Kaibab National Forest

Forest Plan Monitoring Report

Fiscal Year 2015

All cover photos credit U.S. Forest Service, Southwestern Region, Kaibab National Forest. Clockwise from top left: mist netting bats, Mexican spotted owl, Arizona bugbane, AZ Bugbane monitoring, Aspen Field trip, Pottery sherd.

Introduction

This report documents monitoring activities and accomplishments for fiscal year (FY) 2015. This is the second monitoring report prepared using the Kaibab National Forest's revised Forest Plan, which went into effect in April of 2014. The new Forest Plan includes a new monitoring plan that was designed to inform progress toward desired conditions and achievement of objectives. Monitoring information enables the forest to evaluate the conditions and management actions and to identify any concerns that would trigger a change in management or prompt further investigation in support of adaptive management. Subsequent monitoring and analysis will enable the responsible official to determine if a change is needed in plan components or other plan content, including the monitoring plan, that guide management of resources in the plan area.

The Monitoring Plan can be found in Chapter 5 of the Kaibab Land and Resource Management Plan. It is organized by data acquisition method. Monitoring reports from previous years can be accessed at http://fs.usda.gov/goto/kaibab/planning or available on request.

Existing Sources

This section of the report draws upon data that the Kaibab NF or its partners already collect or report for other purposes. Much of these data are managed under the Natural Resource Manager system, a system of database tools for managing Agency data across the Forest Service. Natural Resource Manager includes Forest Service Activity Tracking System, Infrastructure, and the Natural Resource Information System databases, among others. Data routinely collected by the Arizona Department of Environmental Quality and Arizona Game and Fish Department are also accessed to answer Forest Plan Monitoring questions.

Monitoring Plan Question 15

How many acres were burned with desired and undesired fire behavior and effects?

Approximately 21,200 acres of desired fire effects were achieved with managed wildfire, with a total of 5 acres of undesirable (high burn severity). Managed wildfires are those where natural/lightning ignitions are managed to play their natural role in the ecosystem to achieve resource objectives. The managed wildfires were as follows:

Burnt Complex:	3,914 ac. (no high burn severity)
Jar Complex:	4,389 ac. (2 ac. of high burn severity) – total fire acres = 4,391
Locust:	3,279 ac. (3 ac. of high burn severity) – total fire acres = 3,282
Rock:	2,497 ac. (no high burn severity)
Spring:	7,111 ac. (no high burn severity)
Total	21,190 ac.

Monitoring Plan Question 16

How many acres were treated with mechanical thinning?

A total of 5,600 acres were treated with mechanical thinning. Projects included treatments in the Wildland Urban Interface, thinning from below, as well as grassland and aspen restoration.

Monitoring Plan Question 17
How many acres of conifer species were planted?

Conifers were planted on 485 acres on the North Kaibab Ranger District that previously had experienced high intensity stand replacement in the Warm Fire.

Monitoring Plan Question 18
What was the total area of aspen fenced?

Exclosure fences were constructed around 4.8 acres of aspen for browse protection and to stimulate sprouting.

Monitoring Plan Question 19
How many acres treated for conifer encroachment?

Conifers were removed on 238 acres to reduce competition and reduce stress to aspen clones on the Williams District.

Monitoring Plan Question 21
How many miles of fence were modified for pronghorn?

In FY 2015, approximately 7.5 miles of unneeded fence was removed, and approximately one mile was modified to better facilitate pronghorn movement.

Monitoring Plan Question 22
What was the acreage of outbreaks of insects and disease?

Table 1 displays the Forest Insect and Disease data (USDA Forest Service 2015) for activity detected on the Kaibab National Forest during 2015 aerial surveys.

Table 1. Acres of insect and disease activity on the Kaibab NF for FY 15.

Mortality Agent	2014	2015
Aspen defoliation	864	1664.38
Juniper from cedar & cypress bark beetles	1.5	0.5
Douglas-fir Beetle	7	49.65
Ponderosa ips	44	0
Spruce beetle	0.75	1.25
Western bark Beetle	129	2.25
Fir Engraver	N/A	35.43
Pinyon ips	N/A	4
Sudden Aspen Decline	N/A	62.58
Unknown Bark Beetle	N/A	2288.76

These data were collected by the Forest Service Southwestern Region, Forest Health Protection (FHP) Aerial Detection Survey (ADS). This dataset strives to maintain an accuracy, but due to the conditions under which the data is collected, there may be missing or inaccurate data. More

information about these data can be viewed at
http://www.fs.usda.gov/detail/r3/landmanagement/gis/?cid=stelprd3805189

Monitoring Plan Question 23
What is the estimated population trend of pronghorn?

These data were generated by the Arizona Game and Fish Department. Population trends for pronghorn were determined using several model inputs including: harvest, male: female ratios, young: female ratios, estimated mean, mortality rates, and estimated starting populations. The best model is estimated by adjusting estimated mortality rates or starting population so that the predicted male: female ratios from the models for each year match those that are based on the surveys.

Table 2. Trends in Pronghorn Populations for FY 15.

Unit	3-Year	10-Year
7	Stable	Stable
8	Stable	Increasing
9	Stable	Increasing
10	Increasing	Stable
12 A/B	Stable	Decreasing

Monitoring Plan Question 25
How many acres of invasive plants were treated?

Over 1,600 acres of weeds were treated, most of which was herbicide treatment of cheatgrass. Forty-three acres of Russian olive were treated in the Kanab Creek wilderness with a combination of cutting and herbicide, and over 400 acres of bull thistle was treated.

Monitoring Plan Question 27
How many acres of wetlands were restored?

Approximately 2 acres of wetlands were restored in FY15 in the Duck Lake area.

Monitoring Plan Question 28
Are there any water bodies not meeting Arizona water quality standards?

Lake monitoring of four lakes that serve as freshwater fisheries was completed in FY 15. The four lakes monitored were Kaibab Lake, Whitehorse Lake, Dogtown Reservoir, and Cataract Lake. No water quality concerns were found. All lakes were achieving ADEQ standards for designated uses. Water quality monitoring results are reported to ADEQ annually.

Monitoring Plan Question 32
How many acres of cultural resource surveys were conducted?

A total of 7,529 acres of cultural resource surveys were conducted in 2015, with 500 acres that were not project related.

Monitoring Plan Question 34
Have much wood was offered?

A total of 35,800 CCF of timber was sold from the Kaibab NF in FY 2015.

Personal and free-use firewood (for home heating and other purposes) totaled 12,146 cords, and 126 cords of ceremonial use firewood were provided for traditional and cultural purposes to Native Americans.

Interviews

Interviews are largely qualitative in nature and may be subjective. These may include questions posed to resource specialists or partners or during tribal discussions. Follow-up interpretation of the results is required to obtain information.

Monitoring Plan Question 47
Are plant species of known medicinal and cultural value being depleted?

Kaibab staff asked this question during consultation meetings with the Tribal representatives and cultural resource advisory teams. There were no concerns expressed about depletion of any specific culturally important plants, although there is an ongoing general concern about culturally important plants and interest in continuing dialogue and field trips to identify areas with culturally important plants.

Monitoring Plan Question 48
Were the monitoring requirements met as identified in the AZ Bugbane conservation agreement?

The conservation agreement is currently expired and in the process of being renewed. Monitoring protocols developed and implemented in FY 14 will likely be included in the new agreement. In FY 2015, a survey was conducted outside the Level I monitoring area, in a side drainage northwest of the Level I survey transect. A healthy population (500+ plants or groups/clusters of stems) was re-located (known from about in 1982). The population in the side drainage has varying canopy cover, from wide open where large white fir and aspen blowdown has occurred, to very dense canopied areas. There is also an area where locust is the dominate understory plant. The population is most vigorous (widest and tallest plants with the most reproductive stalks in the two areas shown on the map where canopy cover is greatly reduced.

Monitoring Plan Question 49
Were the monitoring requirements met as identified in the Pediocactus conservation agreement?

In 2015, NKRD personnel continued to use survey grade GPS and a total station to better inform current status on eight of the current monitoring plots and to monitor individual plants in the plots. Weekly monitoring that begins immediately after spring snow melt has improved detectability. Although these data have not been thoroughly analyzed, they indicate that the plant is much more numerous and widespread than indicated in previous monitoring. These data were instrumental in reaching consensus in the recently signed conservation agreement with the US Fish and Wildlife service. These data are not shared with the public as they provide very accurate locations for a species that is known to be poached and illegally sold.

Monitoring Plan Question 50
Were there any events or changed circumstances that would indicate a potential change to timber suitability?

Changes to timber suitability can occur through a project-level decision or policy change, or significantly altered circumstances. There were no such occurrences in FY15.

Intensive

Intensive monitoring informs the status of key ecological attributes for focal ecological resources at fine spatial scales or spatial resolution, although measurements in multiple locations can provide wide spatial coverage. Data sources might include simple to complex field-based metrics that are usually quantitative and collected within a statistical sampling design. Examples include surveys of birds to assess density levels, analyses involving specific soil and water chemistry parameters, and quantitative vegetation structure measurements.

Monitoring Plan Question 52
What is the functional condition of lakes and wetlands on the Kaibab National Forest?

Eight wetland areas were monitored in in FY 15. These "lakes" were also monitored in 1990, and 2008, which allow for long term comparison. All eight lakes were in proper functioning condition. The inventories were conducted by the Springs Stewardship Institute through a cost-share agreement. A detailed report and updated geodatabase was provided to the Kaibab NF as part of the final deliverables. The assessment identified management needs for fence maintenance/ reconstruction and for the removal of trees encroaching into the area. Details of the eight wetland inventories for FY 2015 can be found in Appendix A. The complete springs inventory database is available on the Springs Stewardship Institute website available at:
http://springstewardshipinstitute.org/about-the-database

Monitoring Plan Question 53

In treated/protected areas are water flow patterns and vegetation intact?

Informal monitoring was conducted on a spring that had restoration work done in 2104. A follow-up visits in FY15 indicated that native vegetation and water flow were improved. The survey noted that there was a need for follow up treatments of noxious weeds and patrols in the area to prevent recreation related resource impacts.

Monitoring Plan Question 54
What is the estimated population trend for Graces warbler, western bluebird and ruby-crowned kinglet?

The Kaibab NF continued its multiyear project with Rocky Mountain Bird Observatory (RMBO) 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 on the 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. Stratification by elevation allows for adjusting sampling intensity to target management indicator species (MIS) on the Forest.

Results for Kaibab National Forest was obtained by compiling and jointly analyzing data from two strata. The stratum was split into two strata based on elevation prior to the 2012 field season. Stratification by elevation allows for adjusting sampling intensity to target different Management Indicator Species on the Forest.

Field technicians completed all 21 planned surveys (100%) in 2015. Technicians conducted 273 point counts within the 21 surveyed grid cells between 5 May and 20 June. They detected 107 bird species, including all three Management Indicator Species. Bird Conservancy estimated densities and population sizes for 86 species. The data yielded robust density estimates (CV < 50%) for 42 of these species.

Bird Conservancy estimated the proportion of 1 km2 grid cells occupied (Psi) throughout Kaibab National Forest for 83 species, 3 of which are priority species. The data yielded robust occupancy estimates (CV < 50%) for 48 of these species.

The data collected by the RMBO is located in the Rocky Mountain Avian Data Center, http://rmbo.org/v3/avian/Home.aspx. This data is used to help determine population trends. As noted above a CV less than 50% show that the enough data was collected to have a robust estimate for the species for either density or occupancy. The lower the CV percentage the more robust is the data. Starting with the 2010 survey data the RMBO was able to do estimated proportion of transects (Psi) occupied by species. A Psi estimate equal to 1 indicates the species was detected on all transects surveyed (White et al. 2011).

Table 3. Proportion of occupancy for Graces Warbler 2010-2015

Year	Psi	Transects	SE	% CV
2010	0.425	19	0.052	12
2011	0.446	20	0.074	17
2012	0.437	7	0.109	25
2013	0.406	11	0.085	21
2014	0.49	22	0.054	11
2015	0.415	10	0.08	19

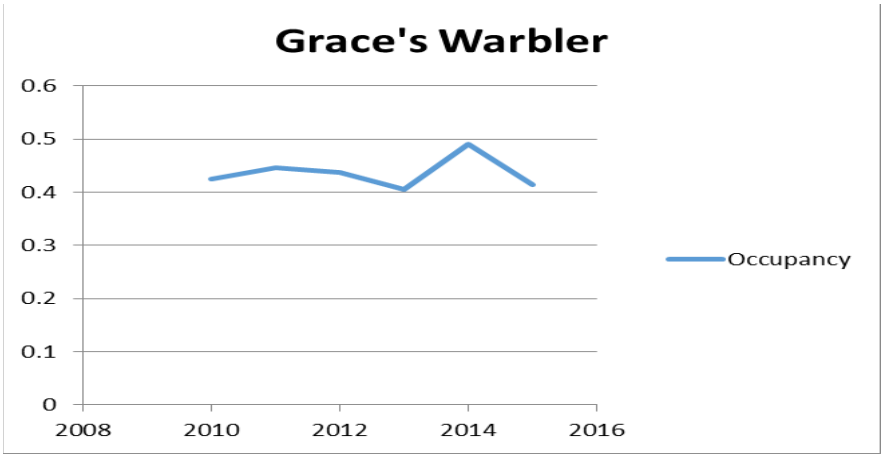

Figure 1. Proportion of occupancy for Graces Warbler 2010-2015

Table 4. Proportion of occupancy for Ruby crowned kinglet 2010-2015

Year	Psi	Transects	SE	% CV
2010	0.113	5	0.046	41
2011	0.089	4	0.042	48
2013	0.039	1	0.038	97
2014	0.089	4	0.042	47
2015	0.128	3	0.067	52

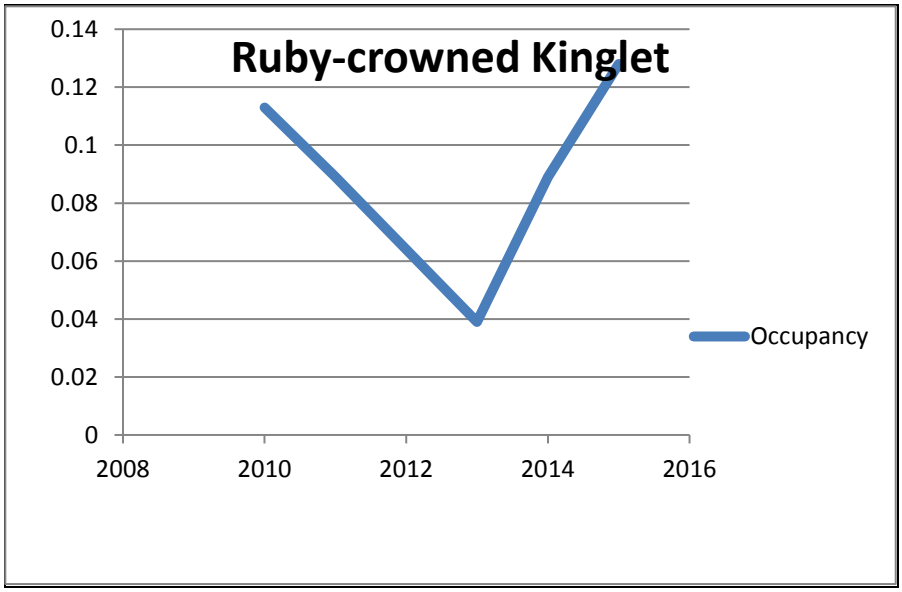

Figure 2. Proportion of occupancy for ruby-crowned kinglet 2010-2015

Table 5. Proportion of occupancy for western bluebird 2010-2015

Year	Psi	Transects	SE	% CV
2010	0.626	25	0.081	13
2011	0.806	33	0.071	9
2012	0.811	12	0.163	20
2013	0.387	10	0.089	23
2014	0.652	27	0.074	11
2015	0.335	8	0.084	25

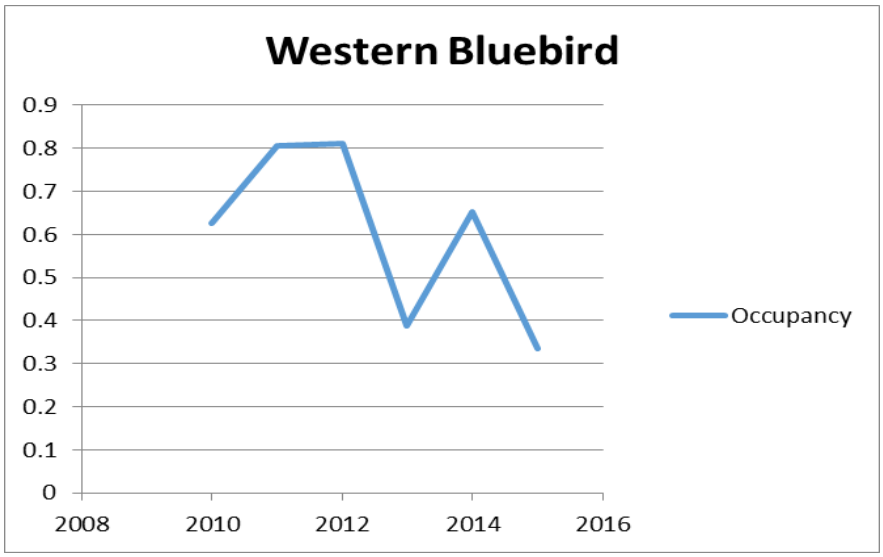

Figure 3. Proportion of occupancy for western bluebird 2010-2015

Monitoring Plan Question 55
Are Mexican spotted owls present in PACs?

This section summarizes the 2015 Mexican spotted owl monitoring efforts. There are seven designated Mexican spotted owl Protected Activity Centers (PAC) on the Kaibab National Forest, all on the Williams Ranger District. All seven PAC's were monitored during the 2015 field season. Mexican spotted owls were detected in 4 of the seven PACs.

Survey methods described in the 2012 U.S. Fish and Wildlife Service Mexican spotted owl survey protocol were used. Surveyors imitated the four-note call as the primary call but occasionally the bark series or contact call was used. All surveys were initiated at sunset. Monitoring was conducted in all PAC's

Big Spring PAC

The Big Spring PAC was surveyed on 4-21. A male MSO responded 14 minutes after calling was initiated. No daytime follow-ups and no further surveys were conducted.

Bill Williams PAC

The Bill Williams PAC was surveyed on 5-11, 6-2, and 6-23 at 6 calling stations. No Mexican spotted owls were detected. The PAC was not surveyed to protocol.

Bear Tank No. 2 PAC

The Bear Tank No. 2 PAC was surveyed on 6-1. A male and sub-adult female responded 3 and 9 minutes, respectively, into calling. The owls were moused during a daytime follow-up. Three minutes after mousing was initiated the female sub-adult took and consumed one mouse. No additional mice were taken. The PAC was again called on 6-15 with the intent of locating owls for another daytime follow-up. The pair was located in the same location as 1st visit; however, the daytime follow-up was not conducted. No further monitoring was conducted.

Kendrick PAC

The Kendrick PAC was surveyed on 5-8 at one call station. A female and female responded 2 minutes after calling was initiated. No daytime follow-ups and no further surveys were conducted.

Pumpkin PAC

The Pumpkin PAC was surveyed on 6-3 at 4 call stations. No Mexican spotted owls were detected and no further surveys were conducted. The PAC was not surveyed to protocol.

Sitgreaves PAC

The Sitgreaves PAC was surveyed on 5-19. We called continuously throughout the entire nest core and down the canyon (approximately 1 mile). No Mexican spotted owls were detected. The PAC was not surveyed to protocol.

Tule PAC

The Tule PAC was surveyed on 4-28. A male and female responded 4 minutes after calling was initiated. No daytime follow-up and no further surveys were conducted.

Monitoring Plan Question 57
What is the population trend of Pediocactus peeblesianus var. fickeisenii?

Pediocactus peeblesianus var. fickeisenii is a Candidate species. In FY 2015, the Kaibab continued a systematic inventory using a total station to establish a baseline understanding of population sizes and distributions. Many new plants were found in areas known to be occupied. Searches of similar habitat in other locations did not yield new populations. Repeat visits will be conducted inform population trends over time.

References

USDA Forest Service. 2015. Forest insect and disease conditions in the Southwestern Region, 2015.
Region 3: Albuquerque, NM.

USDI Fish and Wildlife Service (USFWS). 2012. Recovery Plan for the Mexican Spotted owl (*Strix occidentalis lucida*), First Revision. USFWS, Albuquerque, New Mexico USA. 414 pp. Available at http://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/MSO/2012MSO_Recovery_Plan_Firs

APPENDIX A. Kaibab National Forest Wetland Inventories for Proper Functioning Condition

Submitted April 27, 2016 by Springs Stewardship Institute

1. Bear Lake

Survey Summary Report, Site ID 322

Location: The Bear Lake ecosystem is located in Coconino County in the Grand Canyon Arizona 15010002 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.37138, -112.14729 in the Kanabownits Spring USGS Quad, measured using a GPS (NAD83). The elevation is approximately 2775 meters. The meadows survey team surveyed the site on 6/25/15 for 01:30 hours, beginning at 8:45, and collected data in 3 of 12 categories using PFC protocols.

Fig 1.1 Bear Lake.

Physical Description: Bear Lake is a limnocrene feature that, according to Larry Stevens, this lake may be an ephemeral groundwater-dependent system. Bear Lake emerges as a seepage or filtration spring from the Kaibab Limestone, a sedimentary, limestone rock layer. The emergence environment is subaqueous-lentic freshwater, with a gravity flow force mechanism. The distance to the nearest spring is 806 meters. The site receives approximately 92% of available solar radiation, with 6902 Mj annually.

Survey Notes: Hydrarch succession has occurred over the past 15 years, with loss of open water. Adjacent Populus and Picea have suffered.

Fauna: Surveyors collected or observed 2 terrestrial invertebrates specimens.

Table 1.1 Bear Lake Invertebrates.

Species	Lifestage	Habitat	Method	Rep#	Count	Species detail
Coleoptera Carabidae	Ad	T			1	
Hymenoptera Formicidae	Ad	T			1	

2. Crane Lake

Survey Summary Report, Site ID 330

Location: The Crane Lake ecosystem is located in Coconino County in the Lower Colorado-Marble Canyon Arizona 15010001 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.52992, -112.14908 in the Telephone Hill USGS Quad, measured using a GPS (NAD83). The elevation is approximately 2605 meters. The meadows survey crew surveyed the site on 6/25/15, and collected data in 4 of 12 categories using PFC protocols.

Fig 2.1 Crane Lake.

Physical Description: Crane Lake is a limnocrene feature that, according to Larry Stevens, may not be groundwater-dependent. It is ephemeral, as it dried up in 2000 and 2002. If it is a spring, it appears to discharge directly into the lake. There is evidence of overflow into the depression next to the lake, but no outflow channel.

Crane Lake emerges as a seepage or filtration spring from the Kaibab Limestone, a sedimentary, limestone rock layer. The emergence environment is subaqueous-lentic freshwater, with a gravity flow force mechanism. The distance to the nearest spring is 4373 meters. The site receives approximately 97% of available solar radiation, with 7234 Mj annually.

Fauna: Surveyors collected or observed 2 aquatic and 7 terrestrial invertebrates and 1 vertebrate specimens.

Table 2.1 Crane Lake Invertebrates.

Species	Lifestage	Habitat	Method	Rep#	Count	Species detail
Coleoptera	Ad				1	
Coleoptera Carabidae	Ad	T			1	
Coleoptera Chrysomelidae	Ad	T			1	
Coleoptera Dytiscidae	Ad	A			1	
Coleoptera Silphidae	Ad	T			1	
Diptera Asilidae	Ad	T			1	
Hemiptera	Ad	T			1	
Hemiptera Saldidae	Ad	A			1	
Hymenoptera	Ad	T			1	
Odonata	Ad	T			1	

Table 2.2 Crane Lake Vertebrates.

Species Common Name	Count	Detection
Terrestrial Gartersnake	1	Obs (photo)

3. Deer Lake
Survey Summary Report, Site ID 2

Location: The Deer Lake ecosystem is located in Coconino County in the Lower Colorado-Marble Canyon Arizona 15010001 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.40204, -112.13059 in the De Motte Park USGS Quad, measured using a GPS (NAD83). The elevation is approximately 2657 meters. The meadows survey crew surveyed the site on 6/25/15 for 01:45 hours, beginning at 11:00, and collected data in 3 of 12 categories using PFC protocols.

Fig 3.1 Deer Lake.

Physical Description: Deer Lake is a limnocrene feature that, according to Larry Stevens, may not be groundwater-dependent. Deer Lake is located in the Toroweap, a sedimentary, limestone rock layer. The emergence environment is subaerial. The distance to the nearest spring is 4099 meters. The site receives approximately 98% of available solar radiation, with 7309 Mj annually.

Survey Notes: This site, aside from road effects, appears to be in good condition with little evidence of impairment.

Fauna: Surveyors collected or observed 5 terrestrial invertebrates specimens.

Table 3.1 Deer Lake Invertebrates.

Species	Lifestage	Habitat	Method	Rep#	Count	Species detail
Coleoptera Cantharidae	Ad	T			1	
Coleoptera Carabidae	Ad	T			1	
Coleoptera Chrysomelidae	Ad	T			1	
Coleoptera Coccinellidae	Ad	T			1	
Diptera	Ad	T			1	

4. Dog Lake
Survey Summary Report, Site ID 280

Location: The Dog Lake ecosystem is located in Coconino County in the Lower Colorado-Marble Canyon Arizona 15010001 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.38890, -112.09665 in the Dog Point USGS Quad, measured using a GPS (NAD83). The elevation is approximately 2682 meters. Larry Stevens and Jeri Ledbetter surveyed the site on 8/22/15, and collected data in 4 of 12 categories using PFC protocols.

Fig 4.1 Dog Lake.

Physical Description: Dog Lake is a limnocrene feature that, according to Larry Stevens, may not be groundwater-dependent. Dog Lake is located in the Kaibab Limestone, a sedimentary, limestone rock layer. The emergence environment is subaerial. The distance to the nearest spring is 83 meters. The site receives approximately 85% of available solar radiation, with 6170 Mj annually.

Survey Notes: Large woody debris is abundant, offering lots of structure for wildlife. There were old deer blinds and a salt lick. Aspen is recruiting into pond margins. Fencing is in need

of repair. An excavated area, possibly dug by deer (another salt lick?) should be backfilled, and salt lick used to bait deer should be removed.

Fauna: Surveyors collected or observed 1 aquatic and 1 terrestrial invertebrates and 14 vertebrate specimens.

Table 4.1 Dog Lake Invertebrates.

Species	Lifestage	Habitat	Method	Rep#	Count	Species detail
Odonata Aeshnidae Rhionaeschna multicolor	L	A	Spot		1	
Odonata Aeshnidae Rhionaeschna multicolor	Ad	T	Spot			many

Table 4.2 Dog Lake Vertebrates.

Species Common Name	Count	Detection
Yellow-rumped Warbler	1	obs
Yellow Warbler	1	obs
Violet-green Swallow	2	obs
Flycatcher	1	obs
Mountain Chickadee	2	obs
Dark-eyed Junco	6	obs
Vole		sign
Northern Flicker	1	obs
Red Squirrel	2	call
Red-breasted Nuthatch	1	call
Acorn Woodpecker	1	obs
Rufous Hummingbird	1	obs
Common Raven		call
Clark's Nutcracker		call

5. Franks Lake
Survey Summary Report, Site ID 726

Location: The Franks Lake ecosystem is located in Coconino County in the Kanab Arizona, Utah 15010003 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.51355, -112.18267 in the Telephone Hill USGS Quad, measured using a GPS (WGS84, estimated position error 3 meters). The elevation is approximately 2636 meters. Larry Stevens and Jeri Ledbetter surveyed the site on 8/21/15 for 01:15 hours, beginning at 12:15, and collected data in 5 of 12 categories using PFC protocols.

Fig 5.1 Franks Lake

Physical Description: Franks Lake is a limnocrene spring that emerges in a lake and a surrounding meadow. Franks Lake emerges from the Kaibab Limestone, a sedimentary, limestone rock layer. The emergence environment is subaqueous-lentic freshwater, with a gravity flow force mechanism. The distance to the nearest spring is 4373 meters.

Survey Notes: There are three pools of open water that appear to be perennial. There are no conspicuous signs of grazing or herbivory. There is a lot of evidence of pocket gophers, and some old fencing is present with evidence that some has been partly removed. Surveyors

conducted a partial Stevens et al. Level 2 survey as well as PFC lentic survey.

Flora: Surveyors identified 9 plant species at the site. These included 6 native and 3 nonnative species.

Table 5.1 Franks Lake Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	6	4
Shrub	0	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	1	1
Non-vascular	0	0

Table 5.2 Franks Lake Vegetation % Cover in Microhabitats.

Species	Cover Code	Native Status	Wetland Status	X
Achillea millefolium	GC	NI	U	0
Carex				0
Carex aquatilis	GC	N	W	0
Eleocharis	GC	N	W	0
Epilobium ciliatum	GC	N	W	0
Poa pratensis	GC	NI	F	0
Potamogeton	AQ		A	0
Riccia				0
Typha domingensis	GC	N	A	0

Fauna: Surveyors collected or observed 2 terrestrial invertebrates and 9 vertebrate specimens.

Table 5.3 Franks Lake Invertebrates.

Species	Lifestage	Habitat	Method	Rep#	Count	Species detail
Odonata Aeshnidae Rhionaeschna multicolor	Ad	T	Spot			many
Odonata Lestidae	Ad	T	Spot			

Table 5.4 Franks Lake Vertebrates.

Species Common Name	Count	Detection
sharp-shinned hawk	1	obs
northern flicker	1	call
red-tailed hawk	1	obs
violet-green swallow	1	obs
Common raven	2	obs
pocket gopher		sign

Species Common Name	Count	Detection
deer		sign
salamander	1	obs
red squirrel		call

Fig 5.2 Franks Lake.

6. Lookout Lakes
Survey Summary Report, Site ID 673

Location: The Lookout Lakes ecosystem is located in Coconino County in the Kanab Arizona, Utah 15010003 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.46513, -112.18661 in the De Motte Park USGS Quad, measured using a map (NAD83). The elevation is approximately 2668 meters. Larry Stevens and Jeri Ledbetter surveyed the site on 8/21/15 for 00:30 hours, beginning at 16:15, and collected data in 2 of 12 categories using PFC protocols.

Fig 6.1 Lookout Lakes: Lookout Lakes 1

Physical Description: Lookout Lakes is a limnocrene spring. This site is not referred to as a spring on any other layer, but was included in the Brown and Moran study as a spring. It is a perennial pond that may be spring supported and is located in a natural depression on the surface of the Kaibab limestone.

Lookout Lakes emerges as a seepage or filtration spring from the Kaibab Limestone, a sedimentary, limestone rock layer. The emergence environment is subaerial, with a gravity

flow force mechanism. The distance to the nearest spring is 2404 meters. The site receives approximately 100% of available solar radiation, with 7314 Mj annually.

Survey Notes: Ungulate beds were found at the site. The fence was down in several places. There was little evidence of recent grazing or trampling. Less water is found than in previous surveys, and vegetation is overgrown.

7. Oquer Lake
Survey Summary Report, Site ID 179875

Location: The Oquer Lake ecosystem is located in Coconino County in the Kanab Arizona, Utah 15010003 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.50022, -112.22298 in the Big Springs USGS Quad (WGS84). Larry Stevens and Jeri Ledbetter surveyed the site on 8/21/15 for 00:30 hours, beginning at 15:15, and collected data in 1 of 12 categories using PFC protocols.

Fig 7.1 Oquer Lake

Physical Description: Oquer Lake is a natural wetland.

Survey Notes: Seventeen domestic cattle were inside the fence when surveyors arrived, but soon left. Townsend solitaire and house wren were also observed. The site is heavily trampled with old and fresh cow feces.

Fauna: Surveyors collected or observed 3 vertebrate specimens.

Table 7.1 Oquer Lake Vertebrates.

Species Common Name	Count	Detection
Domestic Cow	17	obs
Townsend's Solitaire	1	obs
House Wren	1	obs

8. VT Lake

Survey Summary Report, Site ID 17947

Location: The VT Lake ecosystem is located in Coconino County in the Kanab Arizona, Utah 15010003 HUC, managed by the US Forest Service. The spring is located in the North Kaibab RD, Kaibab NF at 36.44721, -112.12753 in the Dog Point USGS Quad, measured using a GPS (NAD83). The elevation is approximately 2689 meters. Larry Stevens and Jeri Ledbetter surveyed the site on 8/22/15 for 01:15 hours, beginning at 9:15, and collected data in 3 of 12 categories using PFC protocols.

Fig 8.1 VT Lake.

Physical Description: VT Lake is a limnocrene spring. This is depicted on the DRG as a lake; however, the survey crew suspected that it is heavily influenced by groundwater after examination of the surrounding soils and water table. On 8/22/2015, the survey crew noted this site as a lacustrine/palustrine wetland near Hwy 69. The site is surrounded by spruce and aspen.

VT Lake emerges as a seepage or filtration spring from the Kaibab Limestone, a sedimentary, limestone rock layer. The emergence environment is subaqueous-lentic freshwater, with a gravity flow force mechanism. The distance to the nearest spring is 6258 meters. The site receives approximately 100% of available solar radiation, with 6779 Mj annually.

Survey Notes: The protective fencing at the site was down in places, and more trampling and trail creation was evident compared to previous surveys. There was no open water at the time of the survey due to growth of Potamogeton.

Fauna: Surveyors collected or observed 9 vertebrate specimens.

Table 8.1 VT Lake Vertebrates.

Species Common Name	Count	Detection
warbler		obs
Clarks nutcracker		call
White-breasted nuthatch		call
mountain chickadee		call
mule deer		sign
gopher		sign
woodpecker		call
turkey vulture		obs
red squirrel		obs

Fig 8.2 VT Lake: soil pit location