KAIBAB NATIONAL FOREST

FOREST PLAN MONITORING REPORT

FISCAL YEAR 2008

Forest Supervisor Certification

I have reviewed the Kaibab National Forest annual monitoring report. This report meets the regulatory requirements for completing an annual report. I certify that the Kaibab National Forest Plan as amended is sufficient to guide management of the forest over the next year. However, a revision of the Kaibab's land management plan is currently underway, which will address the identified needs for change.

/s/ Michael R Williams 07/22/09

Mike R. Williams
Forest Supervisor

Date

Introduction

The Monitoring Plan for the Kaibab National Forest Land and Resource Management Plan (Forest Plan) identifies 58 items to be tracked as measures of the effectiveness of the Forest Plan. This report provides information on current and recent accomplishments by resource or concern area. For more information about forest plan monitoring items, see previous year monitoring reports at http://www.fs.fed.us/r3/kai/management/efoia/documents/planning.shtml#MR.

The Kaibab National Forest recently prepared a Comprehensive Evaluation Report (CER) and held a management review about the needs for change in the Kaibab Forest Plan. The CER provides information on the status and trends of social, economic and ecological factors of management under the current Forest Plan, and the need for change. The CER is available at http://www.fs.fed.us/r3/kai/plan-revision/documents/evaluation-rept/comp-eval-rept.pdf .

There were no Forest Plan amendments made in Fiscal Year (FY) 2008; however, there was an administrative correction. The correction did not make or infer any management changes. The land management areas were renamed to update the terminology and correct errors in the term "Ecosystem Management Area." Ecosystem Management Areas were renamed to either to "Geographic Areas", "Special Areas," or "Land Use Zones." The numbering of the units was retained for ease in tracking. Changes were also made to update some of the fire language (i.e. "ground" to "surface", "rural" to "wildland," "person" to "human," and "fire" to "wildland and prescribed fire"). Additionally, a few spelling, numbering, and formatting errors were corrected.

Timber (Timber 1, 2, 3, 4, 5, 6, 8, 9)

The timber sale program on the Kaibab National Forest is administered as one of the tools used to meet vegetation desired conditions including fuels reduction, forest health, wildlife habitat improvement and watershed improvement. The Kaibab Forest Plan was amended in 1996. Since then, most timber harvests have been commercial thinning or group selection harvests rather than shelterwood cuts. The thinning projects and group selection cuts since 1996 have been designed to make progress towards the desired size-class distribution of ponderosa pine and reduce hazardous fuels that are the result of decades of fire suppression.

On the Williams and Tusayan Districts, timber sales were slightly up over 2007. New sales awarded in 2008 were the Government Hill #2 and the Elk Springs Stewardship Contract. These contracts are the last contracts to be awarded under the Spring Valley Fuels Reduction Project, which began in 2001. The 2008 contracts will treat 1,512 acres of forest and produce 18,039 CCF (Hundred Cubic Feet) of wood for local markets. In 2008, logging of contracts awarded in prior years resulted in the treatment of about 1,200 acres of forest and provided 10,247 CCF (around five million board feet) of commercial wood products.

In addition to the timber sales program, the Williams and Tusayan Ranger District sold 514 cords of pinyon/juniper commercial fuelwood to accomplish range, wildlife and

watershed objectives on 200 acres in pinyon/juniper woodlands. Another 4,654 cords of fuelwood were provided for personal use to meet local home heating needs. Permits were also sold for Christmas trees (1,200 permits), fence posts, pine poles, decorative wood, wilding transplants, and pine cones.

The 2006 Warm Fire created the need for timber salvage and/or tree planting on many acres. The ongoing Integrated Resource Timber Contract (North Kaibab Hazard Tree Removal Stewardship Contract) was awarded in fiscal year 2007 but continued in 2008 to remove fire-killed merchantable saw timber along Forest Service roads. The contract is designed to provide more than 11,700 CCF of merchantable saw-timber to local markets while treating hazard trees along 80 miles of roads and about 14 miles of the Arizona Trail.

The FR641U/225 Hazard Tree Salvage timber sale contract was offered and awarded in 2008. It will result in the removal of 381 CCF of Warm Fire-killed hazard trees on 62 acres along about two miles of Forest roads. Another sale contract awarded in 2008 provided 9 CCF of timber removed during the Jacob Lake Campground Reconstruction project. Finally, the Fracas Timber Sale contract involves treating 675 acres to improve wildlife habitat and reduce fuels while providing an estimated 1,537 CCF of volume.

Table 1. Timber resource outputs and accomplishments for FY08.

Resource	Monitoring Item	Unit of Measure	FY08 Output
Precommercial Thinning	Timber 1	Acres	3,540
Commercial Thinning	Timber 2	Acres	1,097
Regeneration Cutting	Timber 3	Acres	0
Shelterwood Removal Cutting	Timber 4	Acres	0
Restocking	Timber 5	Acres	1592
Sanitation Cutting	NA	Acres	2,151
Sawtimber and Roundwood	Timber 8	CCF	31,666
Pinyon-Juniper Fuelwood	Timber 9	CCF	6,805
Christmas Trees	NA	Each	2,469

The local mill in Fredonia processed most of the wood fiber generated from the North Kaibab Ranger District, while other local mills and operators also benefited. Several new private wood industry jobs were created, and there is local optimism that the North Kaibab Ranger District can continue to provide a sustainable and responsible flow of wood products while performing sound ecosystem vegetation management treatments.

Other wood products sold from the North Kaibab Ranger District include:
• Personal-use dead fuelwood: 3,532 cords
• Posts and poles: 78 CCF plus 80 juniper posts
• Free-use green pinyon pine and juniper fuelwood: 336 cords
• Ceremonial free-use dead oak: 17 cords
• Personal-use Christmas trees: 942 trees
• Commercial Christmas trees: 222 trees
• Green blue spruce cones: 1,354 bushels

Fuels Management

Treating build ups of hazardous forest fuels continues to be a priority for Kaibab Fire Managers. In 2008, Fire Managers reduced fuel accumulations and fire hazard on 12,237 acres of Kaibab National Forest lands. Fuels treatments included broadcast burning, thinning, piling, and pile burning.

Most of these acres were treated with broadcast burns lit under prescribed conditions, which remove the buildup of fuels on the forest floor. It is the most cost effective and immediate fire hazard reduction treatment available to fire managers and, as such, the most extensively used. In 2008, broadcast burns treated 9,802 acres. Over half of these acres – 5,942 – occurred within the wildland urban interface (WUI), the areas where forest and communities meet. All WUI treatments were on the Tusayan and Williams districts where there is a high density of WUI areas.

In addition to broadcast burning, the Kaibab fuels program thinned 857 acres, piled 923 acres of slash, and burned 655 acres of slash piles. Thinning and piling slash in dense stands of timber, while considerably more costly than burning, has a longer term effect on reducing fire hazard. The majority of these treatments took place in the WUI where the higher cost of these treatments is justified to protect residences and improvements on private lands, as well and the watersheds and infrastructure that are located on Forest lands. Other thinning and slash piling projects were completed in FY 2008 that had primary purposes to improve timber stands, wildlife habitat, and/or rangelands, with secondary benefits of reducing hazardous fuels, and fire hazard, making the forest more resistant to uncharacteristically severe wildfires. In FY 2008, an additional 9,708 acres were thinned and piled with funding from other resource areas.

When weather and forest fuel moisture conditions are right, naturally ignited wildfires started by lightning can be managed to consume hazardous fuel accumulations as well as accomplish other resource objectives. These fires typically burn at low intensities, with isolated pockets of moderate to intense fire behavior. They mimic the way fires burned on the Kaibab National Forest prior to European settlement, thus returning fire to the landscape as a natural disturbance factor. In FY 2008, eight fires on the Kaibab were managed to meet such resource objectives, burning a total of 8,170 acres. The three largest were the Dutch Fire that treated 3,251 acres on the Williams Ranger District, the Mill Fire that treated 1,710 acres on the North Kaibab Ranger District, and the Twenty-Two Fire that treated 1,255 acres on the Tusayan Ranger District.

A total of 30,115 acres of Kaibab National Forest lands received hazardous fuels reduction treatments in 2008; 12,237 acres of treatments using Hazardous Fuels Reduction funds, 9,708 acres of treatments from projects funded by other resource areas, and 8,170 acres from wildland fire managed for resource objectives.

Insect and Disease (Protection 1)

Destructive insects and disease levels were assessed by the Forest Service-Arizona Zone Office, Forest Health staff. A flight was made over the Kaibab NF and adjacent state and private forested lands July and September 2008. Pine mortality caused by bark beetles on the Kaibab NF, increased from 244 acres in 2007 to 437 acres in 2008. Higher altitude true firs and Douglas-firs are still experiencing limited mortality. About 106 acres of fir engraver caused mortality was recorded of White Fir and Douglas-fir on Bill Williams Mountain and on other peaks like Sitgreaves and Volunteer Mountains.

Aspen decline continues to impact the forest. Approximately 65,204 acres were affected on the Kaibab NF in 2008, primarily on the North Kaibab RD. Affected areas have a combination of symptoms including reduced canopy, branch dieback and mortality. Severe impacts to aspen stands resulted in the Warm fire of 2006. Also, many of sites appear to be associated with poor site quality, shallow soils, and defoliation by a severe frost that occurred in early June of 1999.

Drought stress vegetation recorded on the Kaibab NF continues to show. There were 1,738 acres of drought stressed woody vegetation were recorded this year.

Table 2. Bark beetle incidence from aerial detection surveys on the Kaibab National Forest.

Western Pine Beetle	Ponderosa Ips	Piñon Ips	Douglas-fir Beetle	True fir Pest Complex	Bark Beetle Totals
93	344	<1	106	17	560

Table 3. Defoliation incidence from aerial detection surveys.

Aspen Damage	Drought	Defoliation Total
65,204 acres	1,738 acres	66,942 acres

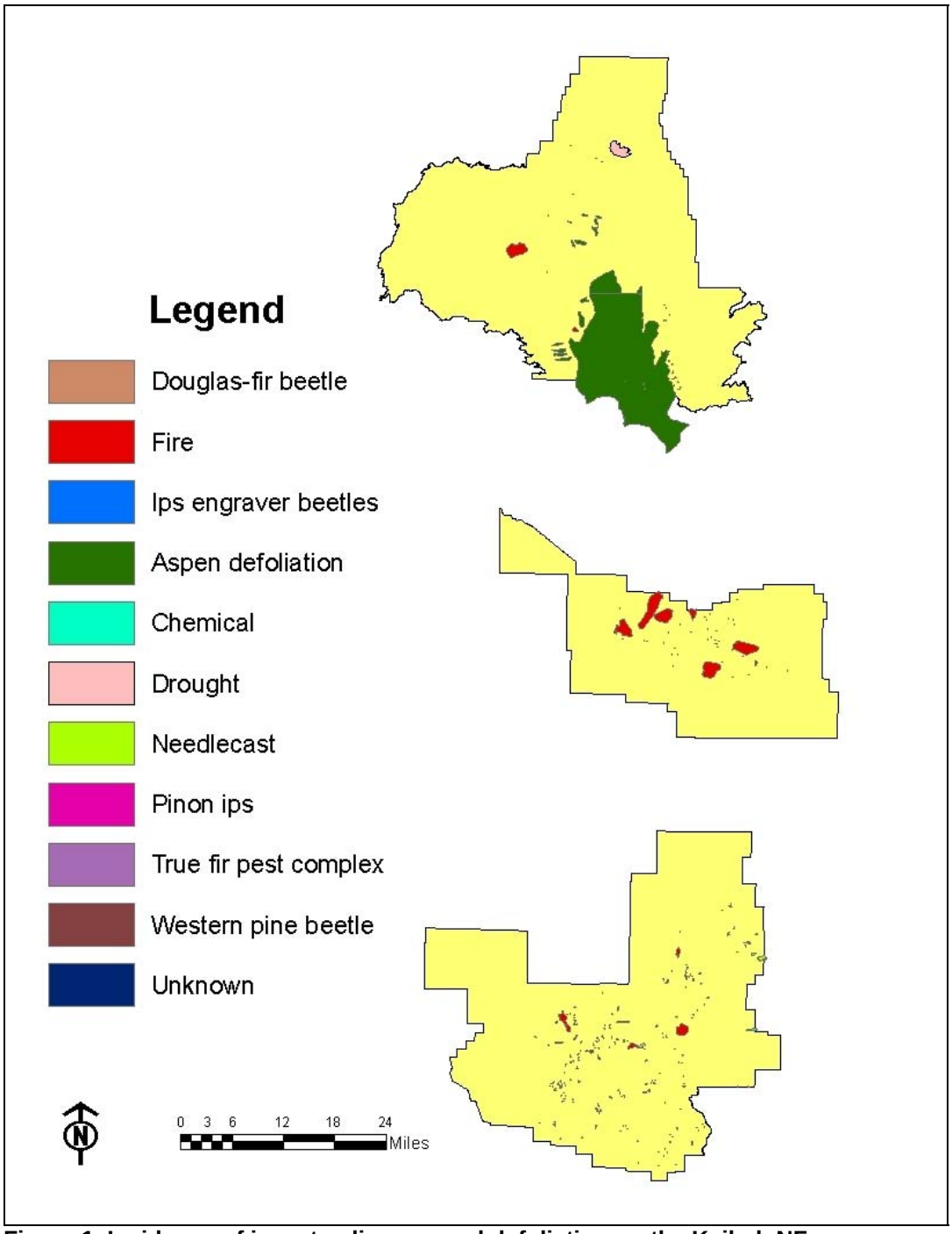

Figure 1. Incidence of insects, disease, and defoliation on the Kaibab NF.

Wild Burro Population (Range 1)

The Kaibab National Forest completed a helicopter survey for burro numbers on May 22, 2008. The survey observed 63 burros. The Arizona Game and Fish Department estimated the burro population to be 82, based on similar wildlife surveys in similar terrain. The populations are significantly higher then the desired range of 22-35 animals. The Kaibab National Forest has begun work to send the extra burro's to an adoption center in California.

Permitted Grazing Use and Capacity (Range 2)

The Kaibab National Forest has grazed at or below capacity for several years and has essentially balanced use with capacity in the first planning period (1988-1998). Grazing capacity is listed as 71,000 AUMs in the Forest Plan. The Kaibab National Forest administrated 25 grazing allotments in 2008 with 52,623 AUMs of authorized grazing.

Table 4. Permitted and authorized grazing on the Kaibab National Forest FY08.

	Cattle & Burros No.			Horses		Sheep & Goats		Total	
	No. of Permittees	No.	HMS AUMS	No.	HMS AUMS	No.	HMS AUMS	No.	HMS AUMS
NFS Permitted Commercial Livestock	27	7,776	54,978 64,027	20	210 252	12,383	60,893 14,695	20,179	116,081 78,974
NFS Authorized Commercial Livestock	25	5,527	35,959 40,008	34	273 328	11,216	51,999 12,287	16,777	88,231 52,623
NFS Authorized Livestock Use	0	0	0 0	0	0 0	0	0 0	0	0 0
***Total NFS Authorized**	**25**	5,527	35,959 40,008	34	273 328	11,216	51,999 12,287	16,777	88,231 **52,623**
NFS Un-Authorized /Excess Use	0	0	0 0	0	0 0	0	0 0	0	0 0
Private Lands	1	0	0 0	0	0 0	400	592 118	400	592 118

Noxious Weeds

Noxious weeds out-compete native vegetation and replace natural communities with monocultures that provide little or no habitat for wildlife. These negative impacts affect insects, birds, and mammals. The wildlife program has committed thousands of dollars to the effort of protecting native habitats from the spread of noxious weeds. The forest teamed with the Arizona Game and Fish Department and the Arizona Department of Transportation to treat 1,458 acres of weeds.

Public Sector Developed Recreation Use (Recreation 1)

There a number of developed recreation sites on the Kaibab including campgrounds, picnic areas, and interpretive sites. In addition to these developed sites, there are a number of dispersed recreation sites on the forest. Dispersed sites are those where there are no substantial facilities, typically consisting of only a parking lot and/or signs.

Table 5. Recreation site type capacity by district on the Kaibab National Forest.

Developed Recreation Site Type	Williams District	Tusayan District	North Kaibab District	Total Capacity Offered 2008 In PAOT
Campground	244,020	54,250	79,669	377,939
Day Use Areas	37,780	4,545	1,925	44,250
Fishing Sites	123,200	6,300	-----	129,500
Group Campground	27,081	19,375	13,700	60,156
Interpretive Sites	100,006	10,728	15,508	126,242
Rental Cabins	4,380	-----	-----	4,380
Observation Sites	0	-----	25,550	25,550
Snowplay Area	4,770	-----	-----	4,770
Picnic Areas	23,868	-----	4,530	28,398
Trailheads	154,056	6,300	61,614	221,970

*Average season (varies from year to year depending upon weather)

Private Sector Developed Recreation (Recreation 2)

The KNF does not have any privately developed recreation sites. There are no sites planned in the future under this monitoring item.

Dispersed Recreation Site Investments - PAOT Offered (Recreation 5)

There are currently 14 dispersed recreation sites that receive some maintenance in order to have a place marker or other signs, sometimes a parking lot, or trailhead registry. These include historic cabins, view points, trailheads and other sites of interest. At this time, a capacity has not been set for these areas as they receive light use.

Recreation Sites Fees Collected Under the Recreation Enhancement Act of 2005 (PL-108-447)

About 80 percent of fees collected under authority of the Recreation Enhancement Act are returned to the Kaibab and used to maintain the sites. The Ten-X Campground collected $37,475. Of this, $29,980 was returned to the Forest.

Spring Valley Cabin on the Williams Ranger District is in the Cabin Rental Program, which is managed under the authority of the Recreation Enhancement Act. In FY 2008, the Spring Valley Cabin was rented 66 nights, and generated $18,400 in revenue. It received an intensive cleaning. All carpeting and linoleum were replaced with laminate flooring, and the deck was repainted.

Hull Cabin on the Tusayan Ranger District, which is expected to eventually be added to the Cabin Rental Program, was thoroughly cleaned, old furniture and appliances were removed, and the interior was painted. The cabin was also re-roofed with fire-resistant shingles.

In addition to these sites, there are six campgrounds that are concessionaire operated. A portion of these funds are returned to the forest for annual maintenance.

Campground Improvements

The Jacob Lake Campground on the North Kaibab Ranger District was reconstructed to be made more accessible for people with disabilities and to accommodate larger recreational vehicles and trailers. The campground reconstruction included a new design, construction of 41 new sites, installation of new bathrooms, and the reclamation of old sites and roads. The campground was closed for two seasons to allow for the work. All camp sites are now fully accessible per the Americans with Disabilities Act. Also, a larger number of sites are now available for recreational vehicles and large trailers. At the Kaibab Lake Campground, a toilet building was replaced with an accessible building, and additional campsites were outfitted with new tables and fire rings. The Dogtown Lake Campground group site received a new retaining wall and improved drainage capacity. The White Horse Lake and Kaibab Lake campgrounds received new restroom facility doors. Swing gates were installed to allow day use at campgrounds.

Heritage (Heritage 1, 2, 3)

During FY 2008, Section 106 compliance (National Historic Preservation Act) was conducted for seventy projects in support of forest functions such as special uses, minerals, timber, range and fire. As a result, more than 12,500 acres were surveyed and 134 new heritage resource sites were recorded, which were evaluated as eligible for inclusion on the National Register of Historic Places.

Table 6. Heritage accomplishments of the Kaibab NF for FY08

Acres Inventoried	New Sites Recorded	New Eligible NRHP Sites	Known Sites Monitored
12,500 acres	134	37	300

The Heritage staff provided support and resource counsel on nine prescribed fires, three wildland fire use fires, and two wildfires and conducted a Burned Area Emergency Response analysis for the Slide Fire on the North Kaibab Ranger District. The Heritage program monitored 206 sites, along with 22 National Register eligible sites managed as Heritage Priority Assets; conducted four site protection and site stabilization projects; erected one display; conducted four training classes for Site Stewards and fire managers; and provided 36 outreach/interpretation programs.

Land Management Planning (LMP1)

The database being maintained and is being centralized nationally in *I-Web*. The forest continues to collect and update information of resource inventories and accomplishments. In FY 2008 the Kaibab conducted stand exams on 1359 acres.

Non-Structural Wildlife Habitat Improvements (Wildlife 1)

In FY 2008, Agra axes were used to restore invaded grasslands on 1,696 acres. Agra axes are powerful shears that cut pinyon and juniper trees. Grasslands are one of the most threatened ecosystems in North America. Thousands of acres of grassland and open

savanna have been invaded by trees due to the exclusion of fire in a fire-adapted ecosystem. Restoring these acres benefits bird species, small mammals and pronghorn antelope. Much of this work is being done in partnership with the Arizona Game and Fish Department.

Also, 8 acres of aspen were thinned to reduce competition and improve growth. An inventory of aspen stands on the South Zone of the Kaibab National Forest was initiated in 2008 and is expected to be completed in 2009. Unlike many other areas, aspen on the South Zone occur as small, scattered pockets. These islands of habitat diversity amidst a sea of conifers support unique invertebrate communities that, in turn, increase the abundance of many species of birds. Currently, high elk populations limit aspen regeneration and the mature trees are dying from a combination of weather events, parasitic insects, and disease.

Table 7. Non-structural wildlife habitat improvements.

Category	Acres Accomplished	Structures Accomplished	Acres Inventoried	Total Projects
Elk	1,696	0	0	5
Deer	3,229	11	0	5
Aspen Restoration	0	4	300	2
Prairie/Grassland Restoration	1,696	0	0	4
Totals	4,925	15	31,410	14

Structural Wildlife Habitat Improvements Planned (Wildlife 2)

The North Kaibab Wildlife Waters Development Project will provide 13 new watering structures within the lower elevation ranges, which are popular winter foraging sites for several species, including mule deer. As the historic water sources in the area have become diverted and less available, these types of water developments have become increasingly important to sustaining wildlife populations.

The Tusayan wildlife waters project will construct 16 new water developments and a 12.2 mile long water pipeline. The pipeline will connect 2 existing water developments (reconstructed in 2006-07) and 3 of the new water developments.

Table 8. Wildlife structures planned and accomplished.

Category	Structures Planned	Structures Accomplished
Totals	31	15
Deer	31	11
Wild Turkey	0	0
Aspen Restoration	0	4 (47 acres)

Amount of Old Growth (Wildlife 3, 5, 17)

Measuring amount of old growth has changed since the Forest Plan's monitoring plan was written. When the 1996 amendment incorporated the Management Recommendation for the Northern Goshawk, old growth acres were no longer measured at the stand level, but as a component within uneven-aged stands. Large trees have been harvested since the 1996 amendment, but the average number of large trees per acre has increased due to annual growth in the 3 largest size-classes: 18 to 24 inches, 24 to 30 inches, and over 30 inches in diameter.

Mexican Spotted Owl Nesting and Occupancy (Wildlife 4)

There are 6 Mexican spotted owl Protected Activity Centers (PACs) on the Kaibab NF, all of which are located on the Williams District: Tule, Big Springs, Bill Williams, Sitgreaves, Pumpkin, and Kendrick. There are no PACs, designated Critical Habitat, or known spotted owl records on the Tusayan District. There is designated critical habitat on the North Kaibab Ranger District, but there are no PACs.

Four PACs were surveyed to protocol, and three were determined to be occupied (Big Springs, Kendrick, and Sitgreaves PACs). Bill Williams PAC was surveyed to protocol but no Mexican spotted owls were detected. Pumpkin and Tule were not surveyed to protocol.

Goshawks Nesting and Occupancy (Wildlife 4)

On the North Kaibab Ranger District, Forest biologists assisted Research Wildlife Biologist, Richard Reynolds, in collecting data on goshawk population demographics. Since 1991, Reynolds had been investigating the ecology of the Northern Goshawk, testing many of the assumptions of goshawk recommendations, and evaluating effects of forest management on goshawk populations. In 2008, 105 Northern Goshawk territories were surveyed. Of those, 29 were occupied.

Limited surveys were conducted at nine historic nest areas on the Williams and Tusayan Districts. Goshawk presence was determined within four historic territories. No new territories were found. Too few surveys were conducted to determine whether the five territories that had no response were unoccupied.

Other MIS species (Wildlife 6, 8, 24)

In 2008, Rocky Mountain Bird Observatory (RMBO), in conjunction with Kaibab National Forest (KNF) conducted bird monitoring on the Kaibab National Forest through a partnership. The monitoring used a protocol similar to other RMBO monitoring programs as delineated by Panjabi (2006). This protocol provides statistically rigorous long-term trend data for populations of most diurnal, regularly breeding bird species in the Kaibab National Forest, including some U.S. Forest Service Region 3 Sensitive Species and Kaibab National Forest Management Indicator Species (MIS). In the short term, this program provides information needed to effectively manage and conserve bird populations, including the spatial distribution, abundance, and relationship to important habitat characteristics for each species. This cooperative project supports the Kaibab's efforts to comply with requirements set forth in the National Forest Management Act and other statutes and regulations. It also contributes to RMBO's broader landscape-scale

breeding bird monitoring program, which currently includes 11 states in the Rocky Mountain and Great Plains regions.

In 2008, RMBO staff conducted 90 point transect surveys (1,181 point counts) in three habitats (Pinyon-Juniper, Mixed-Conifer, and Ponderosa Pine) on the Kaibab National Forest. There were an average of 13 point counts per transect, and recorded 10,580 individual birds and 98 species. Observers detected many of these species on only a few occasions in 2008. Density estimates were calculated for 67 species/habitat relationships based on the 2005-2008 data. Program Distance allows the user to pool years to increase the number of detections of the species to generate a robust detection function if the data collection continues over several years. If the 2005-2006 data was not used, density estimates could only have been determined for 49 species/habitat relationships.

The number of species detected in 2008 ranged from 74 in Mixed-Conifer to 88 in Woodland/Grassland. While these totals reflect the spectrum of possible species across a range of sites within a habitat type, some species included in each total were largely peripheral to the habitat in which they were recorded. Thus, species richness measures reflect both the within- and between-habitat diversity of the sites surveyed in each habitat category.

Table 10. Population density estimates for Management Indictor Species species.

Species	Habitat	D	LCL	UCL	%CV	n
Juniper Titmouse	Woodland / Grassland	59.3	45.8	76.7	16	106
Hairy Woodpecker	Mixed-Conifer	12.8	7.4	22.2	34	35
Hairy Woodpecker	Ponderosa pine	10.3	6.3	16.7	29	41
Pygmy Nuthatch	Ponderosa pine	28.9	22.7	36.9	15	105

D = estimated density (birds/km^2); *LCL* and *UCL* = lower and upper 90% confidence limits on *D*; *%CV* = percent coefficient of variation of *D*; *n* = number of observations used to estimate *D*. We did not include density estimates for species with *n*<10.

Species detections were insufficient to make population estimates for Turkey, Red-naped sapsucker, Lincoln's sparrow, or Yellow-breasted chat. Additional transects would need to be added to increase the number of detections of Wild Turkeys and Red-Naped sapsuckers to produce reliable annual estimates. Due to the very limited amount of riparian habitat on the Kaibab NF, different methodologies would need to be used to estimate populations of Yellow-breasted chat and Lincoln's Sparrow.

Tassel-eared Squirrel Population Trends (Wildlife 15)

To provide a basic metric for the squirrel populations, a squirrel sign sampling protocol was used that recorded sightings of obvious squirrel sign along a transect line. Five types of squirrel sign (cones, scales, clippings, branch cuttings, peeled twigs, and middens) were recorded (5 meters on each side) along the transects as observers walked between points.

Because all cases recorded feeding events, each grouping of each type of sign was only counted once per 20 m section. In 2008, observers sampled 60 transects and 730 line segments (250-m each) for squirrel sign in ponderosa pine and mixed conifer the two habitats. Observers covered over 180 hectares of the sampling landscape. There were 6.96 feeding events observed per hectare in ponderosa pine and mixed conifer habitats combined. Sign was most dense on transect AZ-PP32 with an average of 40.3 feeding events per hectare sampled. Sign was over twice as dense on ponderosa pine transects (8.8 feeding events per hectare) than mixed conifer transects (4.2 feeding events per hectare). This protocol provides presence and population trend data.

Riparian Area Condition (Wildlife 23)

Table 11. Riparian conditions on the Kaibab National Forest.

	Upward	Static	Downward	Total
Perennial Springs	1	10	3	***14***
Historic Springs		1	1	***2***
Ephemeral Spring	0	0	1	***1***
Ephemeral Drainage	0	0	1	***1***
Ephemeral Streams	0	6	1	***7***
Seasonal Wetlands	7	10	1	***18***
Temporary Wetlands	0	4	0	***4***
Semi-permanent wetlands	3	0	0	***3***
Temporary Wetland/Stock tanks	1	2	0	***3***
Reservoirs	1	3	0	***4***
Stock Tanks	2	16	6	***24***
Intermittent Stream	1	1	0	***2***
Seasonal Wetland/Stock tanks	0	2	0	***2***
Semi-permanent wetland/reservoirs	0	2	0	***2***
Semi-permanent wetland/stock tank	0	1	0	***1***
Total	***16***	***58***	***14***	***88***

Other Wildlife Research

- In collaboration with the Forest Service Southwest Regional Office and Bat Conservation International, Kaibab biologists surveyed for bats in and assessed the habitat value of mines and caves on the Tusayan Ranger District.

- They also continued a bat-monitoring collaboration with Northern Arizona University by trapping bats on the district. Because of its proximity to the Grand Canyon and the presence of ponderosa pine forest and pinyon/juniper woodlands, the Tusayan Ranger District has a diversity of bat species.

- Allen's lappet-browed roost research was conducted (a sensitive sp.) included netting, tagging, radio-tracking, and investigating caves for sign of bat use on the Williams and Tusayan Districts.

- Bald eagle winter roost investigations based on telemetry locations provided by G&F site characteristics were quantified at the local level and are being analyzed at the landscape level -- sites were forest wide.

- The Williams Ranger District includes two large and expansive grasslands: Government and Garland prairies. Working with the Rocky Mountain Research Station and Northern Arizona University, Kaibab biologists trapped small mammals in order to inventory the resident animals and look at their habitat characteristics. One of the species trapped, the spotted ground squirrel, had not previously been identified on the Kaibab National Forest.

- Shrub monitoring and deer reproductive success were monitored as part of the West side habitat improvement project on the North Kaibab Ranger District.

- Grazing intensity was monitored by the Grand Canyon Trust and Northern Arizona University on the North Kaibab Ranger District.

Vegetation and Soils Condition and Trend

Table 12. Summary of the state of ecosystems on the KNF by potential natural vegetation type.

Ecosystem	Vegetation		Soil Condition & Productivity	
	Departure	Trend	Departure	Trend
Pinyon-Juniper Woodland	Mod.	Slowly Away	Mod.	Slowly Away
Ponderosa Pine	High	Static	Mod.	Slowly Away
Mixed Conifer Forests	High	Away	Low	Static
Sagebrush Shrubland	Mod.	Away	Low	Slowly Toward
Montane / Subalpine Grassland	High	Away	Mod.	Static
Colorado Plateau / Great Basin Grassland	Mod.	Away	Low	Slowly Toward
Spruce-Fir Forest	High	Static	Low	Static
Semi-Desert Grassland	Low	Away	Mod.	Slowly Toward
Desert Communities	Mod.	Away	Low	Slowly Toward
Gambel Oak Shrubland	Low	Away	Low	Static
Wetland / Cienega	Low	Slowly Away	Mod	Static
Cottonwood-Willow Riparian Forest	High	Away	Low	Static

(Kaibab Comprehensive Evaluation Report 2009)

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."

Table 13. Summary of common variety minerals extracted from the Kaibab NF in FY 2008.

Material	Contracts	Tons	Value
Sandstone	17	47,612	$285,672
Cinders	39	58,777	$58,777
Sand and Gravel	In-service use	6,500	$6,500

Sandstone quarries on the Kaibab NF account for a large percentage of the national production. The stone is used for building material in the construction industry.