, storage and safe release of precipitation on the watershed. The percentage of bare soil is high around waters and on slopes less than 15 percent. Some gullies are present in the bottoms and show deterioration due to the lack of ground cover, poor installation of improvements and lack of improvement maintenance. Also, poorly located and maintained roads are causing sedimentation and erosion problems on the allotment. In order to improve watershed condition, reduce soil loss and improve water quality impacts, there is a need to increase vegetative ground cover, and the repair of improvements, gullies and roads.

For the purpose of evaluating the soil and water criteria for alternative comparison and environmental consequences, the three terms for comparing water quality impacts have been used: High, Moderate and Low. In evaluating the water quality impacts of the Yavapai Allotment, both non-point source and point source (primarily roads, structures, etc.) were looked at for this rating. Low water quality impacts are those pollutants that are affecting the Allotment (Trout Creek and Big Chino Basin watershed) with a low negative impact, have a downward trend and are ideally what the water quality goals for these watersheds are. Moderate water quality impacts are those pollutants resulting from just a few sources. The trend is steady and with the use of watershed improvements, a change in grazing management or other resource management, this can change to either Low or High water quality impacts. High water quality impacts are those pollutants that are resulting from several sources (point and non-point sources) and the trend is in a upward direction.

Non-Point source categories within the State of Arizona have been broken out by the following categories which are applicable to the Yavapai Allotment: Agriculture, Silviculture, Hydrologic/Habitat Modification, Other and Recreation. Of most importance is Agriculture (Rangeland) and Silviculture (Forest management and road construction). Non-point source (NPS) pollution to surface water is difficult to quantify due to NPS pollution being intermittently generated as a result of rainfall and resulting runoff events, snow melt incidents, storm intensities and duration, time of year and land use during and following these events.

Arizona Department of Environmental Quality has correlated watershed condition with NPS pollution based upon the reduction in ground cover and addition of surface disruption to increase the erodibility of rangelands. Due to the absence of perennial waters on the Yavapai Allotment, watershed condition is used here as a surrogate to represent water quality. A healthy watershed releases minor amount of runoff in response to precipitation events, allowing the ground cover to act as watershed protection, protecting the channel stability and allowing only a minor amount of sediment movement.

The capture, storage and safe release of precipitation in the form of runoff, surface flow or groundwater is a vital part of the function of the Trout Creek and Big Chino watersheds. For a watershed to function properly there must be adequate ground cover (litter, plant basal area and rock) to absorb the precipitation and slow the runoff process. This allows water to infiltrate

into the soil and subsequently, sub-surface and groundwater creeks, drainages, washes and even cockpit tanks and springs act to allow for the slow release of this water in the watershed.

The potential for developing riparian areas in this allotment is rated Low or Moderate. A rating of Low signifies only a trace of or no hydric soils and obligate riparian plants, and water availability is from runoff and/or a low yield spring. A Moderate rating implies all available surface water would be available to propagate obligate riparian plants, and would provide some potential in the immediate vicinity of the spring. When plans for the ditch (watercourse from Cienega Spring) are to route the water through a pipe, a riparian potential rating of N/A (non-applicable) is designated. At this time, the ditch supports a five foot wide riparian community of sedges and a few rushes.

The following narratives discusses the environmental consequences of each alternative and describes how each alternative solves the issue of water and soil.

Alternative A: The No Action alternative will continue as described above and vegetative ground cover will decrease, needed improvements will not be done and the gullies in the bottoms will continue to degrade. Consequently, the short- and long-term water quality issue would not be resolved and soil losses will continue to increase. Currently, some roads are poorly located and maintained, and are causing unacceptable sedimentation problems. The short-term water quality impact is moderate while the long-term impact is high. The soil loss rate of 1.9 tons/acre (for 0-15 percent slopes) is the highest of all the alternatives, and if the current trend continues soil loss rates will increase, watershed condition will continue to deteriorate and the area will be difficult to correct in the future.

The riparian potential for the ditch is rated moderate because water would be allowed to continue to flow in the ditch. Riparian potential is rated low for the springs (Mud and Pine springs) because of low water availability and no hydric soils or obligate riparian plants.

Alternative B: This alternative removes livestock from the allotment, however the failure to repair the past degradation will allow the watershed to continue to produce unacceptable sedimentation from roads, gullies, and improvements. Ground cover will improve and resulting soil loss will decrease. The short-term water quality impacts would not be resolved due to this failure of repairing past problems. The long-term water quality impacts would only improve as ground cover improves, but would be off-set by the continued degradation of the other areas left untouched within the watershed. Under this alternative, the trend for soil loss rates will continue to increase, watershed condition will continue to deteriorate and the area will be difficult to correct in the future.

Riparian potential for the ditch is rated as low because this water probably would be diverted for private development. The potential for the springs on forest land is rated as moderate because water sources would be developed and maintained for wildlife.

Alternative C: This alternative reduces the number of cattle though the grazing pressure would continue on the bottoms. This would be unacceptable for water quality in the short- and long-term, would not provide livestock management for the repair of the watershed and improvements, and gullies would continue to degrade. The ground cover is projected to be similar to the

current condition, therefore soil loss rates on slopes of 0 to 15 percent would be the same as Alternative ... Current use and maintenance roads would continue and would cause unacceptable sedimentation problems. Under this alternative, the trend for soil loss rates will continue to increase, watershed condition will continue to deteriorate and the area will be difficult to correct in the future.

The riparian potential for the ditch is rated moderate because water would be allowed to continue to flow in the ditch. The riparian potential is rated low for the springs because of low water availability and no hydric soils or obligate riparian plants.

Alternative D: This alternative would allow ground cover to increase in some of the bottoms but not in Turkey Creek and Pine Creek where the grazing pressure would continue. Therefore, the soil loss rate of 1.7 tons/acre (0-15 percent slopes) is only a slight improvement over the current management. A lack of investment towards structural improvements would allow livestock use to continue to degrade water quality in the short- and long-term, and the continued soil loss from the gullies in the bottoms. Improvement of the roads in the demonstration area will reduce sedimentation problems. Under this alternative, the trend for soil loss rates will decrease only slightly, watershed condition will continue to deteriorate and the area will be difficult to correct in the future.

In this alternative the ditch will be encased in a pipe, therefore the existing riparian adjacent to the ditch will be lost and the rating for the potential will be classified as N/A (non-applicable). The riparian potential for the springs (Pine and Mud springs) is rated as low.

Alternative E: This alternative nearly meets the need to provide watershed repair on the most productive sites, however the livestock management intensity does not change sufficiently to increase the vegetative ground cover of the allotment. The improvement of roads will reduce sedimentation problems. The failure to provide repair of all of the watershed would be an unacceptable watershed consequence resulting in unacceptable water quality in the short- and long-term. With this alternative, the direction of the watershed condition is improving (as shown in table 3) with the increased ground cover and decreasing soil losses on the plaaains and hills.

In this alternative the ditch will be encased in a pipe, therefore the existing riparian adjacent to the ditch will be lost and the rating for the potential will be classified as N/A (non-applicable). The riparian potential for the springs (Pine and Mud springs) is rated as low.

Alternative F: This alternative allows more flexibility to move cattle and rest pastures, consequently 85 percent of the rangeland on 0 to 15 percent slopes is projected to have approximately a 20 percent increase in the ground cover. With this alternative grazing management plans are more conducive to watershed improvement. However, the estimated ground cover and soil loss for this alternative does not provide for repair of all the watershed (present gullies, improvements and roads) to the desired condition. There is more of an opportunity for watershed improvement, but also a burden to repair improvements with a high investment in this alternative. Though the watershed condition trend under this alternative is upward, the water quality in the short- and long-term has a moderate water quality impact.

In this alternative the ditch will be encased in a pipe, therefore the existing riparian adjacent to the ditch will be lost and the rating for the potential

will be classified as N/A (non-applicable). The riparian potential for the springs (Pine and Mud springs) is rated as low.

Alternative G: This is the same as alternative E except a land exchange will take place. Land ownership would be consolidated and grazing management would be decided upon at that time.

Alternative H: This alternative is the same as alternative A except for the adjustment of the stocking rate to the 1979-1989 average level. A slight increase in vegetative ground cover should occur, however degradation from roads, gullies and structures would probably continue and not provide for adequate watershed repair. The estimated soil loss rates are among the highest of all the alternatives. The water quality impacts would continue to have a moderate water quality impact in the short- and long-term. The downward trend of the watershed and degradation from roads would continue.

In this alternative the ditch will be encased in a pipe, therefore the existing riparian adjacent to the ditch will be lost and the rating for the potential will be classified as N/A (non-applicable). The riparian potential for the springs (Pine and Mud springs) is rated as low.

Alternative I: This alternative allows for grazing pressure to increase in some areas but would decrease in the Turkey Creek and West pastures. Watershed condition would improve and show increased water quality. With this alternative, and all of the following alternatives, the ground cover on the hills has increased to the desired level of cover. Ground cover on 0 to 15 percent slopes has improved, and soil loss rates are estimated to be the same as alternatives F, G and J. Increased ground cover, lower soil loss rates and road improvements would improve the trend and the watershed condition.

In this alternative the ditch will be encased in a pipe, therefore the existing riparian adjacent to the ditch will be lost and the rating for the potential will be classified as N/A (non-applicable). The riparian potential for the springs (Pine and Mud springs) is rated as low.

Alternative J: This alternative is the same as alternative F except for the wildlife emphasis and additional waters. Ground cover would improve by 30 percent over the current on the slopes of 0 to 15 percent. Watershed condition would improve and show increased water quality, improvements would be upgraded and repaired resulting in lower soil loss rates.

Riparian potential would be rated N/A for the ditch. The emphasis for wildlife would direct the available water for small riparian areas, therefore the rating for the springs would be moderate.

Alternative K: This alternative concentrates improvements on highly productive sites and increases the grazing management intensity for the allotment using the principals of HRM with a moderate investment. This grazing management plan provides the opportunity to use livestock as a tool for the repair and maintenance of the vegetation and soil. The ground cover on all slopes is projected to increase to meet the criteria for a healthy watershed condition, consequently the estimated soil loss rates on 0 to 15 percent slopes shown in table 3 for alternatives K and L are the lowest compared to the other alternatives. Soil loss rates on slopes over 15 percent are the lowest, and compare with alternatives I and J. Watershed condition would improve and show increased water quality. Gullies, roads and improvements would be upgraded and maintained.

Alternative L: This alternative concentrates improvements on highly productive sites and increases the grazing management intensity for the allotment using the principals of HRM with a high investment. This grazing management plan provides the opportunity to use livestock as a tool for the repair and maintenance of the vegetation and soil, though at a higher cost than alternative K. Ground cover increases and estimated soil loss rates would be identical to that in alternative K. Watershed condition would improve with increased water quality and lower soil loss rates. Gullies, roads and improvements would be upgraded and maintained.

Riparian potential would be rated N/A for the ditch and low for the springs.

Conclusion: It appears that alternatives I, J, K or L would address the watershed condition issues the best. Implementation of these alternatives are projecting the results of returning the ground cover to better than 50 percent, and effecting a moderate to low impact on the water quality. These alternatives have the intensity of livestock management to cause a high probability of improving watershed condition on slopes of 0 to 15 percent, therefore reducing soil losses and improving water quality. Although, there are differences in location and activities in the two proposed Demonstration Areas, there should be little difference in the total result from the choice of the Chino Valley or Trout Creek Demonstration Area. Of these, alternatives K and L (HRM practices) do have the potential to achieve better results than the stated objectives. None of the other alternatives have sufficient livestock management to mitigate the adverse effects of grazing use on the allotment in terms of soil loss or water quality.

WATER AND SOIL CUMULATIVE EFFECTS

Cumulative Effects definition: "A change in the environment caused by the interaction of natural ecosystem processes with the effects of two or more forest practices". Cumulative effects include all effects on beneficial uses of water that occur away from the location of actual land use and which are transmitted through the fluvial system. Furthermore, cumulative impacts are defined through NEPA as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

The soil and water parameters that have the probability of cumulative impacts resulting from the activity of rangeland management are: sediment production, biological water quality, water temperature, soil erosion, and soil bulk density. These are looked at along with the probability of cumulative impacts resulting from roads, fuelwood and timber harvest for the Yavapai Allotment.

The area of analysis for this cumulative effects discussion is the allotment boundaries which are separated into two watersheds: Trout Creek and Big Chino Basin. The Yavapai allotment is located in the upper limits of these two Water Resources Council fifth code watersheds. Most fifth code watersheds vary in size from 40,000 to 120,000 acres in size. Trout Creek is part of the Bill Williams watershed and the Big Chino Basin is part of the Verde River watershed. The area within the Trout Creek watershed on the Yavapai allotment is approximately 23,000 acres. The area within the Big Chino Basin watershed on the Yavapai allotment is approximately 87,000 acres.

The fluvial system on the Yavapai Allotment consists of ephemeral drainages plus two small springs, Pine and Mud springs, and a large spring, Cienega spring. The flow of both Pine and Mud springs are entirely contained in spring boxes and Cienega spring is channeled in a ditch for use in maintaining stocktanks. Besides this, Yavapai Allotment contains no perennial water allowing off-site effects of water to be transported primarily by runoff events.

In discussing cumulative effects which result from activities on the Yavapai Allotment, there are two important points for discussion. One, due to the lack of perennial water on the allotment, the off-site cumulative effects are transported primarily by runoff events which are tied directly to the frequency, intensity, duration and timing of precipitation events. It is primarily during these precipitation events that erosion from runoff results from the cumulative impacts of the activities on the allotment. And two, because these events can't be predicted, the cumulative effects will concentrate on the impacts to the watershed condition (vegetative ground cover). As the ground cover increases, the cumulative effects on the watershed condition becomes less significant when combined with other activities presently occurring. As a result, the watershed is better able to handle large precipitation events without cumulative effects to the watershed condition.

From table 3, it is seen that the existing vegetative ground cover for slopes of 0 to 15 percent is 40 percent. For all of the alternatives, the ground cover is at least 40 percent and usually much higher. This increase in vegetative ground cover represents an improved watershed condition over the allotment and should result in significantly low cumulative effects except when peak precipitation events occur.

Therefore, the overall cumulative effects for the Yavapai allotment analysis area are insignificant due to the lack of perennial water, increase in vegetative ground cover and decrease in soil loss in most alternatives, the need for precipitation events to produce runoff, the small project area compared to the watershed size and the location within the upper watershed.

VIX. VEGETATION EFFECTS

Vegetation Communities

Ponderosa Pine Type

Direct Effects:

ALTERNATIVES A, C, D, E, F, G, H, I, J, K, and L:

None of these alternatives considered prescribed sawtimber or fuelwood harvest treatments within this vegetation type, therefore no direct effects are likely.

ALTERNATIVE B:

Only Alternative B, which assumes potential real estate development of the private sections, would have potential direct effects upon the structural conditions and seral status of this vegetative community. Depending upon intensity of subdivision, the amount of access developed, the level of utility development, and the landscape objectives of the developers and/or purchasers, material modification of the overstory and understory vegetation would be likely on the private sections. The clearing of vegetation for development would increase the amount of openings moving these areas to an early seral status. The degree of change can not be predicted without specific development proposals, which are not available.

Indirect Effects:

ALTERNATIVES A, C, D, E, F, G, H, I, J, K, and L:

No indirect effects on seral status or canopy closure are likely.

ALTERNATIVE B:

The assumed real estate development of this alternative, with subsequent residential occupancy, coupled with the exclusion of grazing of the public sections would have the indirect effect of creating a high wildfire danger from the increase in possible ignition sources and from a predicted increased amount of ground fuels to carry a fire. The potential for crown-fire occurrence, while hard to quantify, would increase dramatically over time and the vegetative mortality involved would create areas of early seral status and reduced canopy closure.

Cumulative Effect:

ALTERNATIVES A, C, D, E, F, G, H, I, J, K, and L:

No cumulative effects on seral status or canopy closure are likely.

ALTERNATIVE B:

The direct effect of clearing vegetation for the assumed residential development and the indirect effect of the increased danger of damaging wildfire, typical of wildland/urban interfaces, would have the additive or cumulative effect of modifying both seral status and canopy closure within the Ponderosa pine areas considered. Again, without specific development proposals, the degree of change is impossible to quantify with certainty. The direction and duration of effect can be predicted. The clearing and loss of vegetation from a habitat standpoint for residential development and access and utility development are permanent and irretrievable. From a timber standpoint, the loss of production is also an irretrievable resource loss. The potential for modification of habitat due to wildfire, while not irretrievable, is of extremely long duration. Many of the Ponderosa pine in the area are 150+ years old. The Gambel oaks and Alligator juniper often exceed 250 years.

WOODLAND

Direct Effects:

ALTERNATIVE A:

Under this alternative, the only activity defined, barring wildfire which would alter the seral status, would be fuelwood cutting on the private land holdings. The general ongoing program has been to treat two sections per year. Not all acres are treated; however, for the purpose of analysis 927 acres per year is projected.

It is assumed that due to merchantability considerations, a high proportion of the acres treated would come from the Potential Ecological Status class and, through treatment, be moved to an Early Status. The following table represents a projection at the assumed rate of treatment of the seral status after seven years:

	%	Acres
Early	22	17,866
Mid	8	6,453
Potential	70	55,097

ALTERNATIVE B:

This alternative, which excludes grazing on National Forest sections, would result in a lack of incentive for treatment on the private sections; therefore, the seral status would remain unchanged from the current status as described in Alternative A above. The potential of checkerboard real estate development would eliminate the area for priority for treatment with Forest Service funds for the projected seven year period.

ALTERNATIVE C:

As defined, this alternative would involve fuelwood cutting on private land at a rate compatible with wildlife diversity needs. An opportunity exists on private and Forest lands around the Game & Fish Department trick tank in Sections 24, T20N, R6W, G&SRM to improve wildlife diversity.

This treatment includes approximately 408 acres of public land and 122 acres of private land to be treated. No other fuelwood treatments are needed for wildlife diversity. Due to a lack of change of intensity of grazing management, no acres of Pinyon/Juniper retreatment are included.

With the above assumptions, the following table represents a projection of seral status after seven years:

	<u>%</u>	<u>Acres</u>
Early	15	11,907
Mid	8	6,453
Potential	77	61,056

ALTERNATIVE D:

This alternative differs from Alternative C with the additional treatment of 927 acres of private land through fuelwood treatment in a demonstration area. The following table represents a projection of seral status after seven years:

	<u>%</u>	<u>Acres</u>
Early	16	12,834
Mid	8	6,453
Potential	76	60,129

ALTERNATIVE E:

This alternative includes the fuelwood treatment of 530 acres (public and private) around the Game & Fish Department trick tank in Section 24, T20N, R6W, the 927 acres of the demonstration area fuelwood treatment, 770 acres of Pinyon/Juniper retreatment, and an additional 927 acres of fuelwood treatment on private land. As the retreatment occurs on areas of early seral status and retains them in an early status, this treatment does not affect the following projection of seral status after seven years:

	<u>%</u>	<u>Acres</u>
Early	17	13,761
Mid	8	6,453
Potential	75	59,202

This alternative includes an additional 789 acres of fuelwood treatment on public land and 586 acres on private land over Alternative E for biodiversity objectives. The following table represents the projected seral status after seven years:

	%	Acres
Early	19	15,136
Mid	8	6,453
Potential	73	57,827

ALTERNATIVE G:

Same as Alternative F.

ALTERNATIVE H:

Same as Alternative A.

ALTERNATIVE I:

Same as Alternative F.

ALTERNATIVE J:

Same as Alternative F.

ALTERNATIVE K:

Same as Alternative E.

ALTERNATIVE L:

Same as Alternative F.

Indirect Effects:

ALTERNATIVES A, C,D, E, F, G, H, I, J, K, and L:

No indirect effects on seral status or canopy closure are likely.

ALTERNATIVE B:

Similar to the indirect effects described for the Ponderosa Pine stands under Alternative B except that Pinyon/Juniper stands are not as prone to catastrophic wildfire as are Ponderosa pine stands due to lack of continuity of fuels.

CUMULATIVE EFFECT

ALTERNATIVES A, C, D, E, F, G, H, I, J, K, and L:

No cumulative effects on seral status or canopy closure are likely.

ALTERNATIVE B:

Again, as in the above discussion of indirect effects on woodland diversity, the cumulative effects are similar to those discussed for the Ponderosa pine stands with the same qualifier relative to fire hazard.

X. RECREATION AND VISUAL QUALITY EFFECTS

Direct Effects:

ALTERNATIVE A:

This alternative is the no action alternative. It does not include any structural or nonstructural improvements on public sections. It does include fuelwood harvest on the private sections, development of selected pipelines and trick tanks would continue on private land. Current use and maintenance level designations for roads and trails, current maintenance construction, reconstruction and schedules would continue as would current grazing levels and strategies.

The whole project area is open to dispersed recreational us except for the private holdings around the ranch headquarters, Cienega Ranch facilities, and the New Water Ranch facilities.

Existing recreational use of the Yavapai Allotment area is low. Primary useage is in the activities of big and small game hunting, gathering forest projects, and pleasure driving on Forest Roads 6 to Seligman. Forest Plan direction includes an emphasis on dispersed recreation along frequently traveled roads and trails. Inventoried Visual Quality Objectives (VQO's) are 45,169 acres of modification and 6,881 acres of maximum modification. No VQO's have been established for the private land. The only trail which received significant useage is Trail No. 3, which will be addressed in the Juniper Mesa Wilderness Plan.

The planned RATM road closures and the activities projected on private lands have the potential to limit vehicle access for recreation and to detract from the quality of recreation experience through alterations in the natural beauty of the area. Any enhancement to wildlife from the proposed treatments on the private land would enhance the opportunities for hunting and observing wildlife.

ALTERNATIVE D:

This alternative differs from Alternative A in excluding grazing, the fencing of public sections, and the likely real estate development of the private sections. While excluding grazing might enhance the recreation experience for those who find cows objectionable, the extreme amount of fencing and the encumbrance imposed by real estate development would severely hinder and limit access for recreational use. The fencing and real estate development would vastly effect the visual quality of the area and drastically alter the natural beauty of the area.

ALTERNATIVE C:

This alternative differs from Alternative A in prescribing the activities programmed in the Prescott Forest Plan. Incorporation of the standards and guidelines such as the limitation on size of openings, screening cover along roadways, and others included in the Forest Plan would not significantly alter aesthetics of the area and, if designed properly, could enhance visual quality through creation of diversity in line, texture, color, and through expanded viewshed.

The wildlife enhancement from the nonstructural improvements, the upgrade of existing structural improvements, and the reduction of permitted grazing would enhance the primary recreational opportunities of hunting and observing wildlife.

ALTERNATIVE D:

This alternative differs from Alternative A through inclusion of the Forest Plan activities described in Alternative C above and through inclusion of a Demonstration Area. The Demonstration Area depending upon design could adversely effect the visual quality and the quality of the recreation experience through the alterations caused by the additional structural and nonstructural improvements included. This effect would be limited to the immediate area and can be mitigated through proper design. Selection of the Trout Creek Demonstration Area would minimize these effects due to lower use in the area.

ALTERNATIVE E:

This alternative differs from Alternative D by prescribing additional vegetative treatment on highly productive sites where needed to meet wildlife and other project objectives. Wildlife has said no other treatments in addition to those included in previous alternatives are needed for diversity. No other specific treatments have been proposed for other projects; therefore, the effects would not differ from Alternative D.

ALTERNATIVE F:

Given that other vegetative treatments are not needed for biodiversity nor have other projects been identified, this alternative only differs in increased grazing use which would have only a negligible effect on dispersed recreation and visual quality.

ALTERNATIVE G:

This alternative includes consolidation of the landownership as included in the Prescott Land Management Plan. As proposed, the consolidation would buffer the Juniper Mesa Wilderness from private land development and insure access by the public to the public lands, but could limit their access to lands which are currently public which would become private. Access for hunting, the highest current use, could be restricted to about 50% of the area currently open for this use, depending on the private land owners' discretion. Visual quality on the public lands could be protected more easily, without the current checkerboard ownership pattern, with proper design.

ALTERNATIVE H:

No difference with Alternative A is projected.

ALTERNATIVE I:

Same as Alternative F, except in the Turkey Creek and West Pastures, where exclusion of grazing would improve the quality of the recreation opportunity for dispersed recreation and enhance the visual quality.

ALTERNATIVE J:

Same as Alternative F.

ALTERNATIVE K:

Same as Alternative E, except the additional electrical fences needed to implement time control grazing would adversely effect visual quality and the quality of the recreation opportunities.

ALTERNATIVE L:

Same as Alternative F, except the additional electrical fences needed to implement time control grazing would adversely effect visual quality and the quality of the recreation opportunities.

Indirect Effects:

No indirect effects on the Recreation and Visual Resources are predicted.

Cumulative:

No cumulative effects on the Recreation and Visual Resources are predicted

XI. OTHER ISSUES AND EFFECTS

LANDOWNERSHIP PATTERN

Direct Effects:

ALTERNATIVES A, B, C, D, E, F, H, I, J, K, and L:

No change in landownership pattern.

ALTERNATIVE G:

Alternative G includes consolidation through exchange of landownership as included in the Prescott National Forest Plan. The accompanying Landownership Plan provides a conceptual plan which has the Forest consolidated to the south and east and the private land consolidated to the north and west. This plan was developed on an approximate area-for-area exchange basis; however, the actual basis used in exchanges is a value-for-value basis. The configuration might change significantly upon appraisal and the receipt of a specific exchange proposal.

Without relief from the general requirement for cultural resource inventory, there would be a significant one-time cost of surveying the public sections transferred into private ownership. The re-posting of the Forest Boundary would also be an initial cost. Consolidation would simplify management, administration, and facilitate public use. As proposed, the consolidation would buffer Juniper Mesa Wilderness from the potential development of the private land.

Indirect Effects:

No indirect effects on landownership pattern are likely.

Cumulative Effects:

No cumulative effect on landownership is expected.

DISCUSSION OF GRAZING MANAGEMENT ISSUE

Alternatives La and Lb best meet the need to improve grazing management by providing dependable waters and other improvements that will allow the flexibility needed to schedule grazing treatments to accomplish adequate recovery rest and other grazing treatment objectives. Maintenance and upgrading of structural improvements will be accomplished under alternatives Ca-Gb and Ia-Lb.

ACCESS ISSUE

Current use and maintenance level designations for roads and trails were examined and would remain as currently designated. A total of 33.8 miles of roads would be scheduled for closure under all alternatives except alternative G where miles

would be closed. Roads designated for closure would be reviewed with the Landowner and Arizona Game & Fish Department on a case by case basis to determine implementation method and coordinate cooperative funding. An review would also be conducted on the powerline road to determine any recommended changes to be brought forward.

LAW ENFORCEMENT ISSUE

Law enforcement activity will vary slightly across alternatives with a slight increase as management intensity is increased under Ea-Fb and Ia-Lb alternatives. Alternative B will also increase law enforcement activity as private land is developed.

Animal Unit- Considered to be one mature cow of approximately 1,000 lbs., either dry or with calf (up to 6 mths. of age), or their equivalent, based on a standardized amount of forage consumed. (3)

A.U.M.- The amount of dry forage required by one animal unit for one month based on a forage allowance of 26 pounds per day. The term AUM is commonly used in three ways: 1) stocking rate, as "X acres per AUM"; 2) forage allocations, as "X AUMs in Allotment A"; 3) utilization, as "X AUMs taken from Allotment B". (3)

Basal Area- In Range Management, basal area refers to the area of ground surface occupied by the stems of range plants (generally measured at 1 inch above ground), as contrasted with the full spread of its foliage. In Forestry, basal area refers to the area of ground surface occupied by tree stems (measured at 4.5 ft. above the ground), generally expressed as sq.ft. per acre. (11)
(Basal area is a measurement of how much a site is occupied by trees or plants.)

Best Management Practices- Methods, measures, or practices to prevent or reduce water pollution, including structural and nonstructural controls and operation and maintenance procedures. (2)

Best Management Practice- Application of the best available demonstrated control technology, processes, measures, and operating methods that are socially, economically, and technically feasible for controlling soil loss or improving water quality. (1)

Biodiversity (Species Diversity)- In common usage "biologic diversity" is usually equivalent to species diversity (the number of different species occurring in some location or under some condition such as pollution). Of the total number of species in a biotic community, only a few are usually abundant while most are relatively uncommon. Because the large number of uncommon, relatively unimportant species largely determine the amount of "species diversity", this property is often expressed as a "species diversity index" which is calculated so as to better reflect the importance of those few species whose numbers so greatly dominate these attributes of the entire biological community. (4)

Biological Assessment (or Evaluation)- A documented Forest Service review of Forest service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species. (8)

Biomass- the total quantity (at a given time) of living organisms of one or more species per unit of space, or of all the species in a biotic community. (4)

Biomass- the total amount of living plants and animals above and below ground in an area at a given time. (3)

Canopy- The continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth. (11) (Compare to Crown Closure)

Carrying Capacity- The optimum density of a species which a given environment or range is capable of sustaining, without deteriorating that environment or range. (1)

Chaparral- A shrub community composed of stiff or thorny shrubs and dwarf trees. (3)

Climax- The final or stable biotic community in a successional series which is self-perpetuating and in dynamic equilibrium with the physical habitat. (3)
(Compare to Potential Natural Community)

Crown- The upper part of a tree or other woody plant carrying the main branch system and foliage surmounting a "clean stem" at the crown base. (11)

Crown Closure (Canopy Cover)- 1) Vertical closure- the percentage of ground covered by the vertical projection of each individual crown's outermost perimeter.
2) Horizontal closure- the degree of closure in which the individual crowns are nearing general contact with one another. (11)

Cultural Resource- The physical remains of past human cultural systems and places or sites of importance in human history or prehistory. (1)

Deferred Rotation- An entire range area is grazed every year, but some parts are deferred from grazing during some portion of the growth period of key forage species. (7) (At least two pastures are required.)

Diversity- The relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area. (1)

Diversity- The distribution and abundance of different kinds of plant and animal species and communities in a specified area. (8)

Ecological Health (Ecological Stability or Balance of Nature)- An ecological system may be said to be stable during that period of time when no species becomes extinct and none reaches plaque proportions for long enough to destroy the niches of other species and cause them to become extinct. The ecological world is not a static equilibrium, but a fluctuating and dynamic one, the density of no species remains at a fixed value. Stability lies in the ability to bounce back, not in the ability to hold tenaciously to the land once taken or numbers once achieved. (4)

Ecological Site- A kind of land with a specific potential natural community and specific physical site characteristics, differing from other kinds of land in its ability to produce vegetation and to respond to disturbance or manipulation. (3) (Compare to Range Site)

Ecological Status- The present state of vegetation and soil protection of an ecological site in relation to the potential natural community for the site. Four classes of ecological status ratings may be used: 1) early-seral (0-25% of PNC); 2) mid-seral (26-50% of PNC); 3) late-seral (51-75% of PNC); 4) Potential (76-100% of PNC). (3) (Compare to Potential Natural Community)

Emphasis Species- A species of high public interest and demand. The management goal for these species is usually to maintain or improve habitat capability when economically and biologically feasible. (8)

Ephemeral Fluvial Ecosystem- This category has neither hydric soils or hydrophytic vegetation, nor evidence that either the requisite plants or soils existed within historic time. Plants in these areas are commonly referred to as "facultative" riparian plants which owe their existence to factors other than the water table, such as cold air drainage, topography, reduced competition from other plants, or occasional flushes of water from run-off or short duration flooding. While they offer exceptional value for wildlife, recreation, and related resources, they are not classified as riparian. (10) (Compare to Riparian Area & Historic Riparian)

Fire Management- Fire management standards, guidelines, and practices based upon land and resource management objectives. Fire management direction is used to define the kind, level, and timing of fire protection and use activities, including the appropriate suppression strategies, which efficiently meet management objectives for each management area for the range of expected fire behavior conditions. (8)

(Prescribed) Fire- A wild land fire under preplanned, specific conditions to accomplish specific planned objectives. It may result from either a planned or unplanned ignition. (8)

Fire Suppression- Acts taken to slow, stop, or extinguish a fire. For example, line construction, backfiring, and the application of water or chemical fire retardants. (1)

Fire Suppression Agreement (Joint Powers Agreement)- An Agreement to provide mutual wildland fire suppression assistance and cooperation between the State Forester, as the agent of all cooperating State agencies, and the federal wildland fire agencies. (8)

Forage- Browse (leaves & twigs) and herbage which is available and may provide food for grazing animals or be harvested for feeding. (3)

Forest- Ponderosa Pine Habitat Types. (Compare to Woodland)

Fuel Treatment Agreements- The Forest Service has the authority to cooperate with other parties for fuel treatment work both on and off National Forest System lands. (8)

Grazing Permit- a document authorizing livestock to use National Forest lands or other lands under Forest Service control for livestock production. (8)

Grazing Treatment Plan (Grazing System)- A plan which contains an area where livestock grazing is scheduled in a manner that provides a 90-day (or less) rest period between each grazing period that occurs during the time active forage growth is taking place. Such areas will be designated as time control grazing areas. Such a plan deals mainly with the grazing portion of ranch operations on that land area and does not address the overall ranch operation, even though the Holistic Resource Management Planning philosophy and techniques may be applied and in operation on the ranch. (8) (Common names for grazing systems include: deferred grazing, modified deferred grazing, best pasture rotation, rotation grazing, etc.)

Ground Cover- The percentage of material, other than bare ground, covering the land surface. It may include live and standing dead vegetation, litter, cobble, gravel, stones, and bedrock. Ground cover plus bare ground = 100%. (3)

Guzzler- A device for collecting and storing precipitation for use by wildlife or livestock. Usually, consists of an impenetrable water collecting area, a storage facility, and a trough from which animals can drink. (3)

Habitat Capability- The estimated carrying capacity of an area to support a wildlife, fish, or sensitive plant population. Habitat capability can be stated as existing or future and is normally expressed in numbers of animals, pounds of fish, or acres of plants. (8)

Habitat Type- An aggregation of all land areas potentially capable of producing similar plant communities. (1)

Herbage- Herbs (flowering plants except those developing persistent woody stems above ground). Total aboveground biomass of herbaceous plants (such as grasses and forbs) regardless of grazing preference or availability. (3)

Holistic Resource Management- HRM is a practical, goal-oriented approach to the management of the ecosystem including the human, financial, and biological resources on farms, ranches, public and tribal lands, as well as national parks, vital water catchments, and other areas. HRM entails the use of a management model which incorporates a holistic view of land, people, and dollars. (3)

Holistic Management Grazing Concept- High-intensity, short duration, repeated grazing. "High intensity" does not mean close use. Instead it means high management intensity in which livestock are moved when grazing on key vegetation and impacts on the soil surface reach the level specified for the pasture. The time to move livestock is determined by the use level on key vegetation, degree of soil disturbance, and management objectives. Length of time in each pasture is governed by forage production and soil surface conditions. Under this concept, most of the range area is grazed every year, often more than once. Intensity of use is adjusted according to physiological requirements of the plants and land management objectives. (7)

Hydric Soil- a soil that in its undrained condition is saturated, flooded, or ponded long enough during the growing season to develop an oxygen deficiency that favors the growth and regeneration of hydrophytic vegetation. (Hydrophyte- a plant that grows in water or saturated soil.) (10)

Land Lines- National Forest property boundaries and subdivision lines. (1)

Nonpoint Pollution- Pollution whose source is general rather than specific in location. It is widely used in reference to agricultural and related pollutants. (e.g., agricultural pesticides, logging operation sediments, automobile exhaust, etc.) (4)

Non-structural Improvements- Direct or indirect approaches to improving range, watershed, or wildlife habitat. For example, protecting particular habitats from livestock grazing, manipulating vegetation to achieve plant & animal diversity, increasing or decreasing harvest of game, grazing management, etc. (1, 6, & 7) (Compare to Structural Improvements)

Old Growth- Terrestrial ecosystems characterized by vegetation and associated animals requiring the oldest and most mature successional stages. Old growth forests contain trees normally beyond the age of optimum maturity for economic timber harvest. (8)

Permanent Water- A watering place which supplies water at all times throughout the year or grazing season. (3)

Potential Habitat- Habitat that is suitable but currently unoccupied by that species or community in question. (8)

Potential Natural Community (PNC)- The biotic community that would become established on an ecological site if all successional sequences were completed without interferences by man under the present environmental conditions. Natural disturbances are inherent in its development. (3)

Range Site- Synonymous with ecological site when referring to rangeland. An area of rangeland which has the potential to produce and sustain distinctive kinds and amounts of vegetation to result in a characteristic plant community under its particular combination of environmental factors, particularly climate, soils, etc. (3)

Range Vegetation Projects (Range Manipulation)- Changing one vegetation seral stage to another. It can be done mechanically, chemically, or by fire. Usually, this is done to increase forage for livestock and benefit wildlife also. (e.g., timber harvesting, Pinyon-Juniper removal, range reseeding, etc.) (1)

Rest Rotation- a certain portion of the range area is rested completely from grazing for a whole year on a scheduled basis. (At least three pastures are required). (7)

Riparian Area- Riparian areas are comprised of two component ecosystems: (10)

- 1) a riparian ecosystem- hydric soils and hydrophytic plants (e.g., velvet mesquite, willow, cottonwood, sycamore, alder, & marsh marigold) that are dependent on the water table (its saturated zone or capillary fringe).
 - 2) an aquatic ecosystem- primarily perennial or intermittent water bodies (streams, cienechas, marshes, ponds, lakes). Ephemeral streams can be classified as a riparian area, only if associated with a riparian ecosystem.
- (Compare to Ephemeral Fluvial Ecosystem)

(Historic) Riparian Areas have: 1) hydrophytic plants and remnant hydric soils, or 2) remnant hydrophytic plants and remnant hydric soils. In the first case, hydrophytic plants exist but are unable to reproduce due to the soil losing its hydric characteristics (e.g., decadent mature cottonwoods along eroded channels). In the second case, the necessary plant and soil characteristics no longer exist in an area that was once a riparian area (e.g., older meander terraces in valley plains). (10) (Compare to Ephemeral Fluvial Ecosystem and Riparian Area)

Road Maintenance Levels- (5)

- Level 1: Road normally closed to vehicle traffic.
- Level 2: Road open for limited passage of traffic but not normally suitable for passenger cars.
- Level 3: Road open for public traffic including passenger cars, but may not be smooth or comfortable.
- Level 4: Road suitable for all types of vehicles, generally smooth to travel and dust may be controlled.
- Level 5: Road is smooth and dust free, and the surface is skid resistant, if paved.

Rotation Grazing- A grazing scheme where animals are moved from one grazing unit in the same group of grazing units to another without regard to specific graze:rest periods or levels of plant defoliation. (3) (Compare to Grazing System)

Sensitive Species- Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: a) significant current or predicted downward trends in population numbers or density; b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. (8) (Compare to T & E Species)

Seral- Temporary species or communities that are eventually replaced by other species or communities within the stages of ecological succession. (3) (Compare to Climax and Potential Natural Community)

Silvicultural System- The entire process by which forest stands are tended, harvested, and replaced. It includes all cultural practices performed during the life of the stand, such as regeneration cutting, fertilization, thinning, improvement cuttings, and use of genetically improved sources of tree seeds and seedlings (8)

Species Diversity Index (Diversity Index)- The ratio between the total number of species in a biotic community and some rating of the relative importance (e.g., numbers, biomass, productivity, etc.) of individual species. Diversity indices provide one of the best ways to detect and evaluate pollution. (4)

Structural Improvements- Any type of site-specific improvement that is man-made. (e.g., fences, corrals, water development, etc.) (1) (Compare to Non-structural Improvements)

Temporary Permit- Issued for a period not to exceed one year to graze specified number, kind, and class of livestock for a specific season and area of use. (8) (Compare to Term Grazing Permit)

Term Grazing Permit- Issued for periods up to 10 years and specifies the number,

kind, and class of lives' k, for a specific season and area of use. It grants the permittee priority for renewal and may contain special clauses. (8) (Compare to Temporary Permit)

Threatened and Endangered Species (T & E)- The 1973 Endangered Species Act defines endangered as those species that are in danger of extinction throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered. Only federally listed T & E species are given legal protection under the Act

Time Control Permit- More grazing capacity may become available and more livestock may be needed to achieve allotment management objectives. The planning period of use for the time control grazing area is specified by the current biological plan and control chart. Numbers and seasons of use may vary from year-to-year and will be specified and approved by annual applications. (8)

Transportation System- The transportation network includes all existing and planned roads, trails, bridges, airfields, and other transportation facilities wholly or partly within or adjacent to and serving the planning area. (4)

Watershed Restoration Projects (Watershed Protection)- Involves a combination of land treatment and structural works to maintain or improve total yield, quality, and stability of the flow of surface and subsurface water and to prevent damage and loss due to excessive and uncontrolled runoff, flooding, salination, and siltation. (e.g., water control structures, rehabilitation following activities or fire, controlled grazing, grass seeding or shrub control along gullies, fuelwood harvests, etc.) (1 & 4)

Water Spreader- A terrace, dike, or other structure intended to distribute surface water runoff and increase the area of infiltration. (3)

Wildlife Habitat- The sum total of environmental conditions that provide food, water, and cover for a wildlife species or a population of such species. (1 & 6)

Wildlife & Fisheries Habitat Improvement-

- 1) Direct approach- using tools and mechanical techniques for site specific improvements. Wildlife structures include: spring development for water, brushpiles for cover, rock & log placement in streams for fish cover, etc.
- 2) Indirect approach- manipulating natural forces in the environment. For example, increasing deer harvest to reduce browsing pressure. (1 & 6)

Woodland- Pinyon-Juniper Habitat Types. (Compare to Chaparral)

S O U R C E S

- (1) Prescott National Forest Plan, USDA Forest Service, 1984
- (2) Environmental Impact Statement for the Eagle Peak & Buzzard Timber Sales, USDA Forest Service, Gila National Forest, July 1990
- (3) A Glossary of Terms Used in Range Management, Society of Range Management, 1989
- (4) Wildland Planning Glossary, USDA Forest Service, Technical Report PSW-13/1976
- (5) Environmental Impact Statement for Prescott National Forest Plan, USDA Forest Service, 1986
- (6) Wildlife & Fisheries Habitat Improvement Handbook, USDA Forest Service, 1986
- (7) Wildlife Habitats in Managed Rangelands, USDA Forest Service & USDI Bureau of Land Management, 1986
- (8) USDA Forest Service Manuals (2200, 2400, 2600)
- (9) Endangered & Threatened Species of Arizona & New Mexico, USDI Fish & Wildlife Service, 1987 (with 1988 addendum)

- (10) Riparian Area Survey Evaluation System, USDA Forest Service, SW Region, 1969
(11) Terminology of Forest Science, Technology, Practice, and Products, Society of American Foresters, 1971