

Chapter 2 - The Historical Geography of the Southwest

The Southwest—Arizona, New Mexico, and the grasslands of northwestern Texas and southwestern Oklahoma—offers the view of an arid or subhumid region of vast plains that are often desert, interspersed by rugged mountain ranges between which lie even more rugged arroyos or gullies (the classic “badlands”), created by the erosion from wind and water.

When they think of the Southwest, most Americans do not think of forests. W.L. Emory, for example, who conducted perhaps the first “official” American expedition into the Southwest with the Army of General Stephen W. Kearny in 1846, reported that the region through which the column traveled was largely destitute of usable timber and forests. Americans assumed incorrectly from such reports that the entire Southwest was a desolate region. On the contrary, New Mexico, with a total land area of 121,666 square miles, includes approximately ten million acres (15,625 square miles) or about one-eighth of the total of forested lands within the National Forest System. Arizona, with a land area of 113,956 square miles, includes 11,392,000 acres (17,800 square miles) of forests within the National Forest System. Southwestern forests are extensive and are in many respects unique in the United States. The Southwest is, in fact, a land of extraordinary environmental and cultural diversity.

Range In Elevation

One of the most significant natural features of the Southwest is the extreme range in elevation—rising from 141 feet above sea level at Yuma, Arizona, to between 11,500 and 12,000 feet in the White Mountains and at Mount Taylor in the Cebolleta Mountains of New Mexico, and to 12,670 feet in the San Francisco Mountains, with the highest elevation of 13,161 feet at Mt. Wheeler in the Sangre de Cristo Mountains in northern New Mexico. Another major characteristic of the Southwest is the basically arid climate with subhumid rainfall. The region averages 14 inches of rainfall annually, with precipitation less in the lower elevations and greater in the higher elevations. Much of northern Arizona and New Mexico is part of the Colorado Plateau, featuring the mountains and deep river canyons also characteristic of the Rocky Mountain regions of Utah and Colorado. Southern Arizona includes the distinctive Sonoran Desert section, which includes much of northwestern Mexico and southeastern California. The desert is often subdivided into seven regions, two of which lie in Arizona: the Lower Colorado Valley and the Arizona Upland. In the Lower Colorado Valley, rainfall averages less than 5 inches, and averages 7 to 12 in the more mountainous Arizona Upland. These regions are not forested, except in the high mountains. The distinctive high plains, the Llano Estacado of New Mexico, are also treeless.

River Systems

Additional prominent geophysical features of the Southwest are, of course, the river systems. There are two great river systems that originate outside the region, the Colorado River in Arizona and the Rio Grande in New Mexico. The Grand Canyon was carved through northern Arizona by the turbulent Colorado River. The awesome Rio Grande Gorge in northern New Mexico was created by the Rio Grande River, which traverses the state at an increasingly leisurely pace as the river flows from north to south. The Pecos and Gila rivers originate in the Southwest. One of the Southwest’s most scenic areas is the Pecos River Valley, which flows from the Sangre de Cristo

Mountains in north central New Mexico southward into the Rio Grande in Texas. The Gila River and its main tributaries drain most of southern Arizona. Arizona and part of New Mexico sit on the west slope of the Continental Divide and most of New Mexico on the eastern slope. Waters of the Colorado and Gila flow westward to the Pacific, and waters of the Rio Grande and Pecos flow to the Gulf of Mexico. The Southwest is not one vast desert, but a region of great rivers, mountains, and tall forests, juxtaposed with desert and upland plains.

Six Life Zones

Rainfall and altitude differences are the key to the distinctive life zones in the Southwest. There are basically six such zones distinguished variously as the Lower Sonoran, Upper Sonoran, Transition, Canadian, Hudsonian, and Arctic-Alpine. The Lower Sonoran zone is the distinctive desert area of Arizona, with elements in the Rio Grande Valley below Socorro, and in the Pecos Valley. Lizards, kangaroo rats, some mesquite, black grama, creosote brush, and desert plants are predominant life forms. The Upper Sonoran (or Arizona Upland) zone offers slightly higher elevations and greater rainfall and can be characterized by improved grasslands (buffalo grass) and some pinyon and juniper. Where there were formerly buffalo, now mule deer, white-tailed deer, and antelope inhabit the zone.

The Chaparral zone, a belt of closely spaced shrubs, including live oaks, mountain-mahogany and birchleaf mountain-[cercocarpus] mahogany, desert ceanothus, hollyleaf buckthorn, and manzanita, among others, often provides a transition to the more broadly construed Transition zone. Here elevations run 4,000 to 8,500 feet on the northeastern slopes, and 5,000 to 9,500 feet on the southwestern slopes. This zone is often synonymous with the vast pinyon-juniper type, which comprises 32 percent of the region's total area, and the ponderosa pine type, of which the Southwest has the largest unbroken stands in the world.

At higher elevations, roughly 8,500 to 9,500 feet, is the Canadian zone, of Engelmann spruce and Douglas-fir. Somewhat higher still, the dwarfed spruce and in some areas the bristlecone pine survive along the cold and craggy peaks in the Hudsonian Zone, and finally, the Arctic-Alpine zone is the treeless zone above the timberline, which often retains snow late into summers. There are relatively few such zones or peaks in the Southwest. The timbered areas of the Southwest, most of which are encompassed by the national forests, lie at elevations of 6,000 to 10,000 feet.

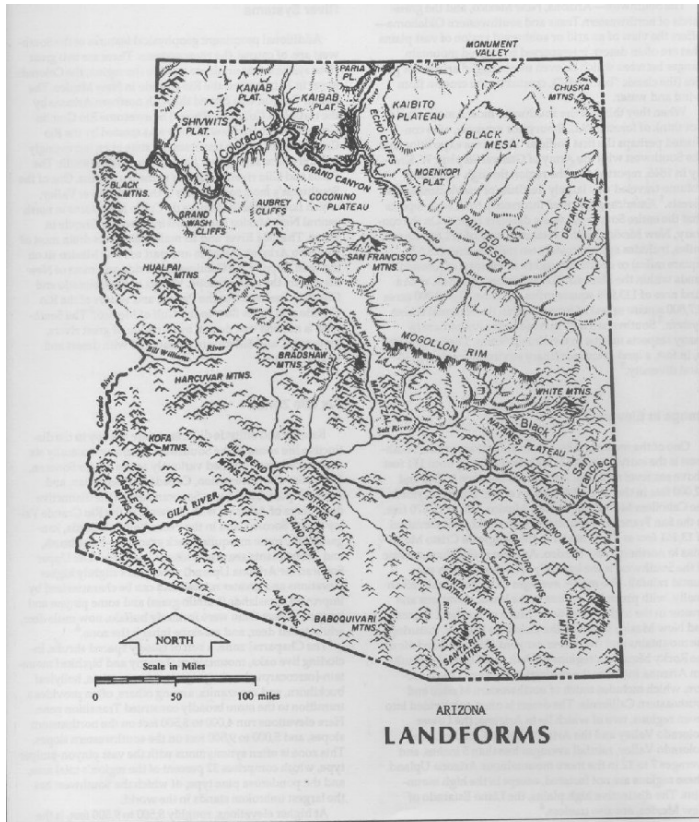


Figure 1 –Landforms of Arizona (adapted from Historical atlas of Arizona, Henry P. Walker and Don Bufkin.

stream courses ceased building flood plains and instead began to trench channels. The depletion of vegetation cover and the substantial elimination of beaver, as well as the development of travel routes in the bottoms, likely contributed to the change. The channeling, in turn, lowered the water table, and streams became intermittent and dry, farm lands washed away, and marshes disappeared with their fish and fowl. Even earthquakes, such as the quake of May 1887, slightly changed the topography of the mountains. Great slices of the mountains gave way and went tumbling into the canyons. The visible consumption of grasslands, timber, and minerals, and appreciation of the scenic beauty of the wilderness, also contributed to the move for conservation. The relatively fragile geophysical and climatic environment of the Southwest has affected the relationship of people to the land.

Although the Southwest is indeed a varied and diverse land, capsule accounts and narratives from the earlier years denote the great beauty, the ruggedness, and often the desolation of the area. Friar Marcos de Niza, in 1539, described the area near the present White Mountain Apache Reservation in Arizona as having “a most plain soyle, without trees or stones . . . where there is no foode.” But he was given “nuttes of Pine trees” or pinyon nuts to eat. A later account of the de Niza expedition describes the large walnut trees, the mountain grapes, partridges, geese, cranes and “other winged creatures”-a terrestrial paradise. Casteneda, a member of Coronado’s expedition, described the country as a “wilderness covered with pine forests,” and having an “oak with sweet acorns of which they make cakes like sugar plums with dried coriander seeds.” Coronado wrote in August of 1540 of the “fresh rivers and grass like that of Castile.”

If the reports of American explorers such as Lt. W.H. Emory in 1846 and Capt. L. Sitgreaves in 1854 were somewhat less enthusiastic in their descriptions, it could well be in part due to the attrition and depletion of natural vegetation and fauna 300 years later. In his journey down the Colorado in 1854, beginning in the San Francisco Mountains, Sitgreaves said that the “whole country from the San Francisco Mountains was barren,” “arable land ... is greatly encroached upon by extensive flat spurs, hard, gravelly, and destitute of vegetation,” while only “two kinds of grass were found at rare intervals and in small quantities” and that had a “perceptible incrustation of salt upon the leaves.” But if these reports lacked enthusiasm, newspaper accounts and immigration brochures of the 1870’s and 1880’s waxed eloquent in their descriptions of the natural beauty and riches of Arizona and New Mexico.

Inventories Made

Despite the great immigration of Anglo-Americans into the Southwest between 1865 and 1900, the development of mining camps, the expansion of railroads, and the growth of lumbering industries, even in 1900 the region appeared on the surface to be unchanged and impervious to it all. Between 1902 and 1909 inventories of the physiographic features, birds, vegetation, and mammals were prepared by foresters and scientists E.A. Goldman, Vernon and Florence M. Bailey, James H. Gant, and N. Hollister. They are remarkable for their completeness and the accuracy of the descriptions and scientific identities. Extracts from these documents give a real sense of segments of the country as it was when the national forests came into being.

Hollister describes the Wingate Station area, in June 1905:

Wingate station, on the Santa Fe [Railroad], lies in about the center of the valley of the Rio Puerco, three miles north of Fort Wingate, near the edge of the military reservation. The flat valley at this point is about two miles wide with a gradual raise north and south to the higher hills. The altitude at the station, practically, the lowest point, is about 7,000 feet. Most of the valley is barren of trees, but low ridges, locally known as “hog backs,” extending from both

sides close to the banks of the Puerco, are covered with good growth of junipers. To the south the junipers become more plenty on the lower foothills between the station and fort, and about the fort, some higher than the river bottom are abundant mixed with many small oaks and the pinon [*Pines edulis*]. Immediately back of the fort, to the south, the mountains suddenly rise, and the pinons, junipers and oaks cover its north slope.

Near the summit, Hollister noted the sudden change of vegetation to yellow [*ponderosa*] pine. This forest of pine, he said, extended as far to the south as he was able to observe, and by all accounts he gathered the forest continued in every direction west, east, and southeast to the northern point of the Zuni Reservation and into the Zuni Mountains. "The line between what appears to be an Upper Sonoran and the typical Transition zone is well drawn and runs almost exactly east and west." He described characteristic mammals and birds of the Upper Sonoran zone as "*Peridipus*, *Perognaltus*, *Neotoma*, *Lepus psaltriparius*, *Astragalinius psaltria*, etc.," and in the Transition zone were "*Erethizon*, *Lynx*, *Serirus*, *Entamias*, *Sixta*, *Dryobates*, etc." Separate inventories were made of birds and mammals sighted or known to be in the region.

Turkeys Were Common

During the "seasons of plenty" of pinyons and acorns, turkeys were fairly common in the timbered areas, Hollister said. They were never seen about in the summer. The Navajo, he commented, did not bother the turkey for they "never eat any kind of a bird." Swallows were abundant, particularly along the barren cliffs of Mesa Butte, and occasional buzzards, horned owls, swifts, and sparrow hawks were among the some 41 bird specimens he observed. The peccary was a wild pig-like animal reported to be no longer in the region. Mule deer were formerly common but had become less evident. Hollister noted that the Laguna and Acoma Indians formerly hunted deer and harvested more than a hundred in their annual hunt, but the "new game laws have stopped their practice and very few deer are now brought into Laguna."

Antelope had also disappeared from the region but could be found further south. Squirrels, chipmunks, various varieties of mice, rats (very common), "*Microtus mogollonenses*" (very rare, a kangaroo rat), porcupines, jack rabbits, and cottontails were evident. Mountain lions (*Felis*) were infrequent, lynx were fairly common, coyotes (*Canis*) were plentiful in the lower mesas, while big wolves (*Canis*) were reported to be seen near Laguna, but rarely. Bear (*Ursus*) were abundant, and many had been killed in the San Mateo Mountains because of their attacks on sheep and livestock. "Only last summer," Hollister said, "a sheep herder was nearly killed by a large bear." Both black and brown bears are reported and stories of silver-tips and grizzlies circulated.

In his inventory of bird life in the Laguna region, Hollister reported a band-tailed pigeon, a few turkeys, an adult goshawk, and one red-tail hawk, and said that golden eagles were seen daily. At one time near Mt. Taylor, four golden eagles were in sight at once. The Laguna region he described as:

divided between the San Jose Valley and lower mesas and the higher mesas and mountains to the north and northwest. The valley proper and lower mesas are typical arid, sandy Upper Sonoran country, with very little vegetation excepting weeds and junipers, outside of the small plots irrigated by the Laguna Indians, ... To the south this sort of country stretches for many miles in a succession of gradually rising mesas, covered with junipers and pinons, to the mountains some fifty miles away.

At the base of the San Mateo Mountains a scattering of ponderosa pines began at the 7,500 to 8,000 foot level, and at higher elevations the pines became larger and thicker, until they suddenly gave way to a belt of quaking aspen at about 9,000 feet. The Transition forest, he said, was replaced by a true Canadian zone with no pines of any species [although he may have overlooked the bristlecone and southwestern white pine], but a solid, dark forest of Douglas-fu with little underbrush or grass. The “spruce” extended almost to the summit, where there were “beautiful grassy” plateaus and mountain pastures of considerable area.

Other Wildlife

In 1906, Vernon and Florence Bailey conducted similar surveys of the San Mateo Mountains from Laguna to Acoma. They found many of the same species, but near old Fort Tularosa green-winged teal, sandpipers, killdeer, grouse, and doves lived at lower elevations, which had more abundant ground water. But eagles, hawks, and a burrowing owl were seen there too. In the Manzano Mountains, James Cant found a small number of black-tail deer, pine and rock squirrels, rabbits, prairie dogs, and occasional but elusive panther (*Felis hippolestes*) and lynx were reported. Cant said that until 1898 a large pack of timber wolves inhabited the northern slopes and caused considerable losses to cattle and sheep. Concerted efforts by the herders had thinned the pack considerably, until only isolated specimens were still around.

E.A. Goldman described the Zuni Mountain area as a “high group” along the Continental Divide, separated into a western range or “Bear Ridge” and an eastern range separated from the western by the upper Bluewater and Cottonwood creek valleys. Mt. Sedgwick, at 9,350 feet, was the highest peak, while Round Top Mountain in the eastern range reached about 9,100 feet. On the eastern range, water flowed to the Rio Grande, and on the west, into the Little Colorado. Most of the forests were of the transition type. His reports on the Socorro describe a country in the Lower Sonoran zone, more arid and with few trees. The region between the Socorro and the Magdalena mountains he described as a gently sloping treeless plain from which the mountains rose abruptly to an elevation as high as 10,000 feet. Unlike other surveyors, Goldman made detailed notes of agricultural practices and possibilities in the areas he surveyed.

North Kaibab Plateau

Perhaps one of the most distinctive areas of the forested areas of the Southwest is the North Kaibab Plateau, located on the north side of the Grand Canyon. And one of the most distinctive and unique inhabitants of the Kaibab Plateau is the Kaibab squirrel, an animal indigenous to the island of ponderosa pine immediately north of the Grand Canyon. Dr. D. Irvin Rasmussen, a noted wildlife biologist, described this unique, large, tassel-eared squirrel in 1941. One noteworthy aspect of the early wildlife inventories was the relative scarcity of deer, a fact duly noted by foresters and wildlife conservationists, and which led to game laws and restocking and a remarkable regeneration of deer herds, the most famous of which became the Kaibab deer. The Kaibab deer herd, as will be seen, becomes a controversial factor in the history of the Forest Service in the Southwest. The 1931 description of the North Kaibab region by Walter G. Mann, former Forest Supervisor of the Kaibab National Forest, provides a useful juxtaposition to the early surveys just reviewed. It also helps create a vivid image of the physical geography of another segment of the Southwest.

Mann described the area sitting on the Kaibab Plateau as a highland peninsula extending from Utah down into the lowlands of Arizona. Elevations ranged from 6,500 to 10,000 feet, with an average elevation of 8,000 feet. The plateau, he said, was 60 miles long from north to south and

15 to 25 miles wide east to west. The northern 50 miles lay within the Kaibab National Forest and the southern 10 miles within the Grand Canyon National Park. Cattle ranged the plateau in the summer and were herded to lower regions for the winter. "The eastern edge of the plateau is marked by steep slopes and escarpments that drop away into the winter ranges of South Canyon and Houserock Valley," while the western side of the plateau sloped gradually to Kaibab Creek Canyon. The westward slope has "numerous long canyons or draws" running east to west. An area known as the "Sand Rocks" are "slopes and benches" below the rims of the large canyons at elevations of 3,000 to 3,500 feet. The plateau contained natural barriers or effective "fences" for wildlife-Grand Canyon to the east and south, Kanab Creek and Snake Gulch on the west and northwest, and the gradual slope of the plateau to elevations of 6,500 feet on the north, which tended to discourage migration of wildlife.

Mann estimated that there were 1.5 billion board feet of timber in trees 12 inches in diameter or more on the summer and fall ranges of the Kaibab. Species included in his estimate were ponderosa pine, Douglas-fir, white fir, blue spruce, and Engelmann spruce. The total tree stand included trees of all ages from seedlings to old trees. Ponderosa pine grew principally at 7,000 to 8,500 feet. At 8,500 to 10,000 feet blue spruce, Engelmann spruce, white fir, and alpine fir dominated. Below 7,000 feet pinyon and juniper grew. Quaking aspen grew in clusters throughout the spruce-fir types, and in part of the ponderosa pine. At higher elevations timber was so thick that forage for wildlife was extremely limited. Most wildlife forage was found in open mountain meadows and along the edge of timbered areas.

As for the climate, Mann noted that summer rains began in July and were frequent in the plateau country. Summer nights were cool. Frosts could occur as early as July. Light snow could be expected in October. "Snow at the VT Ranch was three to eight feet deep in winter," he said, and ran two to four feet at Jacob Lake. In the higher ranges a foot of snow could fall at a time during the winter, but temperatures usually remained above zero.

The vegetation in the ranges outside of the Kaibab National Forest was chiefly sagebrush and grama grass, with some juniper. The adjoining ranges discouraged wildlife from migrating from the Kaibab, as did the physiography. Mann described the vegetation on the summer range of the Kaibab Plateau as heavily timbered with conifer trees but with numerous open grassy parks or valleys. Aspen was mixed with the conifers. Underbrush such as snowberry, currant, and locust grew in places, but scrub willow, once abundant, had disappeared.

On the eastern winter range in the lower country and including South Canyon and the slopes bordering Houserock Valley, heavy stands of pinyon and juniper give way to sagebrush and grama grass.

The west side winter range in the lower country from Grand Canyon to Snake Gulch included pinyon, juniper, and oak changing to cliffrose, sagebrush, and grass on the lower slopes.

Mann included notes on the "North End Winter Range," the "Spring and Fall Range," and the "Sand Rocks," where forage consisted primarily of black brush, rabbit brush, and scattered juniper, cowania, oak, grasses, and weeds. A brief historical overview explains the usages of the forests before the advent of the National Forest Service administration in 1905:

In the early days the Kaibab Plateau was a great Indian hunting ground. There is an old Indian legend that the Kaibab was made especially for Indians and given to them by the Great Spirit, and then, because of something they had done, or not done, it was taken away. Every fall the Indians would gather to a great ceremonial feast and take skins for winter clothing and meat for winter food. Old timers in the Kanab country state that they have seen great

numbers of deer carcasses in piles at these Indian camps-as many as a thousand carcasses in one camp. The white men also took great numbers of deer in the days of the early settlement. So great was the quantity of deer skins which actually came off the Kaibab each year that it was known as "Buckskin Mountain." According to the best information available from old timers, this condition prevailed to a considerable extent up to the creation of the game preserve. There were also large numbers of mountain lions which annually took their toll of deer.

Major Powell, who explored the Grand Canyon in 1870, named the plateau Kaibab for a small almost extinct tribe of Indians of the Pah Ute family who were living in that vicinity. The name Kaibab is of Indian origin and means "mountain lying down." Uncle Billy Crosby, who speaks the Paiute language and has been adopted into the tribe, states that the word is really "Katbabits."

The area was withdrawn as a National Forest on February 20, 1893, south of parallel 36° 30', which was extended on August 5, 1905, to include the present area. Very little was done toward administration until 1905.

By the turn of the 20th century, human society-Indian, Hispanic, or Anglo-had lived in the Southwest for at least 15,000 years. Elements of more contemporary cultures, particularly the Pueblo and Hispanic, survived and flourished with the new and expanding American society. While the numbers of people and the uses and consumption of the natural resources increased greatly in the relatively brief tenure of Anglo-American governance, the forests' mineral and water resources remained limited. When the USDA Forest Service assumed responsibility for most of the forested regions of the Southwest, it became a critical element in the historic processes by which a society adapted itself to and was affected by the lands that it inhabited. The Southwestern Region of the Forest Service found itself allocating limited resources, in terms of timber, minerals, water, grasslands, fish and wildlife, and recreational opportunities, to rapidly expanding populations.

Reference Notes

¹ Calvin Ross, ed., *Lt. Emory Reports* (Albuquerque: University of New Mexico Press, 1951), pp. 102-103, 154-155.

² Henry P. Walker and Dan Bufkin, *Historical Atlas of Arizona* (Norman: University of Oklahoma Press, 1979), parts 1, 54; Warren A. Beck and Ynez D. Haase, *Historical Atlas of New Mexico* (Norman: University of Oklahoma Press, 1979), parts 1, 59.

³ The point is well-documented in the "Tour Guide to the Human and Natural Resources Along the Santa Fe/Taos Highways," prepared by William de Buys for the 106th Annual Meeting of the American Forestry Association, October 11-14, 1981, Santa Fe, NM.

⁴ See Walker and Bufkin, *Historical Atlas of Arizona*, parts 3-8; and Beck and Haase, *Historical Atlas of New Mexico*, parts 2-7.

⁵ *Ibid.*

⁶ *Ibid.*

⁷ *Ibid.*, and see Anne E. Harrison, "The Santa Catalinas," unpublished manuscript (Sabino Canyon Visitor Center, 1972), pp. 16-19, 28-32.

⁸ Quoted in Mary Ellen Lauver, "A History of the Use and Management of the Forested Lands of Arizona, 1862-1936," master's thesis, University of Arizona, 1983, p. 22.

⁹ Harrison, "The Santa Catalinas," pp. 32-33.

¹⁰ George P. Winship, *The Coronado Expedition, 1540-42*, U.S. Bureau of Ethnology, 14th Annual Report, Part 1, p. 355, cited in Mary E. Lauver, ". . . Forested Lands of Arizona," p. 13.

¹¹ *Ibid.*, pp. 13-14.

¹² *Ibid.*, p. 14.

¹³ Capt. Lorenzo Sitgreaves, Report of an Expedition Down the Zuni and Colorado Rivers, pp.13,18, 21-22, quoted in Lauver, “. . . Forested Lands of Arizona,” p.16.

¹⁴ N. Hollister, “Physiography,” New Mexico: Wingate, June 18-29,1905, copies in Cibola National Forest.

¹⁵ *Ibid.*

¹⁶ *Ibid.*, and Hollister, “Mammals,” New Mexico: Laguna, August 7-20,1905, copy in Cibola National Forest.

¹⁷ Hollister, “Mammals.”

¹⁸ *Ibid.*, “Birds,” August 7-20,1905.

¹⁹ *Ibid.*, “Physiography.”

²⁰ *Ibid.*

²¹ Vernon Bailey and Florence M. Bailey, New Mexico: San Mateo Mountains, Laguna to Acoma, September 20-23,1906, copy in Cibola National Forest.

²² James H. Cant, “Mammals,” New Mexico: Manzano Mountains, October 3 to December 22,1903; E.A. Goldman, New Mexico: Socorro, and New Mexico: Magdalena Mountains, Aug.-Sept. 1909, copies in Cibola National Forest.

²³ *Ibid.*, “Physiography.”

²⁴ *Ibid.*

²⁵ The following material is quoted from Walter G. Mann, “The Kaibab Deer. A Brief History and the Present Plan of Management, 1931” (amended 1936, 1941), pp. 1-55; Williams, Ariz, Kaibab National Forest, File 1685; and Federal Records Center, Denver, Acc. No. 095-60D120; and see D. Irvin Rasmussen, ‘Biotic Communities of Kaibab Plateau, Arizona, Ecological Monographs 3 Quly 1941):229-275.

²⁶ *Ibid.*, p. 2.

²⁷ *Ibid.*

²⁸ *Ibid.*, p. 3.

²⁹ *Ibid.*, pp. 5-6.

³⁰ *Ibid.*, p. 7.