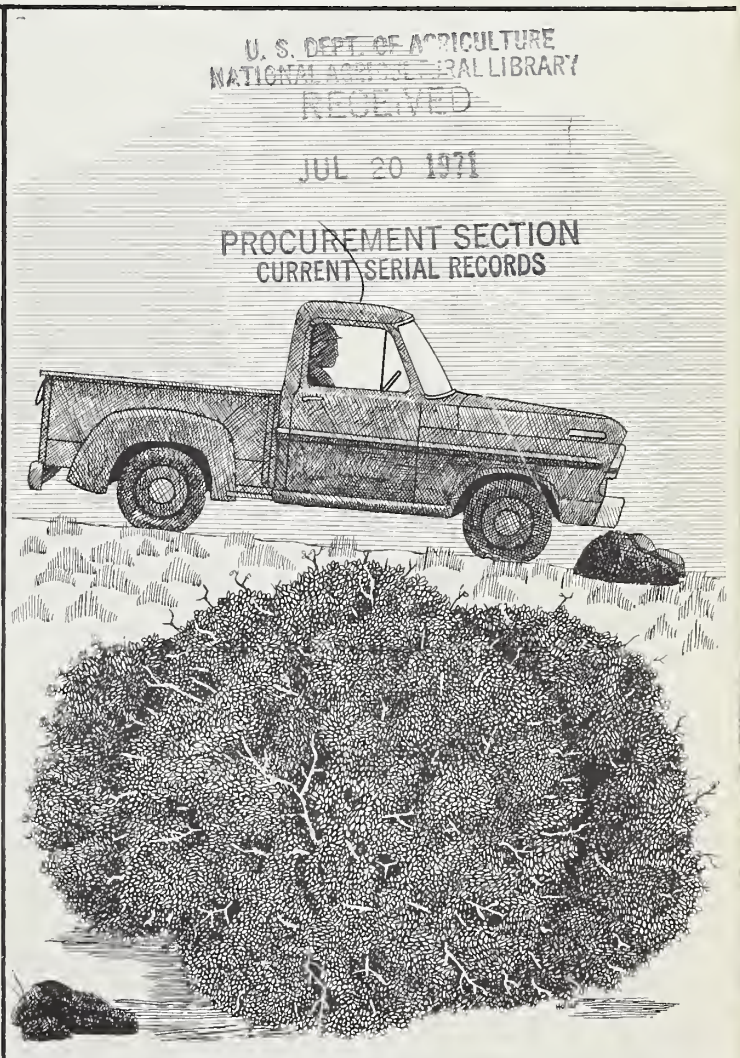
May 1971 USDA Forest Service Research Paper RM-69

CHAPARRAL

•47 YEARS LATER•

FLOYD W. POND



Rocky Mountain Forest and Range Experiment Station

ABSTRACT

Chaparral species that sprout appeared little changed after 47 years though all stems tagged in 1920 were dead. Non-sprouting species had died but were usually replaced by nearby seedlings or by layering.

KEY WORDS: *Quercus turbinella*, *Ceanothus greggii*, *Rhus trilobata*, *Arctostaphylos pungens*, *Nolina microcarpa*, *Mimosa biuncifera*, chaparral.

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Chaparral: 47 Years Later

by

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CHAPARRAL..

47 Years Later

Floyd W. Pond

In 1920, a U.S. Forest Service research team fenced several small plots in central Arizona. One of these, an exclosure 130 by 330 feet in size, was located on what is now the Sierra Ancha Experimental Forest near Globe. This exclosure was located on fairly level terrain near the lower edge of the chaparral type (4,500 feet elevation).

Long-term weather records taken nearby show an average precipitation of 18 inches per year. Approximately one-half the rainfall is from summer thunderstorms (July to September) and the remainder is the result of winter storms. Two comparatively dry periods, May-June and October-November, separate the two precipitation periods. Temperatures rarely exceed 100° F. during the summer and may occasionally reach 10° F. during the winter. Snow may occur several times during winter but rarely remains on the ground for more than a day.

Soils on the area have been tentatively called Jayaar sandy loam and are formed from diabase parent material. These soils rarely show much horizon development and the unconsolidated mass of the soil mantle is frequently over 4 feet. However, numerous large boulders are present in the mantle or on the soil surface.

Immediately after fencing in 1920, individual plants of six chaparral species were tagged. Half the tagged plants of each species were inside the exclosure and the other half outside. Each plant was photographed and negatives deposited in the U.S. Forest Service photographic file, Washington, D. C. This plot with its records provided a rare opportunity to study life span and replacement of several chaparral shrub species.

Some tagged shrubs were rephotographed in 1927, some in 1935, and one shrub live oak in 1962. In 1967, photos were made of all shrubs for which early pictures were available. Several of the 1920 negatives had deteriorated and could not be used.

A general view of the northwest corner of the plot, taken in 1927, (1), showed little change in shrub cover during the 40 years when compared with the 1967 photo (2). Plants appeared a little larger but occupied essentially the same area.

1-1927

2-1967

SHRUB LIVE OAK

Quercus turbinella Greene

Individual shrub live oak plants tended to be tenacious. Only one of the eight plants tagged in 1920 (3) died during the 47-year interval; by 1967 the only visible evidence that an oak had once occupied the area (4) was the 2-inch stem on which the tag had been placed. Photos were not available for five other oaks, but tags were found on three of the five and healthy specimens occupied the sites of the other two. Two of the five can be seen in the lower right-hand corner of the general views, and appear much the same in both photos. Complete photographic records for one shrub live oak were available. This oak was a vigorous plant about 7 feet high in 1920 (5) and changed little by 1927 (6) or 1935 (7). By 1962 (8), many older, larger stems were dead including the tagged one. By 1967 (9), more deadwood was present, but young sprouts from the base were healthy.

3-1927

4-1967

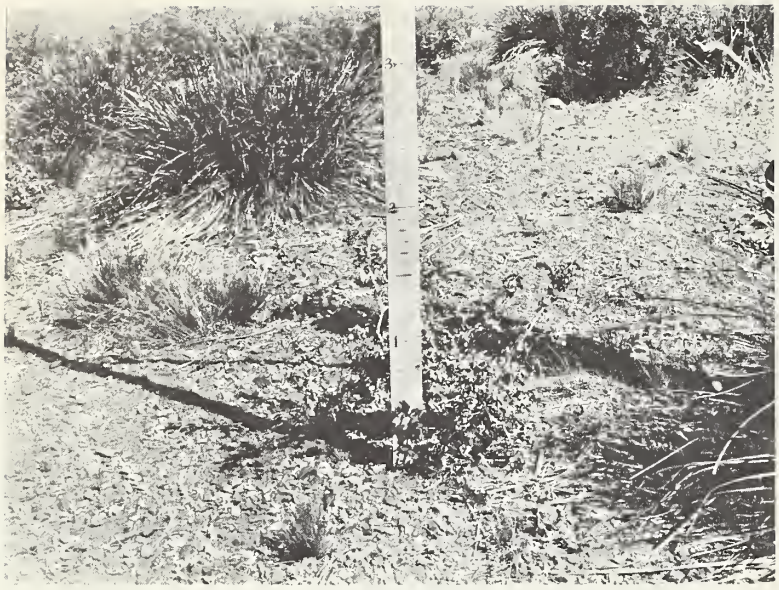
5-1920

6-1927

7-1935

8-1962

9-1967



10-1920

11-1927

12-1967

Photos of the remaining shrub live oak (none taken in 1935) show a plant less than 2 feet high in 1920 (10) and less than 3 feet tall in 1927 (11) or 1967 (12). The tag was on a dead stem less than 0.5 inch in diameter. During the 47 years the plant did not attain the compact, leafy appearance of a vigorous oak plant. Evidently the site was not conducive to good shrub live oak growth.

These photographic records as well as observations of other tagged oaks help demonstrate the tenacious quality of the species. Shrub live oak is known to sprout rapidly following fire and is not easily killed by application of most herbicides. Although one plant died during the 47-year interval, the remaining seven were comparatively healthy. All tags were found on dead stems, which indicates the overstory was replaced at least one time by sprouts. Also, protection did not enhance survival since the one dead plant was inside the exclosure.

13-1920

14-1927

DESERT CEANOTHUS

Ceanothus greggii A. Gray

Desert ceanothus plants were less tenacious than shrub live oak. Since this species seldom sprouts and depends on seedlings for replacement, its ability to compete may not be equivalent to that of prolific sprouters.

Photos for one of the four ceanothus were not available. The nearest living plant or skeleton to the proper location was over 30 feet away. Since dead ceanothus skeletons are persistent, the plant was probably dead prior to the 1935 observation.

A complete photo record was available for the other exclosed ceanothus. Observations without photography in 1962 indicated this plant was still vigorous after 42 years. Search for the tag in 1967, however, revealed a dead, tagged skeleton about 2 feet from the vigorous plant. This replacement plant likely had seeded within a few years after the 1935 observation since it was a fully mature specimen by 1962. The original plant was healthy, mature, and productive in 1920 (13). Some dead material was evident in 1927 (14) but the plant was still fairly vigorous in 1935 (15). The 1967 photo (16) shows only a dead stump with some fairly small twigs still attached. The presence of small twigs on the skeleton indicates recent death—probably shortly before the observation in 1962.

15-1935

16-1967

17-1920

18-1927

19-1967

20-1920

A third plant, located just outside the exclosure, was not found in 1962. Careful search in 1967 located the dead, uprooted stump with tag attached about 20 feet from the proper location. The 1920 photo (17) shows a vigorous shrub about 3.5 feet high. The plant was still vigorous in 1927 (18) but current growth was less obvious at this time. No photos were taken in 1935 and, from the appearance of the stump in 1967 (19), the plant could have been dead or near death at that time. Although this plant was not replaced by a seedling on the exact site, several vigorous young plants were found about 10 feet away.

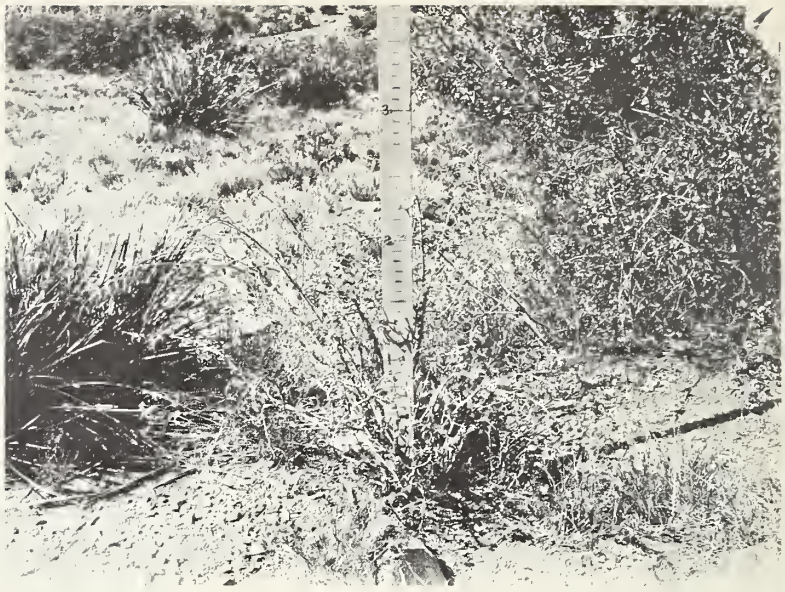
The fourth ceanothus, also outside the exclosure, was not found in 1967. Neither living plants nor dead skeletons were found within 50 feet of the proper location. The plant was vigorous in 1920 (20), but some dead material was evident by 1927 (21). Since photos were not taken in 1935, the plant may have been dead at that time.

All four ceanothus failed to survive the 47-year span of time. From appearance of skeletons or lack of skeletons, three of the four likely died prior to 1940. Other observations within the type indicate ceanothus is shorter lived than the sprouting species. Since vigorous plants were found near two of the four locations, some replacement by seedlings is indicated.

21-1927

SKUNKBUSH

Rhus trilobata Nutt.



22-1920

Only two skunkbushes were tagged in 1920; one inside and one outside the exclosure. Search of the proper area inside the exclosure showed a vigorous skunkbush occupying the proper location, but the tag was not located either on or under the bush. Evidently the tagged stem had died and the tag was either buried or had been carried away.

The unexclosed skunkbush was only 2 feet high in 1920 (22), and the 1927 photo was not usable. By 1935, the plant had grown to 4 feet, and was leafy and vigorous (23). In 1967 (24), the bush was smaller than in 1935 but still healthy. The tag was found on deadwood. Similar to shrub live oak, the old overstory was evidently replaced by sprouts during the 47-year span.

Skunkbush is probably the second most widespread species in the chaparral type since it is found throughout the range. Though the species seldom forms dense thickets to exclusion of other shrubs, a few individuals are usually found on all sites. The species sprouts readily following fire and is resistant to most herbicides.

23-1935

24-1967

MANZANITA

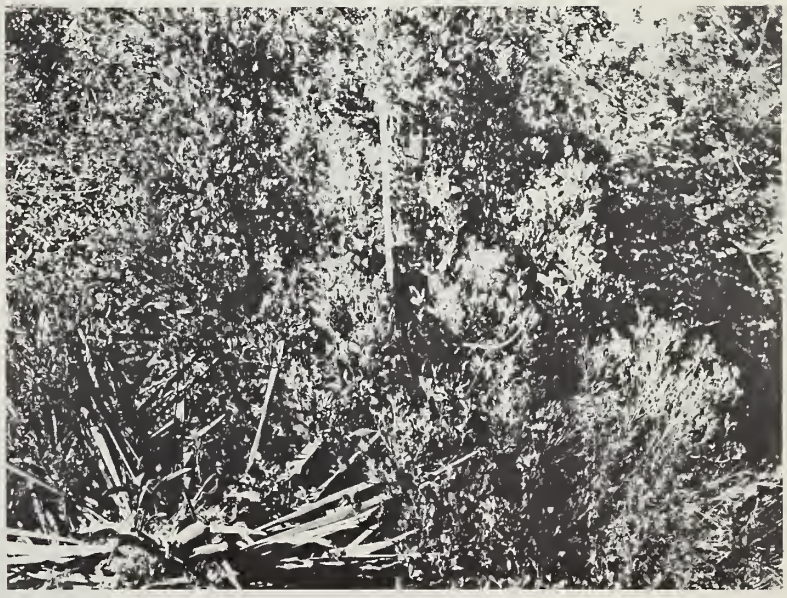
Arctostaphylos pungens H. B. K.

25-1927

Only two manzanita, one inside and one outside the exclosure, were tagged in 1920. Old photos of the unexclosed manzanita were unavailable. A road in the vicinity was rerouted about 1940 and had destroyed part of this plant. However, the tag was found on dead material near what must have been the center of the plant in 1920. The tagged stem, long dead but still rooted, was about 2 feet from the edge of the road disturbance area.

The 1920 photo of the exclosed manzanita was not available but the 1927 photo (25) shows a plant not more than 4 feet in diameter. By 1967, the clump was over 20 feet in diameter with a 5-foot circle of dead material in the center (26). The tag was located on a dead stem, still firmly rooted, near the center of the dead material.

Manzanita often covers large areas of the type and, under certain conditions, forms an impenetrable overstory under which nothing else grows. Species in Arizona do not sprout but often increase in size by layering. Lower branches, lying on the ground for extended periods of time, take root and may or may not stay connected to the mother plant. From evidence here and observations elsewhere, centers of the clump often die while the outer periphery continues to be vigorous. How long these open centers remain barren of plants is unknown. Individual rooted stems of manzanita evidently live no longer than ceanothus since both stems tagged in 1920 were dead by 1967.



26-1967

SACAHUISTA

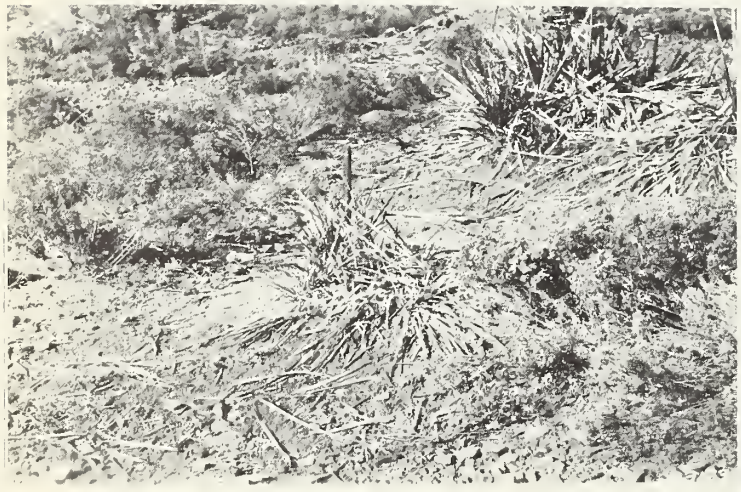
Nolina microcarpa **Wats.**

Two sacahuista were tagged in 1920. Old photos of the exclosed plant were not available, but the iron stake with attached tag used to mark this plant was found and sacahuista were growing no more than 5 feet away. The original plant was completely dead and missing.

The 1920 photo of the sacahuista outside the exclosure showed a plant 2 feet high (27). By 1927 the plant, along with others in the vicinity, had been closely grazed by livestock or rodents, and did not appear vigorous (28). Photos were not taken in 1935, and in 1967 the plant had completely disappeared although several vigorous plants were present in the near vicinity (29).

Sacahuista is most common in the lower (4,000 to 5,000 feet elevation) part of the chaparral type, and is often used by cattle or wildlife. It appears that individual plants may not live longer that 50 years since both the tagged plants were dead. Also, replacement in nearby areas seems to be no problem since vigorous plants were found in both areas.

27-1920



28-1927

29-1967

WAIT-A-BIT

Mimosa biuncifera **Benth.**

Early photos of the two tagged plants of this universally disliked species were not available. Although living plants of this species occupied both sites, tags could not be found. Stems of wait-a-bit seldom get large so the tagged stems could have died and the tags buried or removed from the area.

The tenacious sprouting nature of this shrub is well known. Doubtless, the two plants seen in 1967 were those tagged in 1920. This plant is very resistant to burning, herbicide treatment, or grazing. An area once occupied by wait-a-bit will likely be dominated by the species for many years. Wait-a-bit is restricted to the lower fringe of the chaparral type.

Pond, Floyd W.
1971. Chaparral: 47 years later. USDA Forest Serv. Res. Pap. RM-69, 11 p., illus. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80521.

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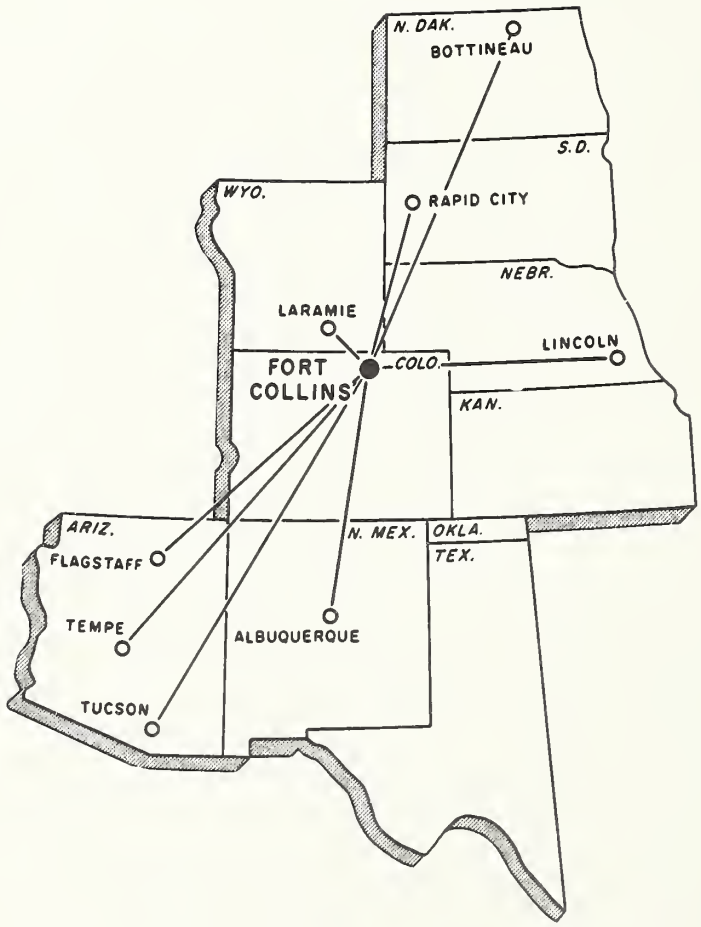
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