

Kaibab National Forest
Forest Plan Monitoring Report
Fiscal Year 2005

Forest Supervisor Certification

I certify that the Kaibab National Forest Plan as amended is sufficient to guide management of the Forest over the next year. Changes that should be considered over time to maintain the viability of the Plan are identified in this document.

/s/ Elizabeth M. Schuppert
MICHAEL R. WILLIAMS

Date

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Introduction

The primary objective of the FY 05 Monitoring Report is to organize the Forest's initial thinking about the needs for change to be considered in a Comprehensive Evaluation Report (CER). The CER will be a collaboratively developed document that evaluates the existing condition on the KNF, continues or provides new desired conditions, and identifies the potential needs for change that may be carried into the 2009 or subsequent forest plan revisions.

It is important to understand that this report is not the CER. We intend to begin working with the public and others later in FY 06 and into FY 07 to develop the CER. It is also important to note that both this report and the eventual CER are menus of possible changes and not a list of the changes that will be undertaken in revision. Revision is very likely to only take on a subset of the needs identified.

This report builds upon a similar process begun with the FY 04 report. Specifically this Monitoring Report begins to:

- a. Identify factors affecting current conditions and trends or influencing implementation of the current Plan (1909.12 sec.24.1)
- b. Identify substantial changes from past conditions or trends (219.6a1), impacts from management activities or suitable uses, and operational controls (i.e. mitigations) that influence those impacts (1909.12 sec. 24.1)
- c. Identify desired conditions from the current Plan, Plan FEIS ... or other sources (1909.12 sec. 24.1).
- d. Compare and document the significant gaps between existing conditions and trends to desired conditions (1909.12 sec. 24.1), including evaluating progress made toward desired conditions under the current Plan, clearly indicate the need for change based on conditions and trends (1921.72)

The work begun with this report is expected to be completed in FY 06 in a collaborative process.

From a draft Regional Working Group product:

The comprehensive evaluation is an important foundation for forest plan revision under the 2005 planning rule. "The purpose of the comprehensive evaluation is to provide information for the management review where the Responsible Official decides whether there is a need for change" (FSM 1924.1). "The evaluation report is the principal document that supports the need to revise a plan" (36 CFR 219.6).

The CER replaces (but is slightly different from) the Analysis of the Management Situation report that was completed prior to development of our current Forest Plans. The [CER] ... uses assessments and other resource condition and trend information to evaluate how Forest management strategies and management plan direction have been affecting ecological, social and economic sustainability and whether the information indicates a need to change the way we are managing our land and resources.

"Sustainability" was evaluated in the original Plan primarily in terms of maintaining various outputs to meet demands in timber, range, recreation and wildlife (over a 50-year planning horizon) while minimally protecting other values rather than to ensure a balance of ecological sustainability with social and economic sustainability.

The Forest is attempting to reorient its management to emphasize long range improvement of land productivity and the protection and enhancement of resource values. The goal is to achieve

a situation that can provide a wide mix of outdoor recreation opportunities, including hunting and fishing, that range from primitive to urban, and that can respond to local and regional demands for water, forage, wildlife habitats, and wood products. These outputs would be produced on a sustained basis while maintaining soil, air, and water resources at or above minimum applicable standards. Levels of outputs and uses are adjusted to be within long-term supply potentials, and to ensure the harmonious and coordinated management of all resources without impairing the productivity of the land. Non-renewable resources are adequately protected to ensure their future availability.

This conclusion is presented in the Plan relative to these outputs:

[T]his Forest is able to satisfy projected use for timber, wilderness, and dispersed and developed recreation across the five-decade planning horizon under the desired resource conditions presumed when the AMS was made. Permitted grazing use exceeds grazing capacity in Planning Period 1; however permitted grazing use is brought into balance with grazing capacity before the end of Planning Period 1 through reduction in permitted grazing use and increase in grazing capacity. Increases in grazing capacity in all planning periods are predicated on the maintenance of existing range structural improvements by the range allotment permittee, re-treatment of existing non-structural (forage) improvements, investment in additional nonstructural improvements made in association with commercial thinning in timber stands, regeneration cutting in piñon-juniper stands, and watershed improvements. The projected future demand for wildlife and fish recreation use exceeds the amount supplied in the Forest Plan in all planning periods.

Plan Goals and Objectives are discussed below by resource area. (A goal is "a concise statement that describes a desired condition to be achieved sometime in the future... it has no specific date by which it is to be completed." [36 CFR 219.3].) Other than for fire use, recreation and noxious weed management, goals have not been changed since the Plan's inception. For each resource section a discussion of the success the Forest has had in attaining the goals and projected outputs for the period from 1988 through 2004 will be presented, trends in accomplishment and budget will be discussed and needs for change will be presented. Table 1 summarizes outputs (objectives) for 50 years.

Table 1. Comparison of Selected Outputs to Potential Supply and Projected Use

Resource Output	Unit of Measure	Forest Plan		Potential Supply		Projected Use	
		Period 1	Period 5	Period 1	Period 5	Period 1	Period 5
Sawtimber and Roundwood ASQ ¹	MBF	768,520	898,180	1,157,990	1,160,290	768,520	898,180
Grazing Capacity	AUM	710,000	753,000	750,700	1,097,000	713,200	771,600
Permitted Grazing Use	AUM	777,150	727,000	750,000	1,097,000	780,500	745,700
Wilderness Recreation Use	RVD	74,600	109,800	234,000	234,000	74,600	109,800
Dispersed Recreation Use	MRVD	9,707	11,175	27,000	27,000	9,707	11,175
Wildlife- fish Recreation Use	MWFUD	1,934	1,989	1,943	3,500	2,320	5,002
Developed Recreation Use ²	MRVD	5,899	9,975	5,949	14,941	5,899	9,975
¹ ASQ - Allowable Sale Quantity ² Includes both private and public sectors.							

Outdoor Recreation

Goals

The 1988 Kaibab National Forest Plan was primarily focused on outputs and production as related to projected use. The outdoor recreation section reflected this in its monitoring items, but was able to incorporate both provision of visitor days (outputs) and some of the desires and needs of Forest users in its goals. The goals were structured to support increased and more varied recreation opportunities. They were based on “planning level 4” which predicted increasing budgets, and also situated the forest to take advantage of the new concept of private investment in recreation facilities (sometimes called public-private venture where private parties would develop recreation facilities on public lands), use of concessionaires to operate some existing Forest Service facilities (also thought of as private sector), and use of partnerships to provide some recreation opportunities. The six monitoring items for recreation were developed to track production (in terms of numbers of Recreation Visitor Days), but also to track the viability the public-private development opportunities, and whether the budget trends were supporting the plan for increased recreation opportunities. The current goals and findings are listed in Table 2.

Table 2. Forest Plan Goals and Accomplishment in Outdoor Recreation.

Goal	Accomplishment
❖ Manage the recreation resource and provide facilities to increase opportunities for a wide variety of developed and dispersed experiences.	In 2006, the Forest began the developed recreation site facility master planning process. This process identifies the overall recreation niche of the forest, the focuses on bringing the developed recreation sites into balance with

Goal	Accomplishment
<p>❖ Manage facilities and use to minimize resource degradation, and to provide for the safety and well being of the public while in the Forest.</p>	<p>the existing maintenance and operations needs and budget. Similar processes will need to be used to balance trails and dispersed recreation opportunities. Clearly, the goal now is to specify the recreation niche for the KNF and align the recreation resources with it.</p> <p>The Forest has reconstructed developed facilities providing for over 1800 people at one time (PAOT) and added capacity for 3 new group camping sites. (See Appendix 1 for details.) Existing facilities have also received heavy maintenance in order to extend their serviceability and assure public safety. Developed sites that meet the forest recreation niche will be retained and considered for capital improvements.</p> <p>In 2004, the Recreation Opportunity Spectrum was updated, and adopted in a Forest Plan amendment. The update provided a comprehensive evaluation of the existing and desired conditions for the recreation opportunities to be provided. A Recreation Opportunity Spectrum-Scenery Management System Guidebook was developed in conjunction with the amendment. The guidebook identifies recreation opportunities and how project activities in each program area can be designed to maintain the ROS. It provides desired condition descriptions, and allows for documented exceptions when needed to accommodate forest health and hazardous fuels reduction projects.</p>
<p>❖ Design resource activities to maintain and enhance visual quality.</p>	<p>In 2004, the Scenery Management System was adopted on the Williams and Tusayan Ranger Districts via a Forest Plan amendment. Comprehensive mapping was completed for these districts, and a Recreation Opportunity Spectrum-Scenery Management System Guidebook was developed. The guidebook gives suggestions for scenery management in relation to each program area, provides desired condition descriptions, and allows for documented exceptions when needed to accommodate forest health and hazardous fuels reduction projects.</p>

Goal	Accomplishment
<ul style="list-style-type: none"> ❖ Provide visitor information services [VIS] to interpret the resources, uses, and management of the Forest. 	<p>Visitor Information Services are provided at the City of Williams-Kaibab National Forest Visitor Information Center and the Kaibab Plateau Visitor Information Center. Both utilize partnerships with Interpretive Associations and National Park Service (and Williams Chamber of Commerce) to operate the facilities. These centers accommodate 246 PAOT and both were opened in this planning period. Campground interpretive programs and other environmental education efforts were developed in the Plan period and have continued to be provided each season. Providing the same level of VIS will probably not be possible in the future if budgets remain the same or decrease. The forest will provide a limited program with increased reliance on volunteers, partners and interpretive associations.</p>
<ul style="list-style-type: none"> ❖ Maintain a variety of Forest trails, considering people's needs and desires for horseback and foot travel, winter sports, and motorized and challenge and adventure opportunities, as well as opportunities for the handicapped. 	<p>The existing trail system provides opportunities for foot travel and horseback on some trails, mountain bikes and OHV routes are provided on existing roadways, and there are cross-country skiing and snowmobiling opportunities on developed winter trail systems. There are approximately 400 miles of developed trail provided on the Forest compared to “200+” miles identified in the 1988 Plan. The trails program will need to be aligned with the ability of the Forest to provide trail maintenance with the funding levels provided.</p>
<ul style="list-style-type: none"> ❖ Establish off-road vehicle [ORV] closures as needed to maintain other resource objectives. Manage ORV use to provide ORV opportunities while protecting resources and minimizing conflicts with other users. 	<p>ORV closures as identified in the Plan have been implemented. Several hundred miles of roads have been closed or obliterated. Despite these efforts, user-created routes continue to increase each year. The Forest is currently participating in a Five-Forest OHV EIS to decide how to best manage OHV use consistently across the Forests. The Forest is currently carrying out a four-year program of collaboratively developing transportation analyses and eventual decisions about motorized route classification, quantity and availability to various users. A parallel process with forest plan revision (but distinct from it) is implementation of the 2006 Travel Management Rule. This will establish the system of roads, trails and areas that will be open to motorized vehicle use. It is expected to be begin to be implemented on the KNF by 2009.</p>

Goal	Accomplishment
❖ Coordinate the management of recreation resources and activities with the Grand Canyon National Park, Coconino County, and the State of Arizona to complement their roles in providing outdoor recreation.	The Forest has recreation-related agreements in place with the Arizona Game and Fish Department, the State of Arizona, the City of Williams, Coconino County, Grand Canyon National Park and the Williams Chamber of Commerce. Many of these agreements allow us to leverage personnel or funding to provide more service than we could provide independently. All such activities will need to be aligned with the forest recreation niche after 2006.

Objectives

Table 3 displays recreation use objectives and estimates of attainment.

The Kaibab National Forest participated in the first round of the National Visitor Use Monitoring (NVUM) project from January 1 through December 31, 2000, and has recently completed the second round from October 2004 through September 30, 2005. The Kaibab National Forest experienced an unusually low snow year for the first winter of the survey and felt use was below normal. During the mid-May, the General Forest Area was closed for 3 weeks due to fires that also reduced overall forest visitation. The second round was completed during a more normal year, and preliminary results show an increase in visitation counts. The final numbers are not available to include at this time.

Table 3. Forest Plan Objectives and Accomplishment in Outdoor Recreation.

Resource Output	Unit of Measure	Forest Plan (Annual, Period 1)	
		Objective	Attainment (2001)
Wilderness Recreation Use	RVD	7,460	3,654
Dispersed Recreation Use	MRVD	971	(1,956 + 505 ¹) = 2,461)
Wildlife-fish Recreation Use	MWFUD	193	
Developed Recreation Use	MRVD	5,900	

¹Not included in these estimates are use by people who drove through the Forest on state or federal (non-FS) highways to visit the Grand Canyon, even if sight-seeing were an important part of their trip. This was probably equivalent to about 505,000 RVDs annually in the late 1980s and has probably increased since then. This use was included in the Forest's Objectives in the Plan.

Table 4 displays the results and an interpretation developed by the Forest for an RVD estimate.

Table 4. Annual recreation use estimates in 2000.

	National Forest Visits	Non-Wilderness Site Visits	Wilderness Visits
Visits	560,000 +/- 149,000	690,000 +/- 200,100	6,545 +/- 2715
RVD Estimate ¹	1,960,000	1,956,300	3654

¹Inferred from average NF visit figure of 42.0 hours and information about length of site visit stay for Wilderness of 6.7 hours.

During their visit to Kaibab National Forest the top five recreation activities of the visitors were viewing wildlife and natural features, camping, general relaxation, and hiking or walking. The top primary activities (reasons stated for visit) were developed camping, hiking/walking, and viewing wildlife.

Prior to 2000, use estimates were based simply upon “swags” by personnel working in the recreation field. Actual use (in RVDs) is probably usually higher than that reported using a scientific methodology in 2000 for the reasons stated above. The Plan EIS reports a (“No Action”) projected annual use of 1,118,000 RVDs for 2000, including private-sector use but excluding “wildlife activities”. The actual use is substantially more than than shown in the NVUM, but is substantially lower than the projected use for the forest in the existing plan. The Forest is not expected to have use in excess of supply for wildlife and fish recreation use as expected when the Plan was created (Table 1).

The Kaibab National Forest has increased its developed and dispersed recreation opportunities in the past 17 years.

Developed Recreation – Table 5 summarizes developed recreation investment activity for the period. The ten new or redevelopment actions completed have accommodated a demand for developed use as expected. The objective level of use was not attained for a number of reasons including:

- the closure/dropping of six facilities;
- the relative lack of success in the public-private development ventures; and,
- public funding levels were lower than expected.

Appendix 1 lists the details of planned recreation developments, including additional sites that have been developed beyond those noted in the Plan as special project funding became available.

Table 5. Accomplishment of Developed Recreation Investments.

Activity	Public	Private	Public/Private	Total
New	1		1	2
Improvement/Reconstruction/Expansion	6	2		8
Planned	5	1		6
Closed/Dropped	1	4	1	6

Dispersed Recreation (including trails and dispersed recreation opportunities) – There were 27 opportunities identified in the Plan. Twelve have been constructed, some with national forest funds, but a number with partnership funding including:

- State Lake Improvement Funds - Kaibab Lake toilet and boat ramp;
- State Heritage Funds – Overland Road and Rainbow Rim trailheads, Benham and Bill Williams Trailheads;
- KV Funds - Route 66 wayside exhibits;
- Arizona Trail Association – Arizona Trail trailheads; and,
- Great Western Trail Association – Wayside exhibits.

Outcomes for dispersed recreation objective attainment are similar to those for developed recreation as discussed above.

Wilderness – Actual recreational use of the Forests four Wilderness areas seems to be about half of the Plan objective for the period. There are a number of factors likely contributing to this difference besides the problems with the 2001 sample year previously discussed (that could narrow the gap):

- funding has limited management of the areas;
- the Pumpkin Fire (2003) burned over most of the Kendrick Mountain Wilderness Area Including the three main trail systems. Pumpkin and Bull Basin Trails have not yet stabilized and require heavy maintenance annually to keep them open. Kendrick Trail has stabilized; and,
- changes in demographics. There is some published evidence that wilderness use is shifting from overnight to day use, from some popular Wildernesses to others less used, and growth in this recreational sector may be slower than it was in the past.

Trends

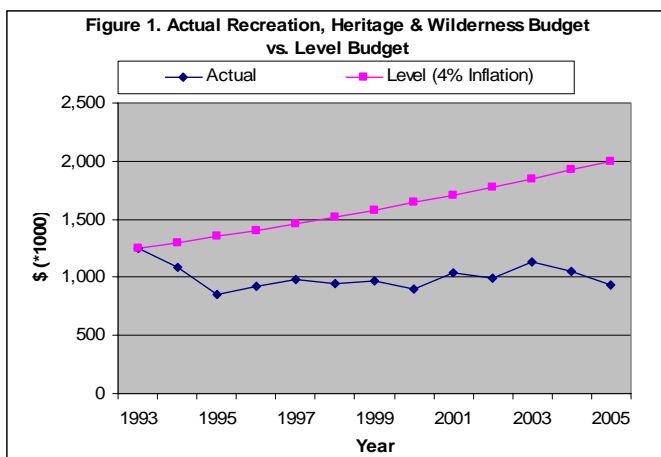
Overall, National Forest funding is decreasing causing a decrease in staffing and the ability of the Forest to directly respond to increases in demand for services across all recreational programs.

Use of private sector and partnership opportunities has allowed the forest to increase recreation opportunities, although public-private venture development often has not worked out as expected either (Table 5). Capital investment funding has allowed reconstruction/expansion of existing facilities (no new campgrounds have been constructed on the Forest). Concessionaire operation of developed campgrounds has allowed aging facilities to continue to be used and maintained, and partnerships have allowed operation of visitor information centers and the development of dispersed opportunities.

Use of the Forest generally reflects economic and social conditions. Fluctuations in gasoline prices, the value of the US dollar, and more recently terrorist threats in the United States have caused dips in visitation. Nonetheless, Arizona is the second fastest growing state in the country, and there is an overall increase in the number of people recreating on the Forest. Proximity to Grand Canyon National Park filters the economic and social effects to some extent, as people still want to visit the park, and some utilize Forest Service facilities enroute.

Many of the cities and towns in northern Arizona and southern Utah have turned from commodity based economies to those based on tourism. This change has provided an increase in employment, but often the retail and service sector jobs created are lower paying. The relative scarcity of private land in the state and the influx of population has significantly raised the cost of living in Coconino County (especially relative to the cost of homes in the larger towns and cities). One effect of the high cost of living is that previously undeveloped private land outside of the population centers is being subdivided and developed. The change in land use effects forest resources both in recreation (increased user created trails, increased OHV use) and other programs causing more person-wildlife encounters and displacement as well as soil erosion and vegetation damage.

Dramatic increases in the popularity and number of OHV users is apparent both in resource damage, and in a change of users. The trend is toward more mechanized forms of recreation and away from foot and equestrian travel.



Recreation funding is expected to continue to limit the ability of the Forest to meet its goals related to operation and maintenance of its facilities. Figure 1 illustrates the decrease of recreation funding over time to currently less than half of 1993 levels. This has substantially reduced the Forest's capacity relative to:

- Operation and maintenance of developed and dispersed sites;
- Maintenance of trails;
- Staffing visitor information centers;
- Providing interpretive programs;
- Responding to requests for special use permits, including (large group special events, commercial recreation business proposals, and outfitter-guides);
- Responding to increasing popularity of incompatible uses (mountain biking and OHV riding) in wilderness areas, as well as increased heritage site vandalism. and,
- Monitoring special use events.

Reliance on volunteers and partnerships will increase as Forest programs change and staffing decreases. For example, Northern Arizona University School of Forestry has assisted with wilderness monitoring at Kanab Creek. However, volunteer programs and partnerships also include a continuing commitment by the Forest Service and even this may become a challenge if funding levels continue to decrease. New skills and methods may be needed, and there will be less Forest Service presence on the ground.

The need to reduce hazardous fuels and improve forest health is resulting in an increase in the number and type of vegetation treatments across the forest. Recreation users will be temporarily displaced from some areas over time, and recreation opportunities will be reduced somewhat as a result. There will also be a corresponding temporary reduction in scenic quality as a result of many of these activities. Public acceptance of the quantity of vegetation treatment needed across the landscape will be more and more dependent upon careful mitigation of sites where mechanical treatment is occurring. Research has shown that money spent to improve the appearance of harvest activities needs to be viewed as a necessary investment to ensure acceptance of the work¹.

Changes Needed

Desired conditions for recreation resources need to be explicitly and collaboratively developed. Plan goals should be updated to reflect changing conditions and monitoring items related to attainment of desired conditions should be developed to reflect these changes. The Forest Plan currently monitors visitor use and places much emphasis on projected use. For example, the goal of increasing recreation opportunities to respond to projected use (at least with public expenditures) is no longer valid with the budget trends experienced. Socio-economic data indicates the forest has the most

Developed and dispersed recreation opportunities will be limited to the funding available and will not provide all recreation opportunities desired by forest users. It is expected that the number of developed facilities will be reduced or changed. Desired conditions will include the recreation niche, and provision of developed and dispersed recreation opportunities will relate to the niche. Recreation monitoring needs to be changed to better relate site/area capacity to visitor use and funding available. In addition, the

¹ 2005. Ryan, Robert L. Social Science to Improve Fuels Management: A Synthesis of Research on Aesthetics and Fuels Management. Gen Tech Rep NC-261. St. Paul, MN: USDA Forest Service, North Central Research Station. 58 p.

management direction needs to be flexible enough to allow for adjustments in the management tools when it appears use is meeting or exceeding capacity or the types of use change.

OHV use requires specific management decisions as to where, when and what types of users will be permitted. The variety or permitted uses of trails provided may be limited to those that can be maintained regularly, those where volunteer groups can assist with maintenance, and some new OHV routes with accompanying facilities may be added to accommodate this use where a fee may be charged for maintenance and operation.

Wilderness capacities need to be established, and use monitored. If capacity is met or exceeded, additional management tools may need to be implemented that limit or restrict use.

Visitor information services and the ability to provide interpretive programs may be limited and changed. Additional reliance on volunteers, partnerships, and interpretive associations will be required in order to continue to provide these services. The recreation opportunity spectrum and scenery management system is currently inconsistent across the Forest and needs to be updated and adopted for the North Kaibab Ranger District. These changes allow the Forest increased flexibility to respond to new emphases, such as hazardous fuels reduction and reintroduction of fire into the ecosystem.. Monitoring should include a gross estimate of total acres in each ROS and SMS class affected by project work across the forest and what fire condition class the acres are in. This would provide a measure of whether the Forest is providing a variety of recreation experiences, high quality scenic resources, and a sustainable ecosystem.

More emphasis will need to be placed on incorporating scenery management in fuels reduction and forest health projects. Public support of the quantity of acres that need to be treated will be most successful if this occurs.

A fundamental shift in how we manage recreation appears to be on the horizon. The Forest has already embarked on developing a recreation niche and aligning the developed recreation sites to it. There is a need to continue this activity in the dispersed recreation and trails programs. Research indicates a move away from the Forest Service doing all toward citizen-based conservation. Use of volunteers, partnerships, sponsorships and other supplemental programs will be critical to the Forest being able to provide recreation and visitor information service into the future.

Heritage Resources

No objectives are set for the heritage program in the Plan. There is one goal statement:

- ❖ Inventory, evaluate, nominate, protect, study, interpret, and enhance heritage resources in accordance with the management prescriptions. Coordinate planning for these activities with the State Historic Preservation Office, State Archaeologist, and other State and Federal agencies.

Figure 2 displays the annual acres inventoried, the number of sites recorded and the number of consultations completed. Table 6 summarizes accomplishments for the Plan period.

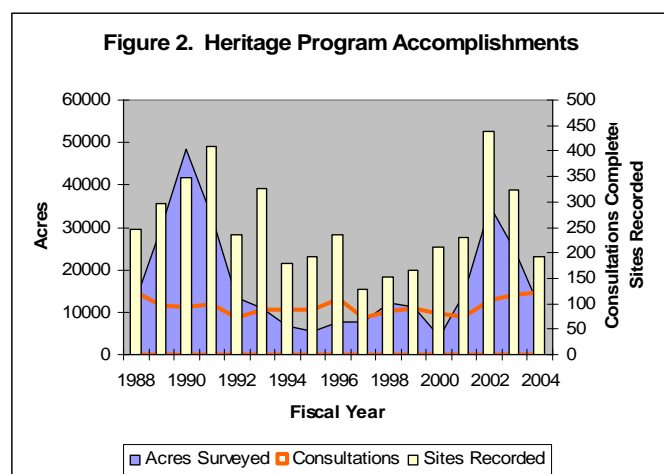


Table 6. Heritage Activity Summary.

Acres Inventoried	Sites Recorded	Consultations Completed
288,040	4,304	1,607

There are two major peaks in surveys (acres inventoried and sites recorded) during the period, one resulting from large scale timber sale surveys (circa 1990) and another in the past few years in response to greatly increased planned activity in the fuels treatment programs. As this work is funded by benefiting functions, the level of work accomplished is not a direct function of heritage funding displayed as part of Figure 1.

Goals that have been undertaken despite the decline in the heritage budget include:

- establishment of tribal relations program including a designated tribal liaison and the completion of memoranda of understanding with three consulting tribes (Hopi, Havasupai and Kaibab Paiute);
- nomination of 27 individual properties, either singly or as part of larger groupings to the National Register of Historic Places;
- study and interpretation of significant heritage resource properties.
- hosting 16 Passport in Time (PIT) Projects since 1991.

With the exception of the Tribal MOUs and PIT projects, most of the heritage-related activities were carried out before 1998.

A potential need for change in the Heritage program is to develop a process to evaluate new interpretive opportunities relative to the forest recreation niche and funding available for maintenance of these opportunities.

Wildlife and Fish

There is one objective (in Table 3 and discussed in Recreation, above) and five goal statements in the Plan about Wildlife and Fish. The goals are bulleted and discussed below.

- ❖ Improve wildlife habitats through expanding knowledge of species requirements, development of habitat quality and diversity, and the identification and protection of key habitats.

The 1987 Forest Plan directed even-aged timber harvest strategies across all acreage determined to be suitable for timber production. “Suitable” was defined as the area remaining after subtracting out those lands withdrawn from timber management (e.g., wilderness areas, recreation sites, and Research Natural Areas) and subtracting out lands not capable of sustained timber management. Under the 1987 Forest Plan, timber was typically harvested by regenerating trees in 30 to 50 acre, even-aged units. Although shelterwood treatments left a portion of the overstory, even-aged management creates abrupt structural variation between stands (“edge-effects”) while decreasing structural variation within stands. The loss of structural variation within stands simplified or eliminated wildlife habitat across most of the treatment area. At the time, many wildlife biologists thought that maximizing edge-effects, i.e., increasing horizontal diversity was a benefit to wildlife, especially migratory birds and game species. In time, it was understood that simply increasing numbers of individual species and/or species richness came at a cost to forest interior species. As species associated with horizontal diversity increased, species associated with vertical diversity decreased.

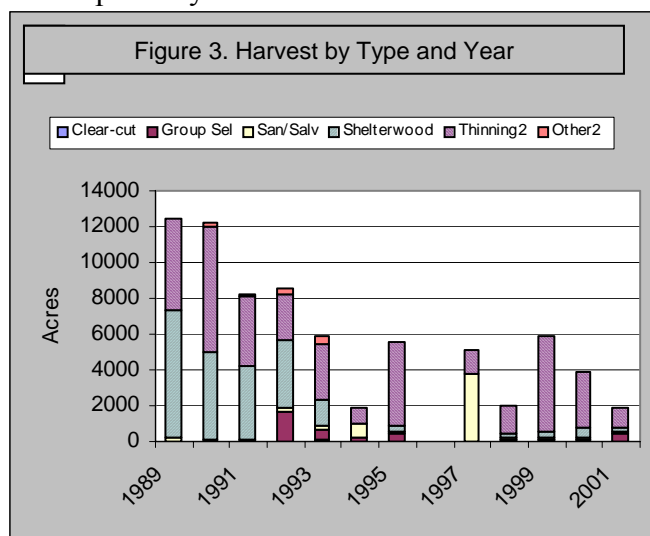
A 1990 amendment to the 1987 Forest Plan initiated a project to designate 15 percent of the "best" suitable timber base as blocks of old-growth. "Old-growth" was defined as sites dominated by trees greater than 120 years old and greater than 18 inches dbh. The North Kaibab Ranger District (NKR D) had been inventoried in 1989 and the Southern three Districts (the Chalender and Williams Ranger Districts later combined into one District) were inventoried in 1990-91. Old-growth reserves were designated within each of the Forest's Management Areas. The concept of old-growth reserves was predicated on the supposition that designated lands would provide blocks of old-growth forest for perpetuity. This approach did not account for the difference between historic and present forest conditions, i.e., the impacts of management (primarily fire suppression) over the last century and the current threat of high-intensity crown fires. This assumption does not correlate historic fire return intervals with current forest/fuel-loading conditions which nearly ensures the eventual loss of old-growth forest over time. In addition, the designation of old-growth blocks relegates the remainder of the forest, i.e., the majority of the forested landscape, as primarily serving to supply timber and eroding wildlife habitat values.

The Forest Plan was updated again in 1996 to address changing societal values. This amendment represented a fundamental shift in forest management by changing the emphasis from managing a timber base to managing forest habitat. The silviculture program became a key tool in managing wildlife habitat for sustainability rather than simply for fiber production. Even-aged management was largely replaced by uneven-aged management with the adoption of the goshawk management recommendations (Reynolds et. al. 1992). Rather than regenerating 30 to 50 acres at a time, the desired future condition became a mix of size-classes, generally at the ½ to 2 acre scale, with desired results of:

- 10 percent of the regenerated area non-stocked or seedlings;
- 10 percent of the regenerated area as saplings (1-4.9 inches dbh);
- 20 percent of the regenerated area as young trees (5-11.9 inches dbh);
- 20 percent of the regenerated area as mid-aged trees (12-17.9 inches dbh);
- 20 percent of the regenerated area as mature trees (18-23.9 inches dbh); and,
- 20 percent of the regenerated area as old trees (> 23.9 inches dbh).

These recommendations were developed to provide habitat for a suite of key goshawk prey species while moving forest conditions closer to the historic range of variability. Harvest objectives have become recreating patterns of natural ponderosa pine forest patch dynamics. The Forest Plan is now rooted more in forest ecology than in timber production. Current management continues this trend, but it does not return to pre-European settlement conditions across the Forest. The actual changes in forest management, including group selection on suitable timberlands, have been implemented by the Forest since 1992.

Per acre, the average treatment now cuts about 25 percent of the total board feet that was cut under the original Forest Plan. The complexity in implementing this approach also means that total acres treated per year has also decreased (Figure 3). Nevertheless, managing for this level of heterogeneity is expected to move the Forest much



closer to the historic range of variation. In terms of wildlife habitat, this results in an increase in horizontal and vertical structural diversity in the forest. The reduction in tree density and decrease in canopy closure should increase availability of moisture, space, and light for understory species, i.e., grasses, forbs and shrubs. This also realigns the current tree growth trajectories so that shade-tolerant species such as white-fir are reduced and shade-intolerant species like aspen are retained.

The 1996 amendment increased acres occupied by old-growth from 15 to 20 percent of the entire timber base. An additional 20 percent of the Forest will be dominated by trees greater than 100 to 200 years-old and greater than 18 inches dbh (note that age is highly variable, depending on site condition). This old-growth structure will occur throughout the forest rather than in old-growth set-asides. Old-growth conditions will be tracked as a percentage of the area; the precise location of these conditions will move over time as new groups of trees grow into old-growth conditions, existing groups die, or are harvested. The Forest Plan still results in commercial harvest of trees greater than 18 inches dbh. Trees greater than 18 inches dbh are harvested in areas where: existing trees in the 18 to 24 inch dbh size-class can be thinned to stimulate recruitment into the larger dbh size-classes; trees greater than 18 inches dbh are heavily infested with mistletoe; and where numbers of large trees exceed target numbers. For example, on the Kaibab Plateau there are more ponderosa pine trees in the 18 to 24 inch and greater than 24 inch dbh size-classes than there were historically. Where these size-classes exceed the above prescription, as evaluated at 3 spatial scales, trees greater than 18 inches dbh may be cut. Of note, however, is that there are fewer trees greater than 30 inches dbh than historically occurred on the Kaibab Plateau.

The amended guidelines call for retaining 3 to 6 of the largest residual trees in regenerated patches greater than 1 acre. In actual practice, these legacy trees are also often left in regeneration harvest patches less than 1 acre. Legacy trees and the size-class ratios described above will lead to the presence of old-growth embedded in the forest matrix across the landscape. Uneven-aged management at this scale will eventually lead to less structural variation between stands while increasing structural variation within stands, i.e., habitat heterogeneity will increase when viewed at the local scale, but homogeneity will increase at landscape scales, mimicking historic forest conditions. The designation of “stands” should become increasingly subjective.

From the wildlife habitat perspective, creating this interspersed age- and size-classes and openings is a key aspect of the amended Forest Plan. Restoring the grouped nature of trees, the interspersed openings (i.e., roost space for groups of trees), and patches of young trees should aid in achieving sustainability. By reducing fuel ladders, interrupting what are now largely continuous canopies, and decreasing stand stocking densities, the resulting forest should be more resilient to drought conditions, insect epidemics and catastrophic fires (Reynolds et. al., undated). Reducing the threat of high-intensity crown fires will allow the increased use of both prescribed fire and naturally ignited fires to maintain forest conditions and bring management actions closer in line with historic fire return intervals.

Direction for the protection and recovery of Mexican spotted-owl (MSO) was also incorporated into the Forest Plan in 1996. The Kaibab National Forest has 6 designated Protected Activity Centers for MSO and **XX** acres of critical habitat. In these locations, MSO habitat concerns always supersede goshawk-related guidelines. Designated critical habitat includes all the pine-oak forest on the Williams Ranger District. Critical habitat primary constituent elements direct managers to maintain forest conditions well above historic conditions. Although some of the Protected Activity Centers have resident MSOs, no MSOs have ever been detected in pine-oak forest on the Williams District despite years of annual surveys. This leaves the central portion of the Williams District at risk to high-intensity crown fire, but this risk is balanced with providing for the future recovery of the MSO. All mixed-conifer forest on the North Kaibab Ranger District is also designated critical habitat. No resident MSO have ever been detected anywhere on the North Kaibab District, despite surveys covering nearly ½ million acres since

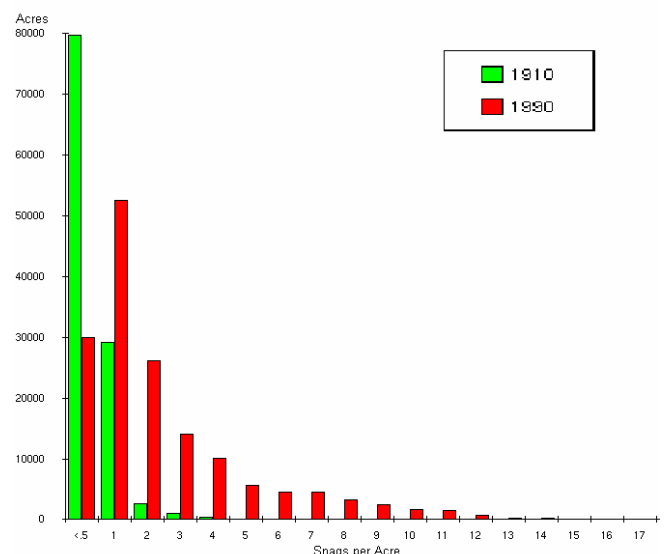
1988. Fire-threat will remain a concern in areas purposely managed outside the historic range of variability, such as unoccupied MSO habitat, particularly where forested lands do not even appear to qualify as MSO habitat but which the Forest is directed to manage as MSO habitat.

Currently, most forested acres support tree densities above the historic range of variation. Excess stem densities typically occur in the 5 to 12 inch dbh size-class, largely as a result of fire-suppression throughout the 1900s. Removal of trees within this size-class is difficult because of the limited market for small trees. Without a viable market, timber sales designed by Forest Service personnel do not sell, precluding implementation of forest management. Subsequently, removal of the smaller tree size-classes has been deferred or directly funded through the FS budget. The latter approach is intrinsically limited in scale, making it ineffective and, in an era of declining Federal budgets, no longer feasible.

Our implementation rate has not matched natural disturbance processes such as the frequent fire return intervals inherent to southwest ponderosa pine forest ecosystems. This discrepancy in acres treated allows the current forest to continue developing beyond the historic range of variation, leading to even denser forests. Pre- and post project surveys from timber sales implemented under the 1996 amendment have shown that, within some project areas, more volume has grown during the period of project planning and subsequent implementation than was actually removed from the area. Projects are still reducing stem and crown bulk densities, but the project targets are often inflated above the actual Forest Plan guidelines as an attempt to avoid being held up by appeal or as a result of compromising with elements of the public (Mark Herron, Williams District Silviculturist, personnel communication 2006). The combination of these influences means that much of the forest is moving out of balance faster than the rate of treatment.

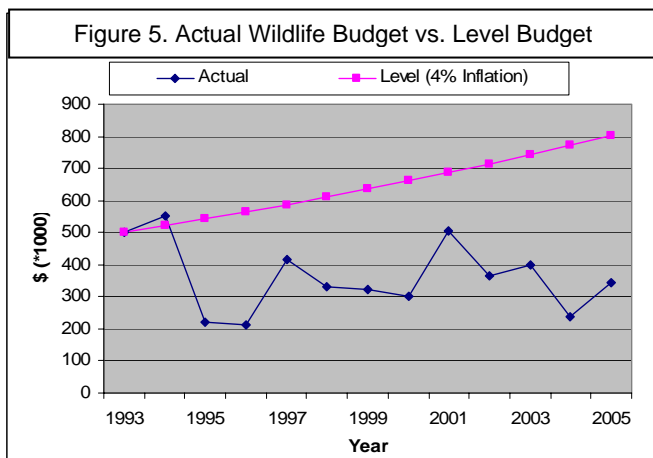
The Forest Plan directs 2 snags per acre be left in ponderosa pine habitats and 3 snags per acre in mixed-conifer spruce-fir forests. More recent research indicates that these levels may be above historic conditions (Ganey, Joseph L., 1999. Snag density and composition of snag populations on two National Forests in northern Arizona. *Forest Ecology and Management* 117, 169-178.). Additional research has emphasized the value of dead wood in living trees such as trees struck by lightning and trees with dead upper boles as a result from insects, disease, or injury (Waskiewicz, J.D. 2003. Snags and partial snags in managed, relict, and restored ponderosa pine forests of the southwest. Masters thesis. Northern Arizona University, Flagstaff, Arizona. 105pp.). Lange & Stewart (1909) surveyed the Kaibab Plateau and documented less than 1 snag per acre across most of the Kaibab Plateau when surveying forest conditions little altered by human activity (Figure 4). Today's snag levels exceed the historic conditions. The trend in snags numbers is also expected to be affected by the broad scale use of fire as a management tool and by increases in insect activity related to drought conditions. Both actions tend to increase snag numbers – sometimes in a dramatic fashion. However, fire- and beetle- created snags do not have the longevity of snags created by other processes, e.g., mistletoe (Chambers, C.L., and J. N. Mast. 2005. Ponderosa pine snag dynamics and cavity excavation following wildfire in northern Arizona. *Forest Ecology and Management* (216) 227-240.). Current and future management actions may result in creating snags with relatively short

Figure 4. Snags per Acre in 1910 and 1990 on the Kaibab Plateau



longevity. If this occurs, snags retained through silviculture treatments may provide resource consistency for snag-dependent species.

Acres treated under the timber program far exceed those treatments actually paid for by the wildlife program. The amount of work accomplished by the wildlife program is directly related to the size of the program budget. “Wildlife dollars” for each National Forest are determined at the Regional Level. The wildlife budget for the Kaibab Forest has failed to keep-up with inflation since 1994 (Figure 5). Relatively speaking, whereas a dollar could “buy” a dollar’s worth of habitat improvement in 1994, that same dollar can only buy about 35¢ worth of improvements in 2005. Availability of adequate wildlife funding to accomplish habitat improvement at the level anticipated in the Forest Plan is an issue. Accomplishments in habitat improvement are below the levels anticipated when the Forest Plan was developed.



The Regional Office tracks three measures of habitat improvements: acres restored or enhanced for terrestrial, stream, and lake habitats (Table 7). The Kaibab Forest is the driest National Forest in terms of stream habitat. There is generally about 2 to 6 miles of perennial stream across the 1.6 million acres of National Forest land on the Kaibab. Water volume and stream distance is determined by snow accumulation and varies tremendously with the seasons. Like all National Forests in Arizona, lake habitat primarily refers to reservoirs, stock tanks, and waters developed for wildlife.

Table 7. Acres of habitat restored or enhanced.

Acres of Key Habitats Treated	1998	1999	2000	2001	2002	2003
Acres of Lake Habitat Restored or Enhanced	4	61	NA	NA	82	1
Acres of Wildlife Habitat Restored or Enhanced	266	9,672	NA	NA	17,720	3,000

Improvements in lake habitat have generally included fencing livestock out of areas capable of supporting emergent vegetation, repairing or improving tanks and drinkers so that they hold water for longer periods of time, and improving the habitat for lakes stocked with fish by the Arizona Game and Fish Department (AGFD). Wildlife habitat restored or enhanced includes grassland and savannah restoration, aspen restoration, and fence removal or modification within pronghorn antelope habitat.

The Forest is entering into a new agreement with the Ecological Restoration Institute (ERI) to create a demonstration block of how restoration principals look when applied to landscapes impacted by past harvest and fire suppression. These kinds of efforts will become increasingly important to the Forest in order to expand the knowledge base for increasing habitat quality and diversity and for the identification and protection of key habitats. Given our decreasing budgets, the need to meet habitat targets that influence future budgets, and decreasing staff, it is difficult to have time to address issues beyond the immediate future. Establishing long-term coordination with organizations like ERI, The Nature Conservancy, Northern Arizona University, etc., requires time commitments upfront to develop mutually beneficial relationships and programs. This is particularly true for understanding and meeting wildlife species requirements, which may take continuing commitments beyond the timeframes likely

available to Forest personnel. Balancing the need to forge partnerships with ever decreasing time and budget availability will be a continuing challenge.

The wildlife program also works to increase the knowledge and protection of species in terms of identifying key habitats and retaining/creating habitat quality and diversity. This includes planning and implementing projects, direct funding to other parties (e.g., graduate student projects through Northern Arizona University), providing field assistance, coordinating with partners, advocating for research, assistance in planning and site selection, and providing administrative support for research conducted on the Forest lands. Work in this arena is expected to follow the trend in budgets.

Summary

Most of the forested lands now contained within the Kaibab National Forest have been moving further away from historic conditions throughout the 1900s. The 1996 Plan amendment shifted management emphasis from fiber production to sustainable forestry. Financial difficulties related to planning (budgets) and harvesting (markets) have further slowed the effort. The progress towards attaining sustainable forests has therefore been limited. Continued forest growth has increased overall tree volume, out-pacing efforts to move forests towards historic conditions and the results of some treatments may be falling short of Forest Plan objectives. Elements of the Forest Plan have habitat objectives that are likely above sustainable conditions. Large blocks of unoccupied MSO habitat have management goals well beyond the historic range of variation and affect large portions of 2 out of 3 Ranger Districts on the Kaibab Forest. Although this may eventually assist the recovery of the MSO on the Williams District, it places habitat at risk for most wildlife species on the North Kaibab District while simultaneously offering little, if any benefit to MSO. These trends are expected to continue with the continuing trend in declining budgets. To remain as effective as possible, the Forest continues to work toward expanding agreements and partnerships with others so funding can be leveraged into greater dollars, but successful partnership programs require time and money to initiate and maintain. The need to form partnerships has been recognized by the Regional Office of the Forest Service. However, until this need has funding associated with it, the opportunities to form new partnerships will remain limited.

Trend

Several trends affecting wildlife habitat are operating simultaneously and are not mutually exclusive. Projects planned and implemented since the 1996 amendment are moving forest conditions closer to the historic range of variation. At the forest-wide scale, these treatments have affected limited acreage and progress towards the Forest Plan goals varies by project. Concurrently, tree growth and development across much of the rest of the landscape continues at a rate well beyond the pace of management. This growth continues to exacerbate conditions suited to creating and supporting high-intensity crown fire. Future weather conditions will likely further magnify the wild fire threat. Wildlife habitat is improving as a result of wildlife, timber, and fuels projects that follow the guidelines established in the 1996 amendment. Other projects that are part of the wildlife program are also improving a range of site-specific locations (e.g., aspen treatments, fence modifications, wetland protection, etc.). However, these habitats remain at risk from high-intensity crown fire and the risk of the latter may outweigh the benefits of the former. The trend of habitat degradation outstripping positive habitat manipulations is expected to continue, hence the overall trend of moving further from desired conditions is expected to continue.

- ❖ Cooperate with the Arizona Game and Fish Department to achieve management goals and objectives specified in the Arizona Wildlife and Fisheries Comprehensive Plan, and in carrying

out the cooperative agreement for the management of the Grand Canyon National Game Preserve. Support the Arizona Game and Fish Department in meeting its objectives for the state.

The Forest works closely with the AGFD, particularly since the 1996 Forest Plan Amendment. Before 1996, AGFD was concerned about the effects of even-aged timber management on the Kaibab Plateau. Once uneven-aged forest management was applied at the landscape scale, the AGFD has continued to help the Forest in developing wildlife-friendlier treatments at increasingly detailed levels. On the SZ, both agencies have been working together to address the loss of grasslands across the southern Coconino Plateau. In the 1990s, this was largely addressed by retreating pushes from the 1950s and 1960s in piñon-juniper woodlands. Since 2000, we have begun looking at larger spatial scales and applying restoration treatments in the ponderosa pine cover types. We hope to continue and expand this effort as new data on pronghorn movements and fawning habitat is becoming available.

The Forest was involved in assisting the AGFD develop their Statewide Comprehensive Plan in 1988 and 2004. In 2004, the Forest also participated in a State-wide effort led by the AGFD to identify key areas of conflict between wildlife and the State's highway transportation network. Both agencies work together on projects affecting the National Game Preserve, particularly on the NKRD. Recent collaboration in that arena has included: a joint working team to establish bison management protocol; efforts to eliminate elk that presumably wandered onto the Plateau from Utah (likely made possible by water developments across the desert-scrub country north of the Kaibab Plateau); and a large-scale effort to document and improve deer winter range on the west side of the Kaibab Plateau. This latter effort relates to money collected through the Sikes Act.

The NKRD is the only Ranger District in Arizona receiving money from AGFD through Sikes Act funding. Fees were raised and expanded in 2003 and 2004, increasing annual funding from about \$5,000 to about \$40,000. The increase in funding has allowed the program to expand from a maintenance program largely confined to repairing wildlife waters and fences to developing a 5-year plan to assess and enhance mule deer winter range across 12,000 acres. This was part of the Bridger-Knoll fire which burned 54,000 acres in 1996. Browse in the form of woody shrubs have been slow to respond in key mule deer winter range. An emphasis with the 5-year plan is to establish and regenerate important woody browse species in this area.

Ongoing cooperation includes: annual surveys of over-wintering bald eagle, peregrine falcon monitoring; administrative assistance for a multi-year effort to inventory amphibian populations in potential northern leopard frog habitat on the NKRD (concluded in FY 2000); the Forest began coordinating with AGFD in 2004 to translocate northern leopard frogs to House Rock Valley on the NKRD; extensive bat surveys across multiple land ownerships, including the NKRD; and extensive thinning projects to improve pronghorn habitat in piñon-juniper and ponderosa pine habitat on the South Zone. We also actively coordinate with the AGFD on multiple working groups, including: the Arizona Condor Recovery Working Group; the Upper Gila and Colorado Plateau MSO Recovery Working Groups; the Rocky Mountain Elk Foundation's Arizona elk conservation initiative and Tusayan water development project; the Chino Valley Pronghorn Antelope Working Group (which includes 5 State Game Management Units and the Kaibab and Prescott NFs); and the Northern Arizona Partners In Flight Working Group.

Trends and Changes Needed

We are beginning to work with AGFD at larger spatial and temporal scales in analysis and treatments. We seek to find ways to better incorporate each agency's concerns. The planning horizons are frequently different between agencies and specific agency mandates sometimes appear as barriers. Working to get comments and concerns incorporated earlier into each agency's planning cycles should

increase the effectiveness of our joint efforts. Although better cooperation will remain a challenge, both agencies recognize this and the need to continually improve communication and coordination. The current relationship between the Forest and the AGFD should continue to improve and thus, continue to improve our effectiveness in working together.

- ❖ Improve habitats for listed threatened, endangered, or sensitive (TES) species of plants and animals and other species as they become threatened or endangered. Work toward recovery and delisting of species.

Most ecological assessments for ponderosa pine forests in the Southwest identify the threat of stand-replacing, high-intensity crown fires as the biggest threat to habitat for TES species, e.g., the Recovery Plan for the MSO, the Management Guidelines for the Northern Goshawk, results from an array of research conducted by the ERI, and virtually every study addressing fire history in Southwest forests. Considering this threat when developing management treatments often leads to issues with section 7 consultation under the Endangered Species Act. Nevertheless, the best science available supports applying silvicultural treatments to ponderosa pine and mixed-conifer forest types when the objective is to restore forest structure closer to or within the natural range of variability. In regards to MSO, listed as threatened under the Endangered Species Act, this can be done in a manner that degrades but still retains their habitat. The Forest continues to support or conduct a wide range of research on aspects of improving habitat for TES species in the long-term while minimizing negative impacts in the short-term (Table 8).

Table 8. Threatened, Endangered, and Sensitive Species research and monitoring conducted on the Forest in the Planning Period.

Principal Investigator(s)	Species	Year Initiated	Subject
Reynolds	Goshawk	1991	Demography
Grubb	Goshawk	1997	Red-tail Hawk Competition
Reynolds & Joy	Goshawk	2002	Habitat & Reproduction
King et al.	Goshawk	2002	Noise Disturbance
Reynolds & Salafsky	Goshawk	2003	Prey Species & Forest Seral Stage
Forest	Goshawk	1991 – 2004	Annual Surveys
Forest	Mexican Spotted Owl	1988 – 2004	Annual Surveys
Nelson	Bald Eagle	1993 – 2004	Annual Surveys
Siders	Mastiff Bats	1999	Roost Locations
Siders	Forest Bats	2000	Artificial Roosts
Chambers & Painter	Spotted Bats	2001	Spotted Bat Foraging
Chambers & Painter	Spotted Bats	2003	Spotted Bat Roosts
Forest	Peregrine Falcons	2002	Eyre Surveys

Many of the forest structural elements that create MSO and goshawk habitat are also wildfire concerns. Life histories of both raptor species include ties to high tree densities, snags, and developed forb and graminoid cover. Tree density is associated with nesting habitat and all the listed structural elements relate to habitat for prey species. Both MSO and goshawks also use piñon-juniper habitat in the winter,

although migration, movements, and habitat use are not yet understood. These elements have been a focus for continued research so resource managers can better evaluate impacts of vegetation-management projects (Table 9). Understanding the trade-offs in management decisions and defining the risk threshold for preserving TES habitat in the short- and long-term is crucial to implementing “habitat improvements.” The Forest is committed to applying informed decisions to secure TES habitat in a sustainable landscape.

Table 9. Research and monitoring studies related to habitat for Threatened, Endangered, and Sensitive Species conducted on the Forest in the Plan Period.

Principal Investigator(s)	Habitat Element	Year Initiated	Subject
Herron	Piñon-Juniper/Understory	1995	Monitoring Post-Thinning Forage Response
Nelson	Snags	1996	Snag Creation: Basal Burning
Fairweather	Snags	1996	Snag Creation: Inoculation
Block and Dwyer	Snags	2000	Fire, Snags, and Use by Secondary Cavity Nesters
Chambers	Snags	2000	Snags, Fire, and Bird Communities
Ganey	Snags	2000	Snag Longevity
Holmes	Piñon-Juniper/Coarse Woody Debris	2000	Monitoring Effects of Personal Fuel Wood Cutting
Edminster	Fire & Forest Health	2001	Fire Reduction & Ecological Tradeoffs
Haire	Avian Response to Fire	2001	Burn Severity and Bird Communities
Block	Snags	2003	Prescribed Fire & Cavity Nesting Birds
Fettig	Snags	2003	Snag Creation From Slash Treatments & Insect Responses
Kolb	Snags	2003	Fire Created Snags
McMillin	Snags	2003	Snag Creation From Fire & Insects

Conservation Agreements (CAs) have been completed for two species in cooperation with the U.S. Fish and Wildlife Service (FWS) since the signing of the Forest Plan: Arizona bugbane and the paradise plains cactus. Both CAs require monitoring that is coordinated through the Zone botanist and completed on agreed to schedules. Completing these CAs significantly contributed to preventing each species from being listed under the Endangered Species Act.

Trends and Changes Needed

The Forest continues to actively work on improving habitats for goshawks and Mexican spotted owls. These efforts will remain in the forefront of Forest planning as a result of the 1996 amendment to the Forest Plan. Our participation in the AGFD’s annual monitoring of peregrine falcons has already

decreased and we may be forced to drop this effort altogether as lack of funding and personnel limits what work can get done. The Forest will continue to contribute to condor recovery by continuing to coordinate with the Arizona condor recovery working group. This is expected to lead to more provisions in project implementation to limit unintended threats to condors as they increase their time on Forest lands. Other opportunities, such as those identified in Tables 8 and 9 are expected to be scaled-down through time as funding limits our abilities to support research and monitoring and meet the assigned management targets. No change to the Plan is needed at this time.

- ❖ Identify and protect areas that contain threatened, endangered, and sensitive species of plants and animals. Consult with the FWS when activities have the potential to impact protected species.

The Forest is unique in regards to the MSO and goshawks, the two species that led to the 1996 amendment: The SZ is at the edge of the MSO range; there is no evidence of resident MSO on the NK; and the NK has the highest known density of goshawks in the world.

There are no MSOs on the Tusayan RD and the Williams RD hosts all six designated Protected Activity Centers (PACs) for the entire Forest. In contrast, the Coconino NF has over 225 designated PACs. Similarly, whereas the Coconino NF has MSOs and PACs in ponderosa pine/Gamble's oak habitat, the Williams RD has never located a MSO in pine-oak habitat despite annual surveys for 17 years. Of the six PACs, typically only three or four are occupied in any given year. The PACs are in Sycamore Canyon and mixed-conifer habitat on isolated volcanic peaks (Bill Williams Mountain, Sitgreaves Mountain, and Kendrick Peak).

Trends and Changes Needed

In 2000, the Pumpkin Fire consumed nearly the total overstory in two PACs, one on this Forest and one on the Coconino NF. The risk to the forest in this Wilderness was previously identified as "highly susceptible to devastating fires" (p. 18, *Analysis of the Management Situation, May 1986*.) In 2002, the Trick fire burned through the Tule PAC within Sycamore Canyon. Fortunately, the fire only burned holes in the canopy and may have improved overall habitat conditions. Fuels reduction work within PACs remains problematic in terms of section 7 consultations with the FWS.

Critical habitat for MSOs was designated in 2004. Critical Habitat is defined as "essential to the conservation of the species." Critical Habitat Units (CHU) were designated on the Williams RD (CHU UGM-13) and on the NKRD (CHU CP-10).

The former extends from Flagstaff to Williams, covering about 238,092 acres. It encompasses the 6 PACs administered by the Forest and all pine-oak habitats on the Williams RD between Sycamore Canyon and the isolated volcanic peaks on the District. Although MSO have never been detected in pine-oak habitat on the Williams RD, at least MSO do occur on the District and could conceivably use this habitat in the future.

The latter has proved to be an interesting delineation given that no owls have ever been detected by surveys to protocol in 15 years of survey effort. Sightings have been reported, but follow-up surveys have either failed to detect owls or identified other owl species. Grand Canyon National Park has found over 40 owl territories, all of which are in canyon habitat. No resident MSOs, juveniles, or MSO nest sites have ever been confirmed on the Kaibab Plateau. This applies to both FS and National Park Service lands. An on-going telemetry project in the Park has documented 2 MSOs foraging within the forested edges of sub-plateaus branching off the Kaibab Plateau, but all nesting, roosting, and much foraging remains in canyon habitat. Nevertheless, when CHU CP-10 was delineated at over 918,000 acres, it included all the mixed-conifer forest on the Kaibab Plateau. This complicates efforts to move mixed-conifer forest towards the natural range of variability as the structural elements of mixed-conifer

habitat undergoes evaluation and discussion with the FWS. In many instances, the Forest has opted to undertake formal consultation in order to address long-term habitat viability issues while retaining MSO habitat on the landscape rather than risk losing mixed-conifer forest to fire.

The Forest continues to survey and monitor for areas that contain threatened, endangered, and sensitive species of plants and animals within the context of project planning and implementation. Consultation with the FWS continues to be problematic while each agency looks to balance short-term habitat retention with the long-term risk of fire. Both agencies recognize this issue and we continue to work to define common ground that meets each agency's needs. Progress is expected while the Forest continues to plan and implement activities that have the potential to impact protected species.

- ❖ Expand agency, conservationist, and citizen understanding and cooperation in wildlife and fishery habitat management, activities, and use.

Each year the District Biologists meet with seasonal staff in timber and fire to discuss the array of wildlife species and their habitats occurring within the Forest. This is reiterated during project planning and implementation.

Trends and Changes Needed

Although acres treated can be affected by appeals and litigation, the timber and thinning programs continue to move more areas annually towards the desired conditions, which approach the natural range of variation. As results from recent research are incorporated into projects, the conservation value of the efforts should continue to improve.

Progress on translating this into citizen understanding is expected to be slow. Nevertheless, the Forest is moving towards increased collaboration in project development and attempts to have dialog with the interest groups that regularly publicize their objections to forest management. In this regard, efforts have been made to increase public understanding through:

- volunteer days with special interest groups working on labor-intensive projects;
- annual field trips conducted with law students from Arizona State University where Forest management, preservation, and conservation is discussed and debated;
- increasing contact and coordination has been occurring with the local chapter of Audubon;
- the Grand Canyon Trust is pursuing the grazing permit for much of the NKR and the potential could soon exist for them to become a partner with and ambassador for the Forest;
- the summer campground series includes talks on wildlife and habitat management; and,
- the Visitor Centers for the SZ and NKR are kept stocked with the most current brochures and pamphlets.

Unfortunately, the most vociferous and litigious groups seem to have the least interest in discussion. Nevertheless, efforts in environmental education are expected to continue and better ties with the general public may result through time.

Riparian Habitats

There are no objectives for riparian habitats in the Plan. There is one goal statement:

- ❖ Inventory all riparian areas. Woody riparian communities and riparian communities dominated by shrub and herbaceous species shall be in satisfactory or better condition.

Riparian habitats were surveyed in 1990, identifying 135 wetlands on or closely associated with the Forest. The total area identified with riparian characteristics is about 1,200 acres. Many riparian areas cover less than one acre and are associated with the numerous small springs on the North Kaibab and Williams Ranger District. The largest area inventoried is 880 acres in Little Hells Canyon.

Arizona Partners in Flight (AZPIF) Bird Conservation Plan defines four kinds of riparian features:

- open water;
- freshwater marshes;
- low elevation riparian (generally less than 4,000 ft); and,
- high elevation riparian (generally 4,000 – 11,000 ft.) (Latta et al. 1999).

Open water and freshwater marshes are the most common riparian habitats occurring on the Forest. Low elevation and high elevation riparian associations are also present on the Forest, but both are limited in distribution. The most typical forms of riparian habitat on the Forest are developed stock tanks and guzzlers and trick tanks developed as wildlife waters. These structures typically provide water, but do not necessarily support riparian vegetation.

The only low elevation riparian habitat on the Forest occurs in Kanab Creek, between elevations of 3,500 and 6,000 feet and about 80 percent of the area has slopes greater than 40 percent. Although the entire National Forest portion of the drainage is a designated Wilderness Area not currently being grazed by livestock, water flow is restricted by diversions upstream of the Forest boundary and most of the area is dominated by tamarisk, an invasive, non-native plant.

Two high elevation riparian occur on the Forest: North Canyon Creek on the NKRD and Big Spring on the Williams RD. These waters flow for a combined maximum distance of about 8 to 9 miles, but average distances range between 2 to 5 miles. Flows and stream lengths vary dramatically between years and seasons. The only fish species in North Canyon Creek is Apache trout. There are none in the Big Spring trickle.

Active monitoring and management occurs in North Canyon Creek with regards to Apache trout, including successful drift fence installation and trail stabilization. A crown fire burning through the drainage would likely eliminate the Apache trout population due to extremely high fuel loading along and above North Canyon Creek, the small width and shallow depths of the creek.

Freshwater marshes (areas of permanent to semi-permanent fresh water characterized by relatively shallow depths and extensive coverage of submergent and emergent vegetation) are an ephemeral anomaly on the Forest, Marsh habitat on the Forest primarily occurs on the Williams RD (Table 10). The Tusayan RD does not have any marshland.

Table 10. Primary Marsh Habitat Summary.

Ranger District	Number of Areas	Acres of Water
North Kaibab	2	12+
Williams	6	540

Franks Lake Geologic-Botanical Area was designated a Geologic-Botanical Area in 1988 and was fenced to exclude livestock in 1990 with a significant increase in vegetative cover since then. A floating bog has expanded to fill the majority of the pond, with only a sinuous channel of open water remaining.

Trends and Needed Changes

Overall the riparian conditions found on the Forest meet Plan objectives. Wetlands are typically enhanced or protected through exclusion of livestock use. Most areas capable of supporting woody riparian vegetation, such as Coleman Lake, Sunflower Flats, Frank's Lake, etc., have been fenced to exclude livestock. Livestock management plans for ephemeral wetlands that are grazed, such as Davenport and Dry Lakes, have been or are being updated to exclude cattle until ten days after standing water is gone to minimize impacts to the soil. Dry Lake was fenced this year to limit livestock access to water and riparian vegetation. The springs on the North Kaibab have also recently had changes in the livestock management allocations, fencing, or both to move them into the fair or better categories.

Follow-up inventories through time for all riparian areas and monitoring woody riparian communities and riparian communities dominated by shrub and herbaceous species will remain a challenge when these activities do not directly relate to the targets assigned by the Regional and Washington Offices of the Forest Service. The decreasing budgets and the decreasing staff that results from loss of funding will make the necessary time and money commitments for surveys difficult to accomplish. Even finding the time and money to complete surveys through partnerships is complicated under these fiscal restraints. Until "surveys completed" becomes an identified goal assigned to the Forest, overcoming the current limits will become increasingly difficult through time.

Range Grazing

- ❖ Produce the maximum amount of forage, consistent with other resource values, for use by wildlife and livestock on a sustained yield basis. Benefits are improved watershed condition, range forage, wildlife habitat, and enhanced visual quality.

Table 11: Changes in Permitted AUMS from 1971 to 2004 and NEPA Sufficiency.

District	Number of Allotments	Rescission Act Allotment	Permitted AUMS 1971	Permitted AUMS 1988	Permitted AUMS 2004	NEPA Completed in Period
Williams	28	17	62,915	43,845	38,540	18
North Kaibab	8	6	15,520	14,715	11,410	6
Tusayan	4	4	30,530	27,770	12,720	4
Forest Total	40	27	108,965	86,330	62,670	28

Table 11 summarizes key information about range allotment management by ranger district over time and within the Plan Period. Since the 1950s numerous studies indicated that a significant number of the grazing allotments were in poor resource conditions with downward trend. As Figure 6 demonstrates, between the years 1971 and 1988, there had been a reduction in the permitted AUMS from 108,965 to 86,330² or roughly 20 percent.

These reductions occurred mostly on the Williams District and included the Corva, Double A, Hat, Irishman Dam, Partridge Creek, and Tule Allotments. The North Kaibab Ranger District had several modifications of term numbers during this time period, mostly downward, and included Central Winter,

² A comparison between the Analysis of the Management Situation (USDA Forest Service, Kaibab National Forest, 1986) and this recent analysis indicates the 1988 permitted AUMS were higher than reported in the AMS by approximately 8,600 or 10 percent. We suspect this difference was the result of not using the proper AUM conversion factor.

Willis Canyon, Houserock, and Kanab Creek. Neither the former Chalender Ranger District (included in the Williams RD figures) nor Tusayan RD implemented any significant modifications in term numbers though; Smoot, Moritz, Ebert, Davenport, Anita, Cameron, Rain Tank, and Government Mountain allotments had been identified as overstocked.

With respect to the Plan objective in range, as indicated in Table 12, and as a result of site-specific analyses and implementation, attainment is approximately 80 percent of the objective. Additionally, the Forest has brought grazing use within capacity with the first Plan period, ahead of expectations (Table 1.)

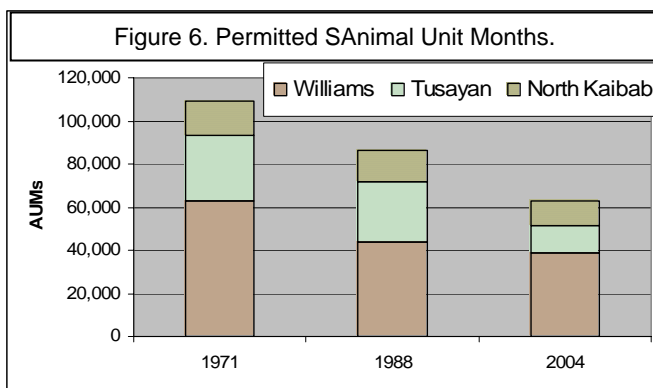


Table 12. Forest Plan Objective and Attainment in Range.

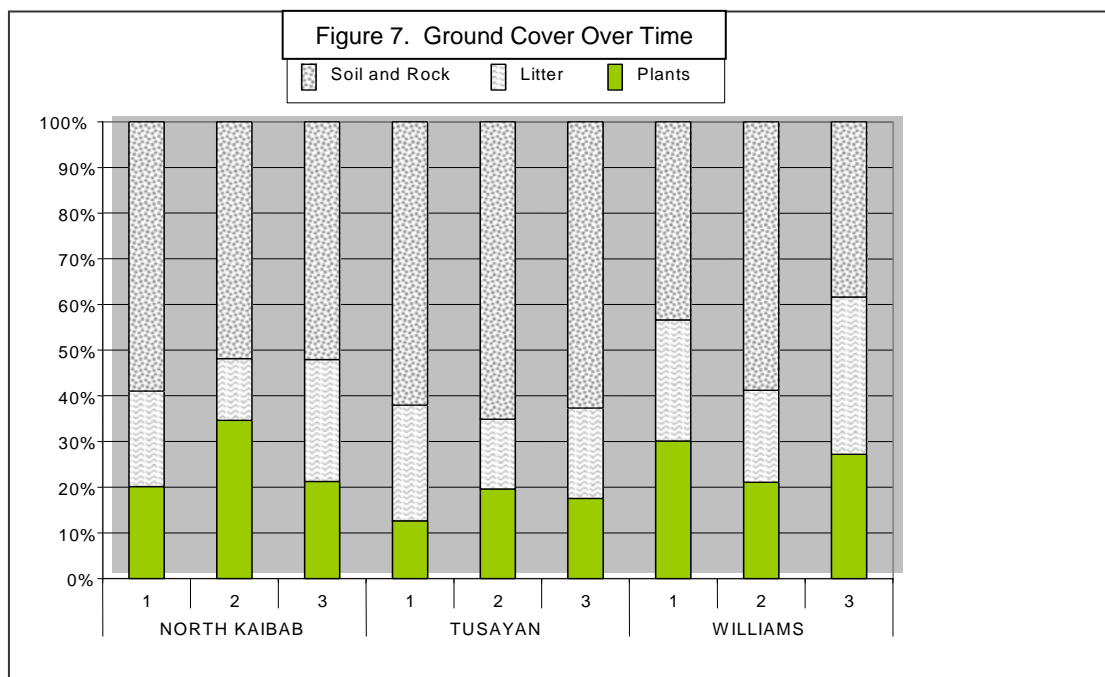
Resource Output	Unit of Measure	Forest Plan (Annual, Period 1)	
		Objective	Attainment (2004)
Permitted Grazing Use	AUM	77,715	62,670

Since the Forest Plan was implemented all the grazing allotments that had been identified for needed adjustments have undergone the appropriate level of NEPA analysis and a decision implemented. This has resulted in a further reduction of 23,660 AUMS or roughly 28 percent drop since 1988. The results of these changes can be roughly monitored above the project level.

Figure 7 displays the change in plants, litter, and soil/rock cover by Ranger District over time. Time periods: 1 = 1950-69; 2 = 1970-89; 3 = 1990-2001. Percent of time each cover type was encountered using the Parker three-step survey method is represented. Only allotments that were surveyed in each time period are included.

Without “controls” to compare measurements to, these data can be misleading, however. There has been a severe drought in place during much of period three which has had a large effect on plant cover. Nonetheless, some trends still seem to emerge.

Major reductions and other grazing methods adjustments were made on Williams RD in period two and between periods two and three. Williams is the



only district showing an increase in plant cover between these two periods. For Tusayan RD, most of the measured reductions have been made late in period 3 and are not yet reflected in the available data. A somewhat similar case occurs on the North Kaibab RD. There were some reductions between periods one and two and more carried out during period three but the available measurements (restricted to just those where measurements are available for all three periods in the same places) are not in place where the changes have occurred.

Surveys conducted on the Forest quantifying responses in range resource conditions indicate that the changes in management have allowed for rangeland recovery. The density and total frequency of desirable plants as well as vigor have all increased since the plan was implemented in 1988. These improvements have generally been confined to the grassland and savanna ecosystems though improvement in the ponderosa pine type has also been documented.

NEPA-sufficient revisions of Allotment Management Plans (AMPS) have been achieved on 28 of the 40 allotments found on the Forest or 70 percent. Of the remaining 12 grazing units still needing NEPA analysis, we do not predict any major changes in the AMP since current management is generally meeting land management planning objectives.

- ❖ Manage the Double A Wild Burro territory to maintain a viable population of burros while minimizing impacts on range forage and wildlife habitats.

Since the 27,000-acre Wild Burro Territory was established in 1984, five populations assessments (once every four years) have been made. The initial 1983 population survey reported that 150 burros (plus or minus 25) occupied the territory. The population seems to have gradually decreased since then with the last survey indicating 36 animals now occupy the territory. The Forest Plan desired condition provides for the herd to fluctuate within capacity; between a minimum of 22 animals to a maximum of 35 animals. At the current population levels the viability of the herd is maintained and potential resource conflicts are avoided.

- Cooperate with private range owners and other agencies to develop coordinated range management systems of livestock grazing where lands of other ownership are intermingled or adjacent to the National Forest.

This Forest has entered into several coordinated range management planning processes since 1988. These include:

- the Partridge Creek AMP revision where we worked with the State Land Department and the Natural Resource Conservation Service to produce a coordinated plan between State, Federal, and private lands.
- The Kane Ranch AMP revision process covering 627,000 acres of National Forest, Bureau of Land Management, and State lands in Northern Arizona. A total of nine allotments were part of this analysis and the Forest and BLM entered into a collaborative approach [to what?] with stakeholders, grazing permittee, and other interested publics.

Trends

Range management is carried out using two funds – vegetation and watershed management and range management. Inflation-adjusted funding for range management is expected to continue to decline over the next decade as it has for the Plan period (Figure 8). This has and is expected to continue to affect our ability to fully administer range permits.

We anticipate the demand for acquiring term grazing permits will continue, however, in some cases non-traditional entities may obtain grazing privileges.

Under normal precipitation patterns we expect that the Forest will authorize the current AUM figure of 62,670. Increases in carrying capacity are projected to occur in the ponderosa pine ecosystems as fuel reduction programs are implemented. We also anticipate some limited improvements in the piñon/juniper woodlands though to a lower degree.

Changes Needed

The Plan desired conditions, goals, objectives and guidelines are sufficient to meet the goals of range grazing. Some change in guidance outside the Plan may be needed over time to help meet likely future Plan desired conditions to reestablish and maintain fire in fire-adapted ecosystems on the Forest.

Timber

Table 13 displays the timber objective in the Plan and attainment.

Table 13. Forest Plan Objective and Accomplishment in Timber.

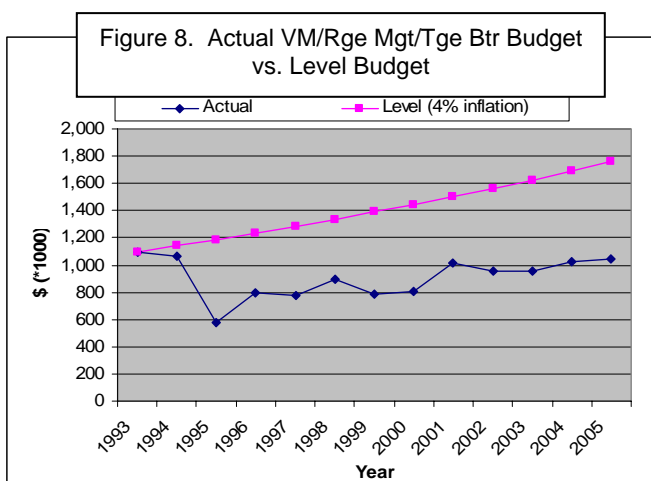
Resource Output	Unit of Measure	Forest Plan (Annual, Period 1)	
		Objective	Attainment (2004)
Sawtimber and Roundwood ASQ	MBF	76,852	9,089

There are five goal statements for timber in the Plan:

- ❖ Manage suitable timberland to provide a sustained level of timber outputs to support local dependent industries. Apply integrated resource management to improve age-class distribution, diversity, and to reduce losses from forest insect and disease pests.
- ❖ Continue developing genetically superior tree stock for use in reforestation.
- ❖ Apply silvicultural practices in accordance with federal regulations, and to resolve public issues and concerns and site specific resource objectives.
- ❖ Concentrate fuelwood programs in the piñon-juniper woodland to accomplish, wildlife habitat, soil and watershed, and range improvement objectives. Encourage substitution of coniferous residues from commercial timber harvest for preferred fuelwood sources.
- ❖ Collect reliable information from unsuitable and suitable lands necessary for both operational and long-range planning.

Timber management direction provided by the 1988 Plan nearly maximized commodity production using even-aged regeneration methods with a rotation age of 120 years and an average diameter at rotation age of 18 inches.

The Plan changed goals for annualized Allowable Sale Quantity (ASQ) of sawtimber from 64,000 MBF to 72,000 MBF and the roundwood and other products component decreased from 27,000 MBF to 4,900 MBF. These changes were based upon increased demand for sawtimber and decreasing demand for roundwood. Although the ASQ was intended to be a maximum amount of timber that could be produced under optimal conditions, it was often considered to be an objective to attain in funding and



project planning. Figure 9 displays the overall volumes of timber offered for sale by the Forest over the past 18 years. (Source: Stars Report 37-2 for each fiscal year)

During the early years of the Plan implementation, the Forest strived to cut at or near the ASQ, using primarily shelterwood methods and moderately intense site preparation and artificial regeneration by planting superior ponderosa pine seedlings at regular spacing intervals. With limited soil and watershed concerns, large regeneration areas dotted the Kaibab landscape. However, concerns about the effects of these types of harvest were rapidly growing, especially around goshawk, Mexican spotted owl, and esthetics.

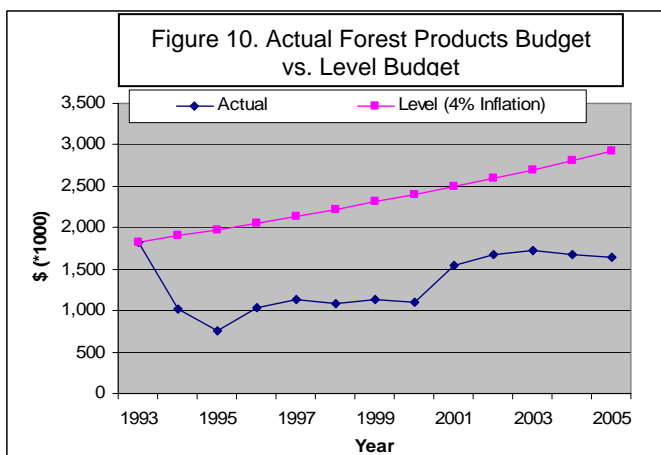
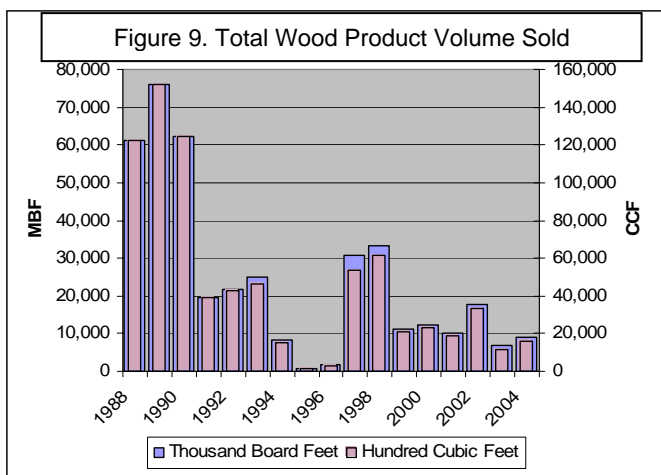
Ultimately, after an early Plan amendment, even internal analysis of continuing the methods and rates of implementation were shown to be infeasible to continue while still meeting all the Plan standards and guidelines, particularly one about “adjacency”. The standards prohibited most shelterwood regeneration areas to be adjacent to other stands of seedlings or saplings. In the early 1990s, the Forest began an extensive “Timber Resource Reanalysis” to amend or revise the Plan and lower the ASQ. Ultimately, this effort was supplanted by a Region-wide amendment to provide for goshawks and 14 of their prey species in a sustainable manner as well as Mexican spotted owl Recovery Plan requirements.

The Region-wide amendment was implemented in 1996, using uneven aged management systems and including desired conditions that would retain or create approximately 40% of the forest in trees 18 inches and larger in groups and patches of approximately ½ to four acres in a landscape matrix. Locations of these old growth patches will change as some patches are harvested and younger patches take their place. Larger areas, ranging from 30 acres (goshawk nest stands) through 600 acres (MSO protected activity centers) are also retained essentially as old growth blocks with desired conditions for large-tree density that obviate most tree harvest except low thinnings.

While regeneration harvest has been accomplished under the new guidelines, the areas are generally small averaging 2 acres or less using group selection methods primarily (See Figure 3, above.) Limited site preparation is done, relying instead on the soil disturbance and site scarification that occurs during the harvesting operation. Seed blown in from adjacent mature trees provides a natural seed source.

There is an overall need to reduce the stocking of most stands. While each stand varies, there is generally an abundance of small to medium sized sawtimber and pulpwood that could be removed and provide improved growth characteristics for the residual forest. There had been limited demand for these products, particularly on the southern ranger districts so their removal has either been deferred or has been accomplished as a cultural treatment that cost money instead of as a timber sale that generated funding.

Demand for forest products in northern Arizona has generally decreased over the last seventeen years. Most of the primary purchasers of Kaibab

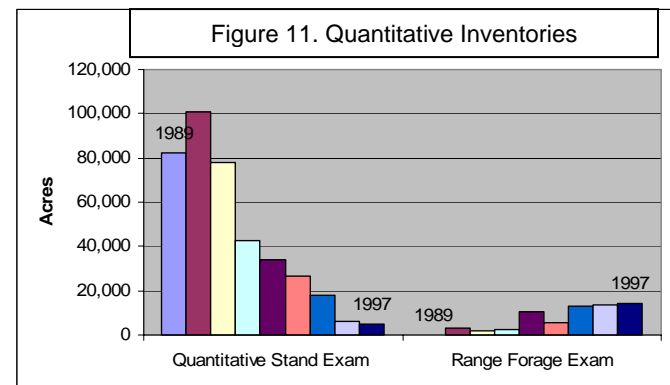


timber products that were active during the late 1980s and 1990s have now closed their mills.

Appeals, litigation, reduced demand for timber products and no-bid sales south of the Grand Canyon have reduced the Kaibab timber program and its subsequent funding. In FY 93, the timber management budget for the Kaibab was approximately 1.8 million dollars. The timber management budget in 2005 was approximately 1.6 million dollars, approximately 84% of the 4% inflation adjusted 1993 rate (Figure 10.)

Fuelwood programs have been concentrated in the woodlands per the Plan objective for the reasons listed. Further discussion that addresses this objective is in the Soil, Water and Air Quality section below.

In 1989 the Forest collected over 89,000 acres of quantitative existing vegetation data. As budgets for this type of work have declined, so has the amount of data collected (See Figure 11.) In 1997, the amount was about 20,000 acres and has not changed substantially since. Data collection on the Forest is now primarily oriented toward project implementation and monitoring. The national Forest Inventory and Analysis program now collects information on existing forest conditions and provides rather rough summaries at the Forest-wide level. In addition, the Forest collected data from about 240 stands randomly selected in 1990 and again circa 2001 from the same stands. This information can be used to characterize trends and existing conditions with about half the error rate of the FIA survey.



Trends

The concerns of declining forest health and the high risk of catastrophic wildfire in the forests prompted the Healthy Forest Initiative in 2003. Efforts to reduce stocking and make the Kaibab more resistant to wildfire have been the focus of numerous projects. The recent severe drought has killed a substantial portion of the piñon component in the woodland and may have a long-term effect upon the scale and scope of this program.

Demand for timber products in Northern Arizona including smaller diameter trees began to increase slightly in 2003. Talk of additional lumber mills in the area has given timber managers optimism that economic ways to address the need to remove trees from overstocked stands may be realized soon.

In 2004, the Forest Service and the State of Utah signed a Memorandum of Understanding (MOU 04-MU-11046000-060) to build “the capacity to accomplish restoration projects” and encourage “local employment in order to benefit the management of the National Forests and communities of the Central Colorado Plateau and Great Basin.”

With an improving timber market, the Kaibab may be able to reduce stocking of its forests to improve growth of the residual trees, reduce the risk of wildfire, improve range and forage, and enhance wildlife habitat on all three Ranger Districts. Funding for this type of work has begun to increase at the Regional level. Presumably some of this funding will flow to the Forest if projects can be successfully prepared, offered and accepted by contractors.

There appears to be a need for this type of work well above current accomplishment levels for the next decade and beyond.

Changes Needed

The Plan guidelines are generally sufficient to carry out the work projected to be needed to implement the desired conditions listed above. There is a need to revisit timber suitability and other strategic elements as restoration of fire-adapted ecosystems has become a priority for action. The goals may be out of date, particularly with reference to supporting local industries and genetically superior tree stock.

For example, many of our currently forested stands were grasslands or savannahs prior to fire exclusion beginning in the late 19th century. Grassland ecosystems on the Forest are seriously degraded and reduced as a direct result of tree invasion, past over-grazing by ungulates and other causes. Restoring these lands to grasslands requires a reclassification of timber suitability that could be done more efficiently in a programmatic manner.

There are arrays of standards, guidelines and monitoring items that may be appropriate to change to make the Forest more efficient at moving toward desired conditions. They are discussed elsewhere in this report or will be part of a Comprehensive Evaluation planned in 2006.

Soil, Water, and Air Quality

- ❖ Maintain soil productivity and watershed condition. Rehabilitate non-productive lands on a planned basis to eliminate unsatisfactory watershed condition by 2020. Maintain a high quality sustained water yield for Forest users and others. Identify and protect wetlands and floodplains.

Since the Forest Plan was implemented numerous proposals have been implemented in the piñon-juniper woodlands and the sagebrush ecosystems to improve watershed values. Most, if not all the 349,000 acres considered unsatisfactory were found in these ecosystems and the focus of most the watershed and rangeland enhancement were targeted towards these zones. This includes approximately 5,000 acres of fuelwood cutting, mostly on the Williams Ranger District, 15,000 acres of prescribed fire on the North Kaibab and Tusayan Ranger Districts within the sagebrush and woodland/sagebrush ecosystems, and 250 miles road obliteration. In addition, over 20,000 acres of formally treated piñon/juniper stands that were noted with substantial tree encroachment have been treated with the agri-axe and restored to grasslands. Modifications in grazing regimes on virtually all allotments found in the woodland zone have also contributed to improved watershed conditions. These changes included modification of the season of use, rotation strategy, or changes in permitted numbers. Documented improvement to higher diversity levels have been recorded since these adjustments were implemented. We predict that the amount of area considered unsatisfactory has been reduced by 125,000 acres since 1988 to 224,000 acres today.

The implementation of Best Management Practices has also encouraged the maintenance and in some cases improvements in watershed condition values. All projects implemented on the Forest have a specific list of practices that need to be implemented to maintain conditions of favorable water flow off the Forest. This includes stream course protection clauses, reclamation procedures after site disturbance, minimum levels of ground cover that need to be maintained after treatments, specific actions to protect wetlands, utilization standards to promote the reproduction of native plants and many others. Once implemented, these practices assure that potential losses of site productivity will not occur.

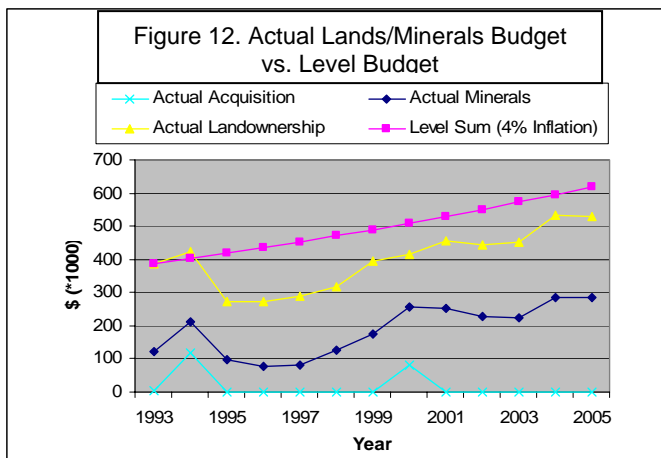
Minerals

There are no objectives for minerals in the Plan. There is one goal statement:

- ❖ Administer the mineral laws and regulations to minimize adverse surface resource impacts. Support sound energy and minerals exploration and development.

The AMS listed a minerals target assigned to the Forest of 59 operating plans (leases and permits) annually for the 1980s decade. The apparent average for 1999-2004 for minerals reviews and inspections is 45 (reported in the SUDS database).

Minerals funding has come close to keeping up with inflation during the Plan period as shown in Figure 12. The “actual” lines in this graph are cumulative; most of the increase in actual dollars over time is due to the increase in the actual minerals funding levels.



Trends and Changes Needed

Funding is expected to roughly parallel activity in this area. Most of this activity is associated with flagstone mineral materials permits on Williams RD. An EIS is currently underway to evaluate the long-term potential for flagstone supply on the Williams RD. The results of this analysis and eventual decision will set the upper limit on this type of activity on the Forest in the future.

Fire Protection and Use

No objectives are set for the Fire Protection and Use program in the Plan. There is one goal statement:

- ❖ Use prescribed fire and wildland fire use as resource management tools where they can effectively accomplish resource objectives. Areas approved for wildland fire use implementation and their prescriptive criteria will be identified within the fire management plan. Fire management, prevention, and control are used to protect life, property, and resources.

The management of fires on the Forest during the 1980's and 1990's was largely based on full suppression actions. The three suppression alternatives at that time included confine, contain, or control (CCC.) Most fires were suppressed at the least cost, with the least amount of exposure, and at the smallest size. Efficiency and effectiveness were the primary drivers of this philosophy. Though aggressive initial attack was common, some naturally ignited fires in more remote areas were allowed to run their course under a confine strategy, however they were generally small fires (less than 100 acres).

During the late 1990's, the Kaibab began developing a Prescribed Natural Fire (PNF) Plan for the Forest. Specifically, this Plan proposed allowing the implementation of PNF on the North Kaibab (472,088 acres), Tusayan (331,789 acres), and Williams (613,718 acres) Ranger Districts. The Plan defined PNF as fire burning under conditions specified in an approved plan and meeting specific resource management objectives. The big difference between the PNF and CCC was that a fire under a suppression response could not be allowed to meet resource objectives. The only reason to confine/contain a wildland fire was for firefighter safety and least cost versus the resource lost. The advent of PNF provided fire managers on the Kaibab more opportunities to actively manage rather than suppress all fire. Prescribed Natural Fire was redefined as Wildland Fire Use and included as an Appropriate Management Response (AMR); a term that replaced Confine/Contain/Control in 2002.

Fire Managers now have a full range of management alternatives under the Appropriate Management Response that include any specific action suitable to meet the objectives of each Fire Management Unit

(FMU) as outlined in the Kaibab Fire Management Plan. AMR's range across a spectrum of tactical options from monitoring to intensive management, and includes the implementation of Wildland Fire Use.

Fire Management and Wilderness

In the past decade, fires in wilderness areas generally fell under a suppression strategy; however these are the very areas that fire should be allowed to play its natural role if possible. Because these areas were generally not subject to any prior fuel treatments fuel loading can be excessive and the implementation of WFU can be challenging due to these conditions coupled with a lack of barriers typically used to check fire spread (i.e. roads). The latter is a measure of natural defensibility of the fire location and an indication of degree of potential mitigation actions needed. Potential outcomes may involve large fires coming out of the wilderness and into areas where WFU may adversely affect values and have unacceptable outcomes. Also, because of the potentially heavy fuel loading, desired fire effects may not be achieved.

During the Plan Period:

- the Pumpkin Fire (2003) burned over most of the Kendrick Mountain Wilderness Area resulting in serious and continuing damage to the three main trail systems;
- the Trick Fire started in the Sycamore Canyon Wilderness Area. No constructed facilities were damaged;
- the Outlet Fire burned in Saddle Mountain Wilderness. No constructed facilities were damaged. Wildland Fire Use has been approved in all Kaibab wildernesses, with the exception of an area of Saddle Mountain Wilderness.

At this time, no wildland fire use fires have been managed in the wildernesses.

Fire Management and Soil, Water, and Air Quality

All Wildland Fire Use and prescribed fires are coordinated and approved by the Arizona Department of Environmental Quality (ADEQ) in order to meet annual emissions goals and smoke management plans. Analysis of emissions from Wildland Fire Use incidents, burns in progress, residual emissions from previous burns, active multiple day burns, and wildfires greater than 100 acres are factored in to the evaluation. Smoke management will prove to be a greater challenge as more prescribed and Wildland Fire Use fires are implemented.

The air quality IMPROVE program (Interagency Monitoring of Protected Visual Environments) began in 1985 as a cooperative effort between Federal managers, the U.S. EPA and State air quality agencies. Data are used to establish current visibility conditions, track changes in visibility, and determine the causes for visibility impairment in the Nation's Class I Wilderness areas. A monitoring system is in place for the Sycamore Canyon Wilderness and is funded by the Coconino National Forest.

Fire Management and Protection

The circumstances under which a fire occurs, the likely consequences on firefighter and public safety and welfare, natural and cultural resources, and values to be protected, will dictate the Appropriate Management Response (AMR) to wildland fire.

AMR evaluation criteria include:

- Risks to firefighter and public health and safety
- Land and Resource Management Objectives
- Weather

- Fuel conditions
- Threats and values to be protected
- Cost efficiencies

Wildland Fire Use

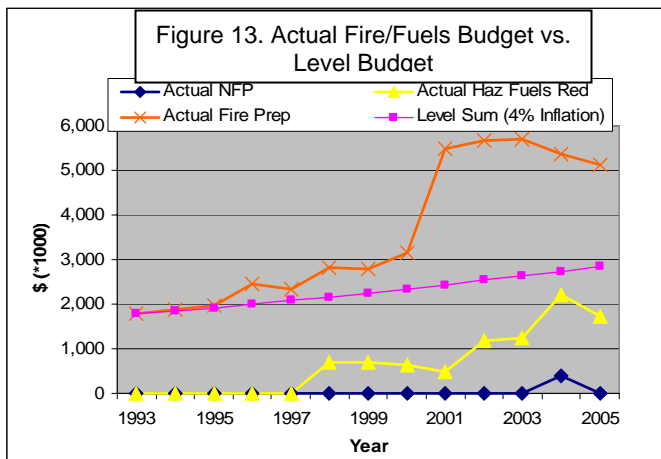
The *Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy* developed in 1998 and revised in 2005 provides us with procedures and requirements to implement the full range of wildland fire use management actions within an appropriate management response framework. Our current goal in fire management on the Forest is to use wildland fire to protect, maintain, and enhance resources and, as nearly as possible, allow it to function in its natural ecological role. Fire, as a critical natural process, is integrated into the Kaibab Land and Resource Management Plan, the Fire Management Plan, and activities on a landscape scale. Response to wildland fire is based on scientific, ecological, and social aspects, and potentially significant consequences of the fire.

Budget

Preparedness budget levels rose dramatically after the 2000 fire season and the advent of the National Fire Plan. By 2002, dollars had decreased to 80-85% of MEL (Figure 13).

Preparedness budgets have been allocated at or below the Most Efficient Level (MEL) derived from the National Fire Management Analysis System (NFMAS) since the inception of this program in 1987. A new allocation program, Fire Program Analysis, will dictate the Preparedness budget tentatively beginning in 2008. FPA is

interagency in nature and allocates dollars to all agencies within a predetermined Fire Program Unit (FPU). All agencies on the Colorado Plateau are included within the "Colorado Plateau Fire Program Unit". These include the Kaibab NF (South Rim only), Prescott NF, Coconino NF, Truxton Canyon Agency, Navajo Agency, Hopi Agency, and South Rim of Grand Canyon National Park. The North Kaibab falls within a different Fire Program Unit called the Arizona Strip Fire Program Unit.



Trends in Wildland Fire and Wildland Fire Use

Wildland Fire

Over the past ten years, wildland fires on the Kaibab have continued to become more complex in nature and some larger in size due primarily to unnatural fuel loadings and an extended drought (i.e. the Pumpkin Fire). This is especially true in wilderness areas, where fuel treatments have never taken place.

The complexities of managing fire within the wildland/urban interface will continue to grow, as will the number of people moving into these areas. The political, social, and safety issues of firefighting in the wildland urban interface will become even more challenging. Smoke management concerns will need continuing attention. The trend will be even more toward an interagency approach to wildland fire with the implementation of Fire Program Analysis.

And, as more hazardous fuels reduction treatments are completed, while these areas will most likely see the same amount of fire, fire intensity levels and resistance to control should begin to be mitigated.

Fire Management and Wilderness

As practicable, fire in our wilderness areas should be managed for resource benefits as long as burning conditions and fire behavior allow for desired conditions and objectives to be met. Burning under approved prescriptions, appropriate time of season, assessing seasonal severity, and monitoring long term weather predictions will optimize successful outcomes.

It has been suggested that management ignited fire may be an avenue to treat areas with high fuel loadings under potentially cooler and more controlled conditions than WFU; however this option is not currently approved and would most likely generate controversy if applied to Wilderness areas.

Currently, administrative responsibility for the Sycamore Canyon Wilderness Area rests with the Coconino National Forest which does not allow for WFU at this time. Future plan revisions on the three Forests that share this wilderness (Coconino, Kaibab, and Prescott) should evaluate a more collaborative approach to the management of this area.

The Sycamore Canyon Wilderness resides in a Class I Airshed and should WFU be allowed in the future, air quality issues must be addressed through both the Arizona Department of Environmental Quality and the population of the Verde Valley that can be affected by diurnal wind flow patterns. The Sedona area in particular is considered a non-attainment area in regards to smoke impacts.

Wildland Fire Use

Since the Wildland Fire Use Plan on the Forest has been approved, implementation and total acres burned has continued to increase annually. Currently, the Forest is averaging 15-20 WFU incidents per year, and this trend will increase depending on weather conditions. Managers are now able to see the benefits of reintroducing fire into a fire adaptive ecosystem from the WFUs of 2-3 years ago, and these successes will continue to make this appropriate management response a viable tool.

Budget

The Preparedness and Hazardous Fuels Reduction budgets should stay fairly static or dip slightly lower over the next several years.

Changes Needed in the LRMP for Fire Management

Many of the guidelines for fire management and use are out of date, in error or are too tactical for inclusion in the Plan. Changes should be considered for the following:

- Eliminate size objectives in regards to wildland fire.
- Change guideline that directs rehabilitation of areas impacted by wildfire to “areas of severe fire effects will be assessed by a BEAR Team for the need of rehab. The BAER Team will consider a fire’s effects on soil productivity, soil stability, and the potential for invasive species to establish themselves.”
- Change the guideline that prohibits the spread of a wildland fire to lands of other ownership to “coordinate the response and management of wildland fires that have the potential to cross agency boundaries with all affected parties”.
- Change the high fire intensity from BTU’s to something that is measurable in the field and understood by the public.
- Change the guidelines that rank preferred fuel treatment methods to something outcome based, considering treatments that have the least impact on goshawks, or MSO, or soils/watershed.
- Change the guideline for fuel treatment priority to use the terminology and process of Fire regime and condition class.

- Changes need to occur within the guideline for EMA 12 to allow for the feasible use of prescribed fire and wildland fire use (wildlife non-structural habitat improvement).
- Change all references to EFSA to WFSA and WFIP. Add references in the Plan or other direction about using minimum impact suppression strategies, tactics and tools in Wilderness.
- Include mixed conifer on the North Kaibab Ranger District for Wildland Fire Use. Currently Wildland Fire Use is excluded from mixed conifer on the North Kaibab Ranger District. The Fire Management Plan for the adjacent Grand Canyon National Park is currently under revision along with a new Biological Opinion (BO). The District is considering its options and may pursue the approach used in the Park Service's BO to meet their intent and needs in addressing Wildland Fire Use in the mixed conifer on the North Rim.

Law Enforcement

- ❖ Cooperate with State and local law enforcement agencies to properly protect Forest resources, employees, visitors, and property.

The Forest has four cooperative agreements – with the Arizona Department of Public Safety, the Coconino County Sheriff's Department and the City of Williams.

Table 14 summarizes the number of law enforcement incidents reported in the past ten years on the Forest in the Law Enforcement and Management Reporting System. Reporting of activity in this database may not have been consistent for this entire period so trends are probably not reliably detected using the database.

Table 14. Summary of law enforcement violations and actions from 1995 through 2004.

Warnings	Incidents	Mandatory	Collateral	Total
439	2,037	3	211	2,690

Trends and Changes Needed

Law enforcement issues are expected to grow as the number of visitors to the Forest grows. Other trends expected to add to demand for law enforcement activities are:

- the rapid increase in use of Forest tracts adjacent to subdivisions currently being developed, especially on the Williams RD; and ,
- the challenges of implementing expected OHV travel restrictions as a result of the Five-Forest OHV EIS and national rule-making in process.

The Plan will probably need to be amended or revised to include changes in desired conditions, strategies and perhaps design criteria as a result of these ongoing efforts.

Special Areas

No objectives for special areas are set in the Plan. Wilderness is discussed above. Two goal statements are made and are reported on below:

- ❖ Identify, recommend, and protect potential Research Natural Areas.

The Garland Prairie Research Natural Area (RNA), representing the Arizona fescue-mountain muhly prairie was recommended in the Plan. An establishment record was transmitted to the Regional Office

early in the Plan period but was never acted upon. The area is posted on the ground and has been managed as a RNA; it is fenced to exclude livestock and natural fires are permitted, although none have occurred during the Plan period.

There is some disagreement between various maps (allotment maps, Plan ecosystem management areas, and the establishment record), what is posted on the ground and what is actually fenced about the precise location of the RNA.

Trends and Changes Needed

Trees are increasingly gaining a foothold in this grassland and many are now large enough to be resistant to grass fires. Invasive, non-native plants, especially cheat grass and Dalmatian toadflax are increasing their presence in the area. The values for which this RNA was established are threatened by these human-caused events. The Forest is planning to intervene directly to reverse these trends with mechanical and chemical methods.

There is a need to resolve conflicts between various map sources about the RNA location and accurately post and fence the agreement on the ground. We also need to complete the establishment of this RNA.

- ❖ Manage specially designated areas according to the enabling orders and to protect their special qualities.

The Plan established areas with specific management direction for a botanical area protecting Arizona bugbane (490 acres) and the Franks Lake Geologic-Botanic Area (145 acres).

A Conservation Assessment and Strategy was completed for the bugbane that includes a monitoring program. It has been implemented and monitoring is on schedule.

Franks Lake was fenced to exclude livestock in 1990. Monitoring indicates a very positive response as a result. Refer to the Riparian Habitats section above and Appendix 3 for more detailed information.

Roadless areas not designated as wilderness were released for multiple uses under the Arizona Wilderness bill. A portion of these roadless areas were included in the subsequent Murray Timber Sale but most of the areas remain largely unroaded, although some roads apparently missed during the original roadless inventory are still present and are being used. Additional rule-making and subsequent litigation over roadless area management policy nationally occurred over the past several years. Under the current rules, the State of Arizona may petition the Forest Service to establish formal roadless areas. As of this writing, the state has requested information about the areas of concern but has not filed a petition.

Trends and Changes Needed

Management actions taken during the Plan period seem to have adequately protected and restored the immediate desired conditions for the special areas designated on the Forest. Maintenance of protective improvements will need to continue.

For the bugbane area, a significant risk of intense crown fire exists. The effects of such a fire, if it were to occur, on existing bugbane populations are unknown but are suspected to be quite adverse. Implementing some of the proposals in the Conservation Agreement and Strategy related to fire use and establishing populations in adjacent drainages should be considered in the next Plan period.

Public Affairs

- ❖ Provide for public participation in and information about Forest management. Involve the public at appropriate points in every decision making process. Seek advice and counsel from people who are affected by Forest management.

We provide opportunities for the public to participate in forest management by first, identifying the audiences affected or interested in our management decisions, and then designing the appropriate communication and public involvement plan to help us achieve our goal. Our involvement strategy includes developing news bulletins to provide updates on the project, hosting public meetings in affected communities, scheduling field trips to project sites, posting information on forest web site, newspaper articles, personal phone calls, and direct mailings such as letters.

In the last five years the number of public affairs specialists (PAOs) on the forest has increased to two. The two positions were filled at the district level. One position has public affairs responsibilities for the North Kaibab Ranger District, and the other position has public information duties for the fire program on the Williams and Tusayan Ranger Districts. The PAOs work closely with forest staff, rangers and district interdisciplinary teams to design and implement public involvement and collaboration strategies.

Working with our public and communities has become increasingly important as we continue to address complex issues concerning natural resources and management of public lands. Over the last 10 years the Kaibab has conducted several major public involvement efforts. The Forest implemented a comprehensive public involvement plan for the Tusayan Growth Environmental Impact Statement. Public involvement efforts occurred during the entire EIS process, a time period of about five years, and included: hosting numerous public meetings in communities across northern Arizona and in Phoenix to provide a wide range of information; developing about 20 news bulletins, which were distributed to an extensive mailing list; providing presentations to civic groups and community organizations in northern Arizona and Phoenix; visits with the editorial boards of newspapers in northern AZ, the greater Phoenix area and in Tucson; visits with elected officials at the local, county, state and federal levels of government; issuing press releases to local, statewide and national media; and hosting numerous field trips to the project site.

When national attention became focused on the need to reduce the accumulation of forest fuels and restore the health of forest ecosystems, we increased our efforts to engage and involve our public and communities in possible solutions. The ranger districts hold public meetings to discuss proposed thinning projects, local media and elected officials are invited on field trips to talk about dense forests and restoration goals, visits are made to property owners living in the wildland urban interface to discuss proposed prescribed burning projects and information about fuels reduction projects is posted on the forest web site.

The Forest Service is in the process of developing an environmental impact statement to address the need to change current management direction on off-road travel on four national forests in Arizona. At the same time a national effort is underway, which is aimed at establishing a consistent and general policy for the agency. The Kaibab is working with user groups and interested individuals to reach a fair equitable and consistent decision about how best to reduce unacceptable impacts of off-highway vehicle travel on the forest. The Forest has held public meetings in several communities to share information about the proposed changes and to gather public comments and concerns. Information will be posted on the forest web site as the EIS process moves forward.

Trends and Changes Needed

Laws, policies and regulations are increasingly requiring or recommending collaborative approaches to planning, implementation and monitoring both programmatically and at project levels. The demand for collaborative and other public involvement skills is likely to rise for the next decade. It is important to look for these skills when hiring people who will be directly involved in collaborative arenas.

Land Management Planning

- ❖ Provide coordination and ensure interdisciplinary input for implementing, monitoring, and updating the Forest Plan.

The Forest Plan has been amended with an interdisciplinary process seven times since it was implemented in May, 1988. All but one of these amendments was triggered by a programmatic need change goals, standards or guidelines for use in project planning and implementation. The monitoring chapter has not been amended although the need has been recognized since 1993. Data collected on-Forest to monitor vegetative resource conditions (and therefore many wildlife habitats along with timber and range conditions) is shown in Figure 10, above. Others, particularly FIA have increasingly received funding to carry out this work while the budget on the Forest has declined. The data provided by FIA is of high scientific quality but of low statistical reliability other than for rather general Forest summaries.

Trends and Changes Needed

Our Forest Plan is 17-years old and is currently on Congressionally-mandated life-support. It is largely silent about the Region's Central Priority – and most significant achievable conservation objective – to restore the functionality of fire adapted systems.

A large majority of the lands on the Forest are in unsatisfactory ecological condition as a result of fire exclusion. We have significant areas of wildland urban interface that must still be treated and maintained to protect communities and set the stage for fire to once again play its historical role as “restorer” rather than “destroyer.” There is little direction in the existing Plan that provides the integrated strategic objectives and guidance for accomplishing this Central Priority.

Our Plan is still largely a tactical document rather than strategic one, focused primarily on desired conditions and goals to make progress toward them. It is often difficult to change tactics in project planning because the Plan must also be amended when other guidance, such as regulations, policies, emerging science, monitoring results or biological opinions change.

There is also rising vulnerability to legal challenges related to Management Indicator Species, Threatened and Endangered Species, schedules of activities in the plans, monitoring requirements, and (without Congressional exemption) the fact that Plan is over 15-years old.

Other Plan Goals

Not enough information is currently compiled to adequately report on the following Plan goal accomplishment. Available information is still reported. They will be addressed in the Comprehensive Evaluation Report in 2006.

Lands

- ❖ Acquire lands that are needed for landownership consolidation and improved management efficiency through land exchange, purchase, or donation.
- ❖ Acquire the road and trail rights-of-way needed to administer the Forest and provide public access.
- ❖ Identify and locate landlines to protect National Forest landownership by detecting and resolving unauthorized occupancy and trespass.
- ❖ Administer the Small Tracts Act to best serve the public and the resources.
- ❖ Administer special uses to best meet public needs.
- ❖ Minimize the number of electronic sites and utility corridors consistent with appropriate public services that require the use of Forest lands.

Refer to Figure 11, above for budget trends.

Transportation and Administrative Facilities

- ❖ Provide and manage a serviceable road transportation system that meets needs for public access, land management, resource protection, and user safety. Provisions are made for the construction and reconstruction, maintenance, seasonal and special closures of Forest roads; and obliteration of unnecessary roads.

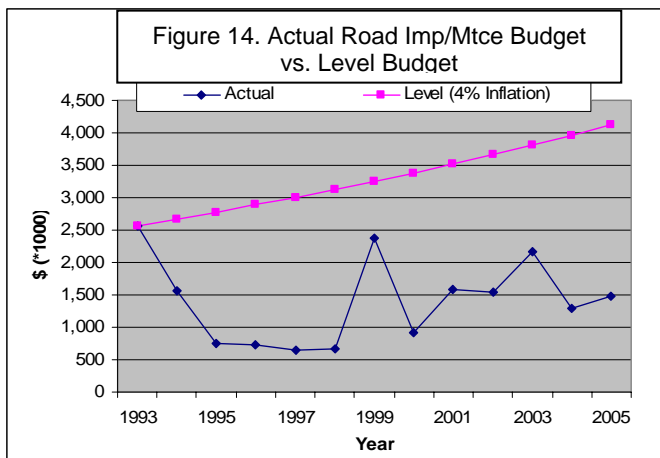
Roads (and road maintenance) are necessary for administrative access to the forest, to manage resources, and to allow for public visitation and recreation.

The road system on the Kaibab National Forest is an artifact of the need for a system for access to remove timber, and the ability to construct and maintain such a system with money from timber sales. There are currently about 6300 miles of open roads on the Forest with objective and actual service levels as indicated in Table 15. This represents a probable decrease in open road mileage of about 2000 miles since 1988. About 250 miles shown for 1988 include state- and county-maintained roads, mostly in service level 4 and 5 categories. These are not shown in the current figures in Table 15.

Table 15. Road Mileage by Service Level

Service Level	Mileage		
	1988	Operation Service Level	Objective Service Level
2	5419	5843	5611
3	736	459	642
4	231	32	53
5	218	0	0
Total	8592	6334	6306

Figure 14 compares the road improvement and maintenance funding level at the 1993 rate adjusted annually for inflation to the actual funding received. Funding has effectively decreased by over 60 percent in the Period. Since 1993, the Forest has been attempting to maintain this large road system with ever fewer dollars. At the same time, the public continues to expect a high standard of road maintenance, while public use has grown, as a result of the Southwest's explosive population growth and changing use patterns, including increased use of and routes created by off-road travel with motorized vehicles.



Funding for road maintenance is expected to continue to decline in the future. Therefore, the Forest's management strategy is to:

- work with the public to identify the roads (and other routes) most important to maintain;
- close other roads, especially those at risk of causing the most resource damage;
- decrease the type of maintenance on remaining roads;
- decrease the frequency of maintenance on the few most important roads; and,
- contain the development of unplanned routes arising from off-road travel.

The Forest is currently working on this strategy with:

- a Five-Forest OHV EIS (draft EIS has been sent out for public comment) that proposes to limit OHV travel off designated routes;
- a collaborative Roads Analysis Process leading toward decisions about which roads and routes to retain or create for public access; and,
- following completion of the first two processes, the publication of a visitor travel map showing all designated travel routes.

The current Forest Plan is not adequate to support this effort because it does not adequately identify desired conditions; doesn't have strategic objectives addressing the desired conditions in place and does not adequately provide guidelines to implement this strategy.

- ❖ Provide administrative facilities for resource and activity needs and that meet Federal and State pollution abatement standards where applicable.
- ❖ Rehabilitate or replace administrative facilities and sewer and water systems as needed to improve management efficiency and insure public and employee health and safety.

Human Resources

- ❖ Manage human resource programs to provide employment, rehabilitation, or other designated objectives while meeting natural resource goals.

See discussion below under General Administration.

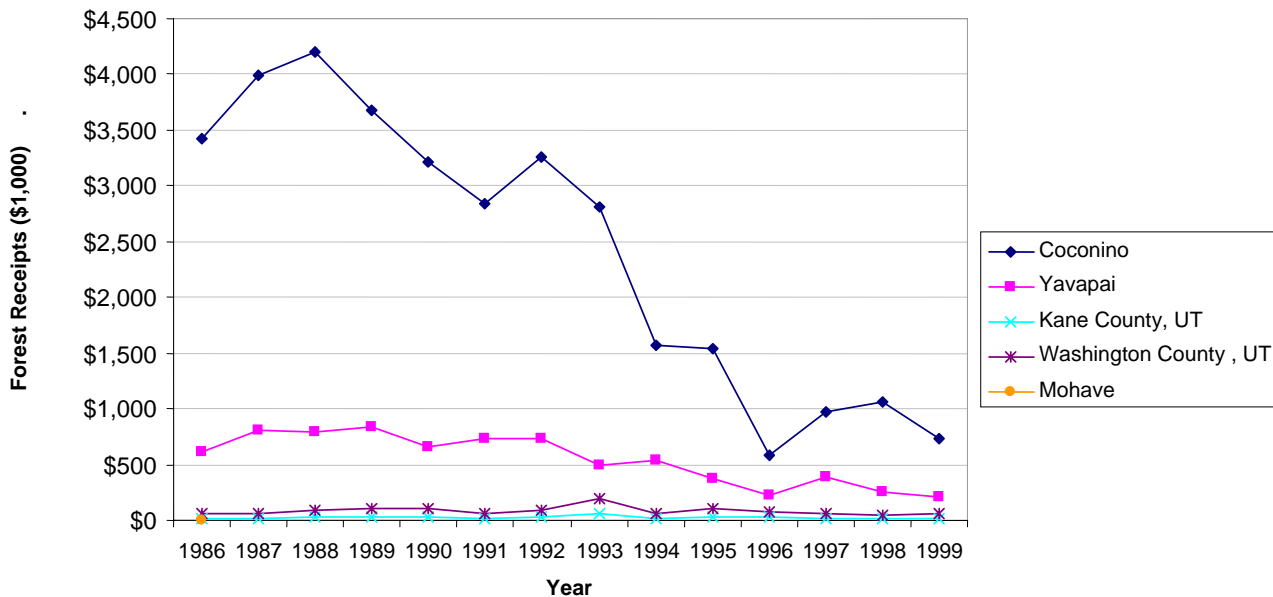
General Administration

- ❖ Provide the organization and administrative support needed to ensure responsive and efficient public land management. Narrative about the size and make-up of the workforce over time, maybe relative to the budget in both absolute and equalized dollars. Might be able to discuss in terms of major work accomplishment areas, as well (recreation, fire, fuels, timber, range & wildlife)?

Direct permanent employment by the Forest has declined in the Plan period from around 250 to around 110. Some of the work carried out by the original workforce has been centralized or contracted as electronic processes have been developed while some work is no longer being accomplished, particularly in resource areas that have had major budget reductions.

Economically, the Forest is much less important in terms of direct receipts into local government coffers although indirect benefits have likely grown substantially. Figure 15 displays annual Forest receipts by county for a 15-year span. Although the figures represent receipts from all national forests with land inside the counties displayed, the trends are similar for all Forests.

Figure 15. National Forest Receipts Transferred to Counties, 1986 – 1999.



Appendix 1 – Table 16. Schedules and Accomplishment of Developed Recreation Investments

1988 Schedule of Developed Recreation Investments	1996 Schedule of Developed Recreation Investments	Actual Achievements
Public – White Horse Lake CG Reconstruction	Public – White Horse Lake Reconstruction	Reconstructed in 1994. PAOT: 741
Public – Kaibab Lake CG Reconstruction	Public – Kaibab Lake CG Construction	Limited reconstruction 2000, additional planned 2008. PAOT: 521
	Public – DeMotte CG Reconstruction	Planned 2005. PAOT: 115
	Public – Cataract Lake CG Reconstruction	Planned. PAOT: 90
	Public – Ten-X CG Reconstruction	2 Group sites added, limited reconstruction in CG, planned. PAOT: 457
	Public – Dogtown Lake CG Reconstruction	Reconstruction in 2004. PAOT: 537
	Public – Indian Hollow CG Reconstruction	Limited improvements 2003. PAOT: 15
	Public – Jacob Lake CG Reconstruction	Group site, picnic area and amphitheatre added 2003, additional planned 2006 or 2007. PAOT: 449
Public – Cougar Lake Recreation Area New Construction	Public – Cougar Lake Recreation Area New Construction	Dropped
Private - Upper Basin CG Construction	Private – Upper Basin CG New Construction	Dropped
Private - DeMotte II CG Construction	Private – DeMotte II CG New Construction	Dropped
	Private - Ten-X Campground Expansion	Dropped, public-private venture unsuccessful
Private – Moqui Lodge Expansion		Facility closed
Private - Jacob Lake Inn Expansion		Expansion in progress
Private - Kaibab Lodge Expansion		Sold, expansion in progress
Private – North Rim		No change in status

1988 Schedule of Developed Recreation Investments	1996 Schedule of Developed Recreation Investments	Actual Achievements
Country Store		
Private - Moqui RV Park Construction		Dropped
Private & Park Service – Visitor facilities for Grand Canyon NP		Planning on-going
Private - Bill Williams Ski Area		Sale in progress
Private – Elephant Rocks Golf Course		Included in Yavapai Land Exchange – status may change
	Kaibab Plateau Visitor Info. Center	Operated May – November. PAOT: 60
	City of Williams-Kaibab NF Visitor Info. Center	Operated year-round. PAOT: 186
Unscheduled developed site improvements completed in Plan period.		<ul style="list-style-type: none"> • East Rim View Point • Perkins Tank • JD Dam and Elk Tank Dispersed Fisheries Developments • Jacob Lake Historic Ranger Station Interpretive Site

Appendix 2 – Table 17. Changes in Permitted AUMS from 1971 to 2004 and NEPA Sufficiency.

District	Allotment Name	Rescission Act Allotment	Livestock Class	Permitted AUMS 1971	Permitted AUMS 1988	Permitted AUMS 2004	NEPA Completed or Planned
01	Corva	Y	Yearlings	3,205	1,250	1,250	2007
	Double A	N	C/c	5,610	1,750	1,750	1995
	Hat	N	C/c	14,240	6,125	6,125	1993
	Irishman Dam	N	C/c	2,690	900	900	1995
	Juan Tank	N	C/c	2,675	2,280	2,280	1995
	Partridge Creek	N	C/c	4,490	1,925	1,350	1995
	Pine Creek	Y	Yearlings	875	875	875	2007
	7C-	Y	Yearlings	60	55	55	2007
	Tule	Y	C/c	3,600	2,175	1,920	2004
	Government	Y	C/c	2,590	2,590	1,750	2001
	Garland Prairie	N	Sheep	370	370	370	1995
	Pomeroy	N	Sheep	180	180	180	1995
	Ebert	N	C/c	775	775	735	1993
	Homestead	Y	C/c	990	990	990	2004
	Davenport	Y	C/c	1,235	1,235	1,050	2004
	Smoot	N	C/c	5,010	5,010	2,490	1994
	Moritz	N	C/c	2,145	2,145	1,110	1994
	Big Springs	N	Sheep	945	1,600	1,600	1995
	Bellemont	Y	C/c	890	1,505	2,070	2006
	Chalender	Y	Sheep	1105	1,105	685	2006
	Twin Tanks	Y	Sheep	1,025	1,025	1,025	2008
	Government	Y	Sheep	1,320	1,320	1,320	2006
	Spitz Hill	Y	C/c	955	955	955	2005
	Elk Springs	Y	C/c	180	180	180	1997
	Dog Knobs	Y	C/c	660	430	430	1997
	Squaw	Y	Sheep	2,050	2,050	2,050	2008
	Cowboy	Y	Sheep	1,025	1,025	1,025	1995
	Sitgreaves	Y	C/c	2,020	2,020	2,020	2005
	Totals			62,915	43,845	38,540	
03	Burro	N	C/c	610	805	660	1995
	Central Winter	Y	C/c	3,900	2,665	2,380	2001
	Central	Y	C/c	3,820	6,295	4,165	2001
	Willis Canyon	N	C/c	1,915	1,345	1,615	1995
	Ryan	Y	C/c	1,740	2,065	1,405	2006
	Kane	Y	C/c	650	650	595	2001
	Houserock	Y	C/c	1,655	750	590	2006
	Kanab Creek	Y	NA	1,230	140	-0-	2001
	Totals			15,520	14,715	11,410	
04	Anita	Y	C/c	6,635	6,635	3,390	2004
	Cameron	Y	C/c	11,390	11,360	3,390	2004
	Moqui	Y	Yearlings	5,810	3,080	3,080	2004
	Rain Tank	Y	NA	6,695	6,695	2,860	1997
	Totals			30,530	27,770	12,720	
Forest Grand Total				108,965	86,330	62,670	

³ Allotments including Government Mountain and those listed below for Williams RD were part of the former Chalender RD.

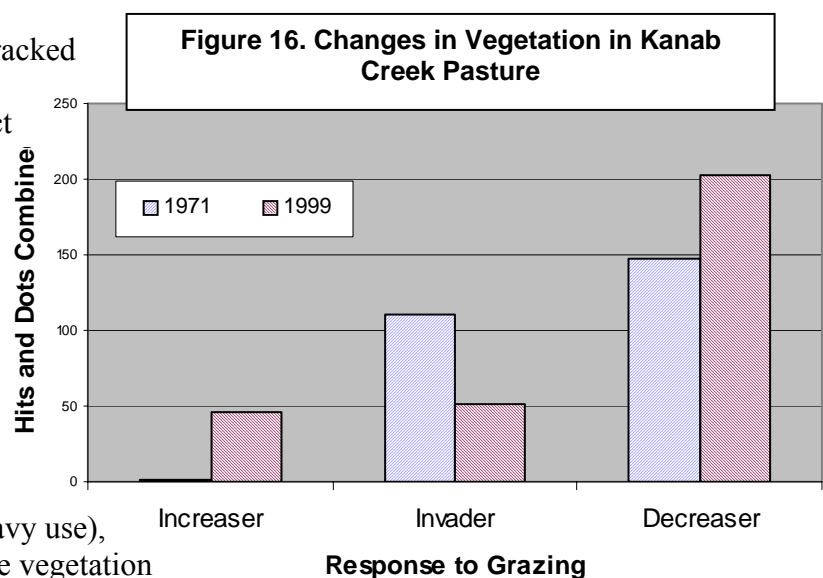
Appendix 3. Detailed Riparian Habitat Conditions Summary

Riparian habitat is largely dependent on fencing on the Forest. Although problematic, the overwhelming majority of the fence lines are intact at any given time and fence maintenance is conducted annually. The Forest began tracking fence conditions and maintenance visits on an electronic database in 2003 and this is expected to improve fence line maintenance.

Arizona Partners in Flight (AZPIF) characterized riparian associations as supporting species and/or life forms that are distinctly different from the immediately surrounding, non-riparian habitat (Latta et al. 1999). The AZPIF Bird Conservation Plan defines four kinds of riparian features: Open water; freshwater marshes; low elevation riparian (generally less than 4,000 ft); and high elevation riparian (generally 4,000 – 11,000 ft.) (Latta et al. 1999). Open water and freshwater marshes are the most common riparian habitats occurring on the Forest. Low elevation and high elevation riparian associations are also present on the Forest, but both are limited in distribution. The most typical forms of riparian habitat on the Forest are developed stock tanks and guzzlers and trick tanks developed as wildlife waters. These structures typically provide water, but do not necessarily support riparian vegetation.

Low elevation riparian includes perennial, ephemeral, or sub-surface water that support woody shrubs and deciduous trees (Latta et al. 1999). This kind of habitat is typically found below the Mogollon Rim. The only low elevation riparian habitat on the Forest occurs in Kanab Creek, beneath the western edge of the Kaibab Plateau. Elevations range from 3,500 to 6,000 feet and about 80 percent of the area has slopes greater than 40 percent. Unlike the Kaibab Plateau, the climate is semi-arid with the mean annual precipitation ranging from eight to 12 inches. The entire Forest Service portion of the drainage is a designated Wilderness Area. Grazing has not occurred on the Forest portion of Kanab Creek since 1996 and a Decision Notice formalizing the no grazing policy was signed in 2001. Water flow has been restricted by diversions upstream of the Forest boundary. Tamarisk is established throughout the watershed, with abundant seed sources upstream of the Forest Service boundary. Tamarisk is out competing and displacing native woody vegetation in Kanab Creek. Tamarisk control treatments in Kanab Creek were evaluated under the Three Forest Noxious Weed EIS, completed in 2003. Tamarisk control could extend to about 565 acres and would include mechanical, cultural, herbicidal, and biological treatments.

Vegetation changes can be tracked using standard range condition evaluations as tracked by successive readings of permanent vegetation plots known as Parker Transect Clusters. Parker Transect Clusters established in the Kanab Creek watershed display changes in vegetation between 1971 and 1999 (Figure 16). Parker Transect Cluster categorizes plants by their response to grazing. Native perennial vegetation normally present in climax communities is classified as increasers (plants that increase under heavy grazing pressure), decreasers (plants that decrease under heavy use), and invaders (species not present in native vegetation



assemblages but appear in response to grazing) (Stoddart et al. 1975). Generally, increasers are less palatable than decreasers. Results from the reading the Parker Transect Clusters indicate improved conditions in the Kanab Creek watershed since the removal of livestock (Table 18).

Table 18. Perennial plants encountered along the Parker Transect Cluster in Kanab Creek, Kaibab National Forest.

Kanab Parker Transect Cluster			Dots and Hits Combined ¹	
SPECIES	COMMON NAME	GRAZING RATING	Survey Year 1971	Survey Year 1999
<i>Atriplex canescens</i>	4-wing saltbrush	Decreaser	0	1
<i>Bouteloua eriopoda</i>	Black grama	Decreaser	85	104
<i>Poa fendleriana</i>	Muttongrass	Decreaser	1	0
<i>Sporobolus cryptandrus</i>	Sand dropseed	Decreaser	61	97
<i>Hilaria jamesii</i>	Galleta	Increaser	1	39
<i>Kochia americana</i>	Greenmolly	Increaser	0	7
<i>Ephedra</i> spp	Mormon tea	Invader	1	32
<i>Gutierrezia</i> spp	Snakeweed	Invader	3	19
<i>Spartina</i> spp	Cordgrass	Invader	59	0
<i>Tridens pulchella</i>	Fluffgrass	Invader	24	0
<i>Zygadenus</i> spp	Deathcamas	Invader	23	0

¹Dots and Hits represent techniques used to record plants along established transects

AZPIF characterizes high elevation riparian as occurring in steep, narrow canyons, drainages, or in mountain meadows at elevations above 4,000 feet with frequent or permanent water (Latta et. al. 1999). Douglas-fir, aspen, cottonwood, willow, and oak are indicative of high elevation riparian habitat. North Canyon Creek on the NKRD and Big Spring on the Williams RD are the only high elevation riparian associations on the Forest. These waters flow for a combined maximum distance of about 8 to 9 miles, but average distances range between 2 to 5 miles. Flows and stream lengths vary dramatically between years and seasons.

The portion of the North Canyon watershed occurring on National Forest lands is nearly entirely within the Saddle Mountain Wilderness Area, located within the extreme southeast part of the NKRD. The entire surface flow of North Canyon Creek is generally restricted to National Forest lands. Surface flow originates at North Canyon Springs and the stream course continues, on average, about 2 to 4 miles. The length of the creek varies, depending on winter snowpack on the Kaibab Plateau and seasonal temperature and precipitation patterns the rest of the year. A survey in June 1990 found 4 to 4.5 miles of perennial water, but flow was measured at 1 to 4 cubic feet per second. Slopes vary tremendously, from about 60 percent near the springs, to 4 to 5 percent in some of the middle and lower reaches. The upper drainage is at about 8,000 feet elevation and the steep, narrow canyon creates a mix of microsite conditions. The north-facing slopes support a dense forest of true fir, Douglas-fir, and ponderosa pine. The south-facing slopes are open, with exposed rock and soils and scattered pine and juniper trees. The traditional riparian zone is occupied by a mix of ponderosa pine interspersed with white fir, Douglas-fir, Gambel oak, New Mexico locust, and juniper. The only fish species in North Canyon Creek is Apache trout.

Apache trout, native to Arizona and listed as Threatened under the Endangered Species Act, were introduced from Ord Creek (in the White Mountains of east-central AZ) into North Canyon Creek in the 1960s. Subsequent fish introductions into Ord Creek threatened the genetics of the native stock and Apache trout from North Canyon Creek were used to restore their genetic purity. Maintaining an isolated, genetically pure population of Apache trout in North Canyon Creek provides future management options.

Active monitoring and management occurs in North Canyon Creek with regards to Apache trout. Drift fences were installed in the upper and lower portions of North Canyon in 2003 to deter livestock from wandering into the drainage. Since then, field sign of livestock in North Canyon is rare. Trail work has occurred in 2003 to help stabilize soils and limit sedimentation into the creek. A fuels reduction project is being implemented above North Canyon Creek (data collection and analysis for the fuels reduction project occurred in 2004) to reduce the threat of stand replacing fires. This threat was identified when the Outlet fire escaped from the Grand Canyon National Park in 2000. A crown fire burning through the drainage would likely eliminate the Apache trout population due to extremely high fuel loading along and above North Canyon Creek, the small width and shallow depths of the creek.

The only high elevation riparian area on the South Zone (SZ) is located in the southeast quadrant of the Williams RD. Big Spring forms a small, shallow pool at the upper portion of Big Spring Canyon and the flow creates a linear feature that, including the entire riparian zone, is generally 2 to 3 feet wide. Actual open, flowing water is typically less than one foot in width and is often only inches across. Riparian plants are primarily sedges with upland vegetation in immediate proximity. The overstory consists of ponderosa pine or is lacking entirely. One small patch of decadent willows (most of the plant structure consists of dead wood) occurs along the riparian strip. Some of the few cottonwoods growing on the entire SZ occur several miles down the drainage where Forest Service road 109 crosses the Big Spring draw (a small clump of 4 to 6 inch dbh trees near the road). Flows are absent or very limited through most of the drainage and scouring rarely occurs, leaving little opportunity for natural cottonwood regeneration. Big Spring Canyon is within an active sheep allotment. Since the mid-1990s the permittee has agreed to avoid camping in Big Spring Canyon. A herder stays with the flock and only allows the sheep to graze lightly in a single pass through the area. Impacts from the sheep are monitored and subsequent site inspections after the sheep have passed through have found little to no effect on the springs, pool, and riparian vegetation.

Similar to the rest of Arizona, freshwater marshes are an anomaly on the Forest. Brown (1982 cited in Latta et al. 1999) attributes this phenomenon, in part, to the lack of recent glaciation and high evaporation rates. The scarcity of marshlands places even more emphasis on this already important habitat. AZPIF defines marshes as areas of permanent to semi-permanent fresh water characterized by relatively shallow depths and extensive coverage of submergent and emergent vegetation. Marshland habitat on the Forest tends to be a result from dams, diversions, and/or consists of ephemeral waters dependent on annual weather cycles. Ephemeral marshlands might only produce the defining vegetation once every several years. Marsh habitat on the Forest primarily occurs on the Williams RD (Table 19). The Tusayan RD does not have any marshland.

Table 19. Primary marsh habitat on the Kaibab National Forest. Note that acres of water refers to total area covered by water and is included for scale; actual marsh habitat will be a subset of this value in most instances.

Ranger District	Location	Acres of Water
North Kaibab	Franks Lake Botanical Area	2+
North Kaibab	Three Lakes	10
Williams	Coleman Lake	80
Williams	Davenport Lake	285
Williams	Duck Lake	50
Williams	J.D. Dam	30
Williams	Scholz Lake	65
Williams	Sunflower Flats	30

Franks Lake Geologic-Botanical Area and Three Lakes are the major marshy areas on the NKRDR. Franks Lake is perennial whereas Three Lakes is an ephemeral feature. Franks Lake is a series of three limestone sinks with a mosaic of wet and dry meadows, marsh, and floating sedge bog. The area was designated a Geologic-Botanical Area in 1988 and was fenced to exclude livestock in 1990. A vegetation survey of the area was completed in cooperation with the Arizona Nature Conservancy in 1991. The impacts of grazing were still evident at the time of the survey, including vegetation trampling, limited plant diversity in some zones, and the floating bog was limited to those regions of the pond too deep for cattle grazing. The area was resurveyed in September 1992. Vegetative cover increased from 35 to 90 percent in the meadow sample plots and the species composition consisted nearly entirely of native plants with only dandelions occasionally recorded. The shoreline had filled in with native vegetation, the bog had expanded in size, and the vegetation had recovered in areas previously trampled by cattle. After discovering three cows in the meadow in 2004, the livestock were chased out, and immediate repair of the entire fenceline was completed. The floating bog has expanded to fill the majority of the pond, with only a sinuous channel of open water remaining.

Three Lakes has an excavated ring around the exterior of the pond to provide open water while retaining emergent vegetation in the center of the lake. A new fencing project was completed this year that involved removal of all existing fencing and rebuilding a combination of aspen rail and 4-wire fencing. The new configuration added 8 additional acres of meadow habitat to the previously protected 9 acres of wetland habitat and 15.5 acres of buffer zone consisting of mixed montane meadow. Other examples of marshy habitat exist on the NKRDR, they tend to be less than 2 acres in size, e.g., Crane Lake (1.5 acres), Deer Lake (1.3 acres), and Indian Lake (0.3 acres).

The Williams RD has a number of marshy areas including small patches or limited linear strips of marsh vegetation, e.g., Hell Canyon and Keyhole Sink, to broad marsh and wet meadow complexes such as Sunflower Flat. Many of these areas are microsites that are only fractions of an acre in size and support limited patches of marshy vegetation, such as Dow Springs, Bear Springs, and Pomeroy Tanks. These perennial springs are more prevalent near the Mogollon Rim where melted snowpack collects and comes to the surface. Coleman Lake, JD Dam, Scholz Lake and Sunflower Flat are the most extensive perennial marshes on the Forest (30 to 80 acres). The amount of marsh vegetation and water are highly variable, depending on the seasonal weather patterns, including winter snows and monsoon rains. As a group, they provide habitat for: resident, wintering, and stopover waterfowl; foraging opportunities for

raptors such as osprey, bald eagles, peregrine falcons, and goshawks; a range of migratory passerines, shore, and wading birds; and 2 great blue heron rookeries.

Wetlands are typically enhanced or protected through exclusion of livestock use. Most areas capable of supporting woody riparian vegetation, such as Coleman Lake, Sunflower Flats, Frank's Lake, etc., have been fenced to exclude livestock. Livestock management plans for ephemeral wetlands that are grazed, such as Davenport and Dry Lakes, have been updated in the last couple of years. Beginning in 2005, cattle are no longer allowed on Davenport Lake until 10 days after standing water is gone to minimize impacts to the soil. Dry Lake was fenced this year to limit livestock access to water and riparian vegetation. Cattle can access water through a single lane while the rest of the lake is protected. Ephemeral wetlands are considered key foraging areas even in dry years and are routinely monitored by the range staff.

Follow-up inventories through time for all riparian areas and monitoring woody riparian communities and riparian communities dominated by shrub and herbaceous species will remain a challenge when these activities do not directly relate to the targets assigned by the Regional and Washington Offices of the Forest Service. The decreasing budgets and the decreasing staff that results from loss of funding will make the necessary time and money commitments for surveys difficult to accomplish. Even finding the time and money to complete surveys through partnerships is complicated under these fiscal restraints. Until "surveys completed" becomes an identified goal assigned to the Forest, overcoming the current limits will become increasingly difficult through time.

Admin Org	1	2	3	4	5	D	C
030402	.0000	.0000	.6300	.0000	.0000	.0000	.0000
Admin Total:	.0000	.0000	.6300	.0000	.0000	.0000	.0000
Admin Org	1	2	3	4	5	D	C
0307	.0000	127.4010	.0000	.0000	.0000	.0000	.0000
030701	3.8640	1,653.8060	227.9430	27.5900	.0000	.5100	.0000
030703	23.4575	3,260.6518	257.0660	23.2790	.0000	22.1872	.0000
030704	.0000	565.9250	154.6870	2.5050	.0000	.0000	.0000
Admin Total:	27.3215	5,607.7838	639.6960	53.3740	.0000	22.6972	.0000
Admin Org	1	2	3	4	5	D	C
030901	.0000	3.6800	.7000	.0000	.0000	.0000	.0000
Admin Total:	.0000	3.6800	.7000	.0000	.0000	.0000	.0000
Admin Org	1	2	3	4	5	D	C
Unknown	.0000	.0000	.6800	.0000	.0000	.0000	.0000
Admin Total:	.0000	.0000	.6800	.0000	.0000	.0000	.0000
Level Total:	27.3215	5,611.4638	641.7060	53.3740	.0000	22.6972	.0000

Operation Maintenance Level

Admin Org	1	2	3	4	5
030402	.0000	.0000	.6300	.0000	.0000
Admin Total:	.0000	.0000	.6300	.0000	.0000
Admin Org	1	2	3	4	5
0307	.0000	127.4010	.0000	.0000	.0000
030701	5.1150	1,716.6320	184.3860	7.5800	.0000
030703	15.9565	3,326.2880	220.7760	23.0590	.0000
030704	.0000	668.6020	52.8250	1.6900	.0000
Admin Total:	21.0715	5,838.9230	457.9870	32.3290	.0000
Admin Org	1	2	3	4	5
030901	.0000	4.3800	.0000	.0000	.0000
Admin Total:	.0000	4.3800	.0000	.0000	.0000
Admin Org	1	2	3	4	5
Level Total:	21	5,843	459	32	0

The Road Core snapshot was refreshed on 08/25/2005 10:52am

Run by OPS\$BHIGGINS
August 25, 2005 10:59 AM
kaibab.r3.fs.fed.us

Parameters

Admin Org: %

Notes:

District mileage is summarized by objective maintenance level and operational maintenance level linear events from the Road Core snapshot.

Make sure the snapshot is current before running this report.

Table used: II_ROAD_CORE