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PLANT COMMUNITIES OF SOUTHEASTERN ARIZONA

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INTRODUCTION

Southeastern Arizona is an area of isolated mountain ranges and intermontane basins. Sonoran Desert flora on the eastern and northern edge of the Mexican Plateau follow the valleys of major drainages into grasslands of the highlands. Chihuahuan Desert flora characteristic of the lower Rio Grande Valley in New Mexico intermingle with desert grassland above the upper limits of the Sonoran Desert zone. These two distinct desert flora are grouped together along with Mohave desertscrub to comprise the Lower Sonoran Life Zone with an upper elevation limit of 1,070 to 1,220 m (3,500 to 4,000 ft). The creosote-bush (Table 1) is everywhere conspicuous within this life zone and where abundant clearly delineates the boundary between the Lower and Upper Sonoran Life Zones. The Upper Sonoran Life Zone is comprised of grassland at its lower limit and evergreen woodland near its upper limit. The next elevation band of vegetation is the coniferous forest belt, extending from a minimum elevation of 2,000 to 2,150 m (6,500 to 7,000 ft), depending on slope exposure, to the tops of the highest mountain ranges (Chiricahuas, Huachucas, Santa Ritas, Santa Catalinas, Galiuros and Pinalenos).

Climate as well as topography has influenced the species composition in this part of Arizona. Two major continental climatic trends are present in this area, reflecting variations in climate to the east and west. In New Mexico summer precipitation dominates, while in California winter precipitation is dominant. In addition, there is a decrease in summer precipitation on a northward trend from tropical Mexico. Precipitation at Tucson is nearly bi-seasonal, grading to "California" precipitation (and vegetation) to the northwest. "Mexican" rains and flora follow a southeastern gradient from Tucson. Microclimates are also present. Air drainage from cold mountain summits to the valleys create "thermal belts" where saguaro cactus are abundant below mid-elevation on mountain foot-slopes. Slope exposure affects the upper and lower elevation limits of plant species. For example, oak-pine woodland is first encountered 365 m (1,200 ft) higher on the southern slopes of the Santa Catalina Mountains than on the northern slopes.

Soils also affect plant distribution. In the arid southwest, topography is the most readily observable factor in the development of desert soils. Rockland is predominant in the foot-slopes. Rocky, gravelly soils are characteristic of upper alluvial fans and are developed from parent material eroded from a single mountain range. The alluvial soils of the basins, derived from a larger area encompassing several mountain ranges, are finely textured. The soils at the edge of the flood plains or playa lakes and in upland areas at the lower end of the fans are also derived from mixed sources, but grade from the fine soils of the flood plains to the coarse textured soils of the upper fans. Above the rocky footslopes increased soil moisture begins to influence soil weathering, and organic matter content increases toward higher elevations.

SOUTHEASTERN ARIZONA LANDSCAPES

Desertscrub

The species comprising the desertscrubland (Lower Sonoran Life Zone) are considered to be more recent successional elements than the grassland, woodland and forest species. The coniferous forests are remnants of more extensive forests left behind by retreating continental glaciation. The oak-woodland and chaparral at mid-elevations and desertscrub are derived from flora to the south in Mexico and South America. Chi-

Table 1. Common and botanical names of flora in southeastern Arizona.

Common Name	Botanical Name
Perennial Grasses	
Dropseed	<i>Sporobolus</i> sp.
Grama	<i>Bouteloua</i> sp.
Muhly	<i>Muhlenbergia</i> sp.
Needlegrass	<i>Stipia</i> sp.
Trees and Shrubs	
Agave	<i>Agave</i> sp.
Alpine fir	<i>Abies lasiocarpa</i>
Arizona oak	<i>Quercus arizonica</i>
Ash	<i>Fraxinus Velutina</i>
Aspen	<i>Populus tremuloides</i>
Blue spruce	<i>Picea pungens</i>
Bristlecone pine	<i>Pinus aristata</i>
Chihuahuan whitehorn	<i>Acacia constricta vernicosa</i>
Cholla cactus	<i>Optuntia</i> sp.
Cottonwood	<i>Populus</i> sp.
Creosotebush	<i>Larrea divaricata</i>
Douglas fir	<i>Pseudotsugia taxifolia</i>
Emory oak	<i>Quercus emoryi</i>
Engelmann spruce	<i>Picea engelmanni</i>
Foothills paloverde	<i>Ceridium microphylla</i>
Juniper	<i>juniperus</i> sp.
Limber pine	<i>Pinus flexilis</i>
Manzanita	<i>Arctostaphylos</i> sp.
Mesquite	<i>Prosopis juliflora</i>
Mexican pirion	<i>Pinus cembroides</i>
Mountainmahogany	<i>Cercocarpus</i> sp.
Ocotillo	<i>Fouqueria splendens</i>
Ponderosa pine	<i>Pinus ponderosa</i>
Saguaro cactus	<i>Cereus gigantea</i>
Sandpaperbush	<i>Mortonia scrabella</i>
Shrub live oak	<i>Quercus turbine//a</i>
Skunkbush sumac	<i>Rhus trilobata</i>
Soto!	<i>Dasyliirion wheeleri</i>
Sycamore	<i>Platanus wrighti</i>
Tarbrush	<i>Flourensia cernua</i>
Walnut	<i>juglans major</i>
White fir	<i>Abies concolor</i>
Willow	<i>Salix</i> sp.
Yucca	<i>Yucca</i> sp.

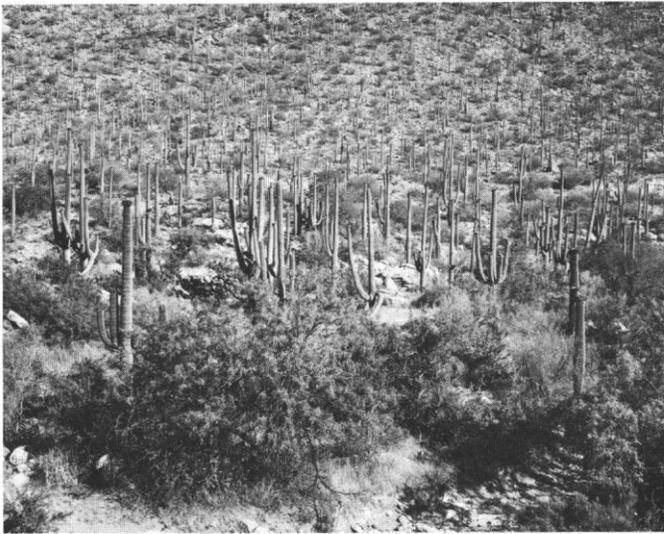


Figure 1. Paleoverde/saguaro desert scrub (U.S. Forest Service photo).

Chihuahuan Desert flora are encountered over scattered areas within the Mexican Plateau in Cochise County. Sandpaperbush, tarbush and chihuahuan white thorn dominate the three distinct plant communities of this desert or are found in combination. The upper San Pedro and Sulfur Springs valleys are typical examples of an intermingling of Chihuahuan desert scrub and desert grassland.

The eastern edge of the Sonoran Desert is roughly at the 1,065 m (3,500 ft) contour along the edges of the Santa Cruz, San Pedro and Gila River valleys. The characteristic desert scrub communities are paloverde-saguaro (fig. 1) and creosotebush. The paloverde-saguaro cactus community is found on the mountainward part of alluvial fans and on mountain foot slopes where it is dominated by foothills paloverde and saguaro cactus. The mesquite-acacia community is found in the dry washes, while the lower parts of the fans are dominated by creosotebush. There is a fourth community on the dry rocky slopes between the paloverde-saguaro and evergreen woodland communities. This is the agave-yucca-sotol-ocotillo community on shallow rocky soils. This would be a desert grassland on more favorable sites.

Grassland

Desert grasslands in southeastern Arizona occupy a transition zone between desert scrub and evergreen woodland or plains grassland (fig. 2). Desert grasslands occur above the upper limits of the Sonoran Desert and are best represented at 1,200 to 1,525 m (4,000 to 5,000 ft). Grama grasses predominate, but other plains grasses do occur. The desert grassland is found between Benson and Tucson in Pima County on the northerly slopes of the Santa Rita Mountains and the southerly slopes of the Rincons. The upper limit of the desert grassland on the slopes of the Santa Rita and Empire mountains is plains grassland.

Plains grassland is extensively developed southeast of Patagonia in the upper Santa Cruz River valley, on the easterly slopes of the Huachuca Mountains west to the Patagonia Mountains. This grassland is above 1,525 m (5,000 ft) in elevation and at similar elevations (1,525 to 2,130 m) is found in the San Pedro and Sulphur Springs valleys in Cochise County. The species mix is usually grama, muhly, needlegrass and dropseeds.

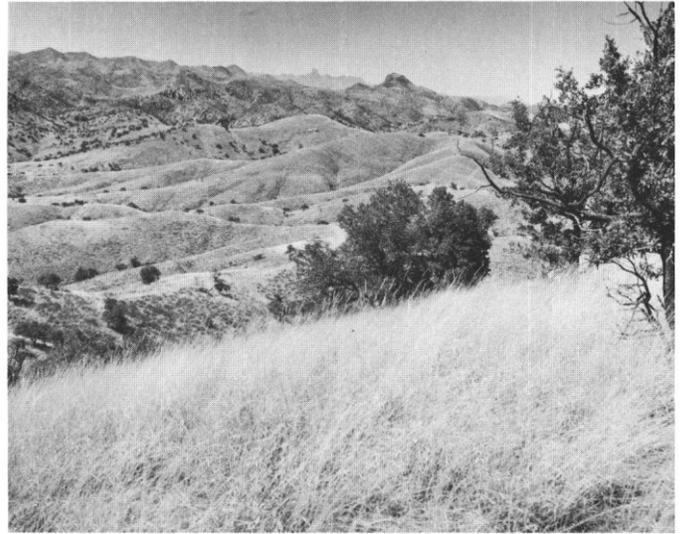


Figure 2. Grassland (U.S. Forest Service photo).

Woodland

Woodland in southeastern Arizona is either riparian (deciduous) or evergreen. The deciduous woodland is found along streams and consists of cottonwood, willow, ash, sycamore and walnut. Occasionally all five are encountered in a single riparian community, but usually a lesser number are found in various combinations (fig. 3). Extensive mesquite bosques occur along flood plains in the Sonoran Desert, notably the lower San Pedro River Valley. The evergreen woodlands are of three distinct types, namely, pinon-juniper (fig. 4), chaparral, and oak woodland (fig. 5). The oak woodland often intergrades with pine forests at higher elevations to form an oak-pine woodland. The characteristic oaks are arizona and emory oak. The chihuahuan pine is almost totally unique to the oak-



Figure 3. Riparian community (U.S. Forest Service photo).



Figure 4. Piñon/juniper woodland (U.S. Forest Service photo).

pine woodland in southern Arizona. The lower limit of ponderosa pine is somewhat below the oak-pine woodland, and this is mid-range for the Mexican piñon. The oak woodland and grasslands with characteristic yucca comprise the Upper Sonoran Life Zone.

The chaparral vegetation type occupies the same zone between grassland and pine forest as does the oak woodland. Chaparral is found at somewhat drier sites than the oak woodland species will tolerate. North and west of Tucson the chaparral type extends its range into the rugged country below the Mogollon rim. South and east of Tucson, where summer rainfall exceeds that of winter, the type begins to diminish. Instead of a single summer dry season as in California, a bi-seasonal spring-fall drought occurs in Arizona.

Coarse soils and steep highly erodible sites are usually characteristic of chaparral lands. The largest chaparral area in southeastern Arizona is at mid-elevation in the Santa Catalina Mountains north of Tucson (fig. 6). Minor chaparral cover is



Figure 6. Chaparral (U.S. Forest Service photo).

found in the Mule, Dos Cabezas and Chiricahua mountains. Shrub live oak is the characteristic species of Arizona chaparral. The species mix is usually shrub live oak, manzanita, mountain mahogany and skunkbush sumac. Shrub live oak and only one of the above mentioned species (e.g. shrub live oak-skunkbush sumac on particularly dry sites) is also found, or pure stands of either mountain mahogany or manzanita.

Forests

The forest landscape in southeastern Arizona is high mountain coniferous forest. Coniferous forest begins at the lower elevation limit for Arizona ponderosa pine, that is 1,825 to 2,130 m (6,000 to 7,000 ft), depending on slope exposure. The ponderosa pine upper limit is 2,750 m (9,000 ft). The next zone in the coniferous forest is the fir zone (or Canadian Life Zone) typified by Douglas fir. Douglas fir is virtually the only tree encountered here except for ponderosa pine on southerly ridges with white fir and aspen encountered throughout. Above this zone is the spruce-alpine fir forest (Hudsonian Life Zone) represented by blue spruce, aspen, alpine fir, limber pine and bristlecone pine with Engelmann spruce and alpine fir dominating. The trees of this forest begin to diminish in stature near the summit of Graham Mountain in the Pinaleno Mountains (fig. 7), but no Arctic-Alpine Life Zone exists in southern Arizona. In fact, the spruce-alpine fir forest exists in only two mountain ranges in southeastern Arizona, namely, the Pinaleno and Chiricahua mountains.



Figure 5. Oak woodland (U.S. Forest Service photo).



Figure 7. Spruce/alpine fir forest (U.S. Forest Service photo).

SUMMARY

The plant communities in southeastern Arizona as elsewhere are distributed along climatic, topographic and soil gradients. The communities comprising desertscrub, grassland, woodland and forest landscapes blend together along these gradients. Although distinct boundaries are observable between most

plant communities, no single species is confined to any one community. This mosaic becomes more comprehensible when one realizes that this area is a blending of dry tropical southern vegetation with moist temperate northern vegetation and that mixing occurs both in elevation and along latitude lines.

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