A MODIFIED KOEPPEN CLASSIFICATION OF CALIFORNIA'S CLIMATES ACCORDING TO RECENT DATA*

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INTRODUCTION

Many papers have discussed the classification of California's diversified climates. Although all of these past presentations have merit and have contributed much to the understanding of the state's climates, the author will not attempt to go into the discussion of these investigations, other than to list a few of them.[1] It can be noted that many of the references listed have employed the Köppen classification, or modifications thereof.[2] This paper also employs the Köppen system with certain modifications introduced by Russell[3] and the author (*e.g.*, a quantitative limit to determine the "m" areas, delimitation of the "m" and "i" areas, etc.).

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* The basic field and office research for this paper were conducted in 1958 and 1959 while the author was employed by the Climatology Group, California Department of Water Resources, Sacramento, California. More recent research (1963-1964) has brought the information up-to-date.

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1 E. A. Ackerman, "The Köppen Classification of Climates in North America," *Geographical Review*, Vol. 31 (Jan. 1941), pp. 105-111 (contains some discussion concerning California climates); Frederick S. Baker, "Mountain Climates of the Western United States," *Ecological Monographs*, Vol. 14 (April 1944), pp. 224-254 (a portion of the paper discusses certain areas of California); John E. Kesseli, "The Climates of California According to the Köppen Classification," *Geographical Review*, Vol. 32 (July 1942), pp. 476-480; Peveril Meigs, "Climates of California," *Science Guide for Elementary Schools*, Vol. 5. (August 1938), pp. 1-44; Clyde P. Patton, "The Climates of California According to C. W. Thornthwaite's Classification of 1948," unpublished master's thesis, Department of Geography, University of California, Berkeley, 1951; W. G. Reed. "Climate of Western United States," *Bulletin of the American Geographical Society*, Vol. 47 (1915), p. 9; and Richard J. Russell, "Climates of California," *University of California Publications in Geography*, Vol. 2 (October 1926), pp. 73-84.

2 Köppen first published what has become known as his classification of climate in 1918 in an article in *Petermanns Mitteilungen* titled, "Klassifikation der Klimate nach Temperatur, Niederschlag und Jahreslauf." He made slight modifications in later publications—in his book *Die Klimate Grundriss der Klimakunde*, in a large scale map by him and Rudolf Geiger published in 1928, and most recently in Vol. 1, part C, of the Köppen-Geiger, *Handbuch der Klimatologie*, published in 1936 with the title "Das Geographische System der Klimate." The changes made in the later publications are, with a few exceptions, insignificant. Earlier Köppen articles in 1884 in *Meteorologische Zeitschrift* and in 1900 in *Geographische Zeitschrift* laid the foundation for the 1918 paper.

3 Russell, *op. cit.*, pp. 73-84.

This is not to say that the Köppen classification is of higher quality than certain other systems, such as that devised by Thornthwaite.[4] However, the ease of application of basic climatic data to the Köppen model and the presentation of that data in the classified form are outstanding advantages. Another very important benefit that can be noted when certain modifications of the Köppen model utilized is that they show a fairly good climate/vegetation correlation in much of California. (Many papers, such as those by Patton and Bailey, have pointed out various discrepancies in the Köppen classification, some of which seem to be the result of translation difficulties.[5])

The usefulness of the accompanying map (Figure 1. See map at end of article.) lies not so much in the classification technique, but more in the use of data from over 1,000 climatic stations in California and adjacent areas of Oregon, Nevada and Arizona. This is many times the number of stations used in previous maps of this kind for this area and allows a more detailed analysis of California's climates. All of the climatic stations do not appear on the base map (nor are they plotted on Figure 3) due to space limitations. However, a few of the key sites are noted. All of the data utilized in preparing the climatic map were obtained from the California Department of Water Resources in Sacramento. It represents data from stations operated by the California Department of Water Resources cooperative stations, and United States Weather Bureau official and cooperative climatic stations. (Table 7 is a more detailed description of the legend shown in Figure 1.)

Method

In order to insure a fairly uniform base period for the climatic data used in preparation of Figure 1 the precipitation means were based on the 50-season period 1904-05 through 1954-55[6] and temperature means were generally based on the 22-year period 1931 through 1952. The length of record at the climatic stations varied from approximately five years at a few places to over 100 years in some instances. If a precipitation station had a shorter record than the length of the base period the record was extended by double-mass comparison with nearby longer-term stations that

[4] C. W. Thornthwaite, "The Climate of North America According to a New Classification," *Geographical Review,* Vol. 24 (October 1931), pp. 633-655; and C. W. Thornthwaite, "An Approach Toward A Rational Classification of Climate," *Geographical Review,* Vol. 38 (1948), pp. 658-672; and a publication containing some modifications of the 1948 Thornthwaite classification.

[5] Clyde P. Patton, "A Note on the Classification of Dry Climates in the Köppen System," *The California Geographer,* Vol. 3 (1962), pp. 105-112; and Harry P. Bailey, "Some Remarks on Köppen's Definitions of Climatic Types and Their Mapped Representations," *Geographical Review,* Vol. 52 (1962), pp. 444-447.

[6] Referring to the "precipitation season," which is the 12-month period from July 1 through June 31. Because of the nature and the timing of Mediterranean type precipitation the cool season is also the wet season, which happens to fall into two calendar years. Thus, in speaking of the year's precipitation it would seem inappropriate to divide December of one year from January of the next merely because the calendar must be changed. This is also the feeling of most state agencies that deal with precipitation data in California.

had records which were adjudged to be homogeneous. The quality of all precipitation data used was checked for homogeneity by the double-mass plot system. In the case of temperature records the regression line method was utilized somewhat as a guide to station validity, but because of a general lack of temperature data compared to precipitation, temperature information was generally accepted at face value. Also, because of this lack of temperature data in some key areas, shorter mean periods than the 1931-1952 base period were utilized in some instances.

Discussion

In his paper of 1926 Russell[7] made certain modifications of Köppen's classification in order to better suit California and show more detail. For instance, the boundary between "C" and "D" climates as Köppen gave it is 26.6°F. Any station with an average temperature for the coldest month of 26.6°F. or below would be classified as "D," and anything warmer, up to 64.4°F. for the average of the coldest month, as "C." However, Russell shows justification for changing this boundary between "C" and "D" climates to 32.0°F. He thought that a brief cold period may not be as effective on the vegetation cover as a longer, less intense one. The important thing according to Russell was whether or not the ground freezes significantly each winter. As one goes up the west slope of the Sierra Nevada a definite vegetation change from the larger and more dense coniferous (Douglas Fir, Yellow Pine, Sugar Pine) forests at lower altitudes to the smaller higher altitude type (Lodgepole Pine) can be seen. This change occurs more nearly the 32° isotherm for the coldest month than the 26.6° isotherm. Thus, the 32° average temperature for the coldest month seems better suited to California.

In the arid and semi-arid climates Russell made two revisions in Köppen's classification. The addition of the BWhh classification to the arid climates gives more detail to the desert regions of southeastern California, and the revision of the quantitative limit of the BSk/BSh boundary in the semi-arid areas (average temperature of the coldest month 32°F.) suits California better than the original Köppen model (average annual temperature of 64.4°). In the large area of BWh climate in southeastern California the areas with the warmer summers have a distinctly different type of vegetation, a vegetation which is much more sparse than the "cooler" BWh desert. Also, evaporation is higher in the BWhh regions. The weather station at Cow Creek near Greenland Ranch in Death Valley compares climatically with certain very hot and dry stations in the North African Sahara region. Average annual relative humidity in this area is among the lowest, and evaporation (averaging over 160 inches per year) the highest, in the United States. It also ranks among the world's hottest places.[8] The following table (Table 1) gives pertinent climatic data for Cow Creek.

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[7] Russell, *op. cit.*, pp. 73-84.

[8] See for example, Arnold Court, "How Hot is Death Valley?," *Geographical Review,* Vol. 39 (1949), pp. 214-220; and M. W. Harrington, *Notes On the Climate and Meteorology of Death Valley, California,* USWB Bulletin #1, 1892.

Mean Monthly and Seasonal Precipitation (in inches)
(based on 1904-05 through 1954-55 period)

July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
.11	.17	.11	.10	.18	.20	.24	.24	.19	.10	.06	.02	1.72

Mean Monthly Temperatures (in F.°)
(based on 1931 through 1952 period)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
52.0	58.3	66.5	77.1	86.8	94.6	101.9	99.8	91.7	77.8	62.0	54.0	76.9

Total Monthly Evaporation (in inches)
(based on 1959 through 1963*)
(summer half year only, with yearly totals)

	May	June	July	Aug.	Sept.	Oct.	Annual
1959	17.13	21.03	21.26	19.84	13.48	10.96	146.88
1960	16.65	21.34	22.71	21.51	14.69	10.09	147.21
1961	22.82	25.17	26.39	21.51	17.55	11.60	167.74
1962	20.04	23.26	24.79	25.50	17.64	13.43	172.64
1963	21.41	22.20	27.78	23.86	14.82	11.25	168.23

* In May 1961 this station was moved slightly (new elevation—195′) and renamed Death Valley. The trend at the new location seems to be for higher evaporation rates, as noted in the generally higher totals after 1960.

Table 1. Climatic Data, Cow Creek, Calif. (Elev., 125′)

The criteria of at least three consecutive months with average maximum temperatures of 100°F. or over was set up by Russell as the boundary between BWh and BWhh climates. Five of the several California climatic stations that fall into this "very hot" category and their mean monthly maximum temperatures for the warmest months can be noted in Table 2.

Mean Monthly Maximum Temperatures (in F.°) at Selected California BWhh Stations (based on 1931 through 1952 period)

Station	Elevation	Apr.	May	June	July	Aug.	Sept.	Oct.
Cow Creek	-125	90.5	100.3	108.5	115.7	113.8	106.5	91.8
Brawley	-119	88.1	96.4	103.7	109.6	107.9	103.9	92.2
Indio (U.S. Date Garden)	11	87.4	94.6	101.2	107.3	105.6	101.9	92.0
Blythe	266	88.3	95.9	102.8	108.5	106.7	102.6	91.3
Iron Mountain	922	84.7	93.5	101.5	107.3	105.5	100.4	82.5

Table 2

A sub-symbol that Köppen originated for use with "A" climates was also found to be applicable in California. This is the small "m" for monsoon type precipitation (in this case, with reference to heavy seasonal precipitation). Precipitation data from various stations in northern California were plotted on a graph (Figure 2) by utilizing Köppen's formula for delimiting "m" areas. It was found that in the north coastal area two separate regions, one in Del Norte County and extreme western Siskiyou County (east of Crescent City) and the other in Humboldt County (southeast of Eureka), have this type of climate (See Figure 1).

BOUNDARIES BETWEEN "sm'" AND "s" CLIMATES

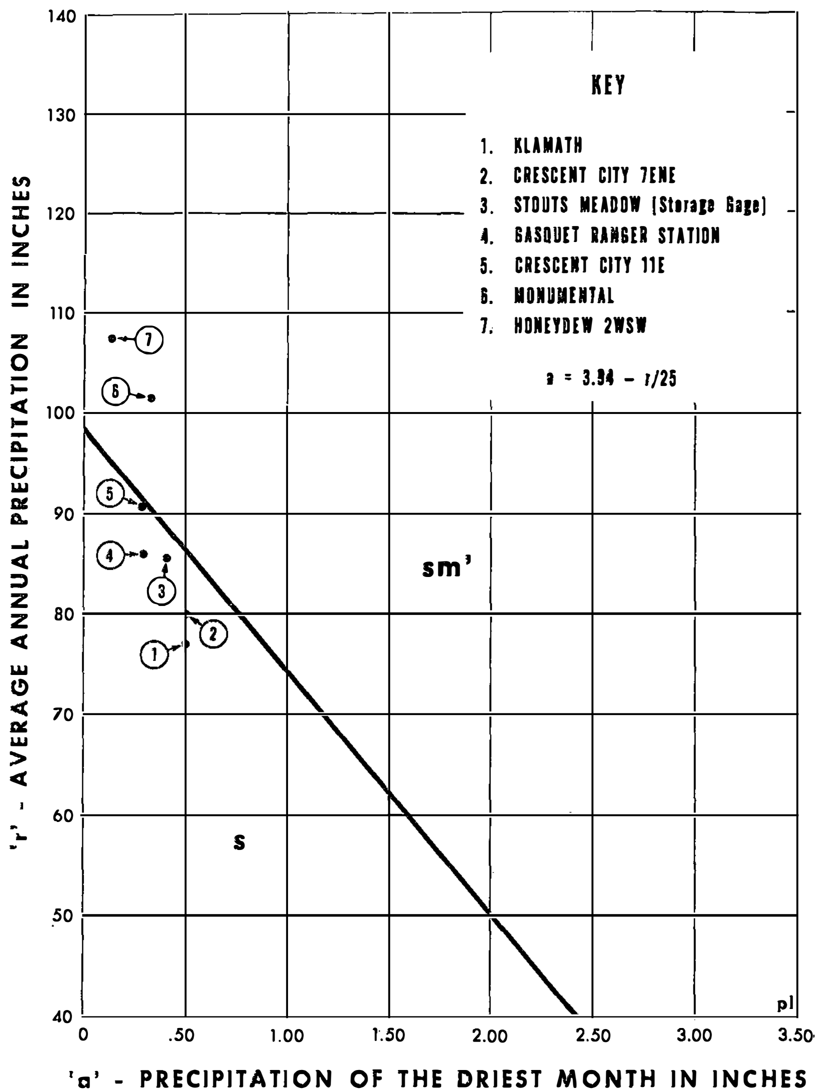

Figure 2

It was also discovered that the boundaries of these Dsbm' and Csbm' areas closely correspond to the 90-inch mean isohyet (Figure 2).

The "m" area was broken into two classifications, Dsbm' and Csbm', because at about the 4,000 to 4,500 foot level in the northernmost of the two "m" areas there is a change apparent in the vegetation cover. Even though the precipitation is extremely high in these higher altitudes (but not as high as it is at elevations below 4,000 feet), and would come under the "m" classification, at least one winter month probably averages below 32°F. There are no weather stations in this Dsbm' area, in fact, there are no year-long inhabitants.

A much smaller region of Csbm' climate can be found along the Mattole River, southeast of Cape Mendocino, in the area around Honeydew. The entire area is probably not more than eight miles in length and less than five miles in width. Precipitation here is heavy, in fact much heavier than nearby places such as the climatic station further downstream at Upper Mattole. The reason for this is due to a funnelling of precipitation into the area. A dip in the NW/SE trending Coast Range (which is not more than 4,000 feet in elevation) in the area immediately southwest of Honeydew is responsible for this. This dip in the coastal mountain range points northeast from the ocean directly toward Honeydew area. The extra-tropical cyclones that enter this region normally approach from the northwest, west-north-west, and west, but because of the counterclockwise circulation of winds around low pressure systems in the Northern Hemisphere precipitation is carried into this region from the south and southwest. This causes the moist air masses to enter directly into the dip and this funnelling combined with the sharp lifting effect of the mountains gives extremely heavy precipitation.

The area around Honeydew and that mentioned earlier in Del Norte County are among the wettest in the continental United States, exceeded only by the western slope of the Coast Ranges in Oregon and Washington. Some extremely high rainfall totals have been recorded in the Honeydew region, where there are two precipitation stations at the present time; at Honeydew (Hunter) and Honeydew 2WSW. For example, in February 1958, Honeydew 2WSW had 58.60 inches of precipitation for the month and in December 1955 that same station had a month's total of 61.50

Mean Monthly and Seasonal Precipitation (in inches)
Honeydew 2WSW, California (elev., 400')
(based on the 50-year period 1904-05 to 1954-55)

July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
.14	.27	1.38	6.88	15.03	19.77	21.33	17.04	12.87	7.39	3.84	1.54	107.48

Monthly Precipitation Totals at Honeydew 2WSW for the 1957-58
Precipitation Season

July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
.70	0	8.50	14.65	9.10	20.20	29.10	58.60	19.65	11.15	.95	1.80	174.40

Table 3

inches. The intensity of the 1955 storm at Honeydew 2WSW can be realized when it is noted that 13.65 inches of rain fell in a 24-hour period, 19.60 inches in two consecutive days, 37.60 inches in five consecutive days, and 51.90 inches in twelve consecutive days. During the 1957-58 precipitation season this station established the highest seasonal total ever recorded in California with 174.40 inches of precipitation. Table 3 gives the average monthly and seasonal precipitation at Honeydew 2WSW, plus the 1957-58 monthly totals recorded at this station.

The small letter "i" that Köppen usually used in conjunction with the "A" climates was found to fit a few small areas along the coast of California. The "i" as Köppen defined it meant that a region must not have an annual variation between the warmest and coldest months of over 9°F. Only three weather stations fall into this category (Pt. Reyes, Pt. Arena and Pt. Piedras Blancas) and only the latter two are in use at present.[9] Table 4 gives the mean monthly temperatures for Point Piedras Blancas.

Mean Monthly Temperatures for Point Piedras Blancas (in F.°)
(based on 1931 through 1952 period)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Range
51.1	51.0	51.5	51.6	52.7	54.6	55.9	55.8	56.8	55.8	55.1	53.0	5.8

Table 4

Other stations such as Eureka and Point Arguello U.S.C.G. came very close to being in this classification, but did not quite qualify. However, it was felt that certain adjacent areas to these borderline cases should be included as Csbni on Figure 1. The immediate coast line in the normally foggier areas, from the Oregon border to a point west of Santa Barbara, probably experiences this same type of climate. However, this strip of coast line would be so narrow that the width of a pencil line on a map of the scale used here would completely overlay it.

Köppen's sub-symbol "c" was found to cover a considerable area in California's higher altitudes. In this case it is associated with the D climates. The majority of this Dsc region is found in the Sierra Nevada Mountains and is a transition zone between the EH (Highland) climates of the very high altitudes and the Dsb (microthermal with cool dry summer) at lower elevations. Only four reporting stations are actually in this type climate. They are, from south to north: White Mountain #1 — 10,150 feet, Ellery Lake — 9,600 feet, Twin Lakes — 7,829 feet, and the station only recently established (1958) by the California Department of Water Resources at the Mount Shasta Ski Bowl — 8,500 feet in elevation. Table 5 gives the average monthly temperatures for Twin Lakes and Ellery Lake.

[9] A climatic station that was established by the Earth Sciences Division, U.S. Army Natick Laboratories, Natick, Mass. (for a climatic study of nearby Hunter Liggett Military Reservation) at Lucia Willow Springs (between Lucia and Pt. Piedras Blancas on the Central California Coast) in 1963 also has shown temperature data that places it in the Csbni classification.

Mean Monthly Temperatures (in F.°) for Twin Lakes and Ellery Lake
(based on 1931 through 1952 period)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Twin Lakes	23.7	24.9	28.6	35.3	41.0	48.2	56.0	55.9	50.6	41.7	33.4	27.3	38.8
Ellery Lake	23.2	22.6	26.8	32.2	38.8	46.2	55.0	54.7	48.7	39.0	31.0	25.0	36.9

Table 5

In other areas that are mapped as Dsc there are no climatic stations, or ones with very short records, but with the information obtained from the four stations mentioned above, and ones in key areas with short periods of record, criteria of a certain altitude combined with the typical vegetation found in the other Dsc areas nearby were used to complete these regions on Figure 1.

When drawing the climatic map an attempt was made to avoid classifying individual mountain peaks. However, in a few instances this was impossible, because the mountain was such an outstanding landmark. This reference is to Mount Shasta and Mount Lassen in Northern California which have some EH and Dsc climates, and Mount San Jacinto (West of Palm Springs) in Southern California, which has Dsc climate in its higher reaches. In most other cases, only mountain ranges, some of them admittedly not large in area, but very much dissimilar to their surroundings, were classified differently than the surrounding area if that was found to be the case. An example would be the White Mountains of east central California. Two complete weather stations were established here in September 1955, by the University of California and the U.S. Navy in conjunction with the U.S. Weather Bureau. One of these, White Mountain #1, was mentioned earlier as being in one of Dsc regions of California. The other, White Mountain #2 is almost 2,500 feet higher than #1, and at an elevation of 12,470 feet is the highest complete weather station in the United States.[10] Being at such a high altitude White Mountain #2 easily qualifies for the ET climate as set up by Köppen. In this case it is not adjacent to the polar regions, but in middle latitudes, so we use Köppen's highland symbol for this Hekistothermal area, EH. Table 6 lists pertinent temperature data for White Mountain #2.

Temperature Data for White Mountain #2, California (in F.°)
(based on the 8-year period 1956 through 1963)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean Maximum	22.1	21.6	22.8	29.5	34.2	46.1	53.0	52.4	47.3	37.3	30.8	28.4	35.5
Minimum Mean	8.1	6.7	6.8	12.6	18.3	29.6	35.8	35.3	30.3	21.8	15.0	12.2	19.4
Mean Monthly	15.1	14.2	14.8	21.0	26.2	37.9	44.4	43.8	38.8	29.6	22.9	20.3	27.4
Absolute Maximum	41	45	37	47	50	64	62	61	61	52	48	52	64
Absolute Minimum	-25	-21	-32	-15	0	11	18	17	4	-20	-28	-12	-32

Table 6

[10] The University of Colorado, Institute of Arctic & Alpine Research, has a complete weather station at approximately 12,300 feet elevation in the Front Range west of Boulder. This station, however, is not manned as is White Mountain #2, but instead is equipped with automatic equipment and is visited weekly.

BSk*	Semi-arid (Steppe). Mean Temperature of coldest month 32.0 F. or below.
BSh	Semi-arid (Steppe). Mean temperature of the coldest month above 32.0 F.
BShn	Semi-arid (Steppe). Mean temperature of the coldest month above 32.0 F. Frequent fog; annual average of 30 days or more of dense fog.
BWh	Arid (Desert). Mean temperature of the coldest month above 32.0 F.
BWhh	Arid (Desert). Mean temperature of the coldest month above 32.0 F. Mean maximum temperature averages 100.0 F. or over for three months or more each year.
Csa**	Humid Mesothermal (Mediterranean or Dry Summer Subtropical). Mean temperature of the coldest month below 64.4 F. but above 32.0 F. Hot summer; mean temperature of the warmest month over 71.6 F.
Csb	Humid Mesothermal (Mediterranean or Dry Summer Subtropical). Mean temperature of the coldest month below 64.4 F. but above 32.0 F. Cool summer; mean temperature of the warmest month 71.6 F. or less.
Csbn	Humid Mesothermal (Mediterranean or Dry Summer Subtropical). Mean temperature of the coldest month below 64.4 F. but above 32.0 F. Cool summer; mean temperature of the warmest month 71.6 F. or less. Frequent fog; annual average of 30 days or more of dense fog.
Csbni	Humid Mesothermal (Mediterranean or Dry Summer Subtropical). Mean temperature of the coldest month below 64.4 F. but above 32.0 F. Cool summer; mean temperature of the warmest month 71.6 F. or less. Frequent fog; annual average of 30 days or more of dense fog. Range of mean temperature between the warmest and coldest months less than 9.0 F.
Csbm'	Humid Mesothermal (Mediterranean or Dry Summer Subtropical). Mean temperature of the coldest month below 64.4 F. but above 32.0 F. Cool summer; mean temperature of the warmest month 71.6 F. or less. (Monsoon); short dry season, but extremely heavy precipitation during the wet season so that mean annual totals are generally in excess of 90 inches. Precipitation of the driest month less than 2.40 inches. (See Fig. 2.)
Dsa	Humid Microthermal (Mediterranean type with colder winters). Mean temperature of the coldest month 32.0 F. or less. Mean temperature of the warmest month above 50.0 F. Hot summer; mean temperature of the warmest month over 71.6 F.
Dsb	Humid Microthermal (Mediterranean type with colder winters). Mean temperature of the coldest month 32.0 F. or less. Mean temperature of the warmest month above 50.0 F. Cool summer; mean temperature of the warmest month 71.6 F. or less.
Dsbm'	Humid Microthermal (Mediterranean type with colder winters). Mean temperature of the coldest month 32.0 F. or less. Mean temperature of the warmest month above 50.0 F. Cool summer; mean temperature of the warmest month 71.6 F. or less. (Monsoon); short dry season, but extremely heavy precipitation during the wet season so that mean annual totals are generally in excess of 90 inches. Precipitation of the driest month less than 2.40 inches. (See Fig. 2.)
Dsc	Humid Microthermal (Mediterranean type with colder winters). Mean temperature of the coldest month 32.0 F. or less. Mean temperature of the warmest month above 50.0 F. Cool short summer; less than four months with mean temperatures averaging over 50.0 F.
EH	Hekistothermal (Highland Climate). Mean temperature of the warmest month below 50.0 F. but above 32.0 F.

Table 7. Detailed Legend for Climates of California Shown in Figure 1.

Except for the various changes mentioned earlier in this paper the climatic areas on the accompanying map (Figure 1) were determined by use of Köppen's classification system and any formulas that he devised to be used with it (see Figure 3). The only exception to this could possibly be the "n" or foggy climates, to which Köppen attached no quantitative limit. This author tentatively attached a limit of 30 days each year with dense fog (as defined by the U.S. Weather Bureau) to be used to delimit the "n" areas. Previous climatic maps of California have been much too conservative in delimiting this foggy region. For example, Russell, in his 1926 classification failed to include Santa Maria in the fog belt.[11] Eureka, included by Russell as an "n" area, has only 49 days a year of dense fog, while Santa Maria A.P. has 88 days.

An effort will not be made to go into the location and explanation of each of the remainder of the fifteen separate climatic regions plotted on the climatic map that accompanies this paper (Figure 1). All of the symbols used on the map can be interpreted with the use of the information in Table 7 and Figure 3. Where no climatic data were available the criteria of elevation, vegetation cover, nearby stations, and knowledge of the landscape by the aurthor and others were used to determine parts of some of the climatic boundaries. As more data becomes available in the future such "second-bests" as mentioned above can be eliminated. This map is certainly subject to revision as such additional information shows changes should be made.

[11] Russell, *op. cit.*, climatic map.

Notes for Table 7 on opposite page.

*See Figure 3 for graph showing Köppen's boundaries between semi-arid, arid and humid climates.

**"s": Summer dry; at least three times as much precipitation in the wettest month of winter as in the driest month of summer; also the driest month of summer receives less than 1.20 inches of precipitation.

BOUNDARIES BETWEEN BW (DESERT), BS (STEPPE), AND HUMID CLIMATES WHEN PRECIPITATION IS CONCENTRATED IN WINTER

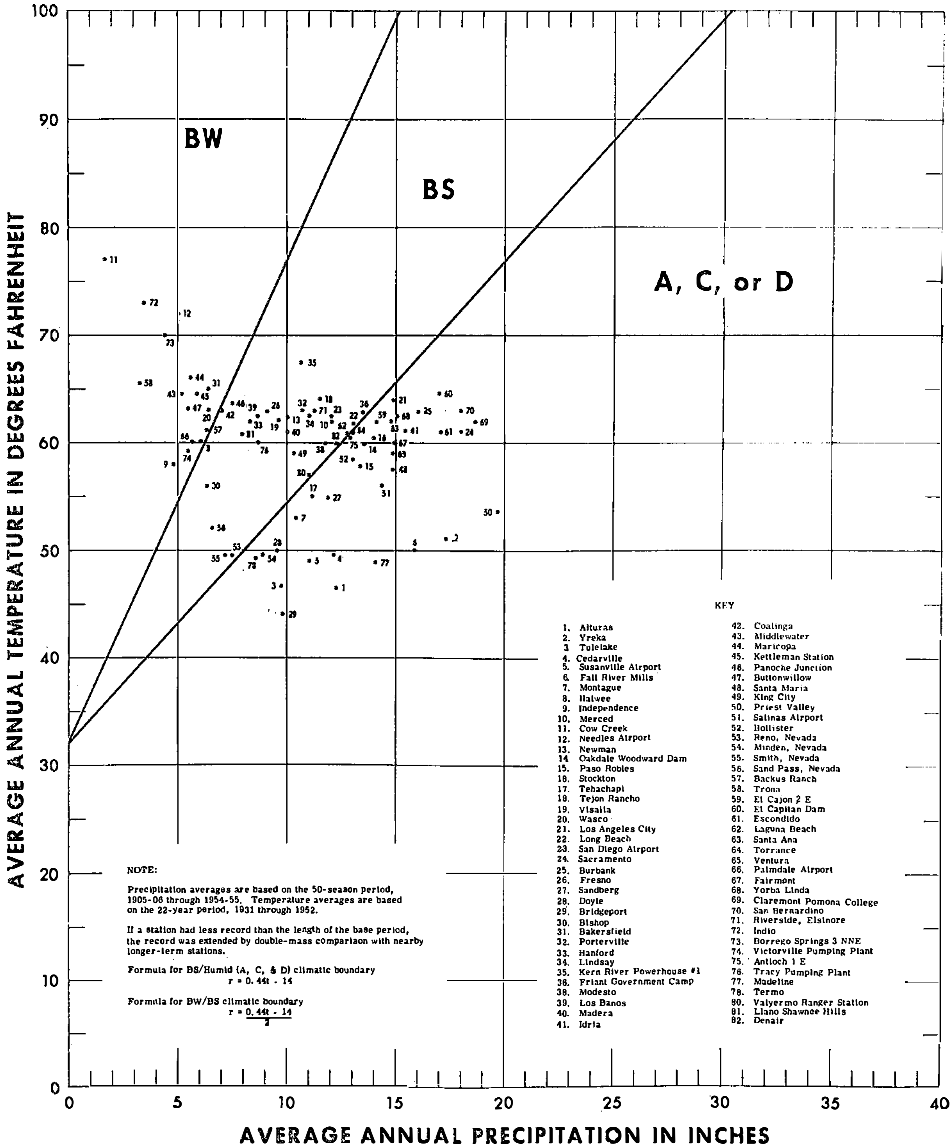

Figure 3

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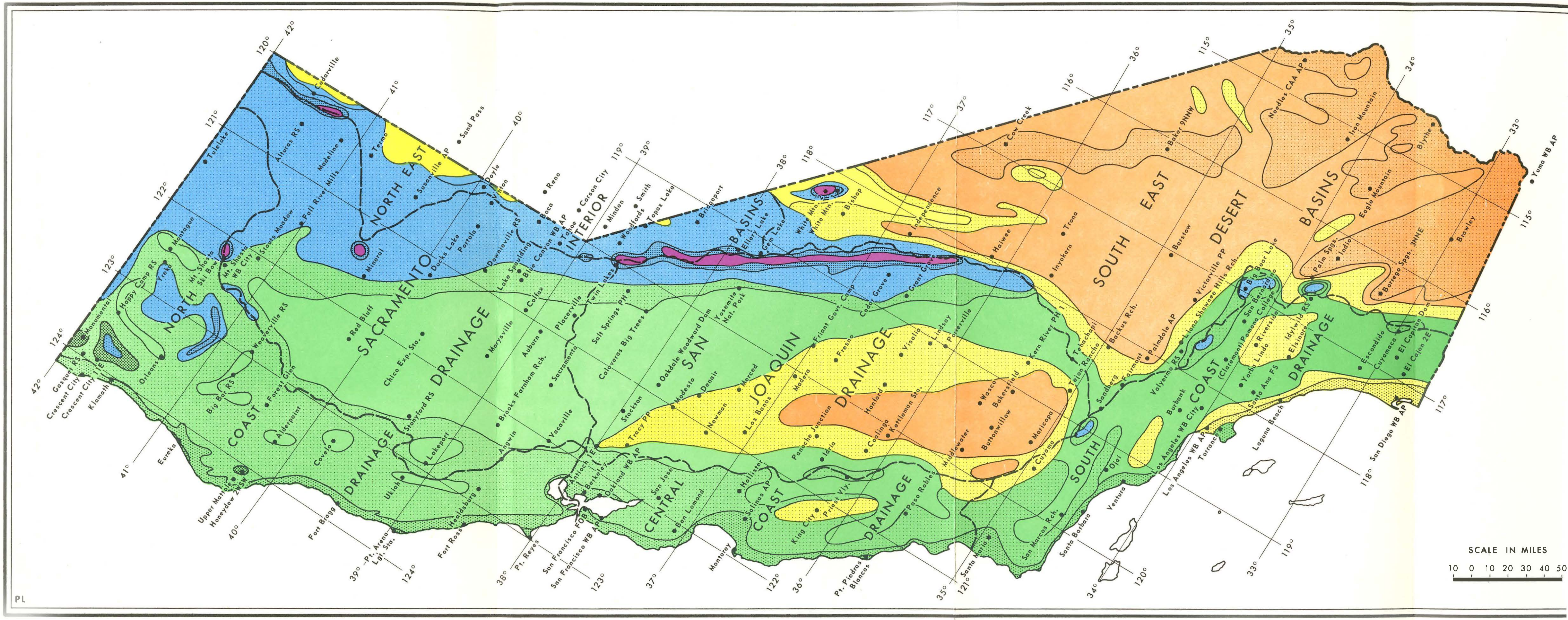
Published and unpublished climatic data on file at the California Department of Water Resources, Sacramento Office. (This includes U.S. Weather Bureau publications such as: *Climatic Summary of the United States, Bulletin W Supplement for 1931-1952,* Washington, D.C. 1958).

CLIMATES OF CALIFORNIA



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