Kaibab National Forest

Forest Plan Monitoring Report

Fiscal Year 2012

All cover photos credit U.S. Forest Service, Southwestern Region, Kaibab National Forest. Clockwise from top left: tree planting in the X Fire burn, Tusayan Ranger District; pack trip in the Kanab Creek Wilderness; bat mist netting, Williams Ranger District; aspen on the North Kaibab Ranger District.

Introduction

The Monitoring Plan for the Kaibab National Forest (NF) 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 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) 2012. 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 Kaibab NF is currently revising its Forest Plan in order to address changing management needs and areas of focus. Chapter 5 of the revised Plan includes an updated monitoring plan, which was designed to better inform progress toward desired conditions and support adaptive management. A decision on the revised plan is expected in fall 2013. Because the revised plan has not yet been approved, this report is guided by the monitoring plan set forth in the current plan.

Timber (1, 2, 6, 8, 9, 10)[1]

The timber program is an integral part of the Kaibab NF's continued strategy to make progress toward desired conditions for fuel loading, forest health, wildlife habitat enhancement, and watershed improvement. Timber sale and stewardship vegetation management contracts are useful, cost-effective tools for manipulating live and dead vegetation in order to restore and maintain fire-adapted forest ecosystems. The vegetation management from these tools improves forest health; resistance to insect, disease and/or stand replacing wildfire; and wildlife habitat, while also increasing over- and understory plant diversity. The wood fiber cut, sold and removed from the forest helps offset high vegetation management costs while reducing carbon footprints by helping meet society's wood fiber demands locally and in a timely fashion rather than depending on imported fiber from distant regions and countries where high transportation costs are incurred. Timber harvesting on the forest has been occurring either for salvaging excess wildfire-killed timber or thinning green timber stands to prevent tree mortality. Some uneven-aged regeneration harvesting has also been performed through group selection cutting of live timber to stagger age/size classes to help achieve and maintain uneven-aged forest conditions.

In FY 2012, the Kaibab NF treated 2,488 acres using timber sales, harvested 19,863 CCF (hundred cubic feet) of timber, and sold 8,000 CCF of timber. This represents a decrease since 2011, when 2,512 acres were treated using timber sales, 23,592 CCF was harvested, and 18,290 CCF was sold.

The Williams Ranger District completed commercial timber harvest on approximately 500 acres, contributing approximately 7,225 CCF of sawlogs (>8" DBH) and pulpwood (5" – 8" DBH) to local markets. These treatments, predominately in ponderosa pine ecosystems, were aimed at improving forest health, reducing hazardous fuels, and enhancing wildlife habitat. In addition to commercial timber harvest, the district sold 219 CCF of commercial fuelwood as part of treatments in piñon-juniper woodlands to restore grasslands and savannahs and improve wildlife habitat.

Meeting local demand for forest products continues to be a priority on the South Zone (Williams and Tusayan ranger districts. Combined, the South Zone issued permits for 5,200 cords of paid personal use fuelwood and 2,326 cords of free-use fuelwood, for a total of 7,526 cords. This is a slight decrease from 7,940 cords in FY11. Additionally, 106 cords of ceremonial use fuelwood and 929 Christmas tree permits

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

were issued on the zone, representing a slight increase from 98 cords of ceremonial use fuelwood and a slight decrease from 975 Christmas trees in FY11.

On the North Kaibab Ranger District (NKRD), timber staff prepared, offered and awarded 1,319 CCF of wood fiber volume from four Warm Fire Recovery salvage timber sales, designed to treat approximately 663 acres. During FY12, 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 40+ miles of public-accessible forest system roads and four miles of the Arizona Trail. Timber staff also prepared the Plateau Facilities Fire Protection Project (PFFPP) at Jacob timber sale. PFFPP consists of thinning 476 acres of ponderosa pine around the Jacob Inn and ADOT yard complex, removing 2,668 CCF of green timber.

In addition to the timber sale program, in FY12 the NKRD issued permits for, sold, and administered 3,308 cords of personal use dead fuelwood for local home heating needs; about 20 CCF of dead posts and poles; 712 personal use Christmas trees; about 23 cords of Ceremonial free use dead oak; 53 cords of free use green piñon/juniper; and 900 bushels of green spruce seed cones.

Other activities on the NKRD included the service contract completion of about 100 acres of pre-commercial thinning with lop and scatter of fuels in western spruce budworm infected stands, plus about 36 acres of force account meadow maintenance in the dry park planning area where encroaching young conifers were cut. The NKRD timber/silviculture shop also performed survival and stocking surveys on post 2006 Warm fire pine and Douglas fir planted acres in late FY12 and early FY13, including: 1,600 acres of 2008 plantations, plus 900 acres of FY10 plantings plus 300 acres of FY11 plantings. The district also prepared units in FY12 for an additional 480+ acres of FY13 spring tree planting, including sections along the Arizona trail.

Finally, NKRD timber staff helped provide education to the local YCC youth crews regarding the district timber program, striving to inspire young students to choose natural resource careers and become aware of the Kaibab National Forest resources and job opportunities.

As a part of Forest Plan revision, the Kaibab finalized a GIS-based analysis of suitable and unsuitable timber lands. Details of this analysis can be found in Chapter 4 of the revised plan and Appendix C of the Environmental Impact Statement.

Insects and Disease (Protection 1)

The Kaibab NF plan revision team identified insect/disease outbreaks as a moderate risk to ponderosa pine (KNF 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, the spruce-fir vegetation community 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 Kaibab NF. 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 Kaibab NF 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 Kaibab NF (KNF 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 2012 *Forest Insect and Disease conditions in the Southwestern Region* report (USDA Forest Service in press), bark beetle activity on the KNF increased from 255 acres in 2011 to 16,330 acres in 2012 (Table 1). *Ips* bark beetles in the ponderosa pine type increased from 190 acres in 2011 to 9,150 acres in 2012. Western pine beetle (*Dendroctonus brevicomis*) increased from 10 acres in 2011 to 7,150 acres in 2012. Douglas-fir beetle (*Dendroctonus pseduotsugae*), true fir complex, and piñon *Ips* were detected in small areas, and cedar bark beetle (*Phloeosinus* spp.) activity decreased from 30 acres in 2011 to 0 acres in 2012. Defoliator activity increased from 5,730 acres in 2011 to 7,090 acres in 2012 (Table 2). Pine sawfly (*Neodiprion fulviceps*) defoliation increased from 260 acres in 2011 to 1,850 acres in 2012. Aspen defoliation decreased slightly from 5,470 acres in 2011 to 5,240 acres in 2012 (USDA Forest Service in press). 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	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Western pine beetle	7,833	3	26	410	9	94	16	27	10	7,150
Mountain pine beetle	79	0	0	0	3	0	0	0	-	-
Ponderosa pine *Ips*	64,195	29,807	23	6,850	215	343	196	489	190*	9,150*
Douglas-fir beetle	1,282	615	2,510	850	251	106	89	53	20	20
True fir complex†	365	1,065	1,211	105	252	17	57	5	0	<5
Cedar bark beetle	0	0	0	0	0	0	1	0	30	0
Piñon *Ips*	158,951	6,922	6	15	0	1	0	5	<5	<5
Total:	**232,705**	**38,412**	**3,776**	**8,230**	**730**	**561**	**359**	**579**	**255**	**16,330**

*Reported as *Ips* engraver in 2011 and 2012

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

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

Defoliator	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Spruce budworm	0	0	0	0	0	0	0	0	0	0
Pine sawfly	0	0	0	0	0	0	1,223	1,143	260	1,850
Aspen defoliation	951	17,782	22,664	28,415	76,185	65,204	4,667	2,815	5,470	5,240
Cenangium canker	0	0	0	0	0	0	0	1,444	-	-
Abiotic factors	2,522	14,683	2,988	210	0	1,738	231	1,495	-	-
Total:	**3,473**	**32,465**	**25,652**	**28,625**	**76,185**	**66,942**	**6,121**	**6,897**	**5,730**	**7,090**

Fire and Fuels Management

Most of the vegetation types on the Kaibab NF are fire-adapted, and require frequent fire to remain healthy and resilient. Restoring fire to fire-adapted ecosystems and reducing accumulations of forest litter and debris to avoid uncharacteristic high severity wildfires are Forest priorities. In FY12 the Forest treated 9,522 acres with prescribed fire, piling of activity-generated slash, pile burning, thinning, and low to moderate severity wildfires.

Generally speaking, opportunities to accomplish prescribed fires are limited by weather conditions and potential smoke impacts. Kaibab fire managers treat and average of 8,000 acres per year with prescribed fire, primarily in ponderosa pine, mixed conifer, and grasslands. Weather and winds limited opportunities to burn in FY12 to 6,958 acres. Sporadic snows during the winter did provide good conditions for burning slash piles, with 1,278 acres burned.

In May of 2012, the Forest Service gave national direction to suppress fires where it was possible to do so. This was due to the prediction of an active and extended fire season across the west, in the interest of not exceeding firefighting resource capabilities, and in light of a decreasing budget. As a result, the Kaibab suppressed all fires after the direction was received in May, including those that had great potential for accomplishing resource benefits on the landscape. Acres treated by wildfire decreased from 19,903 acres in FY11 to 248 acres in FY12, which were all part of the Hollow Fire in October 2011.

Other accomplishments in hazardous fuels reduction included 878 acres of thinning, 26 acres of piling of slash, and 134 acres of fuels mastication.

The Tusayan RD broadcast burned 855 acres on the Scott project in October 2011 and 303 acres on the Flying J project in April and May 2012, and burned 47 acres of piles on the Flying J project in December 2011. In the summer of 2012 fire crews thinned 29 acres within the Flying J project.

Range (Range 2, 3, 4)

The Forest administered grazing on 31 allotments (24 on the Williams/Tusayan districts and 7 on the North Kaibab) during 2012. Permitted use on the KNF increased from 65,264 animal unit months (AUMs) in 2011 to 69,779 AUMs in 2012. Actual use in 2012 was 58,018 AUMs, compared to 44,131 AUMs in 2011. In general, 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 2012 is shown in Table 3.

Non-structural range treatments were completed on 1,500 acres, and 3,278 instances of structural improvements were completed in 2012.

Table 3. Permitted and actual use (AUMs) by ranger district, FY 2012 (Source: Annual Grazing Statistical Report for 2012. IWeb, Accessed 6 June 2013).

District	**Permitted Use**			**Actual Use***		
	Horses	Sheep	Cattle	Horses	Sheep	Cattle
North Kaibab	0	0	11,473	0	0	9,175
Tusayan	0	0	20,551	0	0	3,224
Williams	252	11,848	25,675	252	18,090	27,277
Total:	**252**	**11,848**	**57,699**	**252**	**18,090**	**39,676**

*In the case of cattle 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 Tusayan Ranger District, the Arizona Elk Society entered into a cooperative agreement with the Anita/Cameron grazing permittee to clean nine earthen tanks. These tanks provide water to livestock seasonally and to wildlife yearlong.

Progress was made on the Tusayan/Navajo Nation boundary fence project. The Forest Service surveyed the fenceline and verified that all survey caps were accounted for. The Bureau of Indian Affairs awarded a contract to Southwest Conservation Corp for construction that will begin in June of 2013.

On the Williams Ranger District, Youth Conservation Corp crew was used to repair the fence around Davenport Lake, north of I-40. The lake contains wetland habitat and the fence will serve to keep cattle out of the wetland when soils are saturated. A cable was added to the top wire of the fence to reduce breakage from elk jumping it.

Wild Burro Population (Range 1)

The Kaibab NF conducted a helicopter survey of burro populations in the Double A Wild Burro Territory on June 21, 2012. A total of 29 burros were seen (26 adults and 3 juveniles). The majority (20) were seen at the southern portion of the Territory. The remainder was seen on the Partridge Creek Allotment. The 29 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% detection range results in an

estimated burro population of 58-95 (Hydock 2012). This marks a slight increase from the 50-83 head estimated in 2011. Burro populations are currently higher than the desired range of 22-35 animals. A burro gather began in 2009 with the goal of bringing the burro population closer to desired numbers. As of June 2012 a total of 142 burros have been removed from the Forest. Gathered animals are shipped to the BLM Wild Horse and Burro Center in Ridgecrest, CA, where they are put up for adoption.

Recreation (1, 3)

In FY12, work was completed using funds from the American Recovery and Reinvestment Act of 2009 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.

The Kaibab manages three Wilderness areas: Kanab Creek, Kendrick Mountain, and Saddle Mountain. The Districts continued to improve their wilderness scores for the Ten Year Challenge. Projects in 2012 included developing wilderness education plans, baseline data gathering, campsite and spring condition monitoring, invasive plant surveys, and utilizing volunteer crews to complete trail maintenance.

The North Kaibab Ranger District was selected to host a trail building course sponsored by the International Mountain Biking Association (IMBA). For three days, IMBA instructed over 40 volunteers in trail design and layout and converting roads to trails. Participants completed the design for the future Rainbow Rim Trail Extension. Additionally, the North Kaibab maintained 120 miles of trail, restored six miles of the Arizona Trail within the Warm Fire burn, installed four new kiosks on the Arizona Trail, removed 60 hazard trees from DeMotte Campground, entered Jump-up Cabin into the national registry for Rooms with a View rental program status, completed NEPA for various projects and permit renewals, and hosted numerous volunteer and educational activities on the District and in surrounding communities.

Heritage Resources (1, 2, 3)

In FY12, Forest heritage staff inventoried approximately 3,775 acres and recorded 19 sites on the North Kaibab and inventoried approximately 1,991 acres and recorded 57 new sites on the Williams and Tusayan districts (South Zone) under compliance with Section 106 of the National Historic Preservation Act (NHPA). In addition, heritage staff on the South Zone monitored, flagged, or painted 111 sites to ensure protection and compliance according to their associated clearance reports. Other Section 106 work included providing technical assistance on seven wildland fires and preparing burned area emergency response (BAER) assessments for sites found in the East and Tank fires; monitoring abandoned mines contract work on the Historic Anita Copper Mining District; and consulting/providing assistance on various other projects.

Under Section 110 of the NHPA, North Kaibab heritage staff monitored 40 sites, with eight sites newly recorded and four legacy sites re-recorded. South Zone heritage staff recorded six new sites that had been reported by District personnel and 25 new sites during the Spring Valley Passport in Time (PIT) project. Volunteers and North Kaibab heritage staff also helped conduct 600 acres of non-project survey during the PIT project. Additionally, archaeologists and volunteers monitored 16 eligible heritage resource sites, conducted condition assessments of five Priority Heritage Assets, and re-visited and evaluated 12 unevaluated sites and declared them eligible for the National Register of Historic Places. Other Section 110 work included training new site stewards and overseeing site steward monitoring activities; designing an interpretive panel to be installed at the Tusayan Lookout Tree; installing an interpretive sign at the

Warm Springs Canyon rock art site; hosting Youth Conservation Corps crews; and overseeing various other volunteer activities.

Additional work in FY12 included assistance on various research projects and presenting several research papers; supporting the E-Smart Girls Science Camp at Dixie College; conducting 49 heritage outreach projects that reached 1,692 participants; hosting an intertribal meeting; coordinating various intertribal field trips; participating in numerous government-to-government consultation meetings; and engaging in tribal outreach, relationship building, and collaboration.

Soils and Watershed

Approximately 9,522 acres were improved throughout the Forest by use of prescribed fire, 252 acres of which included grassland maintenance. Such maintenance improves nutrient cycling and removes young, encroaching ponderosa pine trees.

Rehabilitation continued in the Eagle Rock Fire burn scar. Activities included sediment removal from two sediment basins, closure of approximately 1.7 miles of roads within the fire perimeter, treatment of invasive and noxious weeds within burned areas, and stabilization of a large gully caused by post-fire erosion.

Grassland maintenance and restoration was conducted on approximately 2,000 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 130 acres of Davenport Lake wetlands were fenced for the purpose of livestock exclusion.

A team from Northern Arizona University (NAU) and the Museum of Northern Arizona (MNA) Spring Stewardship Institute (SSI) and collected survey data for 30 springs. Data collected included geomorphology, soils, vegetation, invertebrate diversity, flow rate, water quality, solar radiation, images, and an ecological assessment. The data collected are for a graduate project and will be compiled into a database.

Water quality monitoring was conducted during the summer and fall on Cataract, Kaibab, and White Horse Lakes, and Dogtown Reservoir. Water quality parameters monitored include temperature, specific conductance, pH, total dissolved solids, oxidation-reduction potential, dissolved oxygen, and turbidity. Based on water quality monitoring results, all lakes are meeting water quality requirements for their designated uses.

Wildlife

Wildlife and Fish Non-Structural Improvement (Wildlife 1)

On the North Kaibab Ranger District, 323 acres of piñon-juniper was seeded to improve mule deer winter range. In mixed conifer habitat, 1,155 acres were thinned to improve wildlife habitat. On the South Zone, biologists continued efforts from the previous year and relocated more than 250 Gunnison’s prairie dogs from the grounds of the Williams Elementary-Middle School to historical prairie dog colonies on the

Williams and Tusayan districts. Additionally, thinning and piling, prescribed burning, grassland restoration, and invasive species removal and treatment improved wildlife habitat across the Forest.

Wildlife and Fish Structural Improvements (Wildlife 2)

Wildlife structural improvements included ongoing aspen fencing to protect from browsing by elk and deer and promote regeneration, and fencing six wetlands to exclude livestock and prevent unauthorized motor vehicle entry.

Goshawk Nest Location, Occupancy and Productivity (Wildlife 4)

After 21 years Dr. Richard Reynolds did not perform surveys on the Kaibab Plateau. However, North Kaibab Ranger District biologists were able to monitor 48 percent (64 of 133) of the goshawk territories across the District. The presence of a goshawk was confirmed at 34 of those territories. On the South Zone, preliminary results from goshawk occupancy monitoring conducted in early summer 2012 in partnership with the Lab of Landscape Ecology and Conservation Biology at Northern Arizona University indicated that sampling units were occupied by northern goshawks 75 percent of the time. This monitoring employed a method that accounted for imperfect detection, which reduces bias and improves estimates. Additionally, South Zone wildlife staff surveyed the 15,000 acre Bill Williams Mountain Restoration Project area for goshawks. The presence of goshawks was confirmed in both post-fledgling family areas within the area.

Management Indicator Species Monitoring (Wildlife 8, 15)

The Kaibab NF 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 Forest. It also supports the Forest's efforts to comply with requirements set forth in the National Forest Management Act and other law, regulation, and policy. Field technicians completed all 20 planned surveys throughout KNF in 2012. Technicians conducted 241 point counts within the 20 surveyed sampling units between 28 May and 24 June 2012. Survey efforts detected 82 bird species, including four priority species, as well as current and proposed Management Indicator Species (MIS). This is a decrease from 45 surveys and 514 point counts in 2011, in which 101 bird species were detected. As a result, direct year-to-year comparisons should not be made using these data. Table 5 summarizes the results of these surveys for 2010 – 2012.

Additionally, marsh birds were surveyed on Franks, Corral, and Three Lakes following Arizona Game and Fish Department protocol. In conjunction with Arizona Game and Fish, 65 hours were spent capturing 35 deer to determine reproductive health and collar for range use monitoring.

Table 5. Number of birds/squirrels detected on the Kaibab National Forest by ranger district, 2010–2012. Priority designations as determined by US Forest Service, Partners in Flight, Arizona Game and Fish Department, and US Fish and Wildlife Service are noted. Priority species are marked with an asterisk (*). Current 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[1]			Grand Total
Species	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	
Abert's Squirrel*	10	2			1		4	2	1	14	5	1	20
Acorn Woodpecker*	1		2		5		3	1	8	4	6	10	20
American Crow				1			9	2		10	2		12
American Kestrel*							3	6		3	6		9
American Robin	31	15	3	19	13		45	56	24	95	84	27	206
American Three-toed Woodpecker*	1	3		1						2	3		5
Anna's Hummingbird							1	2		1	2		3
Ash-throated Flycatcher*	73	88	27	91	122	33	70	69	43	234	279	103	616
Band-tailed Pigeon*								2			2		2
Barn Swallow							1			1			1
Bewick's Wren	29	35	4	22	40	14	5	8	22	56	83	40	179
Black-chinned Hummingbird	4	15	2	6	8		4		1	14	23	3	40
Black-chinned Sparrow*	1	5	14					6	12	1	11	26	38
Black-headed Grosbeak	29	21	5	22	12	11	33	22	45	84	55	61	200
Black-throated Gray Warbler*	127	181	47	93	83	32	31	49	16	251	313	95	659
Black-throated Sparrow*	30	23	48	1	5				1	31	28	49	108
Blue-gray Gnatcatcher	57	41	23	7	3	9	5	4	9	69	48	41	158
Brewer's Blackbird								3			3		3
*Brewer's Sparrow**	19	11			24	2	3	1		22	36	2	60
Broad-tailed Hummingbird*	13	14	4	8	9	1	14	24	6	35	47	11	93
Brown Creeper	6							3	1	6	3	1	10
Brown-headed Cowbird	6	15	7	11	36	9	30	37	19	47	88	35	170
Bullock's Oriole*							9	4	3	9	4	3	16
Bushtit*	5	3	7	3	12	4	1	2	8	9	17	19	45
Canyon Wren*				3				5	2	3	5	2	10
Cassin's Finch*	2	2	1	7	2					9	4	1	14
Cassin's Kingbird*			2	1	4	12	31	17	14	32	21	28	81
Chipping Sparrow	69	65	35	48	76	12	112	89	55	229	230	102	561
Chukar	12									12			12

Species	North Kaibab			Tusayan			Williams			Yearly Totals[1]			Grand Total
	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012	
Clark's Nutcracker*	4	37		1			4	1		9	38		47
Cliff Swallow								4			4		4
Common Nighthawk*	2	2				1	6	2	8	8	4	9	21
Common Raven	8	10	13	17	18	4	66	103	26	91	131	43	265
Cooper's Hawk*					1			2	1		3	1	4
Cordilleran Flycatcher*	2	1			8		15	10	3	17	19	3	39
Dark-eyed Junco	38	46	6	22	23	2	54	46	18	114	115	26	255
Downy Woodpecker				1			3	1		4	1		5
Dusky Flycatcher*	3		8				3		1	6		9	15
Dusky Grouse*		1									1		1
Eastern Meadowlark*							1	2		1	2		3
Eurasian Collared-Dove				1			4	3		5	3		8
Evening Grosbeak*	2	9								2	9		11
Gambel's Quail*				2			21	29	6	23	29	6	58
Grace's Warbler*	124	82	12	29	31		49	50	19	202	163	31	396
Gray Flycatcher*	61	62	1	73	72	24	66	106	27	200	240	52	492
Gray Vireo*	32	25	22	2	17	10	12	11	5	46	53	37	136
Great Blue Heron							1	1	1	1	1	1	3
Great Horned Owl				1	1			1		1	2		3
Greater Roadrunner		1			1		1			1	2		3
Green-tailed Towhee*			6		1		4			4	1	6	11
Hairy Woodpecker*	28	35	6	17	30	5	45	38	16	90	103	27	220
Hepatic Tanager*	2			6	1	1	11	21	37	19	22	38	79
Hermit Thrush	59	70	1	1	4	1	6	1	2	66	75	4	145
Horned Lark*	22	15	10					12		22	27	10	59
House Finch	20	21	17	7	9	9	9	24	30	36	54	56	146
House Wren	10	17	8	4	3		11	11	17	25	31	25	81
Hutton's Vireo				1	1			2	1	1	3	1	5
Juniper Titmouse*	39	48	20	43	68	41	44	84	46	126	200	107	433
Killdeer								2			2		2
Ladder-backed Woodpecker*	4									4			4
Lark Sparrow	14	9	4	11	29		88	56	21	113	94	25	232
Lazuli Bunting*	7		3						1	7		4	11

Species	North Kaibab			Tusayan			Williams			Yearly Totals[1]			Grand Total
	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012	
Lesser Goldfinch	5	3		5	10	2	38	50	23	48	63	25	136
Loggerhead Shrike*							1			1			1
MacGillivray's Warbler*			1					1			1	1	2
Mallard							4			4			4
Mountain Bluebird*	2			3			12		3	17		3	20
Mountain Chickadee	30	51	19	57	38	3	62	40	12	149	129	34	312
Mourning Dove	8	4	2	12	17		24	53	31	44	74	33	151
Northern Flicker*	33	36	8	23	21	2	39	42	21	95	99	31	225
Northern Goshawk*	1									1			1
Northern Mockingbird	14	3		4	36		35	40	15	53	79	15	147
Northern Pygmy-Owl*									1			1	1
Olive Warbler*								3			3		3
Olive-sided Flycatcher*	2						2	6		4	6		10
Osprey							1			1			1
Painted Redstart*									1			1	1
Phainopepla*							2		6	2		6	8
Pine Siskin*	45	65		5	19		16	16		66	100		166
Pinyon Jay*	48	230	11	91	66	87	85	20	41	224	316	139	679
Plumbeous Vireo*	53	62	6	77	40	17	80	32	32	210	134	55	399
Purple Martin*				12	11		2	6	3	14	17	3	34
Pygmy Nuthatch*	44	53		68	20		98	64	7	210	137	7	354
Red Crossbill*	36	25		54	3		6	8		96	36		132
Red Squirrel*	11									11			11
Red-breasted Nuthatch	7	13					1			8	13		21
Red-faced Warbler*							1		7	1		7	8
Red-naped Sapsucker*		3									3		3
Red-tailed Hawk	2	1	2	1	3		4		5	7	4	7	18
Red-winged Blackbird							1	1		1	1		2
Rock Wren*	23	17	6	3		3	1		2	27	17	11	55
Ruby-crowned Kinglet*	46	73					1	1		47	74		121
Rufous-crowned Sparrow*			1					1	3		1	4	5

Species	North Kaibab			Tusayan			Williams			Yearly Totals[1]			Grand Total
	2010	2011	2012	2010	2011	2012	2010	2011	2012	2010	2011	2012	
Sage Sparrow*	27	10	12							27	10	12	49
Say's Phoebe*	1		1		1		1			2	1	1	4
Scott's Oriole*	1	1	4	2	6		7	13	4	10	20	8	38
Sharp-shinned Hawk*			1									1	1
Spotted Towhee	66	95	56	20	22	11	28	34	54	114	151	121	386
Steller's Jay	24	47	15	18	18		40	48	17	82	113	32	227
Swainson's Hawk*					1						1		1
Townsend's Solitaire				1			2	1	1	3	1	1	5
Turkey Vulture	15	1	2	2	2		3	5	4	20	8	6	34
Vesper Sparrow	23	1	3	16	26		33	38	19	72	65	22	159
Violet-green Swallow*	35	66	7	78	65	14	62	81	18	175	212	39	426
Virginia's Warbler*	29	23	7				6	9	10	35	32	17	84
Warbling Vireo*	64	88	9	1	8	1	3	6		68	102	10	180
Western Bluebird*	29	43	6	42	79	6	78	47	14	149	169	26	344
Western Kingbird					3		4			4	3		7
Western Meadowlark	5			8	25		36	34	17	49	59	17	125
Western Scrub-Jay*	29	48	11	33	29	12	43	59	33	105	136	56	297
Western Tanager	74	60	12	14	28	9	61	78	41	149	166	62	377
Western Wood-Pewee	16	22	2	40	20	1	65	56	39	121	98	42	261
White-breasted Nuthatch*	27	34	6	46	42	15	42	37	28	115	113	49	277
White-throated Swift*	5	13	1					1		5	14	1	20
Wild Turkey*	5						1	2	5	6	2	5	13
Williamson's Sapsucker*	35	21					2		1	37	21	1	59
Wilson's Warbler*				1			4	1		5	1		6
Yellow-rumped Warbler	49	93	1	6	2		30	23	5	85	118	6	209

[1]Due to differences in sample size, direct comparisons of total yearly counts should not be made.

Spring Monitoring (Wildlife 23, 25)

Teams from the Museum of Northern Arizona's Spring Stewardship Institute continued to collect survey data for springs on the Kaibab NF. Thirty surveys were completed in FY12, adding to the 36 surveys completed in FY11. Data collected at the surveyed springs included geomorphology, soils, vegetation, invertebrate diversity, flow, water quality, solar radiation, images, and an ecological assessment. Also in

2012, the Spring Stewardship Institute completed a report documenting these survey efforts and a database containing the survey data. This database will facilitate future springs monitoring on the Forest and provide a valuable tool for identifying management needs.

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

The California condor is known to forage on the Forest and the only successful nesting attempt recorded on the Forest occurred during the 2011 nesting season. 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. In FY12, wildlife staff on the South Zone surveyed five of six Mexican spotted owl protected activity centers (PACs) and detected owls in four PACs.

Other Wildlife Monitoring

Habitat use and roosting ecology of many bat species in Arizona is largely unknown. As a result, in 2012 the Kaibab NF engaged in a project aimed at verifying and ground-truthing all known or suspected bat roosts, assessing bat activity at roosts, and determining overall species diversity and habitat use on the Forest. In total, 16 caves and mines were surveyed on the South Zone. Four additional locations originally thought to be cave or mine structures but revealed to be other features were also surveyed. A total of 13 different bat species were detected using acoustical analysis and three species through one night of mist netting.

Additionally, Bat Conservation International deployed six data loggers in potential bat roosting habitat across the South Zone in spring of 2012. These data loggers are intended to collect environmental data (e.g. relative humidity and temperature) over the period of approximately one year. Data collected by these instruments is currently being summarized and will be used concurrently with other bat survey results.

Facilities/Roads

A total of 530 miles of roads were maintained to standards or improved throughout the Forest during FY12, representing an increase of 190 miles over the 340 miles maintained in FY11. 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 and cattle guards. These road treatments reduce the potential for erosion and sediment delivery to connected stream courses.

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