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## MODOC CYPRESS, *CUPRESSUS BAKERI* JEPS., DOES OCCUR IN MODOC COUNTY

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Much confusion has existed concerning the range of Modoc Cypress, *Cupressus bakeri* Jeps., since Milo S. Baker collected a specimen of this tree in August 1898 (15). Primarily the question has been whether or not *Cupressus bakeri* occurs in Modoc County. Baker collected his specimen between the Hills Farm, near Dana in southeastern Siskiyou County<sup>1</sup>, and Little Hot Springs Valley, Modoc County, along a wagon road crossing the lavas in the vicinity of Timbered Crater. The location was given as the lava beds of southeastern Siskiyou and southwestern Modoc Counties (4).

Jepson in 1909 (4) cited essentially this same location of *Cupressus bakeri*, as have other botanists in subsequent works (6, 7, 9, 12). Carl B. Wolf (15) listed the same location as noted by Baker on his specimen, but viewed only a small portion of the stand to the northeast of Timbered Crater. Wolf also stated that the Modoc County location had not been verified. As recently as April, 1963, Wagener and Quick (14) stated that the species was not known to occur in Modoc County.

Modoc Cypress, *Cupressus bakeri* Jeps., does occur in Modoc County despite the range cited by many botanists. An extensive stand of this species (fig. 1) covering approximately 7000 acres occurs in the area of T. 38 N., T. 39 N., R. 4 E., R. 5 E., M.D.M. at an elevation of 3500 to 4000 feet. This is the junction of the county lines of Shasta, Siskiyou and Modoc counties about 12 miles north of Fall River Mills, Shasta County. For the purposes of this paper the above described area between Little Hot Springs Valley in Modoc County and the Timbered Crater in Shasta County will be known as the Timbered Crater area. The largest portion of this area (fig. 3), approximately 2865 acres, is in Siskiyou County, with 2522 acres in Modoc County, and 1710 acres in Shasta County.

Besides the Timbered Crater area *Cupressus bakeri* is known from two other locations: the Cypress Camp—Burney Springs area of Shasta County, mainly in T. 34 N., R. 3 E., and scattered trees in T. 34 N., R. 2 E., and T. 33 N., R. 3 E., and the Mud Lake—Wheeler Peak areas of Plumas County, T. 26 and 27 N., R. 11 E.

<sup>1</sup>Dana is actually in northeastern Shasta but was erroneously cited by M. S. Baker as being located in southeastern Siskiyou County.

These three presently known stations for Modoc Cypress occur over a wide elevational range. The Timbered Crater area lies between 3500 and 4000 feet; Cypress Camp—Burney Springs groves between 4500 and 5000 feet; and the Mud Lake—Wheeler Peak groves in Plumas County between 6000 and 6900 feet.

The Timbered Crater location of *Cupressus bakeri* is the largest concentration of the species known at this time. This area could properly be called a "stand" while the other known locations are isolated groves with few acres having a continuous cover of cypress.

*Cupressus bakeri* is associated with a variety of species in the Timbered Crater area. The dominant woody species are *Arctostaphylos patula*, *Artemisia tridentata*, *Cercis occidentalis*, *Cercocarpus ledifolius*, *Eriogonum* spp., *Pinus ponderosa*, *Juniperus occidentalis*, *Quercus garryana*, and *Q. kelloggii*. Additional species are listed in table 1. There are few herbaceous plants listed because the area was visited during September, November, and December. Undoubtedly many additional species could be identified during the spring and early summer months.

The Timbered Crater area is located on the Modoc Lava Plain near the southern end of the Cascade Range (10). The associated vegetation suggests a tension or transition zone between a number of plant communities, Northern Juniper Woodland, Yellow Pine Forest and Sagebrush Scrub, and a transition between xerophytic conditions of the Nevadan Province to the east and mesophytic conditions of the Sierran to the west as defined by Munz (10).

The Cypress Camp—Burney Springs groves were visited numerous times and are associated with species typical of a more humid transition zone (2): *Abies concolor*, *Pinus jeffreyi*, *P. ponderosa*, *Libocedrus decurrens*, *Quercus kelloggii*, *Arctostaphylos patula*, *Artemisia tridentata*, *Amelanchier alnifolia*, *Ceanothus cordulatus*, *C. velutinus*, *Castanopsis sempervirens*, *Chrysothamnus* sp., *Prunus emarginata*, *Purshia tridentata*, and *Rhamnus rubra*.

Wagener and Quick (14) reported the groves found in Plumas county to be associated with *Abies concolor*, *A. magnifica*, *Pinus jeffreyi*, *P. murrayana*, *Arctostaphylos patula*, *Purshia tridentata*, *Ceanothus prostratus*, *Artemisia* sp., and *Eriogonum* sp. I believe this combination of species indicates a tension zone between a mesophytic and xerophytic situation in the Red Fir Forest. This particular area was not visited, but was studied on aerial photographs, geology and topographical maps and the available publication.

The geology of the Timbered Crater area (3) is relatively uniform with two major formations, as shown by figure 4. The most prominent is the Recent Basalt (Qrv<sup>b</sup>), referred to by Powers (11) as the Modoc Basalt. This formation is outstanding because of the rough, broken, dark colored lava marked by many ledges, small faults, and depressions. A few of these depressions have been filled with alluvial material and support an open forest of ponderosa pine, incense-cedar, and mixed brush species. The spaces between the rough, broken lava are filled with a fine loamy soil which supports the predominately sparse cover (fig. 2) of brush species and *Cupressus bakeri*.

The other major formation in the vicinity of Timbered Crater and Gassaway Reservoir is Pleistocene Basalt (Qpv<sup>b</sup>), the Warner Basalt of Powers (11). These areas are recognizable by the presence of a soil mantle supporting a cover of mixed conifer forest, in which the dominant species are *Pinus ponder-*



Fig. 1-2. *Cupressus bakeri* in the Timbered Crater Area.—Fig. 1. Northeast of the quarry in Sec. 25, T. 39 N., R. 4 E., in Siskiyou County with Big Valley Mountain, Modoc County, in the background.—Fig. 2. Sparse cover of mixed brush species together with cypress trees.

TABLE 1. A partial list of the vegetation associated with *Cupressus bakeri* in the Timbered Crater Area.

<b>TREES:</b>	<b>SHRUBS (cont.):</b>
Conifers	<i>Prunus virginiana</i> var. <i>demissa</i>
<i>Juniperus occidentalis</i>	<i>Purshia tridentata</i>
<i>Libocedrus decurrens</i>	<i>Quercus garryana</i> var. <i>breweri</i>
<i>Pinus attenuata</i>	<i>Rhus trilobata</i>
<i>Pinus ponderosa</i>	<i>Ribes</i> sp.
Hardwoods	<i>Rosa gymnocarpa</i>
<i>Quercus garryana</i>	<i>Salix</i> sp.
<i>Quercus kelloggii</i>	<i>Symphoricarpos vaccinioides</i>
<b>SHRUBS:</b>	<b>HERBS:</b>
<i>Arctostaphylos patula</i>	<i>Apocynum</i> sp.
<i>Artemisia tridentata</i>	<i>Arabis</i> sp.
<i>Ceanothus cuneatus</i>	<i>Calyptidium umbellatum</i>
<i>Ceanothus integerrimus</i>	<i>Clarkia</i> spp.
<i>Ceanothus lemmonii</i>	<i>Collomia</i> sp.
<i>Ceanothus prostratus</i>	<i>Delphinium</i> sp.
<i>Cercis occidentalis</i>	<i>Eriogonum</i> spp.
<i>Cercocarpus betuloides</i>	<i>Galium</i> spp.
<i>Cercocarpus ledifolius</i>	Grasses, annual and perennial
<i>Chamaebatiaria millefolium</i>	<i>Silene</i> sp.
<i>Chrysothamnus viscidiflorus</i>	<i>Viola purpurea</i>
<i>Garrya fremontii</i>	
<i>Lonicera</i> sp.	<b>OTHERS:</b>
<i>Prunus emarginata</i>	<i>Arceuthobium</i> sp.
<i>Prunus subcordata</i>	<i>Phoradendron bolleanum densum</i>

*osa*, *Libocedrus decurrens*, *Pseudotsuga menziesii*, *Abies concolor*, *Pinus lambertiana*, *Arctostaphylos patula*, *Ceanothus prostratus* and *Quercus kelloggii*. The remaining portion of the mapped area is covered by Tertiary Basalt (T<sub>v</sub><sup>b</sup>) and Recent Alluvium (Qal). No groves of *Cupressus* were found on the formations which have a soil mantle covered by coniferous forest.

*Cupressus bakeri* in the Timbered Crater area is found only on rough broken lava flows of recent origin (fig. 6), except for a few scattered trees found on some of the depressions that have been filled by alluvial material. This is in contrast to the other known locations of *Cupressus bakeri*, where the trees are found on soils derived from volcanic parent materials of different ages.

The Plumas County groves (Mud Lake and Wheeler Peak) are described (14) as being on soil derived from Tertiary volcanics (andesite) (8); whereas the Cypress Camp—Burney Springs (Shasta County) trees are on soils derived from Pleistocene volcanics, (basalt) and glacial outwash from Pleistocene volcanics (3).

The climate of the Timbered Crater area is typical of the Modoc Plateau and is characterized by hot, dry summers and cold, wet winters. Precipitation (fig. 5) varies from a low of 16, to a high of 28 inches (1) in the form

Fig. 3. Stand Location Map of *Cupressus bakeri* in the Timbered Crater Area of Shasta, Siskiyou, and Modoc counties. The cypress stand is indicated by shading.

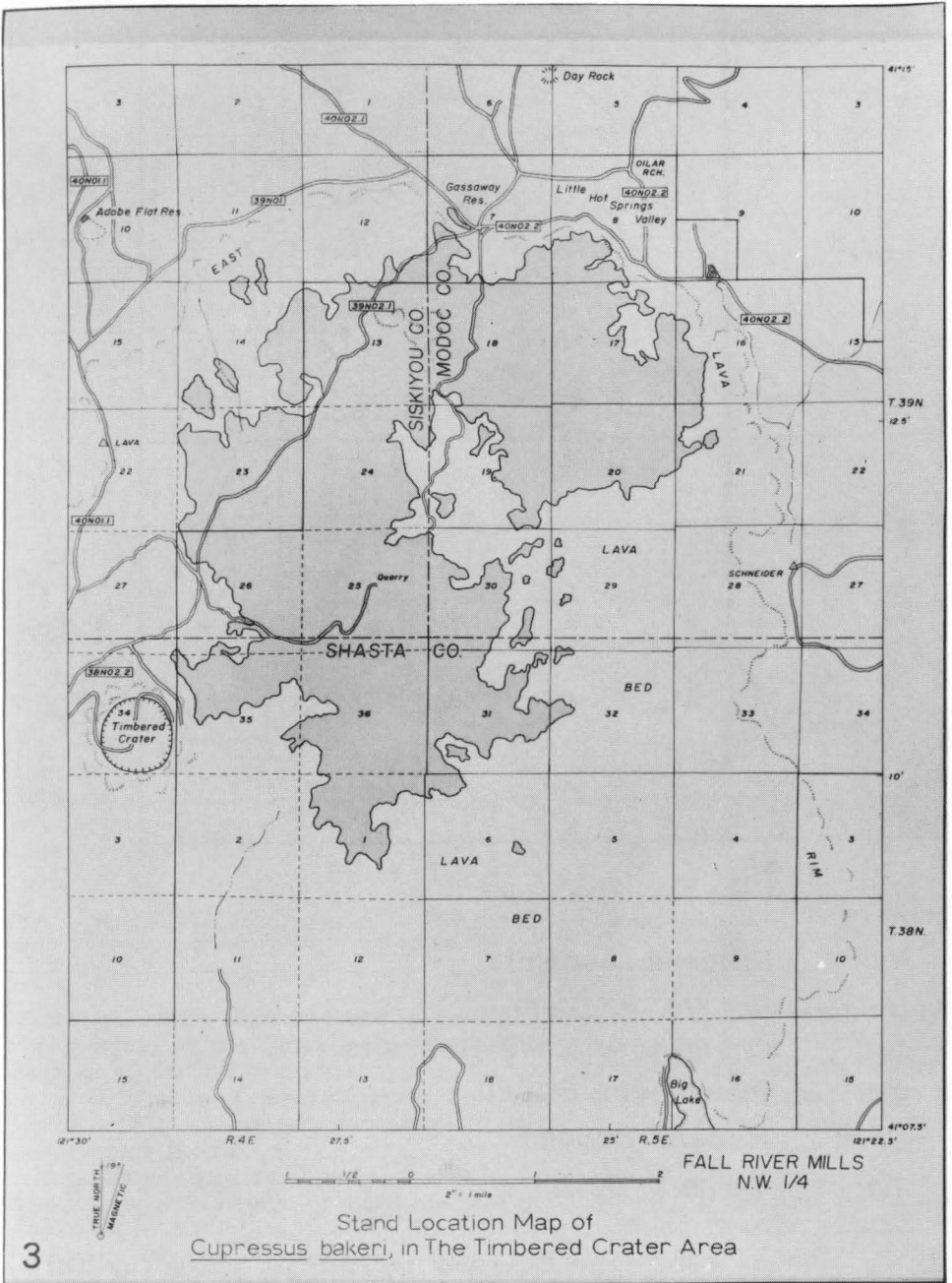


FIGURE 3

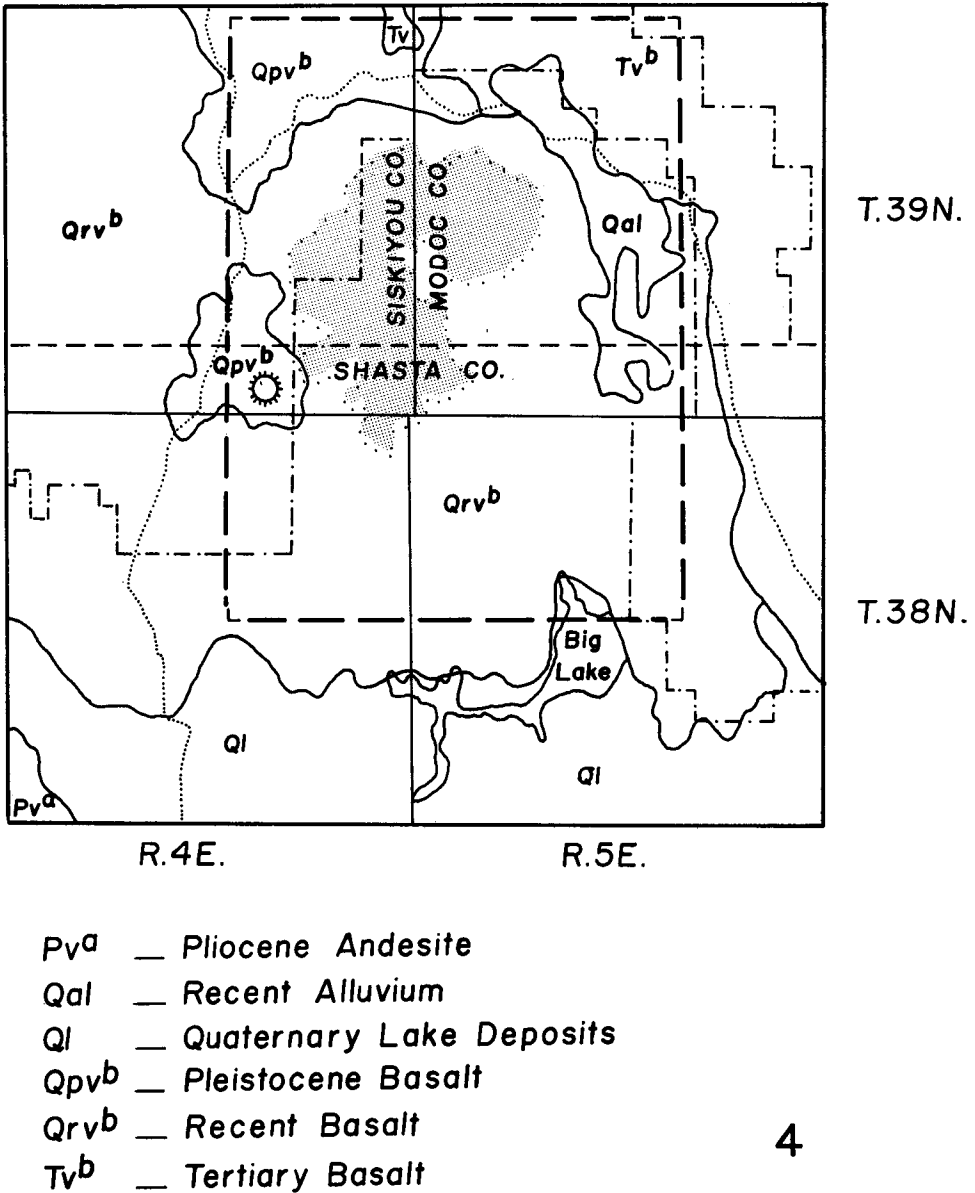


Fig. 4. Geology map of the Timbered Crater Area. The shaded area indicates *Cupressus*; the heavy dashed line outlines the map shown in fig. 3. (Adapted from Gay & Aune, 1958).

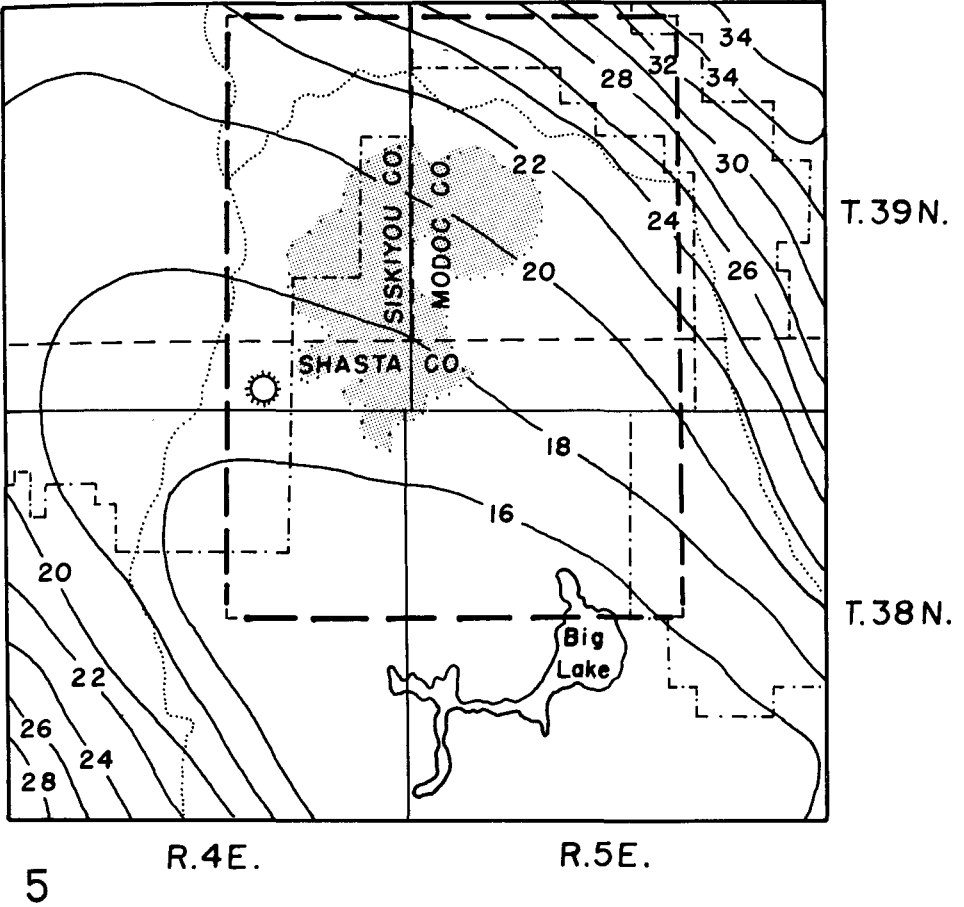


Fig. 5. Precipitation distribution in the Timbered Crater Area. (Adapted from the North-eastern Counties Ground Water Investigation, 1963.)

of rain and snow occurring mostly during the months of October to May (13). Precipitation at the Plumas County locations, near Mud Lake and Wheeler Peak, is 40-50 inches and at Cypress Camp—Burney Springs, Shasta County, about 60 inches. Temperatures in the Timbered Crater area range from a low of -18°F in January to a high of 104°F in July with a mean annual temperature of 49°F.

Weather Bureau data (13) available from the Fall River Mills station, which is approximately 12 miles south of the Timbered Crater area and at an elevation of 3300 feet, present the following statistics. Average snowfall is 35 inches between November and April; precipitation has averaged 19 inches with highs of 3.14 inches in December and lows of .16 inches in August.



Average maximum temperatures have varied from 43°F to 88°F with the mean being 65°F and minimums from 20°F to 50°F with a mean of 34°F. The frost free period varies from 150 to 210 days.

*Cupressus bakeri*, in the Timbered Crater area appears to be holding its own on most of the present area, and several areas of very small trees (fig. 7) were noticed that suggest the stand is being extended. Few seedlings were observed, those most prominent were on the skid roads resulting from logging of the scattered ponderosa pine. In most cases the seedlings were in the immediate vicinity of a cypress tree downed during the logging operations. There are many thickets of saplings 1 to 3 inches in diameter, also mostly observed around downed and rotting trees. In many instances the downed trees did not show signs of recent fires. Many individual cypress trees are infected with mistletoe, *Phoradendron sp.* (fig. 8). Very few dead or dying trees were observed however, either from disease or insects, and it is assumed that the mortality is the result of natural causes. The amount of downed, rotting material (fig. 9) indicates that fire has not swept the area for many years.

Specimen collections were made for verification and samples are on file at two California herbaria, Rancho Santa Ana Botanic Garden, Claremont, and University of California, Berkeley. These collections are summarized in table 2. No age determinations were made of either mature trees or seedlings.

The Burney Springs location has many scattered thickets or groves of cypress, probably as a result of burning the brushfields in 1935 (2). The Cypress Camp area has not been subjected to recent burning and has many trees of all sizes scattered in the native mixed conifer forest with very few thickets. The thickets that are present appear to mark the location of fallen cypress trees.

TABLE 2. List of *Cupressus bakeri* specimens collected in the Timbered Crater Area.

COLLECTION NUMBER	LOCATION	ELEVATION	COUNTY
COS 276	NW¼, Sec.18, T.39N., R.5E.	3640'	Modoc
COS 278	SW¼, Sec.18, T.39N., R.5E.	3600'	Modoc
COS 286	SE¼, Sec.23, T.39N., R.4E.	3600'	Siskiyou
COS 287	NE¼, Sec.25, T.39N., R.4E.	3640'	Siskiyou
COS 290	NE¼, Sec.13, T.39N., R.4E.	3560'	Siskiyou
COS 291	NW¼, Sec.18, T.39N., R.5E.	3560'	Modoc
COS 292	SW¼, Sec.18, T.39N., R.5E.	3520'	Modoc
COS 293	NE¼, Sec.35, T.38N., R.4E.	3720'	Shasta
COS 294	SW¼, Sec. 8, T.39N., R.5E.	3552'	Modoc

*Cupressus bakeri* was probably more widespread in northeastern California before the recent lava flows of the Modoc Lava Plain destroyed the vegetative cover of the area. The Timbered Crater stand appears to be the result of a few trees or even possibly a few seeds that were not destroyed by the lava flows. The *Cupressus* stand is in all probability a reinvasion, from an undisturbed area, of the vegetation that covered the area before the recent lava flows. The present stand is found entirely on the recent lava flows.



Fig. 6-7. *Cupressus bakeri* in the Timbered Crater Area.—Fig. 6. Trees growing on rough, broken lava flows of recent origin.—Fig. 7. Small clumps of sapling size trees indicating that the cypress area is being extended.



Fig. 8-9. Fig. 8. Mistletoe, *Phoradendron* sp., on *Cupressus bakeri*.—Fig. 9. Accumulations of downed, rotting material show no signs of fire having swept the area in recent years; note the many sapling size cypress trees in the area.

The presently known locations of *Cupressus bakeri* show a general pattern of occurrence trending to the north-west along the east side of the Sierra Nevada and Cascade Range. Possibly, there are unreported groves of *Cupressus* on the lava beds of Shasta, Siskiyou and Modoc counties or within the coniferous forest of Lassen and Plumas counties.

*Cupressus bakeri* Jeps. was named by W. L. Jepson (5) in honor of the late Milo S. Baker. I believe "Baker Cypress" would be a more appropriate name than is "Modoc Cypress" as listed by Little (7). Baker Cypress, as the accepted common name, would honor one of the early botanists of California. In addition the species is not limited to Modoc County as the name "Modoc" would imply, in fact on an acreage basis, there is a larger amount of *Cupressus bakeri* in Siskiyou County than there is in either Shasta or Modoc County.

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