

Annual Monitoring Report
for Implementing the
Kaibab National Forest Land Management Plan

1993

The Monitoring Plan for the Kaibab National Forest Plan identifies 58 items to be tracked as measures of the effectiveness of the forest plan. While the frequency of monitoring varies from one to nine or more years, the time for reporting these items is identified as the fifth and tenth years of the Plan. Since the Forest Plan was approved in mid-1988 and most projects under the current Plan weren't completed until 1989 or later, 1993 is considered to be the year for five year monitoring and is covered in this report.

Valuation of various forest resources by society, the Forest Service and other agencies has changed since the inception of this Plan in 1988. This has been expressed in public concern and action, as well as governmental action and funding of activities. This, in turn affects what can or should be monitored and how it will be done.

For example, a joint study between the Arizona Game and Fish Department, the Kaibab National Forest, and Rocky Mountain Station is currently underway to measure the changes in canopy cover as other measures of stand density are changed through management. Another study is currently proposed between Kaibab Industries, Rocky Mountain Station and several administrative levels in the National Forest System to refine models of forest vegetation development on the Forest. A third important example is the on-going study by Rocky Mountain Station, with cooperative work by the Arizona Game and Fish Department and the University of Arizona to study various aspects of northern goshawk biology, behavior and distribution over the Kaibab Plateau ecosystem.

The Kaibab National Forest is currently amending its Forest Plan to respond to these shifts, some of which also change what might be important to monitor, or affect what can be funded to monitor. Because of the significant changes the current process is expected to make in the Plan, the plan Revision has been scheduled for 1997 or 1998.

What follows is a description by item of our monitoring progress.

Timber 1, 2, 3, 4 - See attached Graph #1.

					----- Acres -----	
					Expected	Variation
Item Number	Description	Level	Range	Level		Actual
Timber 1	Precommercial Thinning	7,470	5,603 - 9,338		8,220	
Timber 2	Commercial Thinning	20,900	15,675 - 26,125			25,654
Timber 3	Shelterwood Seed Cut.	14,060	10,545 - 17,575		15,423	
Timber 4	Shelterwood Removal Cut.	18,115	13,586 - 22,644		10,593	

For all these items except Shelterwood Removal Cutting, the Forest is within the tolerance range around the predicted amount for the fifth year. Because of changing direction toward group or small site management, along with possibly insoluble conflicts between visual and/or wildlife concerns and even-aged management, the amount of shelterwood system cutting is expected to drop or shift dramatically from regular to irregular application.

Timber 5 - Adequate Restocking of Regeneration Cuttings

Under the National Forest Management Act (NFMA), timber sites are to be restocked within five years of final removal cutting. For harvest completed in 1988, adequate restocking should be present by 1993. All of the 587 acres with final removal harvest completed in 1988 are adequately restocked. 92% of those acres were restocked without any active treatment. The first treatments covered by this Plan were completed in 1989 and will be evaluated later this year.

Timber 6 - Adequate Restocking of Planted Areas

Planting is carried out to restock sites which were formerly timbered and became understocked due to natural or human-caused events or some combination of the two. In some cases, planting has also been carried out on sites which supported very few trees in the past. This practice is becoming much less common as we recognize the need to restore and maintain the grass/forb/shrub communities in these ecosystems. Additionally, increased emphasis is placed on natural regeneration through shelterwood seed cuts and the planting program is reduced.

Timber 7 - Review maximum size limits for harvest areas to determine whether prescribed size limits should be continued.

A concern exists about the size of created openings (and therefore, the size of future stands of larger trees as well) as they relate to wildlife habitat. This concern has become much less critical with the implementation of the Management Recommendations for the Northern Goshawk in the Southwestern United States (MRNG) and interim direction for managing Mexican Spotted Owl habitat since regeneration treatments currently do not qualify as openings as stated in the Regional Guide for the Southwestern Region because they are less than two acres or have more than five trees per acre greater than 11 inches in diameter, or both.

Less than 5000 acres (out of 475,000 acres inventoried) of inventoried areas are non-stocked - much of this total is either burns or PJ pushes. Some large non-stocked areas exist on the suitable timber area (788 and 235 acres). These are a result of catastrophic fires which have been planted and subsequently failed. A relatively small amount

of the non-stocked area inventoried occurs in the commercial timber base. Nearly all of the cutting performed under this plan has not created areas large enough to be considered openings.

Timber 8, 9 - See attached Graph #2.

----- MMBF -----					Expected Variation	Actual
Item Number	Description	Level	Range	Level		
Timber 8	Sawtimber Sold	355 MMBF	266 - 443 MMBF	180.6		
	Sawtimber Deleted for Goshawk/Oldgrowth				10.1	
	NET Sawtimber Sold					170.5
	Sawtimber Harvested					154.5
Timber 9	Pinyon-Juniper Sold	33.5 MMBF	25 - 42	27.4		
	Pinyon-Juniper Harvested					26.0

The much lower than expected outputs of sawtimber are one important reason the Forest is currently engaged in a Plan amendment.

Timber 10 - Evaluation of Unsuitable Timber Lands

On a project level basis, the suitability of sites for commercial timber production is reviewed by project interdisciplinary teams. Since 1988, the net change in acres classified as suitable has dropped from 479,132 acres to 471,724 acres.

Protection 1 - Determine that destructive insects and disease organisms do not increase to unacceptable levels following management activities.

Aerial surveys by the Forest Pest Management group have indicated only minor problems, mostly involving *Ips* species, following management activities. There has been a slight increase in endemic populations of Western Pine Beetle and in the population of a defoliator in Douglas-fir district-wide and on the east-side, respectively, on the North Kaibab Ranger District. Neither outbreak is associated with treatments. Additionally, there has been a rather severe outbreak of Mountain Pine Beetle on the Dixie National Forest in southern Utah which is being closely monitored to determine if it will spread to the Kaibab.

As our understanding of ecosystem health has increased and studies have shed light on how different our current forest is from the way in which it evolved, a concern about the general nature of how we manage this ecosystem has grown. Managing for tree densities in all size classes much higher than in precolumbian times is leading to larger landscape level risks of catastrophic fire or insect and disease outbreaks. This issue is being addressed in part by the amendment process currently underway.

Range 1 - Wild Burro Population.

The wild burro population was estimated in 1993 to be 22 animals, which is at the lower end of the desired herd size. This population is variable since a portion of the area is off Forest land.

Range 2 - Permitted Grazing Use and Grazing Capacity.

Permitted grazing use was 85,653 animal unit months (AUMs) in 1993. The goal for 1993 was to be between 58,538 and 97,563 AUMs. Capacity is estimated to be about 71,000 AUMs, but this is very rough. Allotment management plans are being executed after environmental analysis and documentation with the specific intent to bring permitted use into range which will allow for "fair" or better range condition with static or upward trend.

Range 3 - Range Structural Improvements.

A total of 761 Range Structural Improvements - Replacement and New are estimated to be built in the decade. An estimate of 180 to 200 structural improvements have been built from 1989 through 1993, or 24% to 26% of the original Plan estimate.

Range 4 - Range Non-structural Retreatments.

A total of 19,378 acres of Retreatment are estimated to be carried out in the Plan for the decade. An estimate of 6000 to 8000 acres have been treated from 1989 through 1993, or 31% to 41% of the original Plan estimate.

Recreation 1 - Public Sector Developed Recreation Use

YearMRVDs

1988273.8
1989321.3
1990271.4
1991258.7
1992266.1
1993279.0

Recreation use in 1993 is 89 percent of the projected average annual Forest Plan output of 314.0 MRVDs. Some of this shortfall may be attributed to the increased accuracy of use data collected from 1991 to present.

Recreation 2 - Private Sector Developed Recreation Use

YearMRVDs

1988181.9
1989165.7
1990189.5
1991204.2
1992208.8
1993174.0

The projected average annual Forest Plan output for private sector use is 275.9 MRVDs. This level of output was based on the construction of a new 2000 SAOT ski area on Bill Williams Mountain, the expansion of Moqui Lodge,

Jacob Lake Inn and Kaibab Lodge totalling 1825 PAOT, and the construction of two private sector campgrounds totalling 800 PAOT. None of these projects have been completed.

Recreation 3 - Operation and Maintenance of Public Sector Developed Recreation Sites

YearMPAOT Days

1988 426
1989 492
1990 492
1991 492
1992 492
1993 507

The average annual Forest Plan output for administration of public sector sites is 429 MPAOT days. The Forest has exceeded this level in all but one year. This is attributed to the campground concession program. Operating the campgrounds under concession special use permits has expanded the managed season of use.

Recreation 4 - Private Sector Developed Recreation Site Construction

No significant expansion of private sector developed recreation sites on the Kaibab has occurred. Planning for the expansion and construction of several sites is underway. These include Kaibab Lodge and Jacob Lake Inn, and a private sector campground in the Tusayan Ranger District.

Recreation 5 - Dispersed Recreation Site Investments

The Forest is implementing the schedule of dispersed recreation investments contained in Table 15 of the Forest Plan, subject to the availability of funds. The Arizona State Heritage Fund program, administered by the Game and Fish Department and State Parks, has been used to make up for the lack of appropriated recreation facility construction funds. The following projects have been completed or underway:

Site Capacity PAOT

Arizona Trail
Kaibab Plateau Trail
Beale Wagon Road Historic Trail
Overland Military Historic Trail
Davenport Trail
Benham Trailhead 25
Scholz Lake Improvement 50
Bill Williams Trail Complex Reconstruction
Moqui Stage Historic Trail
Clover Trailhead 25
Sycamore Falls Trailhead 25
Grandview Trailhead 25
Kaibab Plateau Trailheads Phase 1 50

Heritage (Cultural) Resources 1 - Protection of Cultural Resource Properties

YearSites DiscoveredSites Monitored

1988 25239
 198930729
 199030964
 1991407154
 199223980
 199331061

Heritage properties are routinely marked for protection prior to the implementation of any ground disturbing activities. Marking follows Region 3 guidelines, and is accomplished with either white painted bands or fluorescent pink flagging. Contract administrators are provided copies of maps with site location information on them and monitor these areas during project implementation.

Site vandalism has not been eliminated. Rather the incidents of vandalism appear to be increasing. Increased monitoring efforts are being undertaken by Forest Law Enforcement personnel and Heritage professionals.

Heritage Resources 2 - Evaluation of Cultural Resource Properties

YearSignificance Evaluations National Register Nominations

198824Historic US 66 in Arizona	7 properties
198945Depression Era Structures	3 properties
1990216Fire Lookout Trees	11 properties
1991190Snake Gulch Rock Art	8 properties
199289Logging Railroad Resources	Multiple Property Context
199357Logging Railroad Properties	

The number of full time professionals has fluctuated slightly during the reporting period, but significance evaluations have consistently been above the target accomplishments.

Heritage Resources 3 - Cultural Resource Inventory of Non-Project Related Areas

YearAcres of Non-Project Inventory

1988728

19891081
19901118
1991726
1992779
1993900

The number of para-professionals employed by the Forest has fluctuated over the reporting period, the target accomplishment of 75 acres per individual has consistently been reached.

Wilderness 1 - Wilderness Use

Annual Wilderness Use in RVDs

Wilderness 1988 1989 1990 1991 1992 1993

Kendrick Mountain	700	700	700	750	750	750
Kanab Creek	500	500	700	850	950	1,077
Saddle Mountain	100	100	100	125	150	161

Wilderness use is far below the 1990 projections in the Forest Plan, which are 1,960 RVDs for Kendrick, 2,700 RVDs for Saddle Mountain and 2,700 RVDs for Kanab Creek. This shortfall is attributed to unrealistically high use projections and more accurate use data. Wilderness implementation schedules have been completed for each of the three wilderness areas. Funding constraints have limited implementation of these schedules.

Visual Resources 1 - Effects of Resource Management Practices on Visual Quality

Visual resource input is obtained from the Forest Landscape Architect for all project-level environmental analyses. Each project is reviewed in terms of the existing visual landscape, the desired landscape, and the effects of the proposed activity in achieving the desired landscape conditions. Mitigation measures are developed by the project interdisciplinary team and the Forest Landscape Architect to maintain or enhance landscape characteristics. Photo points are selected for key projects to monitor impacts and the effectiveness of project design and mitigation measures on visual resources.

Soil 1 - Soil and Watershed Conditions

A total of 139,385 acres of unsatisfactory watershed are planned to be improved for the decade. A total of 7,198 acres have been treated from 1989 through 1993, or 5% of the original Plan estimate.

Land Management Planning 1 - Resource Information Management Systems and Resource Inventory and Data Collection Systems for Timber; Range, Soil and Water; Recreation, Wilderness and Cultural Resources; Transportation and Facilities; Wildlife and Fish Habitat; Forest Protection (fire, fuels and pests); Geometronics; Minerals; Landownership; and Cost Accounting.

An Information Needs Assessment (INA) for all resources including a workload analysis by resource to integrate needed information into the Forest's geographic information system (GIS) was completed in May, 1992 and updated in May, 1993. It was reviewed by all staff and approved by the Forest Supervisor. The purpose of the INA is to detail the resource information needs of the Forest in order to implement to Forest Land Management Plan.

Wildlife 1 - Wildlife and Fish Non-structural Improvements

Reported in MAR reports. Totals have not been calculated. Expected to fall below 25% of the expected outputs due to funding.

Wildlife 2 - Wildlife & Fish Structural Habitat Improvements

Reported in MAR reports. Totals have not been calculated. Expected to fall below 25% of the expected outputs due to funding.

Wildlife 3 - Goshawk and Spotted Owl - Amount of Old Growth Habitat

The Forest has fully met the expected outputs which is 15 percent of the suitable timber base. The North Kaibab was inventoried in 1989 and the Southern three Districts were inventoried in 1990-91 for old growth. An allocation was made based upon a selection of the best 15% within each Management Area as directed under C01, page 48 in the Plan. Each Management Area has the prescribed 15%. Because the allocation was made based on the best within a MA and not on each 10,000 acre block, some blocks may exceed the 15% and some may be less.

Wildlife 4 - Goshawk and Spotted Owl - nest location, occupancy, and productivity.

A large percentage of the suitable timber based has been inventoried for goshawk and spotted owl. With expanded surveys the number of known goshawk nests continue to increase each year. Only five territories have been established for spotted owls and this number has not changed with additional surveys. The evaluation for a 15% drop in nesting numbers is over a 10 year period and has not been completed. There is no evidence of decline in either goshawk or spotted owl nesting numbers.

Wildlife 5 - Pygmy Nuthatch - amount of old growth habitat.

All of the suitable timber base has been inventoried and the best 15% by Management Area has been allocated. For further detail see Wildlife 3, above.

Wildlife 6 - Pygmy Nuthatch - snag densities and sizes (existing and future).

Quantitative information within RMRIS indicates that there are two snags per acre greater than or equal to 14 inches in diameter over the landscape. However, individual project analysis based on subjective "walk-throughs" indicate that snags may be deficit in many units being considered for treatment. It is now thought that snags greater than or equal to 18 inches in diameter are more important than smaller sizes. Many projects now specifically require retention of reserve trees and/or recruitment of snags in the larger size class. No post treatment monitoring has been done.

Wildlife 7 - Turkey - roost density.

Roosts are surveyed and retained during each project. Not all project areas will meet the roost density recommended in the Plan, however, there has not been a further loss of roosts. No post treatment field monitoring has been done.

Wildlife 8 - Turkey - population trend.

We have not met the Comprehensive Plan goal for turkey numbers, however, there has not been a 25% decrease in numbers.

Wildlife 9 - Red Squirrel - amount of suitable habitat.

Squirrel habitat is being protected and maintained at the project analysis level. No post treatment monitoring has been done. The Forest Habitat Model is not sensitive enough to detect habitat changes and effects.

Wildlife 10 - Elk and Mule Deer - amount of hiding and thermal cover.

Cover is prescribed and managed for at each project level analysis. No post treatment monitoring has been done.

Wildlife 11 - Elk and deer - reproductive and key area parameters.

No post treatment monitoring has been done.

Wildlife 12 - Elk and deer - browse and forage use and age class structure of browse.

Browse and forage use monitoring is conducted in association with range for all grazing animals for allotment analysis. We do not know the use for elk or deer separately.

Wildlife 13 - Elk and Mule Deer - population trends and distribution.

Both elk and mule deer numbers are within the Comprehensive Plan goals. We presently have the risk of elk numbers exceeding these goals.

Wildlife 14 - Tassel-eared Squirrel - amount of suitable habitat.

Squirrel habitat is being protected and maintained at the project analysis level. No post treatment monitoring has been done. The Forest Habitat Model is not sensitive enough to detect habitat changes and effects.

Wildlife 15 - Tassel-eared Squirrel - population trend

The Comprehensive Plan does not state specific population number goals and population numbers are not monitored by the F.S. or the AZ Game & Fish Department. The 1995 objective is to improve the status of populations in currently occupied habitats. We presently have large acreages of pole size trees that are approximately 75 years old. The habitat quality for squirrels is increasing substantially in these areas as the trees grow larger. In mixed conifer habitat type areas where fire maintained a ponderosa pine climax, fire suppression has led to a loss of habitat as Kaibab squirrels are displaced by red squirrels.

Wildlife 16 - Hairy Woodpecker and Yellow-Bellied sapsucker - snag densities, sizes, and species (existing and future).

Snags densities are met over the landscape but are generally not met in areas proposed for treatment. Analysis assures no further degradation due to treatment. No post treatment monitoring is done. For more detail see number 6.

Wildlife 17 - Plain Titmouse - amount of old growth habitat.

The entire suitable timber base has been inventoried by Management Areas and 15% of the "best" has been allocated as (or for) old growth. For more detail see number 3.

Wildlife 18 - Plain Titmouse - snag densities and sizes.

See number 6.

Wildlife 19 - Antelope - forage use.

Forage use is monitored through the Range program for allotment analysis, however, no distinction is made between grazing animals. Over the course of decades, with fire suppression, forage available to antelope has declined with the increasing canopy densities in the forest and invasion of grasslands by ponderosa pine. Several recent projects have identified this issue as a factor in project design.

Wildlife 20 - Antelope - population trends

The population goals in the comprehensive plan have not been met, however, the population has not declined.

Wildlife 21 - Cinnamon Teal - amount of suitable nesting habitat.

Several wetlands have been enhanced through exclusion of livestock use and have shown significant improvements. This has resulted in a net increase of the amount of suitable nesting habitat for cinnamon teal.

Wildlife 22 - Cinnamon Teal - nesting success.

No monitoring of nesting success has been conducted.

Wildlife 23 - Riparian Areas - habitat condition.

Most of the riparian areas were inventoried in 1990. There is no satisfactory rating system at this time. Riparian areas have not been systematically inventoried as to condition class and no monitoring has been done to determine if the conditions are getting worse. However Several wetlands have been enhanced through exclusion of livestock use and have shown significant improvements. Many of the other wetlands have improved through management of livestock. For example, habitat condition in Kanab Creek Wilderness, the largest riparian area for the Kaibab N.F., is steadily improving through grazing management that only allows grazing during the winter season. Based on an allotment analysis system that keys on those allotments where there are problems, it is our opinion that the Forest wetlands, as a whole, are not decreasing in condition.

Wildlife 24 - Riparian Indicator Species - population trends.

No population monitoring has been done due to a lack of funding.

Wildlife 25 - Aquatic Macro-Invertebrates - Species diversity and biomass.

We only have one perennial stream with water flowing over only a 2 mile section. A base line inventory for macro-invertebrates was done on North Canyon Creek in 1990. No other inventories have been done. Fish were inventoried by AZ Game & Fish Department in 1992 and found to be in good condition with a very high biomass for this size of stream.

Wildlife 26 - Threatened and Endangered Species - amount of suitable habitat.

Because of the type of habitat used by Peregrine Falcons no loss of habitat or habitat quality has taken place. Spotted owls nesting habitat is associated with the cinder cones or the Canyons and none of this habitat has had any change other than succession.

The largest current threats to the amount of suitable habitat for the Mexican Spotted Owl probably come from the risk of catastrophic wildfire and major outbreaks of bark beetles and budworms. With decades of fire suppression, the mixed conifer portion of the Forest has become more dense than any available evidence indicates it ever has been. Areas previously dominated by aspen and ponderosa pine have been succeeded by white fir and Douglas-fir in multiple canopy layers. While this may present a short-term benefit for the Mexican Spotted Owl, it has also created conditions which lead to forest-replacing fires, which were uncommon or even unprecedented in precolumbian times in the Southwest. A couple of examples are the 48,000 acre Dude Fire in 1989 and the 610 acre Graham Fire in 1993, both of which greatly lowered canopy cover in occupied MSO habitat. It's probably just a matter of time before similar events occur in occupied habitat on the Kaibab National Forest.

Wildlife 27 - Threatened and Endangered Species - amount of suitable habitat.

Peregrine Falcon populations have been monitored cooperatively by AZ Game & Fish Department and the Forest. The Peregrine population is doing very well. The Forest has two spotted owl territories that have been part of the Regional monitoring effort. Both territories still exist with no indication of a decline in the Regional or Forest population.

Wildlife 28 - Sensitive Species - amount of suitable habitat and population trends.

Any species that is thought to be of concern because of degradation of habitat or due to declining populations is evaluated during each and every project through the Environmental Assessment and through a Biological Assessment and Evaluation by a qualified Biologist or Botanist. No sensitive species is known to be losing habitat or is known to be decreasing in numbers due to our management prescriptions.

Considerable monitoring related to the northern goshawk has been carried out in the past few years over the Kaibab Plateau ecosystem, recently. The University of Arizona implemented a telemetry study to determine habitat use and food habits study. The Arizona Game and Fish Department cooperated through the Challenge Cost Share Program to carry out nest monitoring. Rocky Mountain Station is continuing long term research to determine food habitats, habitat use, demographics (size, growth, density, distribution, etc.) and life history (adult mortality, etc.).

Wildlife 29 - Diversity - successional stages of major vegetative types.

The significant change has been the 75 year old poles continuing to grow into "immature sawtimber". Most treatments have been thinnings and these do not generally change the successional stages. The largest departure is in regeneration due to overstory removals; the Forest did not achieve the number of acres projected for removals (see Timber 4, above).

Facilities 1 - Forest Transportation System

The National Forest Transportation Information System (TIS) as a measure turned out to be considerably more inaccurate than anticipated. This is because a large number of existing "two-track" roads had not been inventoried at the inception of the Forest Plan. Inventory work continues still, with 10% more miles on the inventory than in 1987. Perhaps a thousand more miles of "two-track" roads are not inventoried yet. The Forest continues to update TIS. Roughly 400 miles of road have been obliterated since 1987, about 25% of which have not remained closed; some members of the public have either driven around or over closures, reopening them. Real road maintenance dollars appropriated to the Forest have declined substantially since 1987.

In summary, the monitoring we are doing indicates that far from getting a handle on this problem, the situation is worse than the planners anticipated and at current budget levels, we do not have the resources available to begin to deal with it.