

## **CHAPTER 3: AFFECTED ENVIRONMENT**

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This chapter describes the physical, biological, social, and economic environments of the project area that would affect or that would be affected by the alternatives if they were implemented. In conjunction with the description of Alternative A (No Graze) and Alternative B (No Change), in Chapter 2 and with the predicted effects of these alternatives in Chapter 4, this chapter establishes the baseline against which the decision maker and the public can compare the effects of all action alternatives.

This chapter summarizes the specialist reports located in the Project Record at the Mogollon Rim Ranger Station [#21-33, 72, 73, 74, 76, 80, 101, 104]. Each specialist report gives much more detail on the existing conditions on the allotment, including information on surveys of the allotment. They reference other reports, journal articles, and databases.

### **HISTORY OF HUMAN USE AND CULTURAL RESOURCES** **(Cultural Resources Report [#33, #80])**

The Buck Springs Allotment falls within the East Clear Creek Watershed. Approximately 5% (3770 acres) has been intensively surveyed for prior projects, recording 28 archaeological sites within the allotment.

An overview of the area and surrounding areas indicates that the known sites represent a fairly typical cross section of the Sinagua settlement pattern. Site types include artifact scatters, field houses, farmsteads, villages, and community centers. A small amount of Archaic Period lithic scatters suggests early utilization during the Middle and Late Archaic Periods of ca. 5000 BC to AD 500. The major prehistoric occupation of the allotment area represents the Sinagua from around AD 700 to about AD 1450.

After 1450 and an apparent abandonment of the area by the prehistoric puebloan peoples, lithic scatters, roasting pits, and petroglyphs indicate utilization of the area by the Hopi, Yavapai, and the Pine Mountain Band of the Northern Tonto Apache, with possible sporadic use by the Navajo and Hualapai. Euroamerican use of the allotment is primarily related to ranching and logging, starting in the 1880's but being most important since the 1920's. The many springs and meadows in the area attracted early settlers.

The General Crook Trail was established in 1871, and provided access between Fort Apache on the east and Fort Verde on the west. The Battle of Big Dry Wash between the Apache scouts and the US Cavalry in 1882 was a prominent historic event that took place with the allotment from General Springs to Rock Crossing. Historic battleground markers mark these areas.

### **RANGELAND MANAGEMENT** **(Range Specialist's Report [#21])**

## **Livestock Management**

Currently the allotment is managed at Level D (see Chapter 1). Full capacity lands are considered the upland areas of the allotment, where slopes are less than 40%, and forage is at least 100 pounds per acre. Potential capacity areas are those with impaired soils. There are approximately 51,900 acres of full capacity lands, and 2,000 acres of potential capacity, with another 2,500 acres in livestock enclosures.

The current permit allows for 746 cows with calves, or 1065 mid-weight yearlings. Actual use between 1992 and 1998 ranged from 96% of permitted numbers (1992) to 60% (1993) and from 100% (1997) to 18% (1998). The entire allotment was rested in 2002 due to drought conditions. Changes in use were based on resource concerns that include impacts to the Little Colorado spinedace, watershed conditions, and drought, as well as economic considerations of the rancher. Current management can be summarized as a deferred-rest-rotation grazing scheme. Occasionally some pastures are rested yearlong.

The Buck Springs Range Allotment is a combination of the former Buck Springs Allotment (Allotment Management Plan (AMP), USDA 1988), and the Battleground/Pinchot Allotment (USDA 1986). In 1990, the two allotments were consolidated with a permit for 746 head cattle and 8 horses, to be run together from May 15 to October 15 each year. Much of the information on the allotment is described in three sub-units known as the Buck Springs Unit, the Battleground Unit, and the Pinchot Unit.

The allotment is divided into 14 pastures, 3 riparian pastures (livestock excluded), and 6 horse pastures for a total of 23 pastures. Several large pastures have an uneven grazing distribution, resulting in patterns of overuse and underuse of forage in uplands, especially in North and North Battleground Pastures. The presence of highly palatable, non-native grass species, such as orchard-grass, results in overuse of this resource. Native Arizona fescue dominates some areas. Some conflicts occur between livestock and recreationists (livestock use of trails; fences affect recreation access; livestock in campgrounds). The entire allotment is within one mile of water. The current 90 miles of fences require constant maintenance for reasons such as terrain, elk, treefall, and snowpack. Large investments of time and money are needed to keep fences in a functioning condition.

Recent and historical overuse in riparian areas and meadows from combined livestock and elk grazing has resulted in impaired riparian and meadow functioning (Haines 1993). The 1998 Proper Functioning Condition Assessment identified 14 miles of nonfunctional riparian streams and 34 miles of functional at-risk streams. The Terrestrial Ecosystem Survey of 1987-1991 identified 412 acres of unsatisfactory soil conditions (all meadows) and 2100 acres of impaired soil conditions on the allotment. Meadow surveys conducted in 1995 found large amounts of bare ground, a lack of litter, and a lack of vegetative diversity. Riparian pastures (totaling about 2900 acres) include approximately 230 acres of meadows and are currently rested from livestock grazing. Seven large elk enclosures, totaling about 15 acres, are located within headwater meadows in Upper Buck Springs, Merritt Draw, Houston Draw, Whistling Springs, General Springs, McClintock Springs, and Kinder Draw.

Three of these enclosures have been in place for 10 or more years, and demonstrate how the meadows can be restored when rested from both wildlife and livestock grazing [#22, 24].

Recent consultations on impacts to threatened and endangered species and their habitats within the allotment resulted in the implementation of projects to control livestock distribution (implementation dates are in parentheses):

- 1) The construction of 3/4 mile of drift fence in the North Battleground Pasture to restrict livestock access into Blue Ridge Reservoir (East Clear Creek, constructed 1999);
- 2) Complete rest from livestock grazing in the Knolls Pasture from 1998 through 2002;
- 3) Elimination of livestock access to the portion of East Clear Creek above Jones Crossing in McCarty Pasture (potential spinedace habitat, fence constructed 2000);
- 4) Construction of elk enclosures at Whistling Springs (Merritt Riparian Pasture), General Springs (South Battleground Pasture), and Kinder Draw (Kinder Riparian Pasture) (summer 2000); and a temporary livestock enclosure around sensitive areas in association with an elk/livestock enclosure at General Springs (summer 2001).

## **Range Condition**

Range condition is "...the present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of a climax plant community for the site" (USDA Rangeland Analysis and Management Training Guide 1997). The terms used to describe range conditions, excellent, good, fair, and poor are defined in terms of providing forage for livestock and do not assess conditions for many species of wildlife (Kie et al. 1994).

Range condition, as measured by the Parker Three-Step or other methods, should be monitored on a periodic schedule, ideally every 10 years or so. The method has been conducted on the three Management Units of the Allotment at differing intervals.

The Parker Three Step Clusters are made up of several transects. Each transect samples a 50 by 150 foot plot. The information gathered for each transect is accurate only within the 50 to 150 foot plot. It is impossible to install sufficient numbers of clusters across each pasture so as to make site-specific determinations of range condition, using only transect data. Range conservationists use the information gathered from the Clusters to train their eyes so that they can make ocular estimates of conditions over much larger areas.

The Forest Service evaluates overall conditions across pastures through subjective evaluations, along with how these conditions change over time. Using these evaluations on a pasture level and incorporating vegetative trend data from all of the Parker Three Step

Clusters across the allotment, personnel estimate that trends on the Buck Springs Allotment are static or that there is no apparent upward or downward trend.

Trends are generally tied to management, and one would expect to see indicators that trends are either generally up or down. On the Buck Springs Allotment, management has been variable every year for at least the last 11-12 years for pasture use, rest, and numbers, making it very difficult to tie conditions to management strategies.

There are several factors that influence current range conditions on the Buck Springs Allotment:

- Numbers of cattle and timing and length of use has varied on the different Management Units, both before and after they were combined into the Buck Springs Allotment.
- Topography complicates livestock management. North-south ridges separated by canyons characterize the allotment, and the vegetation varies from thick mixed-conifer stands interspersed with headwater meadows on the south to more open ponderosa pine stands to the north.
- Vegetation changes have occurred over time. Forest canopy closures in the ponderosa pine and mixed conifer vegetation types have increased since the clusters were read in the 1960's through the 1980's [#72]. Increases in canopy result in decreases in understory and poor vegetation scores.
- Elk populations have dramatically increased since the mid-1970's [#24]. Areas that are rested from livestock grazing often experience heavy grazing by these large ungulates, especially meadows and riparian areas.

The Battleground and Pinchot Units were read in 1963, 1989, and 1998 (most recently 9 years apart). The Buck Springs Unit was read in 1962, 1977, and 1998 (most recently 21 years apart). Vegetation and soil stability condition ratings were compared between monitoring periods (Table 3). Overall, 1998 vegetation ratings indicate that 31% of the clusters rated as poor range condition, 38% as fair range condition 25% as good range condition, and 6% as excellent range condition. Soils stability ratings indicate that 0% of the clusters rated as poor, 19% as fair, 75% as good, and 6% as excellent range condition. Incorporating visual estimates throughout the allotment and comparing these to earlier ratings, the scores show either a static condition, or no apparent trend.

In the 21 years since the clusters were read in the Buck Springs Unit, elk populations have increased dramatically [#24]. The 1989 summary for the Battleground and Pinchot Units noted that the non-native cool-season species were being impacted heavily by elk.

Range inspection reports since 1989 have noted consistently high utilization in meadows and on the seeded cool-season species on the ridges across the entire allotment, whether cattle were in the pasture or not [#21].

**Table 3: Current range resource condition ratings -Summary of 1998 Parker Three-Step-Data for vegetation and soil stability.**

MANAGEMENT UNIT	PASTURE	CURRENT AND PREVIOUS YEAR READ	CLUSTER NO.	VEGETATION TYPE	VEG SCORE/RATING 1998/PREVIOUS	SOIL STABILITY RATING 1998/PREVIOUS
Battleground	Kinder Riparian	1998 1989	C1	PP/ bunchgrass	Fair/ Fair	Fair/ Fair
	McCarty	1998 1989	C2	MC/ bunchgrass	Poor/ Poor	Fair/ Fair
	McCarty	1998 1989	C3	Bluegrass meadow	Poor/ Poor	Fair/ Fair
	South Battleground	1998 1989	C4	PP/ bunchgrass	Fair/ Fair	Good/ Good
	North Battleground	1998 1989	C5	PP/ bunchgrass	Fair/ Poor	Good/ Excellent
Pinchot	North Pinchot	1998 1989	C1	PP/ bunchgrass	Good/ Fair	Good/ Fair
	South Pinchot	1998 1989	C2	PP/ bunchgrass	Fair/ Good	Excellent/ Excellent
	South Pinchot	1998 1989	C3	PP/ bunchgrass	Good/ Excel.	Good/ Good
	North Pinchot	1998 1989	C4	PP/ bunchgrass	Poor/ Fair	Good/ Excellent
	North Pinchot	1998 1989	C5	PP/ bunchgrass	Fair/ Poor	Good/ Excellent
Buck Springs	McClintock	1998 1977	C1	Bluegrass meadow	Fair/ Good	Good/ Good
	McClintock	1998 1977	C2	Bluegrass meadow	Poor/ Good	Good/ Good
	S. Buck Spr. Exclosure	1998 1977	C3	Bluegrass meadow	Good/ Good	Good/ Good
	North	1998 1977	C4	PP/ bunchgrass	Good/ Good	Good/ Good
	Knolls (North)	1998 1977	C6	PP/ bunchgrass	Poor/ Fair	Good/ Good
	Knolls (South)	1998 1977	C7	MC/ bunchgrass	Fair/ Good	Good/ Good

The South Buck Springs Enclosure excludes livestock grazing while allowing elk grazing. The cluster located in the enclosure indicates that conditions have remained static, and that elk grazing has limited improvement in conditions. Current efforts by Arizona Game and Fish Department to reduce the elk population through increased hunting pressure, and Forest Service efforts to promote better control over livestock distribution and grazing pressure are expected to result in improving conditions over the long term.

### Grazing Capacity

An analysis of forage production, forage use by livestock and wildlife, and proposed livestock numbers indicate that the current permitted numbers are within the capacity of the allotment (Table 4). The analysis used forage production and steepness of slopes to determine capacity. The analysis assumes that all acres with greater than 40% slopes are not available for livestock use and all acres with impaired or unsatisfactory soils or less than 100 pounds of forage per acre do not provide forage for livestock, as recommended by the Rangeland Analysis and Management Training Handbook (USDA 1997) [#21f].

Table 4 displays the forage requirements for livestock and wildlife, the forage available on the allotment and the percent utilization that would occur on the allotment with the current numbers of livestock and wildlife. These figures indicate that the current permitted numbers can be accommodated on the allotment in normal years, with a utilization standard of 35%. However, these numbers do not illustrate current problems with over- and under-utilized areas of the allotment due to distribution problems and the disproportionate grazing that occurs in meadows and riparian areas.

**Table 4: Estimated forage availability and use by livestock and wildlife under current management with 746 cow/calf pairs.**

	<b>LIVESTOCK</b>	<b>WILDLIFE</b>
<b>FORAGE REQUIRED</b>	3,942,562 lbs	1,300,000 lbs
<b>FORAGE AVAILABLE</b>	15,024,166 lbs	17,851,530 lbs
<b>ESTIMATE OF FORAGE USE</b>	26.2%	7.3%

Estimated forage production data were taken from each TES soil mapping unit that occurs within the allotment. This information was adjusted through site-specific measurements of forage production taken in 1998 and 1999, and resulted in an estimate of approximately 17,851,530 pounds of forage on the allotment (Table 5). Approximately 15,024,160 pounds of forage are available to livestock outside of livestock enclosures, and in grazed areas under the assumption that acres with impaired and unsatisfactory soils, slopes over 40%, and acres with less than 100 pounds of forage per acre are not available. In addition, the total forage

remaining for livestock includes a reduction of 10%, as recommended by the Rangeland Analysis and Management Training Guide (USDA 1997).

**Table 5: Acres, dominant vegetation type, average slope, and pounds of forage per pasture for the entire analysis area.**

PASTURE	ACRES	VEGETATION TYPE	SLOPE	FORAGE AVAILABLE LIVESTOCK (lbs.)	TOTAL FORAGE (lbs.)
Aspen Springs	472	PP	0-40%	0	151,167
Burn	639	PP	15-40%	205,973	232,074
Dines	1105	PP	15-40%	299,105	324,861
Dines Tank Exclosure	32	PP	15-40%	0	8268
Genes	68	PP	0-20%	22,576	24,256
Jumbo	1541	PP	0-30%	610,917	614,269
Kinder	1355	PP	0-60%	0	504,572
Knoll Lake CG	191		0-25%	0	36,965
Knolls	11932	PP & MC	0-40	2,389,928	2,612,089
Lane	83	PP	0-20%	28,686	31,150
Limestone	172	PP	0-30%	54,414	58,427
McCarty	4361	PP	0-120%	1,058,480	1,282,307
Merritt Excl	400	PP/MC/meadow	0-20%	0	121,545
Moonshine	1286	PP	0-40%	362,732	388,664
N.BuckSprings Exclosure	105	PP	0-15%	0	24,756
North	9821	PP	0-120%	2,624,858	2,903,524
N.Battleground	7570	PP	0-120%	1,611,463	1,830,337
N. Holding	78	PP	0-20%	26,500	28,684
N. McClintock	2044	PP	0-80%	449,257	513,811
N. Pinchot	6205	PP	0-120%	1,449,213	1,615,105
S. BuckSprings Exclosure	703	PP/MC/meadow	0-15%	0	217,169
Schneider	101	PP	0-20%	31,940	34,063
S. Battleground	7444	PP	0-30%	1,422,373	1,575,961
S. McClintock	7241	PP&MC	0-40%	1,327,278	1,507,327
S. Pinchot	5600	PP&MC	0-60%	969,356	1,125,651
Steer	246	PP	0-20%	79,17	84,527
<b>Grand Total</b>	<b>70,795</b>			<b>*15,024,166</b>	<b>17,851,530</b>

\* forage available for livestock excludes forage in livestock exclosures, and on slopes greater than 40%, in areas with less than 100 pounds per acre, and where soil conditions are “impaired” or “unsatisfactory”.

PP = Ponderosa Pine, MC = Mixed Conifer

Wildlife populations (elk and deer) are not restricted by livestock exclosures, impaired soils, and steep slopes, and therefore have access to approximately 17,851,530 pounds of available forage. Wildlife forage requirements are estimated to be between 1,100,000 and 1,350,000 pounds a year, based on population estimates provided by the Arizona Game and Fish Department and average consumption per animal.

The analysis of capacity for current management (Alternative B, Table 4) shows that about 26.2% of the available forage is required by 746 cows with calves (Table 4) in areas available to livestock, while wildlife require about 7.3% of the forage in areas available to them. Under the assumption that wildlife use forage evenly across the allotment, the cumulative utilization consumption in areas grazed by both livestock and wildlife would be 26.2% plus 7.3% for an average of 33.5% forage utilization. Forage available only to wildlife would have 7.3% utilization. This analysis shows that current permitted livestock are within capacity of the allotment, given a 35% utilization standard.

## **VEGETATION**

### **Overstory Vegetation (Silviculturist Specialists' Report [#72])**

The analysis area consists of two major vegetation types: ponderosa pine forest and mixed conifer forest, with small inclusions of aspen, maple, southwestern white pine, pinyon-juniper woodlands, and mountain grassland. Approximately 82 percent of the forested acres within the analysis area is ponderosa pine type, 16 percent is mixed conifer, and the remaining 2 percent is primarily in aspen and other hardwoods. Ponderosa pine is found throughout the area, while mixed conifer stands occur primarily on cooler sites such as north slopes in the steeper drainages. Mixed conifer also increases in abundance near the edge of the Mogollon Rim, due to an increase in precipitation. The extent of the mixed conifer type is gradually increasing due to a successful fire prevention strategy over the past 100 years that favored the climax white fir and Douglas-fir trees over the thick-barked ponderosa pine, which is more fire resistant (Figure 2).

The Coconino National Forest Plan classifies the forest into Management Areas (MA) based on forest type, slope, or special designations (Table 6). The Coconino National Forest Plan identifies standards and guidelines for management activities based on these MAs.

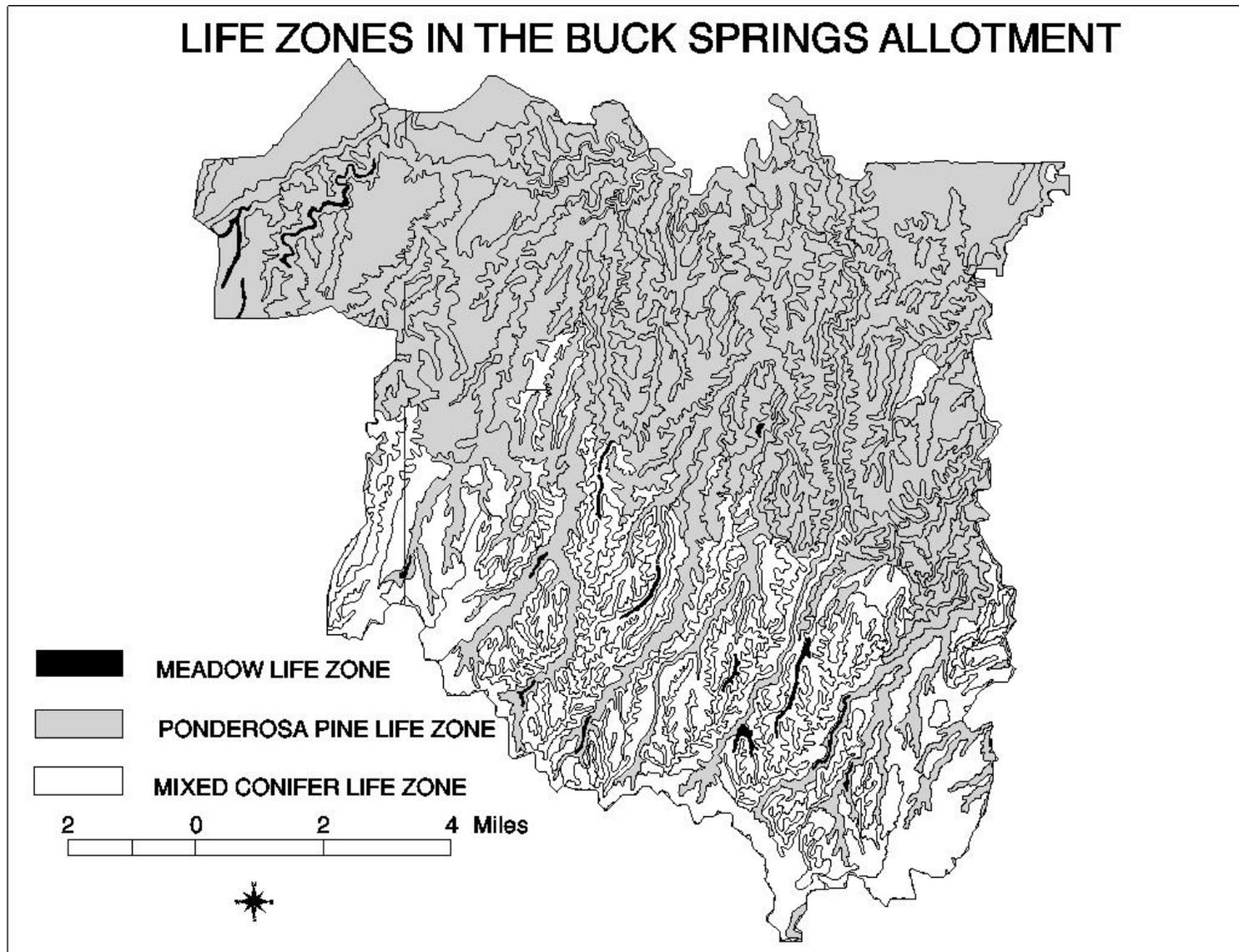


Figure 2: Life zones within the Buck Springs Allotment Area.

**Table 6: Acres by Coconino Forest Plan management areas (MA).**

<b>MANAGEMENT AREAS</b>	<b>DESCRIPTION</b>	<b>ACRES</b>	<b>PERCENT OF TOTAL</b>
<b>MA-3</b>	Ponderosa Pine & Mixed Conifer, < 40% Slopes	45,650	64.5
<b>MA-4</b>	Ponderosa Pine & Mixed Conifer , > 40% Slopes	11,558	16
<b>MA-5</b>	Aspen	266	0.4
<b>MA-6</b>	Unproductive Timber Lands	1,395	2
<b>MA-7</b>	Pinyon-Juniper Woodland, < 40% Slopes	32	0.05
<b>MA-9</b>	Mountain Grassland	49	0.07
<b>MA-12</b>	Riparian & Open Water	1,606	2
<b>MA-19</b>	Mogollon Rim	9,533	14
<b>No Data</b>		803	1
<b>TOTAL ACRES</b>		70,892	

## **Fire and Fuels**

### **(Fire Ecology Specialist's Report [# 32])**

The current fire regime in ponderosa pine has fallen into an unnatural condition due to a century of fire suppression. There are dense stands of ponderosa pine seedlings and saplings, which have excellent laddering potential and continuous canopy cover which extends over hundreds of acres in a stretch. These stands have not experienced fire that thins the stands and breaks up the continuity of the canopy allowing the smaller weaker trees to recycle and the stronger dominate trees to thrive.

Current levels of dead/down fuels on the allotment range from 5 to 35 tons per acre, compared to historic levels from 3 to 15 tons per acre. Fuels treatments have reduced harvest slash and dead/down fuels in areas of timber harvest, along the Rim, and along a few major roads. Fuels are highest in canyons and on steep slopes where there have been few treatments. Maintenance of long-term soil productivity in forested environments is related to the amount of Coarse Woody Debris (CWD, tree limbs, boles and roots in various stages of decay) that exists on site. Graham et al (1994) recommend retaining at least 5-10 tons/acre of CWD in pine/oak forest types in Arizona. To retain soil productivity on mixed conifer sites in Arizona, Graham recommends retaining 10-15 tons/acre of CWD.

Live fuel loadings (live trees) have increased over time and contribute significantly to annual levels of dead fuel loadings. Covington and Moore (1991, 1994) found an increase from 19 trees per acre during pre-settlement to 851 trees per acre in 1990, on studied stands in the Bar-M area south of Flagstaff Arizona.

Wildfires occur at a more frequent rate than historically, and over an increasing number of acres. Lightning still continues to be the main ignition source, causing more than 100 small fires (1/4 acre to 10 acres) each year in the Mogollon Rim area. Person-caused fires average

about 15% of all fires. Increases in person-caused fires correspond to the increased population of nearby cities and new developed recreation sites in the area.

## **Understory Vegetation**

[# 31]

Under the ponderosa pine overstory in the Buck Springs Management Unit (M.U.), there is an oak and juniper midstory, and an understory consisting of Arizona fescue, orchard grass, screwleaf muhly, pine dropseed, muttongrass, squirreltail, elk sedge, spike muhly, junegrass, western wheatgrass, Arizona three-awn, Pringle's pinyon ricegrass, redtop, intermediate wheatgrass, blue grama, Kentucky bluegrass, smooth brome and assorted forbs. There is relatively little browse, other than oak, aspen, and remnant willow. The southern pastures shift to a mixed conifer overstory in the higher elevations near the Mogollon Rim. The midstory is Gambel oak, New Mexican locust, and some aspen. The understory on the ridgetops is dominated by exotic species such as orchard grass. In the wetter meadows and riparian areas, the species shift to more mesic types such as redtop, sedges, rushes and spike rushes.

Timber harvests in the late 1950's and 1960's were confined to the ridgetops, because of topography, and resulted in more open stands. Seeding of exotic grass species after timber sales resulted in improved forage conditions on the ridges. Approximately 18,000 acres were seeded between 1974 through 1986, generally behind slash-piling activities, to prevent erosion and provide forage for livestock and wildlife. In addition, timber sale contracts seeded skid trails, landings, and spur roads. Early seed mixtures were predominately non-native species such as orchard grass and timothy, while later mixes used more native species.

The understory vegetation on the Battleground and Pinchot M.U.'s include the same species as the Buck Spring M.U., plus bull muhly. The wetter meadows and riparian areas support the same species as listed above, while the riparian areas include woody species such as aspen, alder and Bebb's willow.

## **Riparian Vegetation**

Across the allotment, many riparian meadow areas have been converted inadvertently into dry meadows by a drop in the water table, and through over-use, shrub and tree loss, and deep cutting of the water channels. As the water channels cut deeper, more of the water drained out of the flood plain, leaving it drier, less productive, and more susceptible to erosion.

The majority of the steep walled canyons with riparian areas in the bottoms are in good condition, with multiple age classes of many woody plant species present. In most locations, banks are stable and vegetated. The upper reaches of these drainages, with more shallow side slopes and easy accessibility, are not as healthy. Here the soils have been de-watered due to erosion and channel down cutting. Woody plants are infrequent.

Various surveys have shown that riparian area conditions were either stable or declining in the mid 1970's. The majority of the riparian areas showed signs of heavy use by livestock and moderate grazing use by wildlife. In response, stock tanks were built to provide water for both livestock and wildlife in areas outside of the sensitive riparian bottoms and exotic, palatable grasses were planted following timber sales, creating available forage on the uplands. The stream courses showed signs of improvement. In the late 1980's and early 1990's, the riparian areas again showed signs of high grazing use, corresponding to the rise of elk populations.

## Noxious Weeds

[#73]

The Coconino, Kaibab, and Prescott National Forests Noxious Weeds Strategic Plan and list of noxious weed species were consulted. Species that may occur or are known to occur near or within the allotment include *Cirsium vulgare* (bull thistle), *Centaurea (Acroptilon) repens* (Russian knapweed), *Salsola iberica* (Russian thistle), *Convolvulus arvensis* (field bindweed), and *Marrubium vulgare* (horehound). The three forests are currently working on an EIS to address the treatment of noxious weeds (Noxious Weeds, Three Forest Assessment, contact: D.Brewer, 928-635-8200).

Technicians surveyed the allotment for noxious weeds in 1997 and 1999. Bull thistle (*Cirsium vulgare*) is common along several roads in the allotment, and especially on old timber landings. An infestation of Russian knapweed (*Cirsium (Acroptilon) repens*) is located at Blue Ridge Reservoir, just north of the allotment. Cheatgrass (*Bromus tectorum*) is rapidly spreading through the allotment along major roads and another brome is located at the junction of Forest Roads 300 and 321. A group of plants located on Road 141 may be oxeye daisy (*Chrysanthemum leucanthemum*). This plant is recognized in *Weeds of the West* (Whitson, et al. 1999) but is not on the forest list. Various species are located along highways corridors outside of the allotment.

Noxious weeds can be introduced by many activities. Vehicles that travel through infested areas may transport seeds or plant parts to other areas. Seeds or plant parts may be transported by recreationists on their clothing or personal gear, in the fur of domestic or wild animals, by road or logging equipment or in infested hay. Some species can also be dispersed in the feces of animals that have eaten the plants in other areas.

Ground disturbing activities such as logging activities provide sites for establishment of noxious weeds. Many old slash pile sites and log deck areas are infested with bull thistle. This species does not appear to be aggressively invasive and seems to remain limited to the area of introduction as long as there is no additional disturbance. The exception to this seems to be where seeds enter drainages and wet areas and individual plants become established among the existing vegetation. The seeds of bull thistle are primarily wind dispersed, with some dispersal of seeds in runoff water from rainfall. Other ground disturbing activities such as heavy use from recreation or grazing may also provide introduction sites for noxious weeds.

## **SOIL AND WATER** **(Watershed Specialist's Report [# 22])**

### **Soil Condition**

A variety of soil types and depths occur within the allotment. Soil condition categories, satisfactory, impaired, and unsatisfactory, reflect soil quality status (USDA Forest Service, 1991, 1995):

Satisfactory Soil Condition - Indicators signify that soil quality is being sustained and the soil is functioning properly and normally. The ability of the soil to maintain resource values, sustain outputs and recover from impacts is high.

Impaired Soil Condition - Indicators signify a reduction in soil quality. The ability of the soil to function properly has been reduced and/or there exists an increased vulnerability to irreversible degradation. An impaired category should signal land managers that there is a need to further investigate the ecosystem to determine the cause and degree of decline in soil functions. Changes in management practices or other preventative actions may be appropriate.

Unsatisfactory Soil Condition - Indicators signify that degradation of soil quality has occurred. Impairment of vital soil functions results in the inability of the soil to maintain resource values, sustain outputs and recover from impacts. Soils rated in the unsatisfactory category are candidates for improved management practices or restoration designed to recover soil functions.

These soil condition ratings reflect soil disturbance resulting from management practices and activities in relation to maintenance of long-term soil productivity (i.e., changes in physical, chemical or biological properties of the soil resource) (USDA Forest Service, 1991). Management activities affect soil functions that are important to maintenance of long-term productivity, specifically, the soil's ability to accept, hold and release water is affected by physical compaction. The nutrient recycling function of the soil is affected by removal of vegetation, organic matter and coarse woody debris that impacts above-ground nutrient inputs into the system. Finally, the soil's resistance to erosion is affected by changes in plant density and protective litter.

### **Climate**

The majority of the precipitation falls from October 1 to March 31, mainly in the form of snow. The winters are cold and soil temperatures are subject to freezing and thawing. Summer precipitation is spotty, but usually takes place in the form of high-intensity, short duration thunderstorms during the monsoon season (July through September). Precipitation on the average varies from 18 to 26 inches annually in the ponderosa pine cover type, and from 26 to 30 inches in the mixed conifer cover types.

## Landform

A variety of landforms occur within the allotment. Table 7 indicates average slope and acres by landform.

**Table 7: Average slope and number of acres by landform.**

LANDFORM	AVERAGE SLOPE	ACRES
Elevated Plains	<15%	33,290
Hills/Scarp Slopes of Plains	15-40%	22,210
Valley Plains	<2%	412
Escarpments	>40%	14,610
Reservoir	0%	180
No Data	0%	190
<b>TOTAL ACRES</b>		<b>70,892</b>

No data acres are small polygons that exist on the boundary.

## Soil Conditions of the Buck Springs Allotment

Table 8 summarizes the existing soil conditions within the Buck Springs Allotment by forest type. Under this broad-scale level of analysis (coarse filter analysis approach), soil conditions within a given ecological unit may vary widely. A full discussion of soil condition by life zone can be found in the soil and watershed specialist report.

**Table 8: Approximate acres of soil condition by forest type.**

LIFE ZONE	TOTAL ACRES	SATISFACTORY	IMPAIRED	UNSATISFACTORY
Meadow	412	0	0	412
Ponderosa Pine	46,690	44,930	1,760	0
Mixed Conifer	23,790	23,450	340	0
<b>TOTALS</b>	<b>70,892</b>	<b>68,380</b>	<b>2,100</b>	<b>412</b>

The impaired soils in the ponderosa pine and mixed conifer zones are small, discreet areas and are not mapable.

## Riparian Condition

### Streamcourses

A riparian assessment for streamcourses using the Bureau of Land Management (BLM) Proper Functioning Condition (PFC) protocol and scoresheet (Prichard et al. 1998) was accomplished in the East Clear Creek portion of the allotment in the summer/fall of 1995 and again in 1998 and 1999. The following are definitions of the PFC classes described in the document:

Proper functioning condition - A riparian-wetland area is considered in proper functioning condition when adequate vegetation, landform, or large woody debris 1) dissipate stream energy; 2) filter sediment, capture bedload, and aid floodplain development; 3) improve flood-water retention and ground-water recharge; 4) develop root masses that stabilize streambanks; 5) develop diverse ponding and channel characteristics to provide habitat for a variety of uses; and 6) support greater biodiversity.

Functional at-risk - Riparian-wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Nonfunctional - Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality etc.

These assessments identified 94 miles of streams in proper functioning condition, 34 miles of at-risk streams, and 14 miles of nonfunctional riparian streams (see Figure 3). The nonfunctional reaches occur primarily in headwater meadows, while functional-at-risk areas are primarily located in shallow drainages (see Figure 4). Proper functioning condition reaches are generally found in areas with steep canyon walls and in areas with total grazing exclusion. In addition to the riparian streamcourses, there are about 80 miles of non-riparian drainages within the allotment.

Many of the streamcourses are not perennial, and go dry in the summer months. There are roughly 66 miles of perennial streams and interrupted perennial streams within the allotment, contained primarily within the East Clear Creek drainage (see Figure 5). A number of other canyons contain small pockets of perennial water. They include portions of Leonard Canyon, Barbershop Canyon, Yeager Canyon, Bear Canyon, General Springs Canyon, Dane Springs Canyon, and Buck Springs Canyon.

## **Wetlands**

Three intermittent lakes exist within the allotment - Lost Lake, Myrtle Lake and Dude Lake. All three lakes were inventoried in the 1995 meadow inventory. The lakes are seasonal in nature, and contain abundant riparian vegetation.

## **Water Rights**

Tanks and springs that divert water from a streamcourse require filing of water rights. Water rights have been applied for 58 of the 115 tanks, 29 borrow pits, 17 springs, and 10 backhoe springs listed for the allotment. The outcome of current adjudication in the Little Colorado River and the Verde Watersheds may affect pending water rights. The Project Record contains the list of improvements and the water rights status of these improvements.

The amount of water contained within the impoundments is minimal within the entire watershed. The following water budget displays the amount of water held in the tanks.

There are approximately 70,892 total acres within the analysis area. On average, the area receives approximately 24" of precipitation per year (The TES survey displays an average for the mixed-conifer country of 28" and an average in the ponderosa pine lifezone of approximately 22"). A weighted average for the precipitation in these lifezones is 24.2" of moisture. For this analysis, the average will be 24" per annum of moisture. As such, a total of 141,784 acre feet per year of precipitation falls on the analysis area (2 ft X 70,892 acres).

Evaporation, sublimation, and transpiration all act to remove water from the system. A 1993 study of the watershed condition of three subwatersheds within the East Clear Creek Watershed notes that average yield of water is 4-5 area inches (Haines 1993). This calculates to approximately 15% of the water that falls on the watershed is available as water yield, or approximately 12,268 acre feet of water per annum. A sum of the capacity of tanks and springs that are listed in the specialist report comes to approximately 135 acre feet of storage. Thus, the tanks account for less than 1% of the total yield within the watershed.

## **Roads**

There are approximately 468 miles of roads within the allotment. Open roads make up 250 miles, 119 miles have been previously closed, and 99 miles have been obliterated. The allotment contains 110 square miles of area, resulting in an open road density of 2.2 miles of open roads per square mile. The road density of all roads is 4.2 miles of road per square mile. The existing open road system is located primarily on ridge tops, however, there are some open roads that are located in or adjacent to streamside filter strips, many cross non-riparian drainages. Approximately 5.3 miles of road within the allotment impact riparian drainages and are described in the Project Record (Road Connected Disturbed Areas).

The East Clear Creek Road Analysis (USDA 2001) examined the 120,000 acres of the watershed that lies on the Coconino National Forest. The analysis identified all roads, explored the interactions of roads within the watershed and identified issues of concern. The team identified risk factors associated with aquatic systems and, wildlife, benefits for access, and the potential for re-assessing the Visual Quality Objectives for the watershed.

## **WATER QUALITY**

[#22]

The Buck Springs Allotment falls within the following watersheds: East Clear Creek (67,774 acres), West Clear Creek (830 acres), East Verde River (729 acres), Upper Tonto Creek (1,084 acres) and Jacks Canyon (194 acres). For this analysis, only the East Clear Creek watershed and watercourses will be discussed, since the other four watersheds are negligible within the allotment (totaling less than 5% of the area). A detailed description of all watersheds and Arizona Water Quality Assessments undertaken by ADEQ (ADEQ 2000) can be found in the specialist's report. In general, the East Clear Creek watershed is in full compliance for all designated uses: 1) aquatic and wildlife; 2) full body contact; 3) fish consumption; 4) agricultural irrigation watering; and 5) agricultural livestock watering. Table 9 displays a summary of water quality parameters as detailed by the 2000 ADEQ 305(b) report.

Figure 3: Riparian Streams by PFC and Non-Riparian Streams

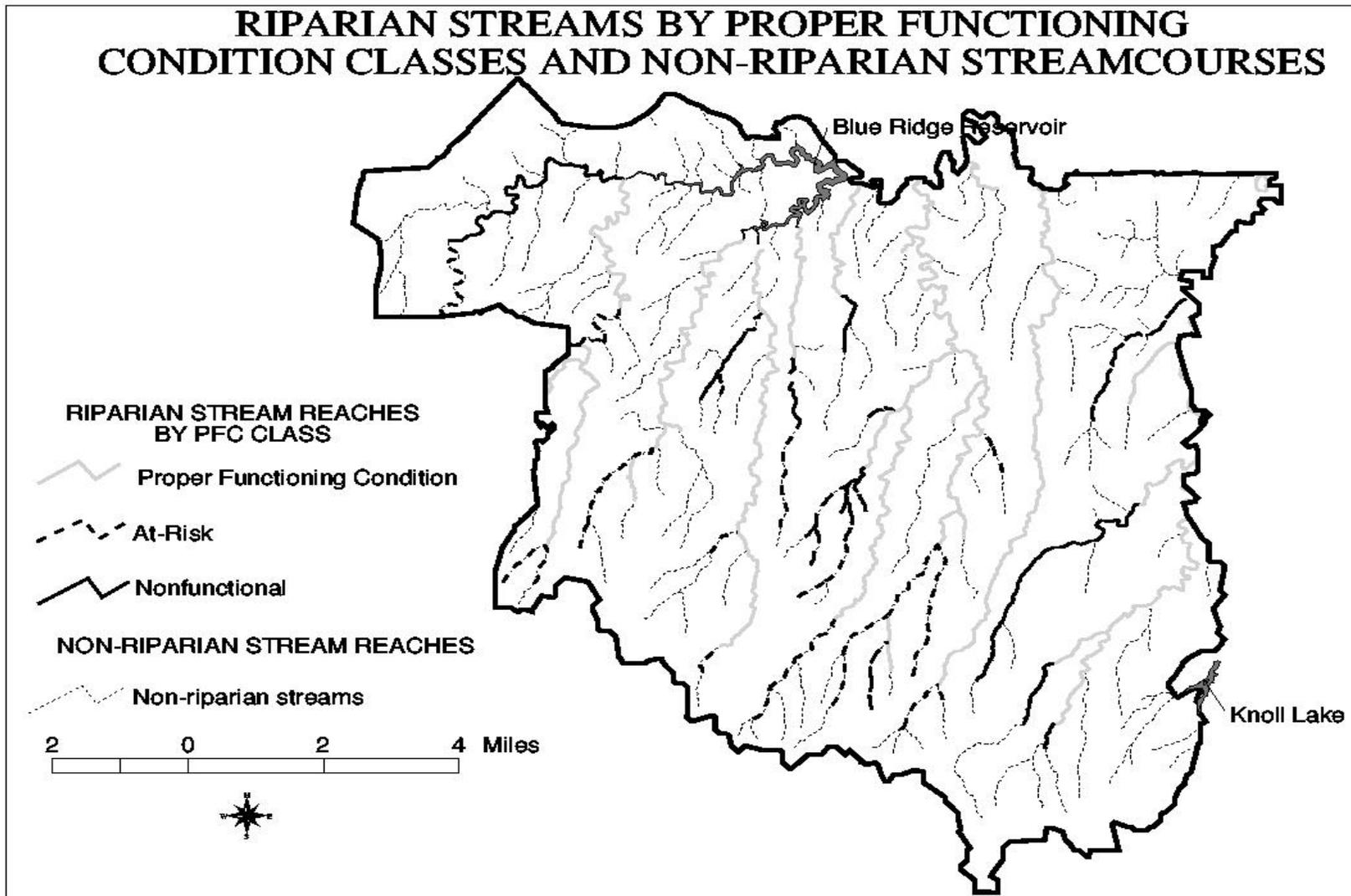


Figure 4: PFC Streams and Meadows with Unsatisfactory Soil Condition

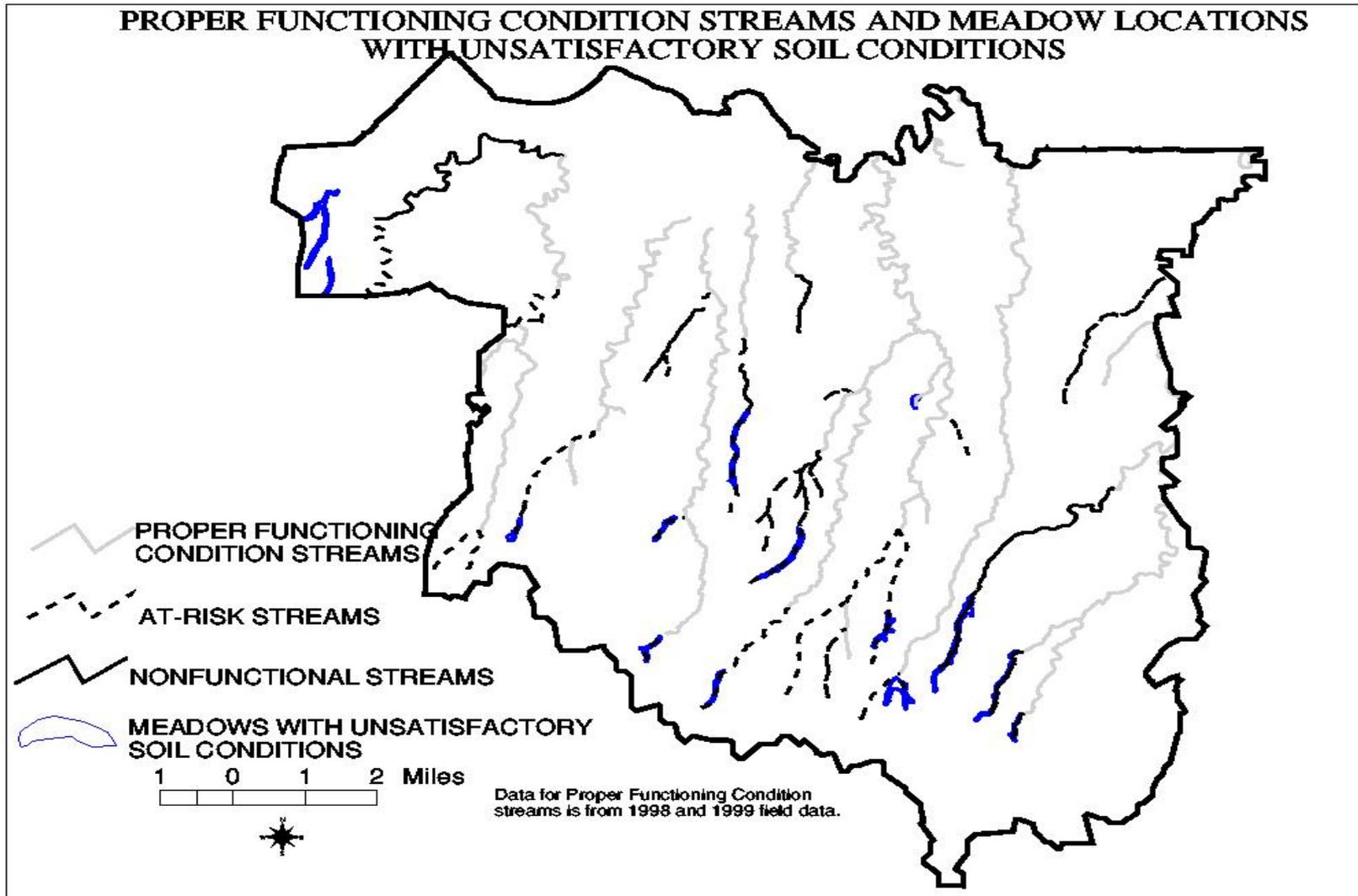
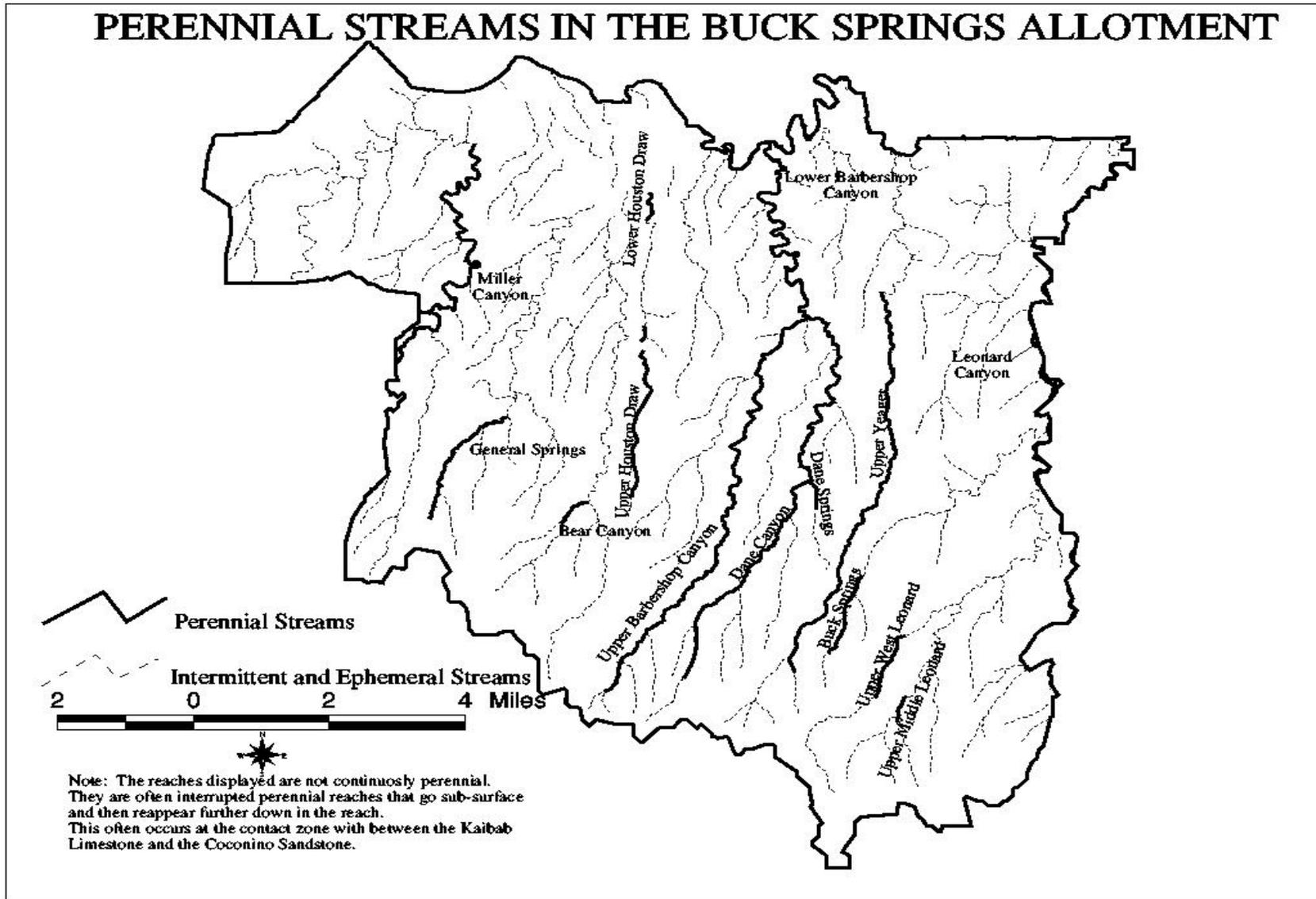


Figure 5: Perennial Streams



**Table 9: Water quality data for stream reaches within the East Clear Creek Watershed.**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY PROGRAM SITE DESCRIPTION SITE CODE	SAMPLES	PARAMETER UNITS	STANDARD	RANGE OF RESULTS (MEDIAN)	FREQUENCY EXCEEDED STANDARDS	USE SUPPORT*	COMMENTS
Barbershop Canyon Creek headwaters-East Clear AZ15020008-537 A&Wc, FC, FBC, AgL	ADEQ Biocriteria Program East Clear Creek confluence LCBRB000.18	1992 - 1 water, bugs 1993 - 1 water, bugs 1994 - 1 water, bugs 1997 - 1 water, bugs	Dissolved oxygen mg/l	7.0 (90% saturation)	6.7-8.95	1 of 4	Full	Naturally low dissolved oxygen in pool
	ADEQ Biocriteria Program At Merritt Draw LCBRB003.84	1992 - 1 water, bugs 1993 - 1 water, bugs 1994 - 1 water, bugs 1997 - 1 water, bugs	OK				Full	
Buck Springs Canyon Creek headwaters-Leonard AZ15020008-557 A&Wc, FC, FBC, AgL	ADEQ Biocriteria Program Outside enclosure of cattle and elk LCBCK003.20	1995 - 1 water	Dissolved oxygen mg/l	7.0 (90% saturation)	6.84	1 of 1		Natural low DO during low summer flows. Combine with other site.
			Turbidity NTU	10	14.6	1 of 1		Combine with other site to assess
	ADEQ Biocriteria Program Inside enclosure of cattle and elk LCBCK003.81	1995 - 1 water	Dissolved oxygen mg/l	7.0 (90% saturation)	3.77-6.11	2 of 2	Full	Natural low DO --mostly pool habitat
			Turbidity NTU	10	12.5-19.1	2 of 2	Partial A&Wc	
			pH SU	6.5-9.0	5.98-6.62	1 of 2	Full	Naturally low pH.
East Clear Creek headwaters-Yeager Canyon AZ15020008-009 A&Wc, FC, FBC, Agl, AgL	ADEQ Biocriteria Program Above Yeager Canyon LCECL007.86	1992 - 1 water, bugs 1993 - 1 water, bugs 1994 - 1 water, bugs	OK				Full	
East Clear Creek headwaters-Yeager Canyon AZ15020008-008 A&Wc, FC, FBC, Agl, AgL	ADEQ Biocriteria Program Above Mack's Crossing LCECL004.07	1992 - 1 water, bugs	OK				Full	

The sample site of the last reach listed in the table is downstream and outside of the Buck Springs Allotment boundary. Source: AZ Department of Environmental Quality 200 305b report (EQR 00-03).

## **AIR QUALITY**

[#76]

The Buck Springs Allotment falls within the Little Colorado Airshed (Airshed #3). There are no Class 1 or non-attainment areas within this airshed. Livestock grazing on Forest Service Allotments does not impact air quality in the airshed.

## **WILDLIFE, THREATENED, ENDANGERED, AND SENSITIVE SPECIES**

(Wildlife Specialist's Reports [#24 and #23])

Wildlife are integral components of the ecosystem that make up the Buck Springs allotment. The area has seen many changes since pre-European settlement, with some species no longer found in the area (Merriam's elk, grizzly bear, and Mexican wolf) and some as recent additions to the area (Rocky Mountain elk, feral pigs, starlings, rainbow trout, green sunfish, and crayfish). Wildlife play an important part in contributing to local economies through tourism from hunting, fishing, bird watching, and general recreation. Some species conflict with livestock use of the land. The allotment falls within Game Management Unit (GMU) 5A, Arizona Game and Fish Department. More detailed information on population status of many wildlife species of interest and impacts of various activities may be found in the specialist reports.

### **Game and Non-game Wildlife**

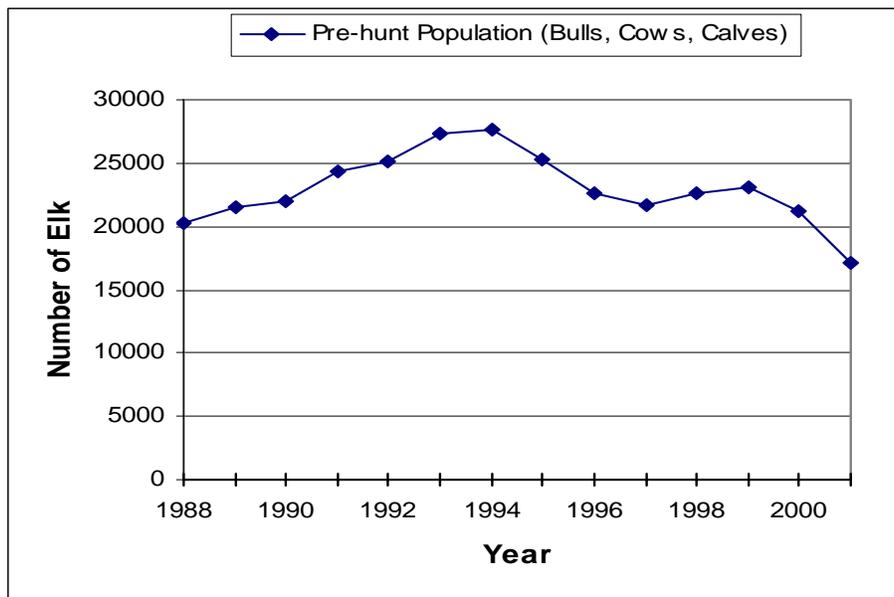
Game species occurring on the allotment include the introduced Rocky Mountain elk, mule deer, Coue's white-tailed deer, turkey, bear, and small game species such as Abert's squirrel, red squirrel, rabbits, and fur bearers. For non-game species, the allotment is home to many ground, tree, and cavity nesting birds. Small mammals such as woodrats, mice, and other rodents are relatively abundant, especially near rock outcrops along the canyon fringes. Over 130 species of birds are found there, including many neotropical migrants and migratory waterfowl. There is also a variety of reptiles and amphibians inhabiting the allotment. These, in turn, supply food for raptors and carnivores such as fox, coyote, bobcat, mountain lion, and bear.

Three game species are designated as Management Indicator Species (MIS) for the Coconino National Forest. Elk are indicators of early-seral stage ponderosa pine, mixed-conifer and spruce-fir habitats. They allotment provides summer range for these animals, with some individuals remaining year-round, especially in years of light snow-fall. The native elk of Arizona was the Merriam's elk, which was extirpated from the state by the 1920's. Historians speculate that the Merriam's elk existed at fairly low densities on the Forest, since few explorers and naturalists reported their presence (Davis 1982).

Rocky Mountain elk from Wyoming were transplanted to the Sitgreaves National Forest south of Winslow in 1913 and adjusted easily to the mild climate of northern Arizona (AGFD 1962).

The state elk population in 1980 was estimated at approximately 10,000 adults after the hunting season. Populations increased dramatically between the mid-80's through the early 90's, and the state population was estimated at 30,000 adults post-hunt in 1989 (Figure 6, AGFD 1995). The Buck Springs Allotment falls within Game Management Unit 5A, and increases in the population parallel the increases statewide. Evidence of elk impacts on vegetation was first noticed in riparian meadows and in seeded areas following timber harvest, particularly those areas seeded with orchard grass. The population continued to increase and in 1992, the AGFD decided to reduce elk populations in by 50% in GMU 5A and GMU 5B south and 10% in GMU 6A. It was later determined that these three units should be combined for modeling purposes, due to elk movements among the units. According to population models, these objectives were met in 1997 with an overall reduction of about 30% in the three Management Units (AGFD 2001b).

**Figure 6: Elk population trend on the Coconino National Forest, from 1988-2001.**



Despite these reductions, impacts to riparian areas and meadows remained high. Paired exclosures for livestock and for livestock and elk illustrate that both animals tend to concentrate in headwater meadows, where they exert substantial grazing pressure that compacts soils, reduces plant biomass, and break down streambanks (Neary and Medina 1996). Current management of elk populations in GMUs 5A, 5BS, and 6A target reductions in very specific sub-unit areas in response to habitat needs (AGFD 2001b).

As a MIS for the Coconino National Forest, elk populations increased between 1988 and 1994, then decreased to pre-1988 levels by 2002 (USDA 2002). These reductions were targeted by the AGFD through the issuance of hunting permits. Calf crops began dropping in the late 1990's and coincided with years of drought. The lower reproduction may indicate that nutrition is no longer optimal.

Mule deer are indicators of early-seral stages of aspen and pinyon-juniper woodlands on the Coconino National Forest (USDA 1987). Early stages of ponderosa pine, mixed-conifer, and chaparral habitats are also important for this species. They frequent the allotment year-round, though many move to the pinyon-juniper woodlands during the winter. Forest-wide populations were estimated to be around 8800-11,000 in the mid-1980's. Over the past 15 years, state and Forest trends show a slight decline in populations (AGFD 2001a, USDA 2002). Population estimates for GMUs 5A / 5B do not show such a decline (USDA 2002).

MIS for late seral ponderosa pine habitat include wild turkeys. They also frequent the allotment in the summer and generally move into pinyon-juniper habitat in the winter. Populations on the Forest were thought to be declining in the 1980's (USDA 1987). Increases in population in the late 1990's are thought to be a response to a change in hunt management and to the maturing of pine trees established in the 1919 seed year. Overall mast production has increased with the maturing of these trees (USDA 2002).

## **Habitat Components**

### **Cover**

Animals utilize cover to modify extremes of weather, shelter their young, and avoid detection and or capture by predators. Thermal cover is desired for bedding and travel; while hiding cover is important adjacent to dependable water, key openings, and travelways. Surveys indicate that there are about 6800 acres of thermal cover, 4200 acres of hiding cover, and 10,500 acres of combination cover within the allotment (total 21,500 acres).

### **Old-growth**

Many of the threatened, endangered, and sensitive avian species of Region 3 have a strong association with old-growth conditions, which provide feeding and nesting habitat. Many other species use old-growth. Birds are often in higher densities in old-growth, while elk and deer take refuge there during heavy snow accumulations. There are approximately 8650 acres of existing old-growth, and 8340 acres of developing old-growth on the allotment. Much of the old-growth occurs in the canyons and drainages.

### **Water Sources**

Reliable, well-distributed sources of water are essential for all wildlife species. Natural water sources on the allotment include perennial reaches of East Clear Creek and Leonard Canyon. Major tributaries such as Barbershop, Miller, Buck Springs, Yeager, and Dane Canyons provide water from spring sources. There are many springs throughout the allotment. Earthen tanks, built to draw livestock out of the drainages, provide water on the uplands of the allotment. However, some of the shallow drainages and headwater meadows still receive heavy livestock use. No area on the allotment is



<b>No Mgt Ind Species</b>								X
<b>Percent of Allotment</b>	64.5%	16%	0.4%	2%	<0.1%	<0.1%	2%	14%

Habitat requirements of each of the remaining 13 MIS are described in the specialist’s report. Turkey, northern goshawk, pygmy nuthatch, elk, red and Abert’s squirrels, hairy woodpecker, Mexican spotted owl, red-naped sapsucker, mule deer, and macroinvertebrates all have breeding populations on the allotment. Cinnamon teal and Lincoln’s sparrow are not known to occur on the allotment. Suitable cinnamon teal nesting habitat does not occur, though the ducks may pass through the area. Lincoln’s sparrow inhabits high elevation riparian areas, generally at elevations higher than found on the allotment.

Information on MIS in this document tiers to the report *Management Indicator Species Status Report for the Coconino National Forest* (USDA 2002). Conditions of the Mexican spotted owls are discussed in the threatened, endangered, and sensitive species section. Existing conditions for turkey, elk, and mule deer on the allotment are discussed under Game Species. Current conditions of the remaining MIS are discussed below.

The northern goshawk is an indicator of late seral stage ponderosa pine habitat, and is dependent on the forest’s ability to provide a continuous flow of habitat structural types over time. The Forest Plan was amended in 1996, in part, to provide guidelines for management of goshawk habitat. Six territories have been delineated within the allotment. Sightings indicate additional goshawks reside in the area, but have not been tied to territories. Despite extensive surveys and designation of new territories yearly, the population trend is considered to be inconclusive on the Forest.

Abert squirrel is a common small game species on the allotment and the Forest. Though the Forest Plan designated this squirrel as an indicator of early-seral-stage ponderosa pine forest, more recent research indicates that this species’ preferred habitat is the intermediate to old aged forest (Dodd et al. 1998, Elson 1999).

The Forest Plan designates the red squirrel as an indicator for late-seral-stage mixed conifer and spruce-fir forests. It is a common species in the mixed conifer portion of the allotment and the Forest.

The pygmy nuthatch is found in late-seral stages of both the mixed conifer and ponderosa pine forests. Data from the Coconino National Forest indicate that populations are stable on a gross, long-range scale with dramatic population fluctuations over short time frames (one to three years, Sauer et al. 2001, National Audubon Society 2001). It is a common species on the allotment.

Data from the Coconino National Forest indicate that populations of the hairy woodpecker, an indicator for the snag component of the Forest, are stable, or slightly increasing on a long-range scale (Sauer et al. 2001, National Audubon Society 2001, Martin 2002).

Available population data indicate that red-naped sapsucker populations fluctuate over time, but are stable overall on the Coconino National Forest (National Audubon Society 2001, Martin 2002). Future trends are of concern, since aspen regeneration is inadequate to provide replacement habitat as aspen stands decline.

The Forest-wide trend for cinnamon teal, indicators of wetland and aquatic habitats, is inconclusive. Population data are limited to two studies, and the results are not necessarily comparable (Myers 1982, Gammonly 1996). Cinnamon teal showed low nesting and reproductive success, largely as a result of nest losses to avian predators. The allotment does not provide nesting wetland habitat, but may be used by migratory birds.

Lincoln's sparrows are ground nesting neotropical migrant songbirds. They occur in wet areas such as riparian thickets and wet meadows, along forest edges, and in open forests with a good understory. They tend to nest in shallow depressions with clumps of vegetation. Lincoln's sparrows eat insects, grains, and seeds. They may benefit from pasture rotation and burning/clearing for early successional plants (Block and Finch 1997).

Macroinvertebrates were selected as indicators for high and low elevation late-seral riparian areas (USDA 1987). ADEQ sampling data from 1992 through 1999 indicate that peaks and valleys occurred in the data in 1993 and 1995, likely related to disturbance to stream channel substrates and water quality before and after the 1993 flood. At present the greater majority of the flood impacted riparian zones are densely vegetated with both woody and herbaceous plants and are in an early to mid-seral stage of development.

### Threatened, Endangered, Proposed, and Sensitive Species (TEPS)

TEPS species include one federally listed endangered species, four threatened species, and several sensitive species that are known to occur within the Buck Springs Allotment (Tables 11 and Table 12. Suitable and potential habitat exists for additional sensitive species (Table 12. The wildlife specialist's report describes basic habitat needs, known information on populations in the allotment, and management direction for these species.

**Table 11: Status of threatened, endangered, and proposed species on the allotment.**

SPECIES	SCIENTIFIC NAME	FEDERAL STATUS	STATUS ON ALLOTMENT
<b>Southwestern Willow Flycatcher</b>	<i>Empidonax traillii extimus</i>	Endangered	Potential Habitat
<b>Bald Eagles</b>	<i>Haliaeetus leucocephalus</i>	Threatened	Present in Winter
<b>Mexican Spotted Owl</b>	<i>Strix occidentalis lucida</i>	Threatened	Present
<b>Little Colorado River Spinedace</b>	<i>Lepidomeda vittata</i>	Threatened	Present

<b>Chiricahua Leopard Frog</b>	<i>Rana chiricahuensis</i>	Threatened	Historic records Suitable Habitat
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### **Southwestern Willow Flycatcher**

The flycatcher was listed as endangered in 1995 (USDI 1995a). No records are known from the allotment, nor from the elevation range of the allotment. Marginal habitat for this species exists along East Clear Creek. Biologists surveyed this habitat for flycatchers in 1993 and 1994. No birds responded to the taped calls. The floods of 1993 reduced the willow communities along the creek, and degraded the habitat for willow flycatchers. The Forest Service assesses the habitat and potential for flycatchers and evaluates all activities that have the potential to affect the habitat or disturb the birds. Habitat evaluations were last conducted in 2002, with no change in condition of the habitat.

Current management guidelines require that suitable habitat be surveyed for flycatchers annually following established protocols. If birds colonize the habitat, livestock use cannot occur within five miles during the breeding season, or within two miles if cowbird trapping is conducted. These guidelines are under revision and may change.

### **Bald Eagle**

The bald eagle was down-listed from endangered to threatened status by the U.S. Fish and Wildlife Service in 1995 and is currently proposed for de-listing (USDI 1995c, 1999b). Eagles are seen frequently along Highway 87 during the winter months and throughout the allotment area. Potential roost locations are abundant along the slopes of the canyons, though no traditional roost sites have been identified. Eagles appear to opportunistically use roosts in response to food availability and weather conditions.

The Forest Land Management Plan requires that a 300 foot radius be protected as an uncut zone around identified bald eagle roosts. Road development should avoid the roost and uncut zone.

### **Mexican Spotted Owl**

The Mexican spotted owl was listed as a threatened species in 1993, and a recovery plan was published in 1995 (USDI 1993, 1995b). The entire East Clear Creek watershed has been surveyed for owls and 21 territories have been delineated partially or wholly within the allotment. The Mexican spotted owl Recovery Plan identifies management recommendations and criteria that must be met in order to delist the owl. The Buck Springs Allotment lies within the Upper Gila Mountains Recovery Unit, which is one of three critical recovery units. The plan stresses the importance of population and habitat monitoring to assess recovery of the owl.

Mexican spotted owl Protected Activity Centers (PACs) make up about 12,000 acres of the allotment. Approximately 3300 acres of restricted habitat are designated as Target threshold habitat. An additional 8250 acres with steep slopes provide protected habitat,

while another 7650 acres fall into restricted habitat. The remaining 40,000 acres of the allotment are covered with ponderosa pine forests, an unrestricted habitat type.

The Mexican spotted owl was identified as a management indicator species for the late seral stage of mixed conifer and spruce/fir (USDA 1986, amended 2003). Management for this species is emphasized in MA 3 and MA 4, which are ponderosa pine and mixed conifer habitats. Despite extensive surveys and intensive study of the demography of spotted owls on the Coconino National Forest from 1991 to 2001, population trends are inconclusive (USDA 2002).

### **Little Colorado Spinedace**

This species will be discussed under aquatic resources.

### **Chiricahua Leopard Frog**

The Chiricahua leopard frog was listed as a threatened species in 2002 (USDI, 2002). A few historic locations of Chiricahua leopard frogs exist from East Clear Creek and Leonard Canyon. Arizona Game and Fish Department surveys conducted in 1992 and 1993, and fish surveys in 1998-2002 did not relocate this species on the allotment. The nearest intact population is located about 17 miles from the allotment. Statewide surveys indicate a severe decline in this species (Sredl 1997).

On the Buck Springs allotment, East Clear Creek and several of the major tributaries provide historic habitat that is considered suitable habitat, with the exception of the presence of nonnative fish and crayfish. All of the allotment is within one mile of water sources, which include perennial and intermittent stream, springs, earthen stock tanks, and shallow natural pools. Though most stock tanks are devoid of riparian and aquatic vegetation, a few are vegetated and provide potential habitat. Historic locations are from perennial streams.

### **Sensitive Species**

In 1999, the Regional Forester's Sensitive Species List for Region 3 of the US Forest Service was updated to eliminate several species that were no longer considered sensitive, and to add species that were now considered sensitive due to habitat modification, impacts, or new information (USDA 1999b).

Several species of sensitive plants and animals are known to occur on or adjacent to the Buck Springs Range Allotment (Table 12). Peregrine falcons were often seen along the cliff faces along the Mogollon Rim, prior to the Dude Fire of 1990. They are currently infrequently seen flying through the allotment. Eight territories of northern goshawks have been documented within the allotment. The Little Colorado sucker is found in East Clear Creek and its tributaries. Historical locations exist on the allotment for northern leopard frog and Arizona southwestern toad. The Mogollon thistle is known exclusively

from the watershed, in two small drainages. Cliff fleabane is found on cliffs in East Clear Creek and Barbershop Canyon.

Potential habitat for several sensitive stream and riparian-dependent species exists on the allotment, particularly along East Clear Creek, Leonard Canyon, and their major tributaries. Potential habitat exists for roundtail chub, narrow-headed gartersnakes, Arizona bugbane, Eastwood alum root, Mountain silverspot butterfly, unnamed tiger beetle, Maricopa tiger beetle, blue-black silverspot butterfly, and spotted skipperling.

Sensitive upland species that may occur on the allotment include several plants and one insect. Plants include the Mount Dellenbaugh sandwort, Rusby's milkvetch, Flagstaff pennyroyal, Arizona sneezeweed, and Flagstaff beardtongue. The early elfin is a butterfly whose larva feed on cliffrose.

**Table 12: Sensitive species that occur on, or have potential habitat on the allotment.**

COMMON NAME	SCIENTIFIC NAME	STATUS ON ALLOTMENT
<b>Peregrine Falcon</b>	<i>Falco peregrinus anatum</i>	Present
<b>Northern Goshawk</b>	<i>Accipiter gentilis</i>	Present
<b>Eared Trogon</b>	<i>Euptilotis neoxenus</i>	Incidental
<b>Little Colorado sucker</b>	<i>Catostomus sp. 3</i>	Present
<b>Roundtail Chub</b>	<i>Gila robusta.</i>	Potential
<b>Northern Leopard Frog</b>	<i>Rana pipiens</i>	Historic
<b>Arizona Southwestern toad</b>	<i>Bufo microscaphus microscaphus</i>	Historic
<b>Narrow-headed gartersnake</b>	<i>Thamnophis rufipunctatus</i>	Historic
<b>Arizona bugbane</b>	<i>Cimicifuga arizonica</i>	Potential
<b>Mogollon thistle</b>	<i>Cirsium parryi mogollonicum</i>	Present
<b>Cliff fleabane</b>	<i>Erigeron saxatilis</i>	Present
<b>Mt. Dellenbaugh sandwort</b>	<i>Arenaria aberrans</i>	Potential
<b>Rusby's milkvetch</b>	<i>Atragalus rusbyi</i>	Potential
<b>Flagstaff pennyroyal</b>	<i>Hedeoma diffusum</i>	Potential
<b>Arizona sneezeweed</b>	<i>Helenium arizonicum</i>	Potential
<b>Eastwood alum root</b>	<i>Heuchera eastwoodiae</i>	Potential
<b>Flagstaff beardtongue</b>	<i>Penstemon nudiflorus</i>	Potential
<b>Mt. Silverspot butterfly</b>	<i>Speyeria nokomis nitocris</i>	Potential
<b>Tiger beetle</b>	<i>Cicindela hirtocollis corpuscula</i>	Potential
<b>Maricopa tiger beetle</b>	<i>Cicindela oregona maricopa</i>	Potential
<b>Blue-black silverspot butterfly</b>	<i>Speyeria nokomis nokomis</i>	Potential
<b>Early elfin butterfly</b>	<i>Incisalia fotis</i>	Potential
<b>Spotted skipperling</b>	<i>Piruna polingii</i>	Potential

## Migratory Birds

[#101]

On January 10, 2001, President Clinton signed Executive Order #13186 for the “Responsibilities of Federal Agencies to Protect Migratory Birds” which directed the federal agencies to develop an MOU with the US Fish and Wildlife Service to promote conservation of migratory birds. Agencies shall identify potential impacts to migratory birds and their habitats, avoid or minimize adverse impacts, restore and enhance habitats, and evaluate the effects of actions on migratory birds. Where they exist, other analyses should be used, such as the Arizona Partners in Flight Conservation Plan.

The Arizona Partners in Flight Bird Conservation Plan (Latta, 1999) identifies priority species by habitat for the state of Arizona. Habitats that are found within the Buck Springs Range Allotment include: mixed conifer, ponderosa pine and pine-oak, aspen, and high-elevation riparian. Priority species were chosen based on a set of 11 criteria that evaluated all of Arizona’s native landbirds based on population trend, distribution, threats to the species, and the importance of Arizona to the overall status of the species. These criteria then generated a species ranking list. Species were grouped by habitat association and the top ranking species in each habitat were designated as priority species. Table 13 lists the priority species for each of the habitats found in the Buck Springs Allotment.

**Table 13: Arizona Partners In Flight designated priority species by habitat.**

<b>HABITAT</b>	<b>PRIORITY SPECIES</b>
<b>Mixed Conifer</b>	Northern Goshawk Mexican Spotted Owl Olive-Sided Flycatcher
<b>Ponderosa Pine and Pine-Oak</b>	Northern Goshawk Olive-Sided Flycatcher Cordilleran Flycatcher Purple Martin
<b>Aspen</b>	Red-Naped Sapsucker
<b>High Elevation Riparian</b>	Common Black Hawk Elegant Trogon Southwestern Willow Flycatcher MacGillivray’s Warbler Red-Faced Warbler

Of the priority species listed, the northern goshawk, Mexican spotted owl, and southwestern willow flycatcher are addressed under threatened, endangered, and sensitive species. The elegant trogon is restricted to high elevation riparian habitats in southeastern Arizona and its range does not include the vicinity of the allotment. The common black hawk is found on the Coconino National Forest, and frequents portions of the Long Valley Ranger District to the west. It has not been found on the Buck Springs Allotment, which is probably too high in elevation and has too dense of canopies to

support the hawk. The olive-sided flycatcher, Cordilleran flycatcher, purple martin, red-naped sapsucker, MacGillivray's warbler, and red-faced warbler remain as species to be addressed, and all have breeding populations on the Buck Springs allotment.

There are no Important Bird Areas (IBAs) in the projects area. IBAs are specific areas that are nominated and designated as areas that are important to birds on a national level, though the importance may be local in nature. The nearest IBA is located at Mormon Lake approximately 30 miles northwest of the allotment. There are also no areas that are important as overwintering areas on the allotment.

## **AQUATIC WILDLIFE AND FISH (Fisheries Specialist's Report [#25])**

The allotment drains south to north into East Clear Creek by way of several major tributaries (McCarty Draw, Miller and East Miller Canyons, General Springs Canyon, Bear Canyon, Houston Draw, Barbershop Canyon, Dane Canyon, Yeager Canyon, and Leonard Canyon). West and Middle Leonard Canyons, Buck Springs Canyon, and Limestone Canyon drain northeast into Leonard Canyon, forming the eastern boundary of the allotment. For the most part, these drainages sustain flowing water interrupted by dry stretches through the drier summer months. Even under the driest of years, some of these drainages contain isolated pools. Several springs keep many of the drainages watered during years with a good snow pack. Substantial summer "monsoon" rains maintain pooled water through intermittent and/or ephemeral flows.

Two dams were constructed in the early 1960's within the East Clear Creek watershed. Phelps Dodge constructed the Blue Ridge Reservoir (BRR) as a water source for the corporation's use. At full capacity, water backs up into ECC, Bear Canyon and General Springs Canyon. The second dam is located near the headwaters of Leonard Canyon and forms Knoll Lake.

### **Species Identification**

Fishes found within East Clear Creek and Leonard Canyon subwatersheds, associated with the Buck Springs Allotment, include at least nine species (Table 14, Minckley 1993, Rinne and Minckley 1991). The first four species in the table are native to Arizona, while the last five are non-native, introduced species. As shown, *Lepidomeda vittata* (Little Colorado spinedace) is the only Federally listed species (USDI 1987). *Rhinichthys osculus* (speckled dace) and *Catostomus sp* (Little Colorado sucker) are species of special concern. Given the status and special interest surrounding the Little Colorado spinedace, the majority of the following information addresses the situation for this spinedace.

Other fishes have been stocked within the ECC watershed over the past few decades. These other species included such fishes as *Salvelinus fontinalis* (brook trout), *Oncorhynchus clarki* (cutthroat trout), *Thymallus arcticus* (arctic grayling), *Ictalurus punctatus* (channel catfish), and *Micropterus salmoides* (largemouth bass). The earliest of these stockings was *O. clarki* in 1937 in Barbershop Canyon, and the latest was *I. punctatus* in 1991 in ECC. None of these other stocked fishes have shown up in recent AGFD survey collections. Habitats of the fish species can be found in the fisheries specialist's report [#25].

### **Occurrence of the Little Colorado Spinedace**

The Little Colorado spinedace is found only in the north-flowing tributaries and the upper mainstream of the Little Colorado River (Miller and Hubbs, 1960 in Minckley 1973). The "remarkably variable occurrence" (Minckley 1993) of spinedace populations, over time, is illustrated by historical accounts and survey information (Miller and Hubbs 1960,

Minckley 1973, Miller 1963, Denova and Abarca 1992). These accounts and surveys indicate that use of fish poisons, the introduction of exotic species, changes in stream flow, and prolonged drought in the early 1970's have contributed to the decline in the species.

**Table 14: Status of fish species found in the East Clear Creek Watershed.**

COMMON NAME	SCIENTIFIC NAME	STATUS <sup>1</sup>
<b>Little Colorado Spinedace</b>	<i>Lepidomeda vittata</i>	Federally Threatened
<b>Little Colorado sucker</b>	<i>Catostomus sp</i>	Wildlife of Special Concern in Arizona
<b>Speckled Dace</b>	<i>Rhinichthys osculus</i>	Forest Service Sensitive
<b>Bluehead Mountain-Sucker</b>	<i>Pantosteus discobolus</i>	No Status
<b>Rainbow Trout</b>	<i>Oncorhynchus mykiss</i>	No Status
<b>Brown Trout</b>	<i>Salmo trutta</i>	No Status
<b>Golden Shiner</b>	<i>Notemigonus crysoleucus</i>	No Status
<b>Red Shiner</b>	<i>Notropis lutrensis</i>	No Status
<b>Fathead Minnow</b>	<i>Pimephales promelas</i>	No Status

Consultation between the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service in 1994 concerned the stocking of rainbow trout in the Blue Ridge Reservoir and Knoll Lake and impacts to the Little Colorado spinedace. Trout stocking was halted for two years, then resumed in 1996, following receipt of a "no jeopardy" opinion from the USFWS (USDI 1997b). The AGFD has implemented management strategies aimed at providing a sport fishery in the two lakes while reducing impacts to the Little Colorado spinedace. Three permanent fish survey stations lie adjacent to the north central boundary of the allotment (AGFD 1992, 1994, 1997).

### Recovery Plan

A recovery plan (USDI 1998) for the Little Colorado spinedace was approved January of 1998. This plan describes reasons for decline of the species, including changes to the watershed through management activities such as dam construction, road construction, logging, and overgrazing by ungulates. These activities affect the watershed through changes in water quality and quantity, channel modifications, sediment loading, increased peak flows, reduced water storage within riparian areas, and reduced base flows. The

<sup>1</sup> **Federally Threatened:** Federally listed under the Endangered Species Act (1973) as threatened  
**Wildlife of Special Concern in Arizona:** Arizona Game & Fish Department classification pending revision to Article 4 of the State Regulations).  
**Forest Service Sensitive:** Forest Service sensitive species, USFS, Southwestern Region, Regional Forester's List (1988).

goal of the plan is to protect and restore spinedace populations and habitat conditions. Among the many steps needed for the recovery of the spinedace, the plan identifies the need to alter and/or remove negative impacts associated with overgrazing and destruction of the riparian corridors.

The elements of the recovery plan were analyzed in more detail for the East Clear Creek watershed in the document *East Clear Creek Watershed Recovery Strategy for the Little Colorado spinedace and Other Riparian Species* (USDA 1999a). The document recommended specific actions to be considered in the allotment to move toward recovery of the threatened fish. Some of these are incorporated into the Buck Springs Range Allotment Analysis.

### **Other Species of Concern**

The speckled dace is a small fish of streams and creeks, widely distributed in western North America. It is generally found in riffles or below riffle habitats of stream, where it feeds on both plant material and small aquatic invertebrates. During drought years this fish becomes very scarce but rapidly recolonizes favorable habitats when conditions improve. Adult speckled dace are capable of holding their position during floods, though young are often washed great distances down stream. It is a fairly common species in the East Clear Creek watershed.

As its name implies, the Little Colorado sucker is found only in the Little Colorado drainage, which includes East Clear Creek. It has been proposed as a Category 2 species and it is likely that it will be accepted. Little is known about the species or its habitat. It apparently likes pools with abundant cover, spawns in the spring, and the young move into slow moving riffles. It has not been described as a species and is found in East Clear Creek.

### **RECREATION USE AND VISUAL QUALITY (Recreation Specialist's Report [# 30])**

The Coconino National Forest Plan lists the Recreation Opportunity Spectrum classes within the allotment as Roaded Natural, (RN) and Semi-Primitive Motorized (SPM) throughout most of the allotment, with Semi-Primitive Non-Motorized (SPNM) in the canyons. Visual Quality Objective (VQO) Designations include Retention and Partial Retention along major roads and their viewsheds. A designation of Modification covers the remaining areas of the allotment. A Retention VQO provides for management activities that are not visually evident while a Partial Retention VQO requires that management activities remain visually subordinate to the characteristic landscape.

The Buck Springs Allotment is within the East Clear Creek Watershed, which offers a wide variety of recreational opportunities, from developed campgrounds and reservoirs, to dispersed camping, hiking, and outdoor activities.

There are two developed campgrounds within the allotment. The Rock Crossing Campground sits above the Blue Ridge Reservoir and within a short drive of the boat ramp and access. Trails lead to popular fishing spots. The Knoll Lake Campground is located on the southeastern boundary of the allotment, on Knoll Lake. Boating and fishing are popular activities on the lake.

Dispersed recreational use can be characterized by the common themes of summer activities, winter activities, consumptive uses, and educational/personal development type activities.

An estimated 70% of the visits to the area occur during the summer season (Memorial Day to Labor Day). It is estimated that a full 90% of the users are Arizona residents, with many users returning to their favorite sites or settings on an annual basis. Recreational activities include: hiking; viewing wildlife; dispersed car-camping; backpack camping; water-based activities such as boating, canoeing, and water play; orienteering; horseback riding, caving, rock climbing, photography, picnicking; taking scenic drives; bicycling; off highway vehicle travel; shooting; and gathering in family or social groups.

The local hunting seasons last from about mid-August through December and account for much of the fall visitors to the area. The winter snow pack generally limits access from most recreational users from mid-December to mid-March and limits access to snowmobiles during most winters.

The gathering of forest resources often ties subsistence with the pursuit of recreation. Consumptive uses within the allotment include: firewood cutting, post and pole cutting, Christmas tree cutting, collecting boughs and cones, collection and transplanting of wildlings, collection of native mineral resources (i.e.: sandstone, chert), fishing, hunting, gathering antlers, collecting food and medicinal resources, and collecting biological specimens for research.

Some visitors desire to learn more about the natural and cultural history of the area. These users may visit natural viewpoints, explore historic sites, or view nature programs. Others utilize the outdoor setting to develop skills in a variety of recreational pursuits. Still others seek restorative experiences and put a high value on solitude, fresh air, healthy vegetation, a comfortable temperature, and the smells and sounds of nature.

## **SOCIAL CONCERNS AND ECONOMIC INFLUENCES** **(Recreation Specialist's Report [#30])**

### **Social Concerns and Perceptions**

Social concerns for livestock grazing use are related to public perception of the appropriate use of public lands, customs and traditions of the area and the community and ranching life-style in relation to forest resources. Based on comments from local residents and forest visitors, there is a wide variation in reactions to cattle on the Forest. To the visitor traveling along the highways or backroads, cattle may be thought of as

picturesque and typical of the “western life-style”. But to someone who dislikes any kind of “un-natural” structures or animal on the landscape, the presence of cattle disrupts their perception of the Forest as a wild place. Some people object to livestock grazing of western public lands based on ecological concerns, such as damage to riparian areas, watersheds and wildlife habitat, which can be caused by poorly managed livestock use. However, to those whose economic and social well-being is tied to the land, and to ranching in particular, livestock use is perceived as part of everyday life. Based on responses to the proposed action for the Buck Springs Range Allotment, there appears to be overall public acceptance of livestock grazing as long as the animals are controlled, impacts to all resources are considered and monitored, and sensitive areas (especially riparian areas) are protected from unwanted impacts.

The allotment is located in an isolated area of the Forest that is a popular recreation area for local residents and people from the Phoenix area. Two developed campgrounds, two reservoirs, and a few isolated private parcels are located here. Many people recreate in dispersed areas as well. Occasionally, there are conflicts when ATV users cut fences, or recreationists leave gates open that are needed to keep livestock in the appropriate pastures.

### **Economic Influences**

The economy of Northern Arizona has long been tied to agricultural-based activities such as ranching and logging. With urbanization and the associated changes in values have come changes in the economic base of this area. Tourism is now considered the leading industry in Northern Arizona. However, domestic livestock grazing still contributes to the livelihood of the permittees, their employees and employees of ranching-based services, as well as directly and indirectly to the economy of the local communities and counties.

### **The Ranch**

The permit holder has this allotment, as well as a primary ranch in the Wickenburg area. Though not solely dependent on revenues generated from this allotment, his livelihood is completely tied to the ranching industry. In addition, he has one ranch worker who is totally dependent on this allotment for his livelihood, and several seasonal employees who work on a part-time basis. The Ranch contributes to the local and regional economy by providing jobs, directly through the ranch operation and indirectly through purchases and investments in the Ranch and spending by employees in the local community.

In addition, the Forest Service pays a portion of the fees collected from grazing permits (25%) in lieu of taxes to Coconino County each year. Although these fees are only a part of the total payments made by the Forest Service, the revenue gained by the county is important to highway maintenance and school budgets.

## **Recreation Use**

Recreation users contribute to the economy when they purchase hunting and fishing licenses and permits, pay fees at the campgrounds and purchase goods and services needed for particular activities. Indeed the revenues generated by hunting and fishing in Arizona alone are estimated by Congressional Sportsman's Foundation as equal to \$140/resident, with added tax revenues equal to \$16/resident (CFS 1998). Many of these purchases are made locally, but may be made at other locations throughout the State and region.

## **WILD AND SCENIC RIVERS**

**[# 29]**

Coconino National Forest personnel evaluated East Clear Creek, Leonard Canyon and Barbershop Canyon in 1993 for their outstanding remarkable values (ORVs) and for potential Wild and Scenic River recommendations. In the *Preliminary Analysis of Eligibility and Classification for Wild, Scenic, and Recreational River Designation*, East Clear Creek has been recommended for status as "wild" due to its fisheries habitat and scenic values. Leonard Canyon was recommended for "recreational" status with the ORV of fisheries habitat values. Barbershop Canyon was considered eligible for a "wild" classification, due to the ORV of scenic values, and threatened and endangered species habitat. Further analysis of the eligibility and classification of these creeks is planned during revision of the Coconino National Forest Plan.

## **INVENTORIED ROADLESS AREAS**

**[#104]**

Inventoried Roadless Areas (IRA) have been delineated for the Coconino National Forest. These areas were first delineated under the RARE II roadless area review process in the early 1980's. The original designation as roadless areas have been included in the proposed Roadless Area policy formulated under the Clinton administration. This proposed policy is currently under review by the Bush administration and is also under litigation.

The Buck Springs Range Allotment contains one complete IRA and a portion of another IRA within the boundaries of the allotment. The 1,310 Barbershop IRA lies completely within the boundaries of the allotment. A total of 309 acres of the 2,035 acre East Clear Creek IRA lies within the boundary of the allotment. These two IRAs were considered for inclusion into the Wilderness System under the Arizona Wilderness Bill in August of 1984, but were not included because they were considered too small. The Coconino National Forest is committed to maintaining the roadless character of these areas.

## **ENVIRONMENTAL JUSTICE**

**[#74]**

Environmental justice ensures that Forest Service programs, policies, and activities affecting human health or the environment do not exclude minorities and low-income groups from participation in or the benefits of programs or activities based on race or economic status.

Native Americans in the area (such as Navajo and Hopi) use the allotment area for the collection of plants and plant parts for medicinal and cultural activities. The primary roads are accessible for handicapped drivers, though “Texas-style” gates on side roads may pose some barriers. Low-income groups may use the area for collection of forest products, such as fuelwood. Local residents also use the area to collect fuelwood.