Kaibab National Forest

Forest Plan Monitoring Report

Fiscal Year 2011

All cover photos credit U.S. Forest Service, Southwestern Region, Kaibab National Forest. Clockwise from top left: Aspen restoration on the Williams Ranger District, Keyhole Sink restoration, Engine 712 crew member working on the Armstrong Fire, meadow on the North Kaibab Ranger District.

Introduction

The Monitoring Plan for the Kaibab National Forest (KNF) is outlined in the current Forest Plan and identifies 58 items in 11 categories (timber, protection, range, recreation, heritage resources, wilderness, visual resources, soil, land management planning, wildlife, and facilities) to be tracked as measures of the effectiveness of management actions under the forest plan. Each year, select items from the above categories are discussed in the monitoring report in order to provide information on monitoring efforts and accomplishments by resource or concern area. The present report documents activities occurring during fiscal year (FY) 2011. Monitoring reports from previous years, as well as the current Forest Plan (as amended), can be accessed at http://fs.usda.gov/goto/kaibab/planning or provided upon request.

The KNF is currently revising its Forest Plan in order to address changing management needs and areas of focus. Chapter 5 of the draft plan includes a revised monitoring plan, which is being designed to better inform progress toward desired conditions and support adaptive management. The draft plan and supporting documents are located on the KNF's website at http://fs.usda.gov/goto/kaibab/plan_rev_docs or provided upon request. Because the revised plan is in draft form, this monitoring report is guided by the monitoring plan set forth in the current plan.

Timber (1, 2, 9, 10)[1]

The timber program is an integral part of the Kaibab National Forest's strategy to make progress toward desired conditions for fuel loading, forest health, wildlife habitat enhancement, and watershed improvement. Timber sales provide a means to accomplish needed thinning and other treatments by capitalizing on the value of the wood removed. In recent years, most timber harvests have been commercial thinning or group selection cuts designed to make progress toward the desired size-class distribution of ponderosa pine and reduce hazardous fuel accumulations that have resulted from decades of fire suppression.

Several projects were ongoing on the South Zone (Williams and Tusayan Ranger Districts) in FY 2011. On the Tusayan District, these included the Upper Basin Fuelwood Project, which involves 36 acres of meadow restoration and 115 acres of piñon-juniper woodland restoration in order to improve wildlife habitat and provide fuelwood (mostly to the western Navajo Nation); the Airport/Boggy/Long Jim/Russell projects, which involve thinning 15,000 acres of ponderosa pine and piñon-juniper in order to improve forest health and wildlife habitat and reduce the risk of high severity wildland fire; and the Watts project, which is currently in the initial planning stages and involves approximately 2,600 acres targeted for restoration of more open woodland and grassland conditions and providing fuelwood supply for the western Navajo Nation in order to mitigate the impacts of illegal fuelwood cutting. Additionally, 738 acres of pre-commercial thinning associated with the Airport and Scott projects were completed on the Tusayan District.

The South Zone sold permits for 466 cords of commercial fuelwood, 7,940 cords of free and paid personal use firewood, 98 cords of ceremonial use firewood, and 975 Christmas trees.

As a part of Forest Plan Revision, the Forest conducted a GIS-based analysis of suitable and unsuitable timber lands. Details of this analysis can be found in Chapter 4 of the Draft Plan and Appendix C of the Draft Environmental Impact Statement. These documents are accessible at the link provided in the introduction above.

[1] Numbers in parentheses correspond with specific monitoring items outlined in the current Kaibab Forest Plan.

On the North Kaibab Ranger District (NKRD), the district timber staff prepared, offered and awarded 6,538 CCF (3,265 MBF [thousand board feet]) of volume from 16 Warm Fire Recovery salvage timber sales, designed to treat approximately 700 acres. During FY1, the ongoing North Kaibab Hazard Tree Removal stewardship contract was administered for the removal and slash treatment of trees killed by the 2006 Warm fire within 100 feet striking distance over an estimated 20+ miles of public-accessible forest system roads and four miles of the Arizona Trail. During FY11 the timber staff also began preparing an additional five salvage sales from the Warm Fire for FY12 offers plus the Dead Horse Stewardship contract for the remaining 4,016 CCF from green timber thinning portions left in the Dry park area per the Dry Park Environmental Assessment implementation. Finally, the NKRD completed 100 acres of precommercial thinning and hand piling in the Fracas project area and approximately 140 acres of precommercial thinning with lop and scatter.

In addition to the timber sales program, the NKRD issued permits for and sold 2,986 cords of personal use dead fuelwood for local home heating needs, about 30 CCF of dead posts and poles, and 750 personal use Christmas trees. During FY11 the NKRD also issued permits for a combined total of about 19 cords of Ceremonial free use dead oak and 200 cords of free use green piñon/juniper. In April 2011, the NKRD planted 300 acres of the Warm Fire area with approximately 103,000 ponderosa pine seedlings. This planting effort was funded by a $59,000 grant through the National Forest Foundation and the Salt River Project.

Insects and Disease (Protection 1)

The KNF plan revision team identified insect/disease outbreaks as a moderate risk to ponderosa pine (Kaibab National Forest 2008). This risk is largely a function of stand density. Across the southwest increased stand densities resulting from years of fire exclusion have created prime conditions for insect epidemics and disease outbreaks, particularly among older trees (Arno 2008). In general, ponderosa pine mortality in the southwest has increased as a result of drought and more frequent bark beetle attacks (Kolb *et al*. 2007).

Historically, the western pine beetle has been the most aggressive damaging agent to ponderosa pine (Lynch *et al*. 2008). Since 2003, however, damage by western pine beetle has been surpassed by the *Ips* genus, an aggressive beetle that favors denser forests and smaller tree diameters. It is expected the high levels of ponderosa pine mortality will continue to occur throughout the region as a result of high population sizes and dispersal distances associated with *Ips* and other aggressive bark beetles (Allender *et al*. 2008). Overall, tree mortality from mountain pine beetle outbreaks has decreased on the Kaibab plateau since 1997 (USDA 2008).

In general, spruce-fir is less prone to large-scale insect outbreaks than ponderosa pine because it occurs in relatively limited amounts, in colder environments, and because fire suppression has not had an overt impact on this forest type. Minor outbreaks may occur every 2-4 decades (Lynch *et al*. 2008). Spruce beetle outbreaks have been minimal on the KNF. The most significant outbreak affected approximately 1,000 acres in the 1990s. Defoliator activity continues to be low due to limited host availability (USDA 2008). There is no evidence of western balsam bark beetle attacks, which primarily affect corkbark and subalpine fir (Lynch *et al*. 2008). On the NKRD, root disease has caused continued mortality since 1991 at DeMotte Campground.

Although common continentally, aspen is threatened regionally. As a result of increased fire suppression activities, forest succession, overgrazing and over browsing by ungulates, and insects and disease, aspen stands are currently in decline in most of the southwest. The KNF has experienced extensive aspen defoliation events caused by Western tent caterpillars, large aspen tortrix, melamspora rust, and black rust

since the 1940s, although in general, mortality has been minimal until now. Recently, the effects of these causal agents have been exacerbated by weather events such as severe drought. Since the late 1990s, these abiotic agents have acted cumulatively with regard to insects and disease to cause accelerated dieback and mortality (Lynch *et al*. 2008).

Increases in tree density and canopy cover and loss of understory plant cover and diversity were identified as the primary threats to the piñon-juniper vegetation type on the KNF (Kaibab National Forest 2008). Several studies have shown that density-dependent factors are especially impacting the piñon pine component of the piñon-juniper system. Areas with high tree density experience higher levels of competition. In the past, fire has been the primary disturbance agent affecting piñon-juniper, but insects, drought, and disease are becoming more influential. Mortality caused by the piñon *Ips* beetle may be attributable to increased levels of dwarf mistletoe infection, competition from higher densities of large diameter trees, and stressors associated with drought and higher temperatures (Lynch *et al*. 2008). Changes in climate are likely to exacerbate the situation.

According to the 2011 *Forest Insect and Disease conditions in the Southwestern Region* report, bark beetle activity in the KNF decreased from 579 acres in 2010 to 255 acres in 2011 (Table 1). *Ips* bark beetles in the ponderosa pine type decreased from 489 acres in 2010 to 190 acres in 2011. Western pine beetle (*Dendroctonus brevicomis*), Douglas-fir beetle (*Dendroctonus pseduotsugae*), cedar bark beetle (*Phloeosinus* spp.), and piñon *Ips* were detected in small areas, with cedar bark beetle activity increasing from 0 acres in 2010 to 30 acres in 2011. Defoliator activity decreased from 6,897 acres in 2010 to 5,730 acres in 2011 (Table 2). Pine sawfly (*Neodiprion fulviceps*) defoliation decreased from 1,143 acres in 2010 to 260 acres in 2011. Aspen defoliation increased from 2,815 acres in 2010 to 5,470 acres in 2011 (USDA Forest Service 2012a). Mountain pine beetle (*Dendroctonus ponderosae*), cenangium canker, and abiotic factors were not reported.

Table 1. Bark beetle conditions report for the Kaibab National Forest (acres)

Bark Beetle	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Western pine beetle	0	7,833	3	26	410	9	94	16	27	10
Mountain pine beetle	4	79	0	0	0	3	0	0	0	-
Ponderosa pine *Ips*	6,012	64,195	29,807	23	6,850	215	343	196	489	190*
Douglas-fir beetle	0	1,282	615	2,510	850	251	106	89	53	20
True fir complex†	80	365	1,065	1,211	105	252	17	57	5	0
Cedar bark beetle	0	0	0	0	0	0	0	1	0	30
Piñon *Ips*	1,269	158,951	6,922	6	15	0	1	0	5	<5
Total:	**7,365**	**232,705**	**38,412**	**3,776**	**8,230**	**730**	**561**	**359**	**579**	**255**

*Reported as *Ips* engraver in 2011

†True fir complex includes fir engraver and/or western balsam bark beetle.

Table 2. Defoliator conditions report for the Kaibab National Forest (acres)

Defoliator	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Spruce budworm	0	0	0	0	0	0	0	0	0	0
Pine sawfly	0	0	0	0	0	0	0	1,223	1,143	260
Aspen defoliation	16,370	951	17,782	22,664	28,415	76,185	65,204	4,667	2,815	5,470
Cenangium canker	0	0	0	0	0	0	0	0	1,444	-
Abiotic factors	4,129	2,522	14,683	2,988	210	0	1,738	231	1,495	-
Total:	**20,499**	**3,473**	**32,465**	**25,652**	**28,625**	**76,185**	**66,942**	**6,121**	**6,897**	**5,730**

Fire and Fuels Management

Restoring fire-adapted ecosystems remains one of the Forest's highest priorities. In FY 2011 the Forest had a unified (core + integrated) accomplishment of 27,513 acres with prescribed fire, piling of activity-generated slash, pile burning, thinning, and wildfires.

On the Kaibab, the majority of prescribed burning over the years has taken place during the fall months when fuel moistures, temperatures, humidity and winds are most conducive to accomplishing burn objectives. Some burning has been done in the spring months as well, but spring wind events generally limit the ability to burn in the spring months. During the fall of 2011, conditions rapidly went from too dry to burn to too wet to accomplish objectives, so acres treated with prescribed burns were low in 2011, with only 1,007 acres burned.

Eastern Arizona and New Mexico experienced an extremely dry year and an elevated fire season with enormous fires including the Wallow and the Las Conchas Fires. Conditions on the Kaibab, however, were fairly moderate, and after the onset of the monsoons fire managers were able to manage multiple lightning-caused wildfires to achieve hazardous fuels reduction objectives. In all, the Kaibab managed 8 wildfires in FY 2011 to treat a total of 19,903 acres. These fires included:

- Hobble – 2,395 ac
- Scott – 458 ac
- Parallel – 4,344 ac
- Woodbridge – 1,110 ac
- Beale – 5,096 ac
- Lower – 1,715 ac
- Armstrong – 2,679 ac
- Skinner – 2,106 ac

Other hazardous fuels reduction accomplishments for FY 2011 include:

Pile Burning – 1,386 ac
Thinning – 1,437 ac
Piling of activity generated fuels – 990 ac
Grassland Maintenance – 2,790 ac

Range (Range 2, 4)

The Forest administered grazing on 31 allotments (24 on the Williams/Tusayan districts and 7 on the North Kaibab) during 2011. In 2011, permitted use on the KNF was 65,264 Animal Unit Months (AUMs) and actual use was 44,131 AUMs. Permitted use has stabilized and is expected to remain relatively constant for the foreseeable future. Information on permitted use and actual use by ranger district in 2011 is shown in Table 3.

Table 3. Permitted and actual use (AUMs) by ranger district, FY2011

District	**Permitted Use**			**Actual Use***		
	Horses	Sheep	Cattle	Horses	Sheep	Cattle
North Kaibab	0	0	8,277	0	0	5,746
Tusayan	0	0	20,551	0	0	6,203
Williams	252	11,730	24,454	338	12,140	19,704
Total:	**252**	**11,730**	**53,282**	**338**	**12,140**	**31,653**

*In the case of horse and sheep on the Williams district, actual use exceeded permitted use because the District Ranger has the authority to grant small increases in actual use based on forage conditions.

On the North Kaibab Ranger District, a categorical exclusion was completed for a five mile pipeline replacement project, and this project was implemented. Additionally, 963 acres of cheatgrass was treated and reseeded with native grasses and shrubs in the Buckhorn area on the northwest side of the Kaibab plateau in order to combat a cheatgrass invasion resulting from the Bridger-Knoll Fire. Forest-wide, noxious weed treatments were completed on approximately 4,000 acres and grassland maintenance and restoration was conducted on over 2,600 acres.

Wild Burro Population (Range 1)

The KNF conducted a helicopter survey of burro populations in the Double A Wild Burro Territory on July 1, 2011. A total of 25 burros were seen (19 adults and 6 juveniles). The majority (15) were seen at the north end of the survey area. A lone male with a broken leg was seen on a mesa top north of Double A Knoll. The remainder were seen east of Double A Lake. The 25 burros are believed to represent 30-50% of the actual population. Ohmart *et al*. (1978) suggest that aerial surveys can count approximately 30-35% of a population. The 30-50% range results in an estimated burro population at 50-83 (Hydock 2011). Although this marks a reduction from the 102-153 head estimated in 2010, burro populations are higher than the desired range of 22-35 animals. A burro gather began in 2009, which should help bring the burro population closer to desired numbers. In 2011 the burro gather collected 68 burros. In total, as of the time of the survey, over 115 burros had been removed from the Forest and shipped to the BLM Wild Horse and Burro Center in Ridgecrest, CA, where they are put up for adoption.

Recreation (1, 3) and Wilderness Visitation

The Kaibab National Forest, in cooperation with Arizona State University's School of Community Resources and Development, completed the third round of National Visitor Use Monitoring (NVUM) in 2010. This monitoring involved surveying Forest visitors on all three of the Forest's districts to better understand what sites and facilities they use, how long they stay, and how satisfied they are with their experience. Survey information was recently released, and can be found at http://apps.fs.usda.gov/nrm/nvum/results/ReportCache/Rnd3_A03007_Master_Report.pdf. Table 4 describes the annual visitation estimate for the KNF resulting from this monitoring.

Table 4. Annual visitation estimate, Kaibab National Forest (USDA Forest Service 2012b)

Visit Type	Visits (1,000s)
Day use developed site visits	274
Overnight use developed site visits	403
General forest area visits	70
Designated wilderness visits	9
Total estimated site visits*	**757**
Total estimated national forest visits†	**456**

*A site visit is the entry of one person onto a national forest site or area to participate in recreation activities for an unspecified period of time.
†A national forest visit is defined as the entry of one person upon a national forest to participate in recreation activities for an unspecified period of time. A national forest visit can be composed of multiple site visits.

On the Williams Ranger District, major improvements were completed at Kaibab Lake Campground in 2011. Improvements to the campground included new pavement, new parking spurs, new campsite amenities such as fire rings and picnic tables, more day-use parking for improved fishing access, improved ramadas, additional small group capacity, a re-designed overnight group camping area, and a new camping loop with an additional 11 campsites. The entrance road to the campground was also improved.

On the Tusayan Ranger District, progress continued on a multi-use greenway trail linking Grand Canyon National Park with the town of Tusayan.

In FY 2011, funds from the American Recovery and Reinvestment Act of 2009 were used to upgrade and restore the Dry Park cabin, structures at Big Springs, and Jump Up cabin. Restoration work and Dry Park cabin and Big Springs included replacing the walls, windows and floors; repairing the concrete porch; and upgrading the heating, electrical and plumbing systems. Work at Jump Up cabin included replacing flooring, interior walls, and the wood stove, and repairing the foundation and exterior of the cabin.

Heritage Resources (1, 2, 3)

In FY 2011, Forest heritage staff completed approximately 65 projects under sections 106 and 110 of the National Historic Preservation Act. These included approximately 8,076 acres of survey, recording 340 sites, and monitoring 391 sites on the North Kaibab and approximately 3,100 acres of new survey, recording 64 new sites, and monitoring 217 sites on the South Zone (Williams and Tusayan ranger districts). Work related to Section 106 included completing heritage inventories for travel management, collaborating with the Coconino Nation Forest in developing a strategy for meeting Section 106 responsibilities for the Four-Forest Restoration Initiative, and completing clearances for numerous range, recreation, fuels, vegetation management, and timber-related projects. Section 110 accomplishments included a variety of site stabilization and protection projects, including completing site protection plans for two sites and stabilizing the Murray Tank site, which was damaged during the Warm Fire. Additionally, the South Zone managed 13 priority heritage assets to standard and the North Kaibab conducted monitoring assessments on 11 priority asset historic sites.

Additional work in FY11 included sharing services with multiple federal, tribal and academic entities; developing a database that allows for the study of spatial and temporal changes in projectile point distributions; co-conducting and outdoor kids camp emphasizing environmental education; conducting the Dixie College e-Smart Girls Camp; re-shooting historic photographs of the Bill Williams Mountain

area; restoring vandalized rock art at Keyhole Sink; participating in various conferences, hosting the 21st annual Passport in Time project; and providing fire support.

Finally, KNF archaeologists presented 57 programs to tribal neighbors, Forest Service personnel, and the public. These presentations included conference papers, interpretive hikes, lectures and trainings. Approximately 4,684 people attended these trainings.

Soils and Watershed

Approximately 21,224 watershed acres were improved on the Williams and Tusayan Ranger Districts through prescribed burning and wildfires managed for resource benefits including the Beale (5,096 ac.), Lower (1,715 ac.), Parallel (4,344 ac.), Armstrong (2,679 ac.), Skinner (2,106 ac.) and Woodbridge (1,110 ac.) wildfires.

Approximately 1,466 acres were improved on the Williams and Tusayan Ranger Districts through forest thinning and piling of activity-related woody debris. These projects improve soils and watershed condition by increasing vegetative ground cover, which consists of grasses, forbs, and shrubs, and decreasing the potential for wildfires to become active crown fires.

Grassland maintenance and restoration was conducted on approximately 2,600 acres to improve soil and watershed conditions. This work focused on grasslands that have been encroached by piñon and juniper trees. Monitoring has shown substantial improvements in ground cover conditions after treatment, resulting in improved soil and watershed conditions.

Invasive and noxious weeds treatments were completed on approximately 4,000 acres across the Forest. These treatments improve native vegetation cover by eliminating weed species that increase bare ground and potential soil erosion and sediment delivery to watercourses.

Approximately 300 acres of wetlands were fenced for the purpose of livestock exclusion. Fenced areas included Dry Lake, Duck Lake, and Sunflower Flat. Fences included top-wire cables to prevent unauthorized motor vehicle entry into these areas and fence cutting.

Reclamation was completed on approximately 83 acres of sandstone quarries. This work included filling in quarry holes with stone blocks, reshaping quarry areas to create gentle slopes, adding material to create smooth surfaces, covering reclaimed areas with the available topsoil from the site and seeding where necessary. These activities reduce erosion and sediment delivery to watercourses.

Fire rehabilitation continued at the Eagle Rock Fire. Activities included sediment removal from two sediment basins, stabilization of roads within the fire perimeter, and treatment of invasive and noxious weeds within burned areas.

A total of 340.8 miles of roads were maintained to standards or improved throughout the Forest. Maintenance activities included blading to improve road drainage, placing gravel fill to prevent erosion of native soil, installing erosion control structures (e.g. broad-based dips, rolling dips, and water bars), replacing existing culverts, and removing sediment from lead-out ditches. These road treatments reduce the potential for sedimentation into watercourses.

Approximately 10 miles of Forest Road 307 on the Tusayan Ranger District was reconstructed. This road had major drainage problems that resulted in rutting of the traveled way and eventual failure of the road prism and associated drainage structure causing sediment delivery directly into a tributary of the Little Colorado River.

A HAZMAT site that was under special use permit to the City of Williams was disclosed in 2011 by the City. The site contained 15.35 tons of buried asbestos-cement pipe, barrels that had contained and leaked heptachlor and benzene, and numerous paint cans. Approximately 100 tons of contaminated soil was removed and disposed in accordance with CERCLA standards. This project improves watershed condition by preventing groundwater contamination in the Williams Municipal Watershed.

The Tusayan Ranger District implemented the Travel Management Rule in 2011. This decision resulted in the removal of approximately 143 miles of roads from the existing open forest road system. Soils and watershed conditions will be improved as a result of this implementation.

Teams from the Museum of Northern Arizona and Grand Canyon Trust collected survey data for 36 springs, some of which were previously unmapped. Data collected included geomorphology, soils, vegetation, invertebrate diversity, flow, water quality, solar radiation, images, and an ecological assessment. The data collected are being compiled into a database.

Wildlife

Wildlife and Fish Non-Structural Improvement (Wildlife 1)

On the North Kaibab Ranger District, 300 acres of piñon-juniper was thinned to improve mule deer winter range. Additionally, thinning and piling, prescribed burning and wildland fire managed for resource benefit, grassland restoration, and invasive species removal and treatment served to improve wildlife habitat across the Forest.

Wildlife and Fish Structural Improvements (Wildlife 2)

Wildlife structural improvements included 8 acres of aspen fencing/planting and 300 acres of wetland fencing on the Williams District, and installation of 12 bat barks (artificial roosting habitat) on the North Kaibab.

Goshawk and Owl Nest Location, Occupancy and Productivity (Wildlife 4)

Mexican spotted owl monitoring – Surveys were conducted in three of the six Mexican spotted owl protected activity centers (PACs) on the Williams District. Mexican spotted owl detections occurred in two of the three PACs surveyed. A total of 2,310 acres were surveyed.

Northern goshawk surveys – On the Williams district, goshawk surveys were conducted within the Bill Williams and Scott project areas and in two known goshawk territories outside of the project areas. These surveys covered approximately 11,500 acres. On the North Kaibab, Dr. Richard Reynolds continued to perform goshawk monitoring. An effort is currently underway bythe Kaibab Supervisor's Office to assess goshawk occupancy on the South Zone. These data will be available next year.

Management Indicator Species Monitoring (Wildlife 8, 15)

Bird Monitoring – The Kaibab National Forest continued its multiyear project with Rocky Mountain Bird Observatory to gather long-term trend data for populations of most diurnal, regularly breeding bird species in the forest. In the short term, this program provides information needed to effectively manage and conserve bird populations in Kaibab National Forest. It also supports the Forest's efforts to comply with requirements set forth in the National Forest Management Act and other statutes and regulations.

Field technicians completed all 45 planned surveys throughout KNF in 2011. Technicians conducted 514 point counts within the 45 surveyed grid cells between 11 May and 25 June 2011. Survey efforts detected 101 bird species, including eight priority species, as well as current and proposed Management Indicator Species (MIS). Additionally, this monitoring detected 10 Abert's squirrels. Table 5 summarizes the results of these surveys for 2010 and 2011.

Table 5. Number of birds detected in Kaibab National Forest, by ranger district, 2010 – 2011, with priority designations as determined by US Forest Service, Partners In Flight, Arizona Game and Fish Department, and US Fish and Wildlife Service. Priority species are marked with an asterisk. Management Indicator Species (MIS) are bolded and proposed MIS are underlined. Species most likely detected as migrants are italicized.

	North Kaibab		Tusayan		Williams		Yearly Totals				
Species	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**Grand Total**	**Density Estimated**	**Occupancy Estimated**
Abert's Squirrel	10	2		1	4	2	14	5	19		
Acorn Woodpecker	1			5	3	1	4	6	10	X	X
American Crow			1		9	2	10	2	12	X	
American Kestrel					3	6	3	6	9	X	X
American Robin	31	15	19	13	45	56	95	84	179	X	X
American Three-toed Woodpecker*	1	3	1				2	3	5		X
Anna's Hummingbird					1	2	1	2	3		
Ash-throated Flycatcher*	73	88	91	122	70	69	234	279	513	X	X
Band-tailed Pigeon*						2		2	2		X
Barn Swallow					1		1		1		
Bewick's Wren	29	35	22	40	5	8	56	83	139	X	X
Black-chinned Hummingbird	4	15	6	8	4		14	23	37	X	X
Black-chinned Sparrow*	1	5				6	1	11	12	X	X
Black-headed Grosbeak	29	21	22	12	33	22	84	55	139	X	X
Black-throated Gray Warbler*	127	181	93	83	31	49	251	313	564	X	X
Black-throated Sparrow*	30	23	1	5			31	28	59	X	X
Blue-gray Gnatcatcher	57	41	7	3	5	4	69	48	117	X	X
Brewer's Blackbird						3		3	3	X	X
*Brewer's Sparrow**	19	11		24	3	1	22	36	58		
Broad-tailed Hummingbird*	13	14	8	9	14	24	35	47	82	X	X
Brown Creeper	6					3	6	3	9	X	X
Brown-headed Cowbird	6	15	11	36	30	37	47	88	135	X	X
Bullock's Oriole					9	4	9	4	13	X	X
Bushtit	5	3	3	12	1	2	9	17	26	X	X
Canyon Wren*			3			5	3	5	8	X	X
Cassin's Finch*	2	2	7	2			9	4	13	X	X
Cassin's Kingbird*			1	4	31	17	32	21	53	X	X
Chipping Sparrow	69	65	48	76	112	89	229	230	459	X	X
Chukar	12						12		12		
Clark's Nutcracker*	4	37	1		4	1	9	38	47	X	X

Species	North Kaibab		Tusayan		Williams		Yearly Totals		Grand Total	Density Estimated	Occupancy Estimated
	2010	2011	2010	2011	2010	2011	2010	2011			
Cliff Swallow						4		4	4	X	X
Common Nighthawk*	2	2			6	2	8	4	12	X	X
Common Raven	8	10	17	18	66	103	91	131	222	X	X
Cooper's Hawk*				1		2		3	3		
Cordilleran Flycatcher*	2	1		8	15	10	17	19	36	X	X
Dark-eyed Junco	38	46	22	23	54	46	114	115	229	X	X
Downy Woodpecker*			1		3	1	4	1	5		
Dusky Flycatcher	3				3		6		6		
Dusky Grouse*		1						1	1		
Eastern Meadowlark*					1	2	1	2	3	X	X
Eurasian Collared-Dove			1		4	3	5	3	8	X	X
Evening Grosbeak*	2	9					2	9	11	X	X
Gambel's Quail*			2		21	29	23	29	52	X	X
Grace's Warbler*	124	82	29	31	49	50	202	163	365	X	X
Gray Flycatcher	61	62	73	72	66	106	200	240	440	X	X
Gray Vireo*	32	25	2	17	12	11	46	53	99	X	X
Great Blue Heron					1	1	1	1	2		
Great Horned Owl			1	1		1	1	2	3		
Greater Roadrunner		1		1	1		1	2	3		
Green-tailed Towhee*				1	4		4	1	5	X	X
Hairy Woodpecker*	28	35	17	30	45	38	90	103	193	X	X
Hepatic Tanager*	2		6	1	11	21	19	22	41	X	X
Hermit Thrush	59	70	1	4	6	1	66	75	141	X	X
Horned Lark	22	15				12	22	27	49	X	X
House Finch	20	21	7	9	9	24	36	54	90	X	X
House Wren	10	17	4	3	11	11	25	31	56	X	X
Hutton's Vireo			1	1		2	1	3	4		
Juniper Titmouse*	39	48	43	68	44	84	126	200	326	X	X
Killdeer						2		2	2	X	X
Ladder-backed Woodpecker	4						4		4		
Lark Sparrow	14	9	11	29	88	56	113	94	207	X	X
Lazuli Bunting	7						7		7		
Lesser Goldfinch	5	3	5	10	38	50	48	63	111	X	X
Loggerhead Shrike*					1		1		1		
*MacGillivray's Warbler**						1		1	1		
Mallard					4		4		4		
Mountain Bluebird*	2		3		12		17		17		
Mountain Chickadee	30	51	57	38	62	40	149	129	278	X	X
Mourning Dove	8	4	12	17	24	53	44	74	118	X	X
Northern Flicker	33	36	23	21	39	42	95	99	194	X	X
Northern Goshawk*	1						1		1		
Northern Mockingbird	14	3	4	36	35	40	53	79	132	X	X
Olive Warbler*						3		3	3		X

Species	North Kaibab		Tusayan		Williams		Yearly Totals		Grand Total	Density Estimated	Occupancy Estimated
	2010	2011	2010	2011	2010	2011	2010	2011			
Olive-sided Flycatcher*	2				2	6	4	6	10	X	X
Osprey*					1		1		1		
Phainopepla*					2		2		2		
Pine Siskin*	45	65	5	19	16	16	66	100	166	X	X
Pinyon Jay*	48	230	91	66	85	20	224	316	540	X	X
Plumbeous Vireo*	53	62	77	40	80	32	210	134	344	X	X
Purple Martin*			12	11	2	6	14	17	31		X
Pygmy Nuthatch*	44	53	68	20	98	64	210	137	347	X	X
Red Crossbill	36	25	54	3	6	8	96	36	132	X	X
Red Squirrel	11						11		11		
Red-breasted Nuthatch	7	13			1		8	13	21	X	X
Red-faced Warbler*					1		1		1		
Red-naped Sapsucker*		3						3	3	X	X
Red-tailed Hawk	2	1	1	3	4		7	4	11	X	
Red-winged Blackbird					1	1	1	1	2		
Rock Wren*	23	17	3		1		27	17	44	X	X
Ruby-crowned Kinglet*	46	73			1	1	47	74	121	X	X
Rufous-crowned Sparrow*						1		1	1	X	X
Sage Sparrow*	27	10					27	10	37	X	X
Say's Phoebe*	1			1	1		2	1	3		X
Scott's Oriole*	1	1	2	6	7	13	10	20	30	X	X
Spotted Towhee*	66	95	20	22	28	34	114	151	265	X	X
Steller's Jay	24	47	18	18	40	48	82	113	195	X	X
Swainson's Hawk*				1				1	1		
Townsend's Solitaire			1		2	1	3	1	4	X	X
Turkey Vulture	15	1	2	2	3	5	20	8	28	X	X
Vesper Sparrow	23	1	16	26	33	38	72	65	137	X	X
Violet-green Swallow*	35	66	78	65	62	81	175	212	387	X	X
Virginia's Warbler*	29	23			6	9	35	32	67	X	X
Warbling Vireo*	64	88	1	8	3	6	68	102	170	X	X
Western Bluebird*	29	43	42	79	79	47	150	169	319	X	X
Western Kingbird				3	4		4	3	7	X	X
Western Meadowlark	5		8	25	36	34	49	59	108	X	X
Western Scrub-Jay	29	48	33	29	43	59	105	136	241	X	X
Western Tanager	74	60	14	28	61	78	149	166	315	X	X
Western Wood-Pewee	16	22	40	20	65	56	121	98	219	X	X
White-breasted Nuthatch	27	34	46	42	42	37	115	113	228	X	X
White-throated Swift*	5	13				1	5	14	19	X	X
Wild Turkey*	5				1	2	6	2	8	X	X
Williamson's	35	21			2		37	21	58		X

Species	North Kaibab		Tusayan		Williams		Yearly Totals		Grand Total	Density Estimated	Occupancy Estimated
	2010	2011	2010	2011	2010	2011	2010	2011			
Sapsucker*											
Wilson's Warbler			1		4	1	5	1	6		
Yellow-rumped Warbler	49	93	6	2	30	23	85	118	203	X	X

Additionally, on the North Kaibab surveys for Kaibab squirrels were completed along 10 transects and marsh birds were surveyed on Franks, Lookout and Three Lakes following Arizona Game and Fish Department protocol.

Spring Monitoring (Wildlife 23, 25)

Teams from the Museum of Northern Arizona and Grand Canyon Trust collected survey data for 36 springs on the North Kaibab. These teams located several previously unmapped springs in the wilderness areas, some of which were relatively small hanging gardens in the Kanab Creek drainage. Data collected at the surveyed springs included geomorphology, soils, vegetation, invertebrate diversity, flow, water quality, solar radiation, images, and an ecological assessment. The data collected are being compiled into a database.

Threatened, Endangered, and Sensitive Species Monitoring (Wildlife 27)

The California condor is only known to forage on the Forest and there are no known nest sites on the Forest. The Apache trout occupies the same length of stream where it was released in the 1940s and its local population appears to be stable. The KNF does not currently possess the data necessary to estimate threatened and endangered species population trends.

Facilities/Roads

In FY 2011, funds from the American Recovery and Reinvestment Act were used to upgrade and restore the Dry Park cabin, structures at Big Springs, and Jump Up cabin. Restoration work and Dry Park cabin and Big Springs included replacing the walls, windows and floors; repairing the concrete porch; and upgrading the heating, electrical and plumbing systems. Work at Jump Up cabin included replacing flooring, interior walls, and the wood stove, and repairing the foundation and exterior of the cabin.

A total of 340.8 miles of roads were maintained to standards or improved throughout the Forest. Maintenance activities included blading to improve road drainage, placing gravel fill to prevent erosion of native soil, installing erosion control structures (e.g. broad-based dips, rolling dips, and water bars), replacing existing culverts, and removing sediment from lead-out ditches. Approximately 10 miles of Forest Road 307 on the Tusayan Ranger District was reconstructed. This road had major drainage problems that resulted in rutting of the traveled way and eventual failure of the road prism and associated drainage structure causing sediment delivery directly into a tributary of the Little Colorado River.

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