May 14, 1982

Director
Bureau of Alcohol, Tobacco,
and Firearms
P.O. Box 385
Washington, DC 20044

Dear Sir:

Pursuant to the provisions of Section 4.25a of 27 Code of Federal Regulations, as respects the establishment of viticultural areas, we respectfully submit a revised application for the establishment of the "Monterey" viticultural area.

Supporting this application, we submit the following:

1. Evidence that the name of the viticultural area is locally and/or nationally known as referring to the area specified in the application.

   The commercial history of significant grape growing and winemaking in the county of Monterey began in the year 1962 with the planting of approximately 1400 acres of varietal grapes by three of California's renowned producers and marketers of premium quality wines: Paul Masson Vineyards, Mirassou Vineyards, and Wente Bros. Vineyard acreage in the county of Monterey has since grown to 31,632 acres as reported in the publication "California Grape Acreage 1979", issued by the California Crop and Livestock Reporting Service, May 1980 (attached Exhibit I). Recognition of "Monterey" as a viticultural area is manifested in countless references and articles in newspapers, magazines, and books having local, national and international distribution.

2. Historical or current evidence that the boundaries of the viticultural area are as specified in the application.

   The area included in this application has been historically and currently delimited by the U.S. Geological Survey as the "County of Monterey" by its political boundaries. In keeping with the ATF position, as recognized in its final ruling on the "Augusta Viticultural Area" and on the "Napa Valley Viticultural Area," "...that the use of political boundaries and survey lines is appropriate where they coincide with the distinguished geographical features or where they reasonably describe an area which which possesses a distinguishing viticultural characteristic", likewise, in the case of the "Monterey" area, the political boundaries delineate an area with distinguishing viticultural (climatic and topographical) characteristics.

3. Evidence relating to the geographical features: climate, soil, elevation, physical features, etc., which distinguish the viticultural features of the proposed area from the surrounding areas.

The Monterey Viticultural Area as proposed is distinguished by the following characteristics:

Soil - Monterey County is unique in its coarse and fine sandy loams distributed throughout the county. These are Diablo, Kettleman, and Holland series and are sub-divided on the basis of origin into old valley filling deposits, younger valley filling deposits, and recent alluvial soils.

The Lockwood series has been classified in the old valley filling deposits. Greenfield and Salinas series have been grouped in the younger valley. The Hanford, Metz, and Dublin series has been placed in the recent alluvial soils.

These soil types are not only dominant in the Salinas, Carmel and Hames valleys, but also in the mountainous pockets and smaller valleys of the Santa Lucia range on the west and the Diablo range on the east of Monterey County.

These well-drained soils are particularly suited to the growing of grapes and other deep-rooted crops that are fairly drought resistant.

Climate - The weather in Monterey County is unique primarily due to the sparse natural rainfall and the influences of the bordering Pacific Ocean and Monterey Bay. The area is relatively dry throughout the growing season compared to other areas. The valleys in Monterey County where grapes are currently growing, or which have the potential to grow grapes, have an average rainfall of 10 inches - generally classified as desert. However, the watershed of the Santa Lucia and Diablo ranges included in our viticultural area provides adequate water through underground aquifers to irrigate the grape acreage, as well as to supply other agricultural requirements.

The low rainfall is an advantage during the growing season because it allows for controlled water management rather than the unpredictability and vicissitudes of nature. To have very litte, or no rainfall during the harvest is an advantage to producing distinctive high quality wines because of the lower incidence of bunch rot.

The inland valleys which open to the Pacific Ocean between the parallel mountain ranges (Gabilan; Santa Lucia; Diablo) form corridors of cool air which contribute to a long growing season. The variability

Climate - of the winds which sweep down from Monterey Bay through the inland valleys produces optimum grape growing conditions. Temperatures are rarely extreme enough to cause serious problems of frost or heat as in other grapegrowing areas.

The proposed Monterey Viticultural Area encompasses within its boundaries areas with generally similar soils, weather, and topography which have the potential to produce grapes and wines of a noticeable similarity.

4. The specific boundaries of the viticultural area, based on features which can be found on a U.S. Geological Survey map of the largest applicable scale, are as follows:

   Beginning at the junction of River Road and Highway 68, south of the city of Salinas; thence following River Road southeasterly to Chualar Road,; thence following Chualar Road northeasterly to Old Stage Road; thence following Old Stage Road northeasterly to the centerline of Chualar Creek; thence following Chualar Creek and Chualar Canyon northeasterly to the summit of the Gabilan Range of mountains; thence southeasterly along the summit of the Gabilan Range to the Chalone Peak; thence southeasterly in a direct line to the division line of the parts of the San Lorenzo Sobrantes owned respectively by Breen and Dunn; thence along said dividing line of said rancho to the southern boundary thereof; thence due south of the San Lorenzo Creek; thence southeasterly up said San Lorenzo or Lewis Creek and up the north fork thereof, to the summit of the divide between the waters of said Lewis Creek and San Benito Creek; thence, following said divide southerly, to the summit of the Coast Range of mountains to just past the peak of Reason Mountain to the headwaters of Little Cholame Creek, thence following along the ridge to the southeast of Little Cholame Creek to its intersection with Cholame Creek; thence crossing said Cholame Creek and following along the top of the southwest ridge draining to Cholame Creek to the intersection of Vineyard Canyon and Cholame Creek; thence following in a southwesterly direction along the ridge draining to Vineyard Canyon until it reaches the Salinas River; thence following northwesterly along the Salinas River until it intersects with the San Antonio River; thence following along the south ridge draining into the San Antonio River in a general northwesterly direction to the boundary of the Los Padres National Forest; thence following in easterly, northerly, westerly, and subsequently northwesterly direction the boundary of the National Forest until it intersects with White Rock Ridge; thence following Robinson Canyon northwesterly, crossing the Carmel River; thence following Buckeye Canyon northeasterly to a point intersecting Highway 68; thence northeasterly along Highway 68 to the point of beginning.

5. A copy of the appropriate map with the boundaries prominently marked is attached as Exhibit II.

We will be pleased to answer any questions, and we trust our application will receive your favorable consideration.

Respectfully,

MONTEREY WINEGROWERS COUNCIL

Terrel West
President

PETITION FOR MONTEREY VITICULTURAL AREA

Additional Attachments:

III Letter from Mr. Rudy Neja, Area Viticulture Farm Advisor, Monterey County regarding the viticultural homogeneity of Monterey County; dated 12/21/81; with attachments including treatise entitled "Grapevine Response...."

IV Letter from Professor Mary Ann Sall, University of California - Davis, regarding unique growing conditions in the Monterey area; dated 10/12/81.

V Letter from C. J. Alley, Ph. D., University of California, Davis, regarding vine propagation with relation to climate in the Monterey area; dated 10/28/81.

VI Letter from Mesdames Ruth Teiser and Catherine Harroun, historians with offices in San Francisco, regarding Monterey as a unique viticultural region: dated 12/7/81.

VII Letter from Mr. David Ririe, County Farm Director and Farm Advisor, Monterey County, regarding the soil characteristics in Monterey County; dated 10/30/81.

VIII Letter from Professor William H. Rempel, Director, Research and Long-Range Forecasting, National Weather Institute, La Canada, CA, regarding climatic conditions in Monterey County; with attachments; dated 10/22/81.

IX Articles published in magazines and wine newsletters which refer to Monterey as a unique winegrowing region.

X Articles published in newspapers which refer to Monterey as a unique winegrowing region.

XI Excerpts from books on the subject of wine which refer to the unique characteristics of Monterey for winegrowing.

NAMES	ADDRESSES
Edward B. Hamler	The Monterey Vineyard [redacted] Gonzales, CA 93926
John P. McClelland, Pres. by Keith Greaves	Almaden Vineyards [redacted] San Jose, CA 95118
Gene P. West	Arroyo Seco Vineyards, Inc. [redacted] - Greenfield, Ca. 93927
J. Douglas Meador Genl Partner	Ventana Vineyards [redacted] SOLEDAD CALIF 93960
J. Douglas Meador Pres.	Ventana Vineyards Winery Inc [redacted] SOLEDAD CALIF 93960
Peter M. Mirassou	Mirassou Vineyards [redacted] Soledad, Ca 93960
Jerome J. Lohr	Turgeon & Lohr Winery Greenfield Vineyards [redacted], San Jose, 95126
Jon A. Wells, Vice President	Paul Masson Vineyards [redacted], Saratoga, Ca. 95070
Jean K. Wente Vice president	Wente Bros. Inc [redacted] Livermore CA 94550

NAMES	ADDRESSES
Bernard J Turgeon	[redacted]
	Saratoga CA 95070
Barry [illegible]	[redacted]
	Santa Cruz CA 95060
[illegible]	[redacted]
	SARATOGA CA. 95070

California Grape Acreage

1979

CALIFORNIA CROP AND LIVESTOCK REPORTING SERVICE

CONTENTS

CALIFORNIA CROP AND LIVESTOCK REPORTING SERVICE

United States
Department of Agriculture
Economics, Statistics, & Cooperatives Service

State of California
Dept. of Food and Agriculture
Bureau of Agrl. Statistics

P.O. BOX 1258, SACRAMENTO, CALIFORNIA 95806

FOREWORD

Since 1969 the California Crop and Livestock Reporting Service has endeavored to record and publish current acreage statistics for the California grape industry. In the late 1960's and early 70's, the major concern of the industry was the magnitude of new plantings, especially premium varietals, in areas which up to that time had not been major grape growing regions. Of additional concern were acreage increases in already established areas. Between 1969 and 1974, total grape acreage increased by 36 percent while wine grape acreage alone increased by 118 percent. The drastic changes during that time period have been tabulated and released in annual grape acreage publications with data showing varietal and geographic changes affecting the grape industry.

The need continues to keep abreast of new plantings and geographic change. It is also one of accurately tabulating decreases in acreage due to removals, corrections, and planting failures. The acreages, varieties, locations, and ages of removals are now of greater concern than they were previously. To this end, with matched funds supplied by the Grape Industry and the United States Department of Agriculture, the Crop and Livestock Reporting Service has again compiled acreage statistics for use by interested persons.

SURVEY METHODS

A questionnaire was mailed to vintners, grapestake suppliers, custom grape planters, County Commissioners, Farm Advisors, and licensed nurseries to aid us in developing a list of new growers. Names which they supplied on the questionnaire were screened against current records to avoid duplication of operators and their operations. A list of new growers was developed. Each of these was later verified along with their acreages.

Following completion of the 1978 survey, corrected questionnaires were used to update the fruit acreage master files. Changes reflecting all information obtained from the previous grape acreage survey, from County Commissioners, and our own fruit acreage surveys were used in the update. From these updated fruit acreage files, grape plantings for nearly 16,000 parcels and 9,700 operators were transfered to the 1979 grape acreage schedules. Each farm's grape acreage was listed with information concerning grape variety, year of planting, vine counts, vine spacings, and net acreage at the location described on the questionnaire. The questionnaires were mailed during mid-February to all known operators asking for necessary changes and corrections to be made and returned to the Crop and Livestock Reporting Service.

Mail response was obtained on 61 percent of the schedules before the sample cut-off date. All growers with more than 200 acres in their operation, and not responding by mail, were designated to be enumerated, as were 3 out of 4 of those nonrespondents having 50.0 to 199.9 acres and 1 out of 20 of those having 20.0 to 49.9 acres and 1 out of 50 of those having under 20 acres. This sampled group was enumerated by telephone or personal interview. All field work and telephoning was completed during March and April.

Acreage covered by mail returns and enumeration accounted for about 95 percent of the total grape acreage. About 5 percent was estimated for by sample. New computer programs were used to summarize and assimilate data into county, variety, and age categories, as well as summaries for the various size groupings.

Timing of the survey was changed from summer to spring with the 1975 survey. This was done to enable a more accurate accounting of removals. The summer surveys were primarily designed to record new plantings. Removal data for 1976 and later surveys was recorded by additional questions on the regular questionnaire. Removal data was collected in the 1975 survey with a separate questionnaire.

DATA LIMITATIONS

General:

This report provides acreage data at several levels of detail. Although the procedures used were designed to minimize the impact of sample variations on the results, users are cautioned that the figures provided at the level of finest detail are subject to more sample variation than those at a gross level. The highest level of precision will, of course, be found at the State level for all grapes and for the three grape types. Somewhat less precision should be attached to data provided for minor varieties. An extreme example would be the case of a single grower of a minor variety in a county. If he were drawn in the sample of nonrespondents, the expansion process would exaggerate the county acreage for that variety.

Cases such as this were not frequent and careful consideration was given to all aspects of each individual case before estimates were made.

A high percentage of the information was acquired from the vineyard operator. If the operator could not be reached, every effort was made to contact a source such as a nonresident owner or relative that could be expected to have definite knowledge of the operation. Only in a very few instances was it necessary to visit the block and draw conclusions independently.

All reported data were carefully reviewed and incomplete or questionable reports were resolved by secondary contact with the respondent. However, for most, the reported variety, acreage, and year planted were accepted as reported.

Comparison of the current inventory of 1978 and earlier plantings with those published a year ago reveals differences. The current estimate of 1978 plantings is higher because the 1979 survey accounted for acreage that was not included in the 1978 survey and rootstock grafted in 1979 was designated as planted in 1978. Other factors affecting data for all years are variation due to sampling procedure and changes by growers in acreage, variety, and year planted information reported in earlier surveys. A complete fruit and nut acreage survey was completed in Tulare County this year.

Varieties:

Data are provided for each variety with 50 or more total acres standing in 1979. Acreages for all other varieties are combined in "Other" categories. Data are shown individually for 98 varieties including 66 wine types. Care was taken to properly identify each block reported with a recognized varietal name. However, a reasonable variety reported by the respondent was accepted with no further verification.

Rootstock:

Most of the rootstock acreage shown was planted in the past three years. However, some earlier plantings are included. These older rootstock blocks were verified by contacting the reporting growers. When rootstock is budded over, the year of planting assigned to that block of grapes is the year preceding the budding. For instance, if a 1970 rootstock planting is budded over in 1979 the year of planting assigned to the selected variety would be 1978.

Period Covered:

The primary intent of the 1979 project was to record removals of grapes since the 1979 harvest and new plantings of grapes during 1979. Planting activity is accounted for on a calendar-year basis. Removal data pertains essentially to the period between the 1978 and 1979 harvests. In 1971 and 1972, we collected planting information on a July 1 to June 30 basis. Because of increased planting activity after mid-year since 1971, and because of many requests from data users, we changed to a calendar-year basis for plantings with the 1973 report. For the 1973 and subsequent reports, growers were asked to report grapes actually planted during the year up to the time of their report and in addition, plantings intended to be made prior to the end of the year. Data shown in this report for 1974, and in most cases earlier years, reflect remaining actual plantings for the entire calendar-year. No effort has been made to resolve inconsistencies with inventories published with earlier reports.

Table 10. ALL GRAPES (excluding rootstock): Acreage; bearing, nonbearing, and total, by type, by county, California, 1979--continued

County	WINE TYPE			ALL GRAPES		
	Bearing	Non-bearing	Total	Bearing	Non-bearing	Total
	- - - Acres - - -			- - - Acres - - -		
Alameda	1,773	214	1,987	1,773	214	1,987
Alpine	---	---	---	---	---	---
Amador	863	172	1,035	878	172	1,050
Butte	524	60	584	570	60	630
Calaveras	63	18	81	63	18	81
Colusa	69	40	109	69	40	109
Contra Costa	876	158	1,034	899	158	1,057
Del Norte	---	---	---	---	---	---
El Dorado	159	43	202	161	63	224
Fresno	36,645	1,533	38,178	186,766	9,923	196,689
Glenn	815	95	910	815	95	910
Humboldt	---	---	---	---	---	---
Imperial	---	---	---	---	---	---
Inyo	---	---	---	---	---	---
Kern	36,206	1,151	37,357	68,177	6,326	74,503
Kings	1,104	56	1,160	3,253	200	3,453
Lake	2,259	210	2,469	2,259	210	2,469
Lassen	---	---	---	---	---	---
Los Angeles	---	---	---	---	---	---
Madera	27,057	3,282	30,339	56,852	6,267	63,119
Marin	14	1	15	14	1	15
Mariposa	---	---	---	---	---	---
Mendocino	8,886	1,218	10,104	8,893	1,218	10,111
Merced	11,796	1,091	12,887	14,683	1,435	16,118
Modoc	---	---	---	---	---	---
Mono	---	---	---	---	---	---
Monterey	29,090	2,542	31,632	29,090	2,542	31,632
Napa	21,859	3,494	25,353	21,869	3,494	25,363
Nevada	11	12	23	11	12	23
Orange	71	---	71	145	---	145
Placer	205	2	207	208	2	210
Plumas	---	---	---	---	---	---
Riverside	2,093	464	2,557	9,931	3,071	13,002
Sacramento	2,947	292	3,239	3,015	292	3,307
San Benito	4,517	97	4,614	4,517	97	4,614
San Bernardino	7,262	24	7,286	7,453	24	7,477
San Diego	228	---	228	243	---	243
San Francisco	---	---	---	---	---	---
San Joaquin	33,271	5,759	39,030	51,326	6,145	57,471
San Luis Obispo	3,417	1,018	4,435	3,418	1,018	4,436
San Mateo	7	---	7	7	---	7
Santa Barbara	5,595	1,880	7,475	5,596	1,895	7,491
Santa Clara	1,635	20	1,655	1,637	20	1,657
Santa Cruz	88	8	96	89	8	97
Shasta	74	---	74	74	---	74
Sierra	---	---	---	---	---	---
Siskiyou	---	---	---	---	---	---
Solano	1,274	40	1,314	1,274	40	1,314
Sonoma	23,959	3,256	27,215	23,992	3,259	27,251
Stanislaus	18,135	1,419	19,554	21,324	1,445	22,769
Sutter	---	---	---	---	---	---
Tehama	267	---	267	271	---	271
Trinity	---	---	---	---	---	---
Tulare	15,179	1,335	16,514	70,005	6,321	76,326
Tuolumne	---	---	---	---	---	---
Ventura	20	---	20	20	---	20
Yolo	504	163	667	504	163	667
Yuba	697	---	697	697	---	697
STATE TOTAL	301,514	31,167	332,681	602,841	56,248	659,089

Exhibit III

AGRICULTURAL EXTENSION
UNIVERSITY OF CALIFORNIA
MONTEREY COUNTY

December 21, 1981

118 WILGART WAY
SALINAS, CALIFORNIA 93901
TELEPHONE: (408) 758-4637

Mr. Thomas George
Chief, Regulations & Procedures Division
Bureau of Alcohol, Tobacco & Firearms
Washington, D.C. 20226

Dear Mr. George:

The Monterey Winegrowers Council has asked me to review their petition for a "Monterey" viticultural area appellation and to provide additional and/or supporting evidence based on my knowledge of the area as the University of California Farm Advisor.

I base these observations on twelve years of experience in the area. I have spent more than half of my time researching new techniques that work well within the proposed boundaries of the appellation. I am familiar with the surrounding areas because I also have been/am currently officially charged with providing council to the areas north and east of the Monterey area, namely Santa Cruz, San Benito, Santa Clara and Alameda Counties, and have taken the time to compare vine growth, yield quality, etc. via University Departments, Experiment stations, and Extension Personnel regarding Sonoma, Napa, and Mendocino Counties in the north coast area and San Luis Obispo and Santa Barbara Counties to the south. I think that there is more homogeneity within the proposed Monterey boundaries than the already approved Napa Valley appellation.

Some points that I would like to make regarding the homogeneity of the Monterey area are:

1. The relative newness of the industry. I've seen it grow from about 1,500 acres to 30,000 plus acres within the past twelve years, and I anticipate another 5,000 to 15,000 acres in the next ten years.

2. Freedom from phylloxera, with the ability to plant vines on their own roots--also the recent availability and ability to plant improved clones of recognized high quality varieties.

3. The new technology, based on Monterey research as how to diagnose soils limitations, alter same by way of deep tillage, and how to plant vineyard blocks by variety to best cope with particular soils.

4. The availability of large tracks of land that fit todays economy of scale of size, provide for the upgrading of workers skills and salaries and provide an increased number of year-round-jobs.

5. Similar pest and disease problems and approaches for control within the designated area. (Refer to supporting evidence provided by Dr. Mary Ann Sall).

My knowledge of the Monterey grape growing area would support the proposed boundaries on the north and east with a slight change on the southern boundary and the southern part of the western boundary.

In discussing the southern boundary with the Monterey Winegrowers Council, it was agreed that this boundary should be redrawn to exclude that portion of Monterey County south of the watershed of Lake and River San Antonio, which is a tributary of the Salinas River. Likewise, it was agreed to exclude that portion of Monterey County south of the southern ridge of Vineyard canyon and to exclude Cholame Valley.

I have studied the eastern and southeastern boundaries as to their geographic climatic and water quality/quantity conditions. The eastern boundary of the Monterey County line is on a ridge top of a significant mountain range. Little coastal air moves over it. Thus the area east of this ridge top has far less coastal influence. Moreover there is significant distance from both the San Francisco and Monterey Bays, and the distance away from these two moderating temperature and rainfall influences, when coupled with the topographic and geographic conditions very logically separates Monterey's climate from San Benito's. An example as to how much this county-line-ridge top partitions Monterey from San Benito County is best described as San Benito County has spring frosts, occurring 2 to 4 weeks later, fall frosts occurring 1 to 6 weeks earlier, and hot spell lasting 1 to 3 days longer than occurs in Monterey County. The same is true for that southeastern portion we wish to exclude from Monterey County proper.

Other factors pertaining to geographic partitioning as related to overall climate conditions would include the amount of rainfall and smog. Air currents from the Monterey Bay move air pollutants away from Monterey County and air currents from the San Francisco Bay, containing much pollutants, remain east of the Monterey County ridge top. Rainfall is less with each mountain ridge and distant air moves away from the ocean.

I will be pleased to discuss with you any of the above information.

Sincerely,

Rudy A. Neja

Rudy A. Neja
Area Viticulture Farm Advisor

RAN/cr

INSIGHT: "To water or not to water: the $64 question"
Ed Souder, Jr., 11/ 6/75

Can a superior wine come from vines that have been irrigated?

"The answer you'll get varies by the amount of summer rainfall normal to the given production area," said viticulturist Rudy Neja of Monterey County's Extension Service.

"Generally Europeans shudder at the idea of irrigating grape vines. It's considered a 'plus' to put the appellation 'non-irrigated' on a bottle of wine. But apparently they're unwilling to classify their natural summer rains as, at least, 'celestial irrigation'," Neja told the Council of California Growers.

The aversion to irrigation carries over into major California growing area as well. "Napa-Sonoma receives 25" to 50" of rain annually, versus the 10" to 12" we get here in Monterey. And rain early in the Fall is not uncommon in that area. So they can afford to share the European aversion to man-made 'rain fall' in the form of sprinkler irrigation," Neja explained.

Since 1972, viticulturist Neja has been actively involved in irrigation trials involving area grape growers and wineries, as well as the University's experiment station.

"We are studying four systems: non-irrigation; an early cut-off in mid-July to stop plant growth; irrigating through the entire season, ~~cutting back~~ and ignoring vine growth; and finally, in mid-season, cutting back canopy growth and reducing irrigation, but continuing water application right up to harvest time in September and November," Neja told the Council. He referred to the latter technique as "E.C.B." - early cut back of irrigation to reduced levels.

Measured results have been startling, if probably insufficient to lower the raised eyebrows of European traditionalists.

"Wineries and the University, cooperating in evaluating quality, report the ECB system resulted in superior wines, based on sugar acids and taste panel ratings," Neja said.

The farm advisor reported further results of the trials. "Under ECB, production averaged over 16 pounds per vine, versus 10 pounds when not irrigated.

(MORE)

In pounds of sugar per vine, ECB averaged 3.2, versus 2.1 non-irrigated."

Water application under ECB is dramatically low. "It requires one-third to one-half the amount of water needed to furrow-irrigate row crops, and about one-half of what grape growers previously thought necessary," Meja reported.

Infra-red aerial photography has aided Monterey county investigators in evaluating vine conditions, whether still growing, defoliating, or in a "holding pattern." "We've found that night time irrigation gets better results: reduced water loss from evaporation and, therefore, minimized salt concentratio on leaves," the viticulturist said.

Ultimately the consumer will judge the merits of irrigation versus natural rainfall. But leading California vintners already are reaching the conclusion that European prejudices in wine-making are in for shattering disillusionment.

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EXTENSIONS OF REMARKS

DOMESTIC WINES

HON. ALPHONZO BELL

OF CALIFORNIA

IN THE HOUSE OF REPRESENTATIVES

Monday, December 8, 1975

Mr. BELL. Mr. Speaker, many of us have known for a long time that our domestic, U.S. wines are of a quality to rival the best imported vintages.

Some of them, such as several of the well-known California wines, are finally beginning to come into their own in the international wine market.

In part, this is due to some of the advanced techniques being used by U.S. viticulturalists. One such innovative procedure now being used on a trial basis in California is vineyard irrigation.

A recent bulletin published by the Council of California Growers describes this project.

The text of that article follows:

TO WATER OR NOT TO WATER—THAT IS THE QUESTION

Can a superior wine come from grape vines that have been irrigated?

"The answer you'll get varies by the amount of summer rainfall normal to the given production area," said viticulturist Rudy Neja of Monterey County's Extension Service.

"Generally, Europeans shudder at the idea of irrigating grape vines. They considered it a 'plus' to put 'non-irrigated' on a bottle of wine. But apparently they're unwilling to classify their natural summer rains as, at least 'celestial irrigation'," Neja told the Council of California Growers.

The aversion to irrigation carries over into major California growing areas as well. "Napa-Sonoma receives 25" to 50" of rain annually, versus the 10" to 12" we get here in Monterey. Any rain early in the Fall is not uncommon in that area. So they can afford to share the European aversion to man-made 'rainfall' in the form of sprinkler irrigation," Neja explained.

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"Wineries and the University, cooperating in evaluating quality, report the ECB system resulted in superior wines, based on sugar acids and taste panel ratings," Neja said.

The farm advisor reported further results of the trials. "Under ECB, production averaged more than 16 pounds per vine, versus 10 pounds when not irrigated. In pounds of sugar per vine, ECB averaged 3.2, versus 2.1 non-irrigated."

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Ultimately the consumer will judge the merits of irrigation versus natural rainfall. But leading California vinters already are reaching the conclusion that European prejudices in wine-making are in for some shattering disillusionment.

NEW POSTAL SERVICE POLICY WILL BENEFIT CONGRESSMAN

HON. WILLIAM D. FORD

OF MICHIGAN

IN THE HOUSE OF REPRESENTATIVES

Monday, December 8, 1975

Mr. FORD of Michigan. Mr. Speaker, I would like to call attention to two policy changes just announced by Postmaster General Benjamin F. Bailar which will be of interest to all our colleagues in the House and Senate.

These changes were made by Mr. Bailar after consultation with members of the Post Office and Civil Service Committee, and I want to express my appreciation to him for a fine gesture of cooperation and an indication of a new openness in the Postal Service.

For a number of years, many of us have strenuously opposed a Postal Service rule which prohibited Postmasters from responding to a simple congressional inquiry. Instead, they were instructed to forward all congressional mail to Postal Service headquarters in Washington.

Mr. Bailar has now reversed this shortsighted policy and authorized "Postmasters and Sectional Center Managers—to respond to congressional inquiries received directly on matters under their jurisdiction affecting the customers and services of the postal office or sectional center."

In a second order, Mr. Bailar has halted another ridiculous policy barring elected officials from participating in open-house ceremonies for new and remodeled post offices. This rule, designed to agument the Postal Service policy of "keeping politics out of the post office," had often resulted in limited public knowledge or use of new postal facilities.

These "tunnel-vision" policies were inaugurated by Mr. Bailar's predecessors at the Postal Service, who had ignored or overlooked the problems that had been created by them, even when brought to their attention.

I am most pleased that Mr. Bailar has expressed his willingness to make needed changes in postal policies, and I commend him for his cooperative attitude.

For the benefit of my colleagues, the two new postal orders are herewith printed:

POSTAL BULLETIN NOTICE ON CONGRESSIONAL PROCEDURES

It is of the utmost importance that inquiries from Congressional offices receive prompt and accurate attention. All levels of management are expected to assist toward successfully meeting this objective. In this regard, Postmasters and Sectional Center Managers are authorized to respond to Congressional inquiries received directly on matters under their jurisdiction affecting the customers and services of the post office or sectional center. Information copies of Postmaster and Sectional Center Manager responses and memoranda recording verbal responses, as well as questions received directly involving policy matters (which should be forwarded to Headquarters for answering), will be collected by the Sectional Center Manager for forwarding to the Assistant Postmaster General, Government Relations Department, United States Postal Service, Washington, D.C. 20260. Policy matters are interpreted to include but are not limited to such answers as mail classification, rate making, contracting, real estate, interpretation of the collective bargaining agreement, personnel policies, arbitration, appointments, and promotions. The existing procedural framework, governing labor, management relations must be maintained at all times.

POSTAL BULLETIN NOTICE ON OPEN HOUSES

When new or substantially remodeled buildings are occupied by the Postal Service, open houses should be held for the general public, employees, their families, and friends. Ceremonies will be informal and will not include speeches. National, state, and local elected officials will be invited. As far in advance of an opening as possible, postmasters should contact their Sectional Center Managers for detailed instructions, which will be furnished.

U.S. PRESENCE VITAL IN ASIA

HON. EDWARD J. DERWINSKI

OF ILLINOIS

IN THE HOUSE OF REPRESENTATIVES

Monday, December 8, 1975

Mr. DERWINSKI. Mr. Speaker, at a time when the President has just returned from a trip to Asia and announced a new Pacific doctrine which bears the imprint of Secretary Kissinger, I believe the Members ought to ponder the message of Harry G. Wiles, the American Legion commander, who has also just returned from an Asian trip. As a legionnaire, I recommend Commander Wiles' message to the Members:

THE COMMANDER'S MESSAGE—U.S. PRESENCE VITAL IN ASIA

A curious Asian big power triangle balances precariously on the Korean peninsula in the wake of the Communist conquest of Southeast Asia.

Contrary to their propaganda broadsides, both the Soviet Union and Communist China appear anxious that the United States maintain a meaningful and conspicuous military presence in the western Pacific.

APR 4 REC'D

AMERICAN SOCIETY OF ENOLOGISTS

P.O. Box 411, Davis, California 95616
Telephone: 916-752-0385

March 30, 1978

Mr. Rudy A. Neja
University of California
Agric. Extension
118 Wilgart Way
Salinas, California 93901

Dear Rudy:

It is my great pleasure to notify you that your paper "Grapevine response to irrigation and trellis treatments in the Salinas Valley" has been selected by the American Society of Enologists to receive its annual award for best paper in viticulture for 1977. We will award a plaque to each of you at the Annual Meeting Banquet at the Town and Country Hotel, San Diego, on July 29, 1978. If you cannot be present at the banquet, then we will mail your plaque to you shortly thereafter. In this regard please note that your registration fee and banquet ticket will be paid for by the Society if you attend.

Congratulations on doing an excellent job. We hope you will continue to favor our journal with research reports of excellent quality in the future, just as you've done in the past.

Best personal regards.

Very truly yours,

Dick

Richard G. Peterson
President

RGP:rm

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GRAPEVINE RESPONSE TO IRRIGATION AND TRELLIS TREATMENTS IN THE SALINAS VALLEY

R. A. Neja, W. E. Wildman, R. S. Ayers, and A. N. Kasimatis

GRAPEVINE RESPONSE TO IRRIGATION AND TRELLIS TREATMENTS IN THE SALINAS VALLEY

R. A. Neja, W. E. Wildman, R. S. Ayers, and A. N. Kasimatis

Respectively Area Farm Advisor, Soil Specialist, Water Quality Specialist and Viticulturist, University of California Cooperative Extension. Present respective addresses of the authors are: 118 Wilgart Way, Salinas, California 93901; Department of Land, Air and Water Resources, Soils and Plant Nutrition Section, University of California, Davis, 95616; Department of Land, Air and Water Resources, Water Science and Engineering Section, University of California, Davis 95616; Department of Viticulture and Enology, University of California, Davis 95616.

Portions of the soil and aerial photography investigations were funded by the Alameda, Santa Clara and Monterey County Wine Growers Associations.

Grower cooperation in the trial was provided by Mirassou vineyards, in particular Peter Mirassou, Otto Schwab, Manual Riviera and Jose Almo.

Assistance from W. M. Kliewer, F. J. Hills, A. O. Marsh, F. K. Aljibury, D. Ririe, and V. L. Singleton is appreciated.

Presented at the Annual Meeting of the American Society of Enologists, June 25, 1976, Anaheim, California.

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ABSTRACT

Four irrigation treatments (nonirrigation, early cut off, early cut back and late cut off) each with three trellis types (2-wire vertical, 1.4 m high; 3-wire vertical, 1.7 m high; and 2-wire vertical, 1.7 m high with a 0.6-m cross-arm were tested to determine effects on the yield and growth of Cabernet Sauvignon and on the composition of the fruit. The split-split-plot experiment was conducted in a low rainfall Mediterranean climate near Soledad in the Salinas Valley of Monterey County, California. The soils were classified by the Soil Conservation Service as a Chualar loam. Topsoil and root depth was uniformly shallow, approximating 50 cm. Irrigations were scheduled primarily on the basis of tensiometer instruments 40 cm deep. Soil suctions in the irrigated plots were maintained between 10-30 cb during the early season until vine growth resulted in uniform canopy density down the vine row with some shoots trailing the ground. Irrigation then was discontinued for the early cut off treatment; soil suctions were allowed to approach or exceed 80 cb for the early cut back treatment before subsequent irrigations in order to retard further shoot growth; but suctions ranging between 10-50 cb were maintained for the late cut off treatment through mid-September. A soil moisture tension of 1-7 bars at harvest was the goal for the last two treatments.

Statistical analysis showed significant differences in °Brix, total acidity, pH, yield of both grapes and fruit sugars, cluster numbers and weights, berry weights, bloom-time petiole percentages of Na, K, and Mg, harvest-time must levels of arginine, and pruning weights.

The late cut off treatment showed delayed maturity and lower yields than the early cut back treatment. The non irrigated and early cut off treatment did not result in a more favorable sugar, acid and pH balance, and resulted in lower yields than the early cut back treatment. The 2 wire vertical trellis with a cross-arm resulted in higher yields than the other two trellises only for the early cut back and late cut off irrigation treatments receiving pre-harvest irrigations.

Most vineyard irrigation research in California has been conducted in the hot arid to semi-arid interior valleys. Until recently many vineyards in the world's Mediterranean climates, which includes much of California's coastal wine grape areas, have relied solely on winter rains stored in relatively deep root zones, or on a combination of winter and growing-season rainfall. Moreover, many vineyardists and winemakers have believed that grapes from nonirrigated vineyards in cool regions produced better wines than the irrigated ones.

Irrigation of premium wine grapes in the Mediterranean climate of California evolved slowly. The installation of permanent set sprinklers for spring frost protection was the turning point (4,12). Subsequent to documentation that sprinklers could provide adequate frost protection, a rapidly expanding demand for wine in the United States encouraged increased plantings. Many new plantings were located on shallower soils than the old established vineyards. Also many new plantings were located in areas that had neither deep soils nor abundant rainfall although the summers were cool and free of rain.

Successful irrigation during the growing season in a low rainfall Mediterranean climate has not been well documented by research. Yet many growers have claimed success while others have admitted nearly complete failure, with or without irrigation.

Beginning in 1970 an extensive survey was conducted in the central coastal California counties of Alameda, Santa Clara, and Monterey. The survey involved infrared and color aerial photography coupled with on-ground and root-zone investigations. Soils, water quality, and plant tissues were studied in relation to irrigation practice. Concomitantly, demonstration trials were conducted involving several irrigation practices. Results of the survey and trials indicated that heavy irrigations of 10-18 cm (4-7 in.) applied infrequently (2-3 per season) often caused problems where root depth was limited to less than 0.8 m (30 in.) because of temporary perched water tables underlain by dense subsoils (11).

Poor water increased the problem. The loss of lower roots by suffocation when attempting to leach salts during the growing season made shallower the root zones that were already shallow. Temporary perched water tables followed by severe plant stress between the infrequent irrigations often caused an unbalanced uptake of certain nutrients and toxic ions, resulting in deficiency symptoms and leaf burn. Toxicity symptoms were especially severe when sudden extreme vine stress occurred during the rapid shoot growth period. Moreover, daytime sprinkler irrigations during periods of high wind, high temperature and low humidity often caused considerable concentration of salts as the applied water evaporated on the leaves between rotations of the sprinkler heads. The resulting high concentration of Cl and Na on the leaves caused leaf burn due to foliar intake when well waters contained more than 3 meq per liter of either Cl or Na. Sprinkling only at night when humidity was higher and drying was slower was very effective in reducing leaf intake of Cl and Na, surface accumulation of lime, and burning of leaves (3,10). Controlling the depth of water penetration during the growing season to avoid perched water tables and leaching only during the dormant season allowed deeper root growth than occurred if leaching irrigations were applied during the growing season. Small depths of water of 2.5 to at most 6.5 cm (1 to 2½ in.) per irrigation instead of 10-18 cm (4-7 in), coupled with frequent irrigations (6-12 instead of 2-4) allowed growing and maintaining a viable leaf canopy through harvest. Applying one or more irrigations after harvest extended the time the vines retained their leaves. In most years one to two postharvest irrigations plus winter rainfall were sufficient to maintain leaves into December and to leach seasonally accumulated salts to favorable levels by the beginning of the growing period (10,11).

Three of the four demonstration trials initiated in 1970 were not designed with sufficient replications, and/or one or more of the treatments was so severe as to cause extremely variable responses associated with weak vines. The data thus did not allow conclusions backed by a high level of statistical significance but did lead to changed irrigation practices in the area (1). The fourth trial initiated in 1970 was reported by Wildman and co-workers (17).

Although a period of diminishing soil moisture prior to harvest has been thought to be necessary to obtain favorably balanced musts, data is limited and conflicting. Also conflicting are declarations of various wineries as to irrigation cut off dates. An inclusive cut off date for a particular area may ignore a wide range of microclimates, and soils, and the fact that numerous varieties may ripen over a considerable period. A comprehensive literature review on irrigation, and a five-year study regarding irrigation cutoff dates was conducted in the hot semi-arid climate of Fresno, California (1).

There being little information on irrigation or cut off dates in the cool coastal climates, a replicated experiment was established comparing several irrigation and trellis treatments.

MATERIALS AND METHODS

The experiment was initiated in 1973 and conducted over a three-year period in a Cabernet Sauvignon block planted in 1966 on a 1.8 x 3.6-m (6 x 12-ft.) spacing. The vineyard was near Soledad, California, in a low rainfall Mediterranean climatic region II (16). Average annual 1961-70 rainfall = 28 cm (11 in.); evaporation from a U.S. Weather Bureau Class A evaporation plan = 166 cm (65 in.); precipitation/evaporation index = 9.05 cm (3.56 in.). P/E index <38 cm (15 in.) = arid climate (14). The weather station was located approximately 5 km from the experiment. The area is a relatively new premium wine grape growing area in California.

Topsoil depth was uniformly shallow within the block, approximating 50 cm (20 in.). The Monterey County SCS soil map (in press) classifies the soil as a Chualar Loam.

In a representative Chualar Loam profile the surface layer is dark grayish brown, mildly alkaline loam and sandy loam about 52 cm thick. The subsoil is a yellowish brown, neutral to moderately alkaline heavy sandy loam, sandy clay loam, and fine gravelly heavy sandy loam about 90 cm thick. The substratum is a brown, neutral loamy coarse sand at depth of about 2 m. In the trial, soil texture below 50 cm did not change significantly but soil density increased significantly, restricting both deep root growth and drainage. The loam topsoil was weakly alkaline, the subsoil neutral.

Four irrigation treatments were established: nonirrigated (NI), early cut off (ECO), early cut back (ECB), and late cut off (LCO), each with three trellis types: 2-wire vertical 1.4 m high; 3-wire vertical 1.7 m high; and 2-wire vertical 1.7 m high, plus a 0.6 m wide cross-arm. The experimental design was a split-plot randomized complete block. Main plots were the irigation treatments replicated four times; subplots were the trellis treatments in each irrigation treatment replicate. By analyzing the data over a three-year period, the experiment also became a split plot in time. There were three sample vines per subplot.

Tensiometers were installed at 4 depths per station (23, 40, 61 and 122 cm deep) and located adjacent to the vines on the berm. Readings were recorded once or twice a week depending on the moisture withdrawal rates.

Irrigations during the growing season were scheduled primarily on the basis of the 40-cm (16 in.) instrument. During the early period between the time pruning wounds began to bleed until vine growth filled the 3-wire vertical 1.7-m high trellis, soil suctions were maintained between 10 and 30 cb for the three irrigated treatments. Bud break was in early April, bloom in early June, véraison in the late August or early September. Irrigations were applied by permanent-set over-the-vine sprinklers capable of delivering a 0.368-cm (0.145-in.) depth of water per hour. Irrigation amounts (Table 1) were estimated according to tensiometer readings. From readings before and after a given irrigation amount, it became possible to control the depth of water penetration (fill the topsoil) yet avoid the perching of water above the dense subsoil (8).

Vine growth was usually adequate to fill the trellis by early August. Differential soil-moisture regimes were usually begun in mid-July. At that time irrigation was discontinued for the ECO treatment. To greatly slow or stop vigorous shoot growth in the early cut back (ECB) treatment, soil suctions were allowed to range up to or exceed 80 cb (depending on daytime temperatures).

Daytime temperatures in the Salinas Valley are unique compared with most of the other grape growing areas in California. Usual nighttime and early-

Table 1. Total precipitation as rainfall and irrigation water, and degree day heat summation for the 1973-1975 seasons.

Period	Treatment	Precipitation; rainfall and irrigation								
		1973 Season*			1974 Season*			1975 Season*		
		No. irrig.	Amount cm.	(in.)	No. irrig.	Amount cm.	(in.)	No. irrig.	Amount cm.	(in.)
(A) Precipitation, late fall & winter rainfall.	All treat-ments	–	43.5	(17.1)	–	26.2	(10.3)	–	24.1	(9.5)
Irrigation.		1	2.5	(1.0)	2	4.3	(1.7)	2	9.4	(3.7)
Total			46.0	18.1		30.5	12.0		33.5	13.2
Bud Break to ECO & ECB cutoff/back date cutoff/ back date	ECO, ECB and LCO	3	10.6	(4.1)	2	7.4	(2.9)	4	13.5	(5.3)
ECO & ECB cutoff/back date	ECB	2	7.6	(3.0)	2	8.1	(3.2)	1	3.8	(1.5)
to harvest	LCO	6	24.2	(9.5)	5	21.2	(8.3)	3	12.7	(5.0)
Soon after harvest	ECB and LCO	1	4.3	(1.7)	1	3.8	(1.5)	1	4.6	(1.8)
Season total precipitation, rain and irrigation	NI	1	40.2	(18.1)	2	30.5	(12.0)	1	33.5	(13.2)
	ECO	4	55.2	(22.2)	4	37.9	(14.9)	5	47.0	(18.5)
	ECB	7	68.3	(26.9)	7	49.8	(19.6)	6	55.4	(21.8)
	LCO	11	84.8	(33.4)	10	62.6	(24.7)	9	64.2	(25.3)
(B)		Heat summation; degree days								
April 1 to October 31	All treat-ments	2896° days			2948° days			2172° days		

* Period beginning Nov. 15 of the previous season.

morning temperatures are quite cool because of frequent coastal fog, followed by temperatures rising rapidly to a daytime high of 16-24°C (60-75°F) around noon, at which time winds rapidly lower the temperature to about 13-18°C (55-65°F) for the rest of the day. For usual cool-weather conditions, tensiometers were allowed to exceed 80 cb for one to several weeks. During unusual unpredictable 2 or 3 day sudden hot spells, when temperatures exceeded 38°C (100°F), a sprinkler cooling, light 2.5 to 3.8 cm (1 to 1.5 in.) irrigation was employed whenever tensiometer readings at both the 23 and 40 cm (9 and 16 in.) soil depths exceeded 80 cb (5,6).

Soil suctions ranging between 10 and 50 cb were maintained through mid-September for the LCO treatment. Thence soil suctions for the LCO and ECB treatments were allowed to rise to an estimated 1 to 5 bars by harvest-time. Occasionally soil suctions would rise to an estimated 10 bars shortly before harvest.

At the onset of véraison irrigations were scheduled during the nighttime not only to reduce foliar burn but also to decrease the hazard of *Botrytis* bunch rot. Irrigations were scheduled late in the evening, with turnoff on the next day coinciding with sunshine and rapid drying conditions. Irrigations during unsettled, cloudy, foggy, or otherwise humid periods were avoided to ensure that the vines and bunches were wet for not longer than approximately 8 to 12 hours (W. B. Hewitt, personal communication).

Harvest-time (late October-early November) soil suctions of over 1 bar but under an estimated 5 bars were aimed for so as to maintain healthy leaves, encourage continued sugar manufacture, and discourage new or continued vegetative shoot growth in the ECB and LCO treatments (7,15,17).

Between harvest and the first killing frost, postharvest irrigations were applied to the ECB and LCO treatments as needed to maintain the upper soil profile below an estimated 5-10 bars in order to maintain in a viable condition those leaves remaining after machine harvest. (Test vines were hand harvested but the beater rods of the machine harvesting the vineyard were not turned off while passing over the hand-harvested test vines). Harvest was usually in late October or early November, a period of mild temperatures, free of fog and significant rainfall.

Dormant-season irrigations were applied to all four treatments if winter rainfall was inadequate to ensure leaching of salts and wetting the soil profile to a depth of at least 2 meters.

Table 1 summarizes the yearly amount of rainfall, the amount of supplemental irrigation water necessary to meet the aforementioned irrigation treatment criterion, and the degree-day summation from April 1 through October 31 for the 1973, 1974, and 1975 growing seasons (16).

Laboratory analysis of the irrigation water was performed in 1972, bloomtime petiole analysis in 1973-74, and harvest-time arginine must analysis in 1975. Water analysis indicated that nighttime irrigation should be practiced to reduce the potential hazard of leaf burn due to relatively high Na (4.1 meq/l) and Cl (2.9 meq/l) (3,10). Slight symptoms of Zn deficiency were noted in prior years and confirmed by the laboratory analysis. Thus prebloom Zn sprays were applied annually.

Laboratory analysis also showed K values of 0.91 to 0.52%, considered borderline to deficient (2). Potassium deficiency symptoms on the basal leaves were noted in 1973 and 1974 only during the early season whereas in 1975 they persisted throughout the season. Test vines were treated after the

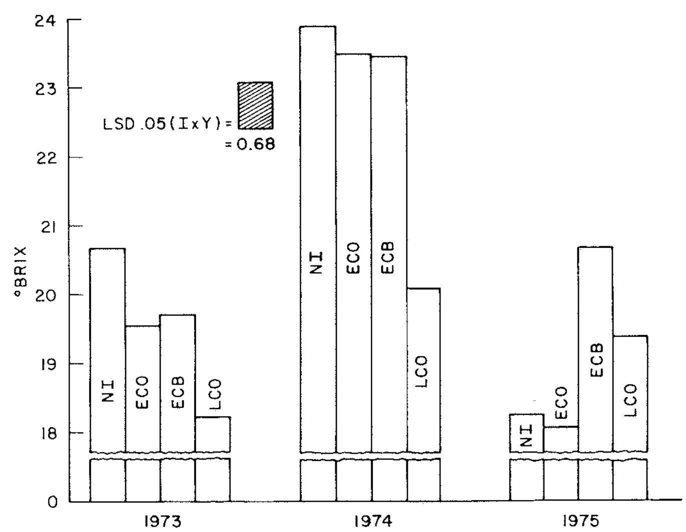

Fig. 1. °Brix readings for the interactions among four irrigation* treatments and three years. *Irrigation treatments: NI = non-irrigated; ECO = early cut off; ECB = early cut back; LCO = late cut off.

Table 2. Mean °Brix combined for years 1973-1975.

Treatment	°Brix	LSD .05	Significance level (%)
Irrigation		0.669	0.1
NI	20.93		
ECO	20.36		
ECB	21.27		
LCO	19.49		
Orthogonal comparisons			
ECB vs others			1
LCO vs ECO + NI			0.1
ECO vs NI			NS
Trellis			NS
Irr. x Years		0.339	0.1

1975 harvest with 2.7 kg K_2SO_4 per vine. All test vines were cane-pruned to four, 12 to 15-node canes and three or four, 2 node renewal spurs.

At harvest-time, clusters from the selected test vines were picked, counted and weighed, and 100 berries from these clusters were selected at random, weighed, and analyzed for °Brix, total acidity, and pH.

In 1973, the NI, ECO and ECB treatments were harvested at the same time, ten days before the LCO treatment. In 1974 all four treatments were harvested on the same date. In 1975 the NI and ECO treatments were harvested at the same time, ten days before the ECB and LCO treatments. Harvest date of the NI and ECO treatments coincided with the onset of significant berry shriveling. Harvest of the LCO was scheduled at a convenient period before the block was commercially picked. Wines were made from the grapes from the four irrigation treatments by Singleton and co-workers and will be reported on at a later date.

RESULTS AND DISCUSSION

Fruit composition related to quality: There were highly significant differences among the four irrigation treatments for °Brix, total acidity, and pH. The interaction of irrigation treatment and years was also highly significant, whereas trellis effects were not.

Degrees Brix: The ECB treatment three-year-average °Brix was the highest of the four treatments, the LCO the lowest. Of the three treatments receiving growing-season irrigations, the ECB treatment resulted in higher °Brix than the ECO and LCO (Table 2).

Fig. 1 shows for °Brix the interaction of irrigation treatment and years. In 1973, when the NI, ECO, and ECB were harvested on the same date, the NI resulted in the highest °Brix, and LCO in the lowest. In 1974, however, when all treatments were harvested on the same date, the LCO was significantly lower than the other three, which were statistically similar. In 1975 when the NI and and ECO were picked earlier than the ECB and LCO because of berry shriveling, the ECB treat-

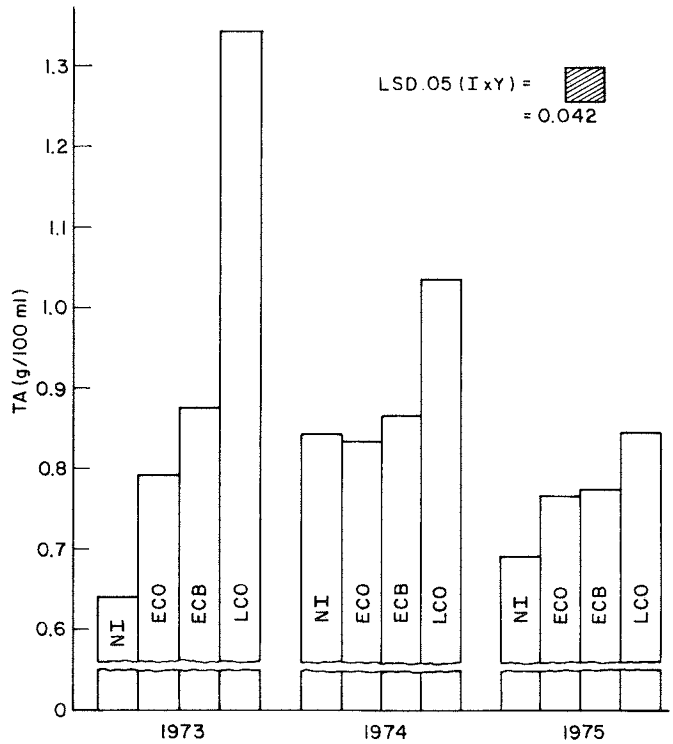

Fig. 2. Total acidity values for the interactions among four irrigation* treatments and three years. *Irrigation treatments: NI = non-irrigated; ECO = early cut off; ECB = early cut back; LCO = late cut off.

Table 3. Irrigation treatment means for total acidity combined for years 1973-1975.

Treatment	Total Acidity	LSD .05	Significance level (%)
Irrigation	g/100 ml	0.035	<0.1
NI	0.725		
ECO	0.799		
ECB	0.840		
LCO	1.076		
Orthogonal comparisons			
NI vs others			<0.1
ECO = ECB vs LCO			<0.1
ECB vs ECO			<5
Trellis			NS
Irr. x Years		0.042	0.1

Table 4. Irrigation treatment means for pH combined for years 1973-1975.

Treatment	pH	LSD .05	Significance level (%)
Irrigation		0.04	<0.1
NI	3.45		
ECO	3.45		
ECB	3.39		
LCO	3.22		
Orthogonal comparisons			
LCO vs others			<0.1
ECB vs ECO + NI			1
ECO vs NI			NS
Trellis			NS
Irr. x Years		0.04	<0.1

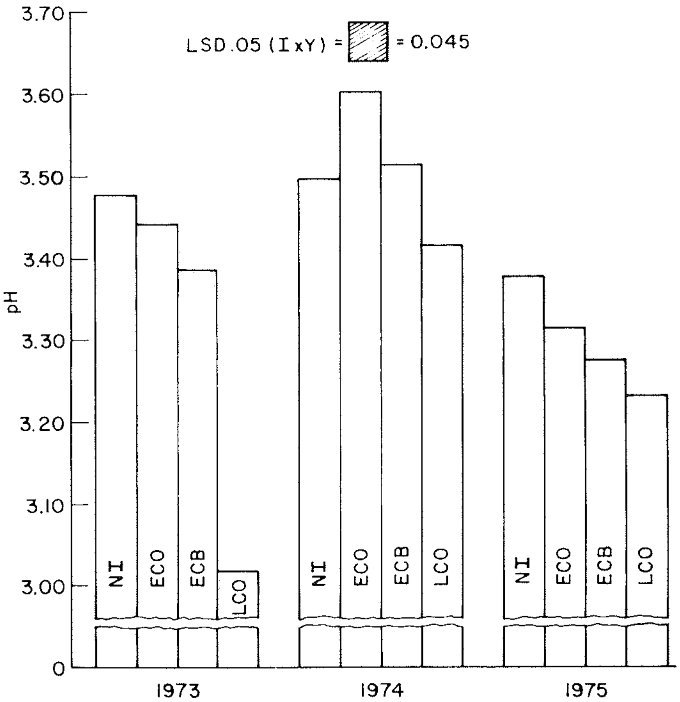

Fig. 3. pH values for the interactions among four irrigation* treatments and three years. *Irrigation treatments: NI = non irrigated; ECO = early cut off; ECB = early cut back; LCO = late cut off.

ment had the highest °Brix, LCO was intermediate, and NI and ECO the lowest.

Total acidity: The LCO three-year-average total acidity value was the highest, and NI the lowest. Statistically each of the four irrigation treatment means were distinct, with acidity related directly to the amount of water received (Tables 1,3).

Fig. 2 shows the interactions of the treatments for total acidity and years. The 1973 irrigations resulted in statistically different acidity level means, with NI resulting in total acidity somewhat low, LCO undesirably high, and ECO and ECB intermediate, and in a desirable range for dry table wines. In 1974 the NI, ECO, and ECB total acidity values were statistically similar and in a desirable range whereas the LCO was significantly above the desired range. In 1975 the NI was significantly lower than the three treatments receiving growing-season irrigations. Although the LCO was significantly higher than the ECO and ECB, all three were in a favorable range.

pH: The three-year-average pH values were significantly higher for the NI and ECO than the two treatments receiving preharvest irrigations. The LCO, which received the most water had the lowest pH (Tables 1,4).

Fig. 3 shows the interaction of irrigation treatment means for pH and years. Except for NI in 1974, pH values decreased with increasing amounts of water the vines received.

Table 5. Irrigation and trellis treatment means for crop yield per vine combined for years 1973-1975.

Treatment	Yield	LSD .05	Significance level (%)
	kg grapes/vine		
Irrigation		0.39	<0.1
NI	4.55		
ECO	5.46		
ECB	6.89		
LCO	5.68		
Orthogonal comparisons			
NI vs others			<0.1
ECB vs ECO + LCO			<0.1
ECO vs LCO			NS
Trellis		0.20	<0.1
6′2wV	5.40		
7′3wV	5.47		
7′2w+T	6.06		
Orthogonal comparisons			
7′2w+T vs others			<0.1
6′2wV vs 7′3wV			NS
Irr. x Trel.		0.40 & 0.51	1
(a) NI vs others x 7′2w+T vs others			1
(b) ECB vs ECO x 6′2wV vs 7′3wV			1
(c) ECB + LCO vs NI + ECO x 6′2wV vs 7′3wV			1

The marked effect of year rated for total acids and pH (Figs. 2,3) deserves comment. The ECB and ECO values appear to be in better balance over the three years than the NI and LCO which fluctuate more depending on the weather during a particular season. The spring of 1973 was cool and wet; 1974 similar but milder. However, after spring there were more extremes in temperatures in 1974 than in 1973. Most of the growing season was very cool in 1975 until October 1 when temperatures rose above 80 for most of the month. There appears to be for total acids and pH an interaction of temperature and soil moisture. More research on these interrelationships appear in order.

Yield; grape yield and fruit sugars per vine: The ECB three-year-average yield of both grapes and fruit sugars was significantly higher for the ECB than for the other three irrigation treatments, and lowest for NI. The ECO and LCO treatments were intermediate and statistically similar (Tables 5,6).

The three-year-average yield of both grapes and fruit sugars was significantly higher for the cross-arm trellis than for the other trellises (Tables 5,6).

Table 6. Irrrigation and trellis means for weight of fruit sugars per vine combined for years 1973-1975.

Treatment	Yield	LSD .05	Significance level (%)
	kg fruit sugars / vine		
Irrigation		0.09	<0.1
NI	.931		
ECO	1.090		
ECB	1.453		
LCO	1.103		
Orthogonal comparisons			
NI vs others			<0.1
ECB vs ECO + LCO			<0.1
ECO vs LCO			NS
Trellis		0.06	<0.1
6'2wV	1.110		
7'3wV	1.093		
7'2w+T	1.241		
Orthogonal comparisons			
7'2w+T vs others			<0.1
6'2wV vs 7'3wV			NS
Irr. x Trel.		0.11 & 0.13	<1
(a) NI vs others x 7'2w+T vs others			0.1
(b) ECB + LCO vs NI + ECO x 6'2wV vs 7'3wV			NS
(c) ECB vs ECO x 6'2wV vs 7'3wV			1

There was a significant interaction of irrigation and trellis treatments. The interaction of the ECB irrigation and the crossarm treatment resulted in the highest yields of both grapes and fruit sugars. The NI treatment did not respond to the crossarm trellis as did the other three irrigation treatments receiving growing-season irrigations. Similarly the ECO did not respond as well as the ECB or LCO. The two treatments (NI + ECO) not receiving preharvest-season irrigations did not respond in terms of increased yield of grapes per vine to the 1.7-m 3-wire versus 1.4 m 2-wire vertical trellis as did the ECB and LCO treatments. There was a similar but not statistically significant trend for fruit sugars (Figs. 4,5 and Tables 5,6).

Components of grape yields: The ECO and ECB gave significantly more clusters per vine than the NI and LCO. The crossarm treatment resulted in significantly more clusters than the 1.4-m 2-wire vertical or 1.7-m 3-wire vertical (Table 7).

The NI resulted in the smallest berry weight, the ECB and ECO were significantly smaller than the LCO, and the ECO was significantly smaller than the ECB. Trellis did not influence berry weight (Table 8).

The NI gave the lowest cluster weight, and the ECB the highest, when statistically compared with the other three treatments. The ECB and LCO re-

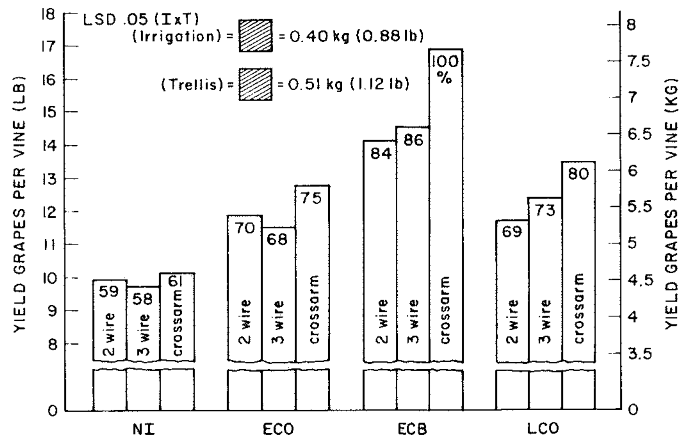

Fig. 4. Crop yield per vine for the interactions among irrigation* and trellis** treatment means combined for the years 1973-75. Each bar is labeled with a percentage of the highest yielding irrigation x trellis treatment. Statistical significance of orthogonal comparisons among irrigation treatments and between trellis treatments is shown in Table 5. *Irrigation treatments: NI = non-irrigated; ECO = early cut off; ECB = early cut back; LCO = late cut off. **Trellis treatments: 2 wire = 2 wire vertical, 1.4 m high; 3 wire = 3 wire vertical, 1.7 m high; crossarm = 2 wire vertical, 1.7 m high with a 0.6 m crossarm.

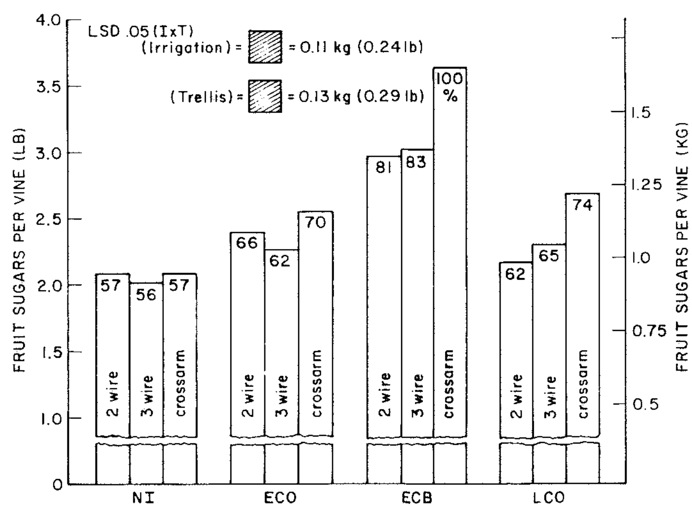

Fig. 5. Yield of fruit sugars per vine for the interactions among irrigation* and trellis** treatment means combined for the years 1973-75. Each bar is labeled with a percentage of the highest yielding irrigations trellis treatment. Statistical significance of orthogonal comparisons among irrigation treatments and between trellis treatments is shown in Table 6. *Irrigation treatments: NI = non-irrigated; ECO = early cut off; ECB = early cut back; LCO = late cut off. **Trellis treatments: 2 wire = 2 wire vertical, 1.4 m high; 3 wire = 3 wire vertical, 1.7 m high; crossarm = 2 wire vertical, 1.7 m high with a 0.6 m crossarm.

sulted in heavier clusters than the ECO and NI. The ECB gave significantly heavier clusters than the ECO and NI but not heavier than the LCO (Table 9). There was a significant trellis effect on cluster weight. The crossarm resulted in a highly significant increase in cluster weights over the other two vertical trellises, while the 1.7 m 3-wire vertical resulted in a significant increase in cluster weights over the 1.4 m 2-wire vertical (Table 9). There was a significant interaction of irrigation and trellis treatments regarding cluster weight. With a crossarm, the ECB treatment versus the ECO resulted in significantly heavier clusters compared to the

Table 7. Mean number of clusters per vine for irrigation and trellis treatments combined for years 1973-1975.

Treatment	Clusters per vine	LSD .05	Significance level (%)
Irrigation		5.1	< 10
NI	84.5		
ECO	90.0		
ECB	92.7		
LCO	86.0		
Orthogonal comparisons			
NI + LCO vs ECO + ECB			1
NI vs LCO			NS
ECB vs ECO			NS
Trellis		4.9	5
6'2wV	88.5		
7'3wV	85.5		
7'2w+T	91.7		
Orthogonal comparisons			
7'2w+T vs others			5
7'3V vs 6'2wV			NS

Table 8. Mean berry weight for irrigation and trellis treatments combined for years 1973-1975.

Treatment	Avg. berry wt.	LSD .05	Significance level (%)
	g		
Irrigation		0.067	<0.1
NI	0.842		
ECO	0.999		
ECB	1.144		
LCO	1.202		
Orthogonal comparisons			
NI vs others			<0.1
ECO + ECB vs LCO			<0.1
ECB vs LCO			<0.1
Trellis			NS

Table 9. Mean cluster weights for irrigation and trellis treatments combined for years 1973-1975.

Treatment	Average cluster wt.	LSD .05	Significance level (%)
Irrigation	g	6.6	<0.1
NI	54.3		
ECO	60.5		
ECB	76.0		
LCO	67.3		
Orthogonal comparisons			
NI vs others			<0.1
ECB vs others			<0.1
ECB + LCO vs NI + ECO			<0.1
ECB vs ECO			<0.1
ECB vs LCO			NS
Trellis		3.1	<1
6'2wV	61.8		
7'3wV	64.7		
7'2w+T	67.1		
Orthogonal comparisons			
7'2w+T vs others			1
7'3wV vs 6'2wV			5
Irr. x Trellis		6.1&8.2	5
(a) ECO vs ECB x 7'2w+T vs others			5
(b) ECO vs ECB x 7'3wV vs 6'2wV			5
(c) ECB + LCO vs NI + ECO x 7'3wV vs 6'2wV			1

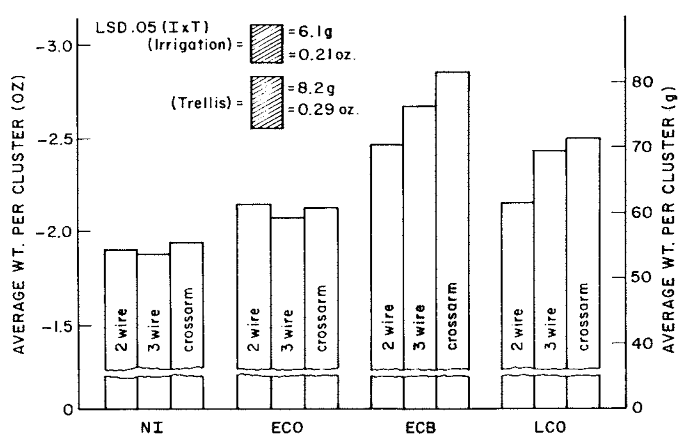

Fig. 6. Average weight per cluster for the interactions among irrigation* and trellis** treatment means combined for the years 1973-75. Statistical significance of orthogonal comparisons among irrigation treatments and between trellis treatments is shown in Table 7. *Irrigation treatments: NI = non-irrigated; ECO = early cut off; ECB = early cut back; LCO = late cut off. **Trellis treatments: 2 wire = 2 wire vertical, 1.4 m high; 3 wire = 3 wire vertical, 1.7 m high; crossarm = 2 wire vertical, 1.7 m high with a 0.6 m crossarm.

Table 10. Mean levels of Na, K and Mg in petioles collected during bloom from 4 irrigation treatments 1974.

Petiole ion-irr. treatment	Treat. mean	LSD .05	Significance level (%)
(a) Na	%	0.08	1
NI	0.19		
ECO	0.28		
ECB	0.29		
LCO	0.34		
Orthogonal comparisons			
NI vs others			1
ECB + ECO vs LCO			0.1
ECB vs ECO			NS
(b) K	%	0.26	1
NI	0.80		
ECO	0.91		
ECB	0.56		
LCO	0.52		
Orthogonal comparisons			
NI + ECO vs ECB + LCO			1
(c) Mg	%	0.07	5
NI	0.50		
ECO	0.49		
ECB	0.41		
LCO	0.42		
Orthogonal comparisons			
NI + ECO vs ECB + LCO			1

two vertical trellis treatments, and significantly heavier clusters with a 1.7 m 3-wire vertical trellis than with a 1.4 m vertical trellis. The interaction of the ECB and LCO versus the NI and ECO irrigation treatments with the 1.7 m 3-wire vertical versus the 1.4 m 2-wire vertical trellis was also highly significant (Fig. 6, Table 9).

The components of yield (clusters per vine, berry weight, and cluster weight) partially account for the irrigation treatment differences in yield of grapes per vine. Both the ECB and ECO irrigation treatments had higher cluster counts than the other two irrigation treatments. However, the ECO treatment had smaller berries and smaller clusters which could account for less yield than the ECB treatment. The NI treatment had fewer clusters, smaller berries and lighter clusters than the ECB treatment and resulted in the lowest yields, the LCO treatment had fewer clusters and tended to have lighter clusters than the ECB treatment.

Powdery mildew and bunchrot in the LCO was more prevalent than in the other three treatments. This would help to explain the discrepancy of an apparently larger berry but lighter bunch weight at harvest than the ECB treatment and also may explain some of the benefits of the cross-arm trellis. Berries per cluster were not determined, but may also have been a factor in trellis differences. Both the ECB and LCO retained more leaves near the harvest period than the NI and ECO which grew less and/or defoliated more. The ECB and LCO were harder to penetrate with fungicides for mildew control and dried off more slowly after sprinkler irrigation or fall rainfall. This was especially true for the 1.4-m 2-wire vertical trellis. Thus the increased yield associated with increased trellis level appeared not only to be a function of the number and spread of leaves to sunlight, but was also a function of disease incidence influenced by the rate of drying and fungicide penetration. The increased exposure of viable leaves to sunlight apparently resulted in an increased number of clusters (13), and the increased spread apparently resulted in sounder, heavier clusters (Fig. 6, Tables 7,9).

Table 11. Mean arginine levels in the must for 4 irrigation treatments, 1975.

Treatment	Arginine level	LSD .05	Significance level (%)
Irrigation	μg/ml	199	1
NI	422		
ECO	543		
ECB	557		
LCO	761		
Orthogonal comparisons			
NI vs others			<5
ECB + ECO vs LCO			<5
ECO vs ECB			NS

Vine growth aspects: Bloomtime petiole analysis taken in 1974 showed that Cl, Ca and NO_3-N values were not influenced by irrigation treatment. Mean values were 0.66% Cl, 2.04% Ca. and 480 ppm NO_3-N. The petiole ion levels showing a response to irrigation were Na, K, and Mg.

The NI petioles contained significantly less Na than the ECO and ECB. The LCO contained significantly more, probably because the irrigation waters had a relatively high Na content (Table 10).

The ECB and LCO petioles contained significantly less K than the ECO and NI (Table 10). As previously mentioned, springtime K deficiency was noted in 1973 and 1974 in all treatments. Except in 1975, when symptoms persisted through the growing period, no visible differences among treatments were noted. In 1975 the NI and ECO exhibited more severe symptoms toward harvest than the ECB and LCO, possibly because of higher soil suction values and greater vine stress than for the ECB and LCO treatments.

The ECB and LCO petioles contained significantly less Mg than the ECO and NI (Table 10).

At harvest in 1975, must samples composited from the trellis treatments were analyzed for arginine to determine possible differences due to irrigation treatments. The NI proved significantly lower

Table 12. Mean weights of prunings for irrigation and trellis treatments combined for years 1973-1975.

Treat. mean	Pruning wt.	LSD .05	Significance level (%)
Irrigation	kg/vine	0.68	<0.1
NI	1.98		
ECO	2.38		
ECB	2.81		
LCO	3.45		
Orthogonal comparisons			
NI vs others			0.1
ECB + ECO vs LCO			<0.1
ECB vs ECO			NS
Trellis		0.20	
6'2wV	2.54		
7'3wV	2.54		
7'2w+T	2.88		
Orthogonal comparisons			
6'2wV + 7'3wV vs 7'2w+T			0.1
6'2wV vs 7'3wV			NS

in arginine than the others, and the LCO treatment higher. The trend was for increasing arginine with increasing duration of soil moisture (Table 11).

Both the NI and ECO resulted in severe vine stress by harvest each year. The NI stopped vegetative shoot growth sooner than the ECO but leaf senescence began about the same time for both treatments, usually after a hot spell. Considerable defoliation occurred for both the NI and ECO to about the same degree except in 1974 when the ECO defoliated more than the NI and may explain the high ECO pH that year (Fig. 3). The degree of defoliation was especially obvious in infrared aerial photographs.

The ECB and LCO vines were not allowed to stress nearly as much and did not undergo early leaf senescence and defoliation. Even so the lesser stress from the LCO than of the ECB resulted in a more viable leaf appearance, possibly because the LCO treatment vines grew longer and thus supported numerous leaves younger than the ECB vines. During machine harvest many more leaves were removed from the NI and ECO vines than from the ECB and LCO.

The NI gave the lowest pruning weights and LCO the greatest with the ECB and ECO intermediate and statistically similar (Table 12). Even so, there was an apparent direct relation between the larger amount of water applied and the heavier pruning weights.

The crossarm trellis resulted in heavier pruning weights than the two vertical trellises, which were statistically similar (Table 12).

CONCLUSION

Growing-season irrigations *per se* did not reduce wine grape quality (except in the late cutoff treatment) but did increase yields over the non-irrigated treatment. Yield and quality were lowered, both by excessive vine stress, resulting in preharvest defoliation, and by lack of enough vine stress before harvest, resulting in late-season shoot growth. Of the four irrigation treatments conducted on a relatively shallow soil in a low-rainfall cool-climate area, the early cut back (ECB) treatment was superior, but may have approximated a successful nonirrigated culture where soils are deeper and rainfall is adequate.

Canopy control involving vine stress by regulating available soil moisture once the canopy was uniform down the vine row and filled the trellis, resulted in superior yields and quality only when viable leaves were retained through harvest, as evidenced by the ECB versus the ECO and NI treatments. Soil suctions of 50 cb (LCO) were not high enough to greatly reduce midseason shoot growth, resulting in delayed maturity. Yields were increased through increased trellising only when viable leaves were retained through harvest. Yields were highest, however, when the interaction of adequate vine stress, viable leaves through harvest, and spread of the leaves with a cross-arm occurred.

Tensiometers were particularly useful in the early part of the growing season. They were helpful in scheduling irrigations and maintaining adequate levels of soil moisture while avoiding excessive application of water that could cause temporary perched water tables and saturated soil conditions.

Soil suctions of 80 cb and higher in the ECB treatment for both canopy control and maintenance of viable leaves were considerably higher soil suction values than those reported in the literature for warmer climates.

The one to two preharvest irrigations applied to the ECB treatment did not significantly increase *Botrytis* bunch rot in this experiment or in other irrigation experiments with Pinot blanc, Semillon and Chardonnay, provided the vines and bunches did not remain wet for more than 8-12 hours.

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Exhibit IV

UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO SANTA BARBARA • SANTA CRUZ

COLLEGE OF AGRICULTURAL AND
ENVIRONMENTAL SCIENCES
AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF PLANT PATHOLOGY

DAVIS, CALIFORNIA 95616

October 12, 1981

Mrs. Jean Wente
President, Wine Growers Council
5565 Tesla Road
Livermore, CA 94550

Dear Mrs. Wente:

Re: Request for a Monterey Appellation

I have been engaged in research concerning grapevine diseases for the past five years in all regions of California including Monterey. In this endeavor I have accumulated reams of weather data. It is my opinion based on this research that the Monterey grape-growing area has several unique climatic features which distinguishes it from other California grape regions.

The Monterey area is characterized by the following features: a long period from bloom to harvest, mild daily high temperatures during most of the fruit development period, fog in the morning, a quick rise to the daily maximum temperature with simultaneous precipitous drop in humidity and regularly occurring wind from the north beginning in early afternoon. The high temperatures familiar to the Central Valley are rare in Monterey and are most frequent in their Indian summer period.

I have weather records from Gonzales, Soledad, Greenfield, and King City; all of these records show a high degree of similarity. Comparisons to those from other grape areas show that the combination of morning fog and afternoon wind produces a unique temperature and relative humidity pattern.

Sincerely yours,

Mary Ann Sall

Mary Ann Sall
Assistant Professor

MAS:rl

UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO   SANTA BARBARA • SANTA CRUZ

COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES
AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF VITICULTURE AND ENOLOGY

DAVIS, CALIFORNIA 95616

October 28, 1981

Mrs. Jean Wente
Wente Bros.
5565 Tesla Road
Livermore, CA 94550

Dear Mrs. Wente:

I am writing this letter to provide information that Monterey is a unique area compared to other grape growing areas of California.

I have been heavily involved in budding and grafting and lately using the same practices to change over varieties in a mature vineyard.

Well over 15 years ago when Eric Wente was a student at Davis, I gave him special private instructions on how he could change over varieties in his Monterey vineyards following practices that are used in the San Joaquin and Napa Valleys. He had a failure. It was not until about 8 years ago when I actually demonstrated myself these methods in the Greenfield area of Monterey using similar methods that I found out that they would not work in this unique area. We had to resort to T budding to finally achieve success over the generally-accepted grafting methods used in the San Joaquin Valley.

In addition to grapevine propagation, I am involved with clonal studies and varietal adaptability. I have three varietal test plots in Monterey: at Greenfield, Gonzales, and Chualar.

Monterey is so different from the other areas of California that when the fruit reaches the sugar at which it is harvested (21-22°Brix for whites and 22-24° Brix for reds) the total acid is generally around 0.75-0.85 in most areas of California. However, not in Monterey. It may range from 0.9 to 1.5 which is very high. In order to achieve a better balance between sugar and acid, the grapes are left on the vine until the sugar reaches around 26 so the total acid will be down around 0.9.

I believe this retention of acid is caused by the winds which occur daily anywhere from 10 a.m. to 2 p.m. When this happens, our daily temperatures which are normally up until their occurrance drop down drastically and remain so the rest of the day. This prevents the normal reduction in acid as the fruit matures compared to other areas of California.

Since this area is one that gives high acids to most normal varieties, I have been testing some of the newer German hybrids which are characterized by what I would consider for most California area an abnormally low total acid, hoping to find cultivars which when harvested at the normal, correct sugar maturity would have the proper, good acid level of 0.8 to 0.9.

Sincerely yours,

C. J. Alley

C. J. Alley, Ph.D.

CJA:bw

Exhibit VI

RUTH TEISER / CATHERINE HARROUN

932 VALLEJO STREET, SAN FRANCISCO, CALIFORNIA 94133

7 December 1981

Mrs. Jean R. Wente
Wente Bros.
5565 Tesla Road
Livermore, California 94550

Dear Mrs. Wente:

This follows our recent discussion of Monterey as a viticultural region.

Our researches, particularly those for the Regional Oral History Office of the University of California relating to the wine industry interview series, and those for our book on the history of wine making in California that McGraw-Hill will publish next year, have led us to the conclusion that there is indeed a distinct Monterey viticultural region. We have dealt with it as such in our book, and we are also doing so in a forthcoming article devoted to the vineyards and wines of the region.

In the period when Spain and Mexico held California, missions near Jolon and Soledad grew grapes and made wine. We understand from the historian at Mission San Antonio near Jolon that old mission vines still exist near the coast that were used to make wine at that mission. The Soledad vineyard was quite extensive, as indicated in letters and shown on maps of its holdings.

Scattered vineyards existed during the American period following. No directories were issued before 1888, but the state directories of grape growers and wine makers of that year and 1891 list vineyards with post office addresses at Salinas, Gonzales, San Lucas, San Ardo, Bradley, and Parkfield.

Prior to World War I, according to Roy E. Silvear, a Frenchman planted vines at what is now the Chalone vineyard, and later Roy and William Silvear made additional plantings there. These were all wine grapes.

In 1960, after Dr. A. J. Winkler of the University of California, Davis,reported on the area's potentialities, having examined some of the old vineyards, the development of the Monterey region as such began. Although the geographic division jumps the county line at the south, the Monterey area developed independently of the San Luis Obispo and Paso Robles areas, and also of the viticultural regions to its north and east.

Yours sincerely,

Ruth Teiser
Catherine Harroun

AGRICULTURAL EXTENSION
UNIVERSITY OF CALIFORNIA
MONTEREY COUNTY

118 WILGART WAY
SALINAS, CALIFORNIA 93901
TELEPHONE: (408) 758-4637

October 30, 1981

Peter Mirassou
Manager
Mirassou Vineyards
Rt. 1, Box A
Soledad, California 93960

Dear Peter:

I have studied the soil maps and information that we have in our office concerning Monterey County soils with the objective in mind of finding similar characteristics that might be distinguished in the support for the appellation that you desire for wine grapes in Monterey County. The soils upon which we grow grapes in our area are numerous as you can see from the list included.

Climate, in my opinion, is the main thing that makes this area different from other areas. I have tried to put together a short statement concerning the characteristics of the soils in question, but I am not sure how effectively it supports your request for a Monterey County appellation. Hopefully, it will be of some help. I am mailing this copy to you and giving Rudy Neja a copy to bring to your meeting on Monday in case the letter does not arrive in time for that meeting.

If you have further questions concerning this subject or feel that there are some relative things that I should do, I will be glad to respond.

Sincerely yours,

David Ririe
County Director & Farm Advisor

DR/cr

enc.: "Soils of the Monterey County Grape Growing District"

SOILS OF THE MONTEREY COUNTY
GRAPE GROWING DISTRICT

The principal soil series on which wine grapes are grown in Monterey County, California are the Arroyo Seco, Chualar, Danville, Elder, Garey, Greenfield, Gloria, Lockwood, Metz, Oceano, Pico, Placentia, Rincon, and Tujunga. The soils are alluvial soils deposited by intermittent streams from the mountains and by the Salinas River and its principal tributaries. Some of the alluvial soils have been wind modified or deposited such as the Oceano and Garey series.

The parent materials of the soils were originally granite, sandstone, and diatomaceous shales. The soil orders in which the soils fall are Alfisols and Entisols. The alfisols have a B horizon that shows evidence of clay illuvation. They are commonly light colored and have a base saturation of over 35 percent. Placentia soils are typical of this order. The entisols are young mineral soils that do not have genetic horizons or have only the beginning of such horizons. The Metz soils are typical entisols.

Soils of the grape growing section of the county are for the most part light textured loams to loamy sands varying in reaction from pH 5.1 to 8.4 and having low salinity. They are generally well-drained if properly prepared before planting by deep ripping and cultivation. They are generally low in organic matter content. The soils were subject to a Mediterranean type climate during their formation which resulted in low organic matter accumulation because of the short winter growing season followed by a relatively mild and dry summer season during which plant growth was minimal. The temperature is cooler during the growing season than in other California areas.

The soils of the area require irrigation in the summer months. They are low in naturally supplied nitrogen, but generally adequately supplied with the other minerals, even though potassium and zinc may be needed in specific instances.

The need for irrigation and nitrogen fertilization is an expense that must be borne by the crop, but in some ways the constant need for these two inputs enables growers to adjust water and nitrogen supplies into the fine balance needed for high quality wine.

EXHIBIT VIII

LONG RANGE LABORATORY
4529 ANGELES CREST HIGHWAY
LA CANADA, CALIF. 91011
PHONE 790-2593

National Weather Institute
INC.

SHORT RANGE LABORATORY
P. O. BOX 286
LA CANADA, CALIF. 91011

LONG RANGE LABORATORY • RESEARCH DEPT. • BUSINESS OFFICE
PROFESSIONAL BUILDING - SUITE 209
4529 ANGELES CREST HIGHWAY
LA CANADA, CALIFORNIA 91011
AREA CODE 213 790-2593

October 22, 1981

Mr. Thomas George
Chief of Regulation and Procedures
Department of the Treasury
Bureau of Alcohol and Firearms
Washington, D.C.

Dear Mr. George:

For your information, almost all of the growing and populated areas of Monterrey County are located in a narrow valley along central and northern parts of the Salinas River.

A map is attached showing this in detail.

Elevations of the Salinas River valley area decrease from 500 to 600 feet at the southern boundary of Monterrey County to near sea level in northwestern Monterrey County. Thus, the water in the Salinas River flows northward at a very slow rate. The Salinas River often dries up completely in the south in summer months.

The annual rainfall ranges from 13 to 16 inches in the Salinas Valley areas of northern Monterrey County to 10 to 12 inches in the south. Most of this rain occurs in the winter season with extremely dry conditions in all areas in the summer months.

The average annual temperature is much the same or 57 to 60 degrees in northern and southern Salinas Valley areas of Monterrey County. However, southern areas are farther inland and with clearer skies have both warmer days and cooler nights or 10 to 20 degree greater ranges of both daily and seasonal temperatures.

The growing season is quite long in Monterrey County areas. Last spring frosts normally occur in mid March and first fall frosts normally occur in late November in the northern growing areas of Monterrey County. In southern growing areas spring frosts normally occur near the end of March with first fall frosts in early November.

In summary, Monterrey County growing areas are in an unusually homogeneous region. In addition to the above summations and attached tables of climatological averages, the natural vegetation of grasses, sage brush and sparse low trees shows that the weather is quite uniform throughout the Monterrey County growing areas.

Sincerely,

Prof. William H. Rempel, Director
Research & Long-Range Forecasting

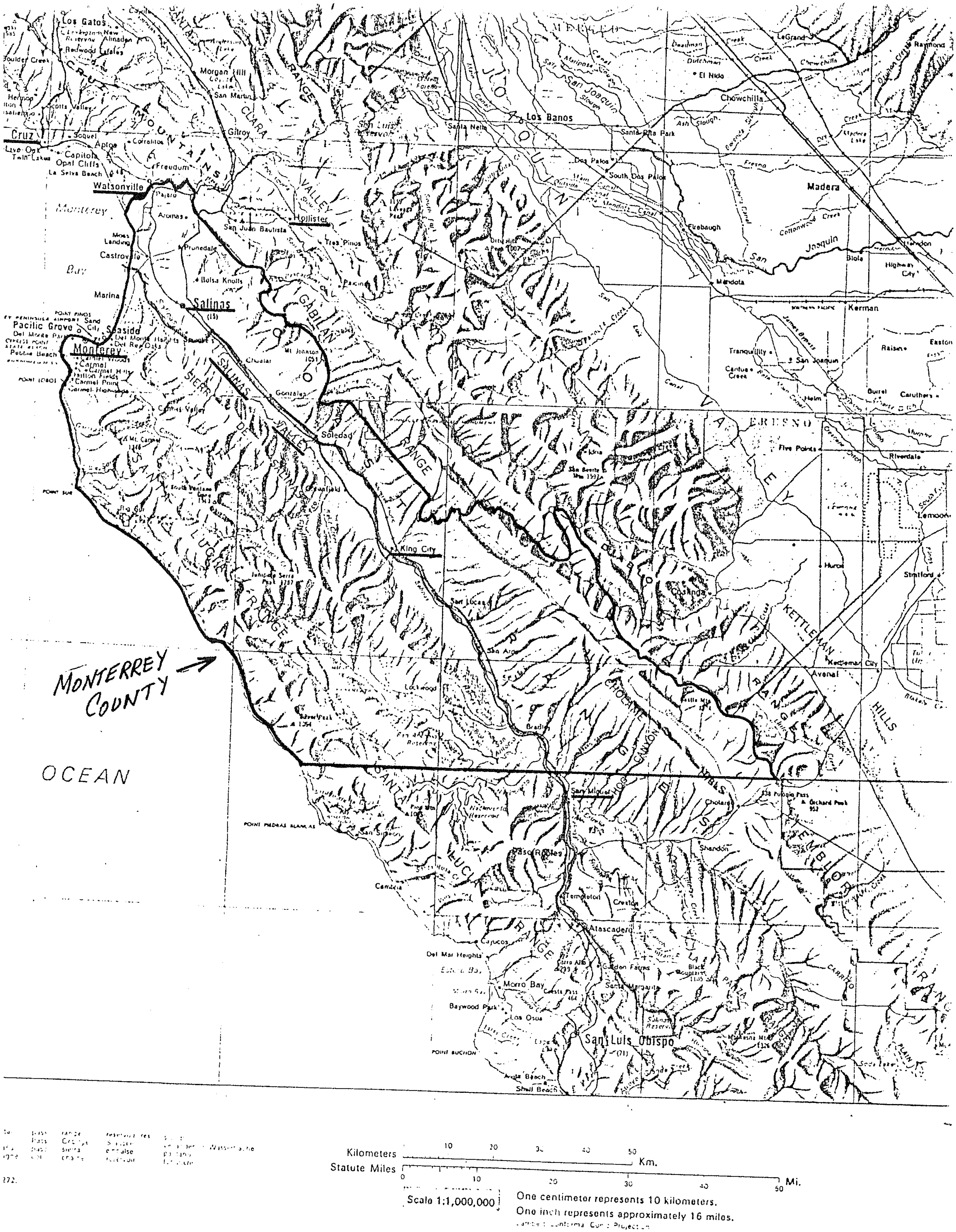
WHR:kw
Encl.

AVERAGE TEMPERATURES AND RAINFALL FOR THE MONTERREY COUNTY AREA

Month	1	2	3	4	5	6	7	8	9	10	11	12	Annual
KING CITY (South central Monterrey County)													
Temperatures	48.3	51.0	54.2	57.9	62.1	65.5	68.1	67.5	66.8	62.2	54.9	49.7	59.0
Rainfall	2.4	2.1	1.8	0.7	0.3	0.0	0.0	0.0	0.2	0.4	0.9	1.8	10.6
MONTERREY (Northwest Mounterrey County)													
Temperatures	50.0	51.0	51.5	53.0	56.0	58.0	58.5	59.5	60.5	58.5	55.0	52.0	55.5
Rainfall	3.5	2.2	1.6	1.2	0.4	0.1	0.0	0.0	0.3	0.3	1.4	2.4	13.4
SALINAS (Northern Monterrey County)													
Temperatures	49.7	51.7	53.6	55.7	58.5	60.7	62.0	62.3	63.6	60.9	56.1	51.6	57.2
Rainfall	3.0	2.7	2.1	1.2	0.4	0.1	0.0	0.0	0.2	0.5	1.1	2.8	14.1

AVERAGE TEMPERATURES AND RAINFALL FOR THE MONTERRY COUNTY AREA

Month	1	2	3	4	5	6	7	8	9	10	11	12	Annual
SAN MIGUEL (South Monterrey County)													
Temperatures	47.0	50.0	54.0	59.0	64.4	71.0	76.2	74.2	69.7	62.7	54.1	47.3	60.8
Rainfall	2.9	2.1	2.3	0.6	0.5	0.0	0.0	0.0	0.2	0.5	0.9	1.9	11.9


MONTERREY COUNTY
OCEAN
Monterey Bay
Los Gatos
Morgan Hill
San Martin
Gilroy
Soquel
Aptos
Capitola
Watsonville
Freedom
Aromas
Moss Landing
Castroville
Prunedale
San Juan Bautista
Hollister
Tres Pinos
Bolsa Knolls
Marina
Salinas
Pacific Grove
Seaside
Monterey
Carmel
Chualar
Gonzales
Soledad
King City
San Lucas
San Ardo
Lockwood
Bradley
San Miguel
Paso Robles
Templeton
Creston
Atascadero
Cambria
Cayucos
Morro Bay
Baywood Park
Los Osos
San Luis Obispo
Santa Margarita
Shandon
Cholame
Coalinga
Huron
Avenal
Kettleman City
Stratford
Lemoore
Riverdale
Five Points
Kerman
Mendota
Firebaugh
Dos Palos
South Dos Palos
Los Banos
Santa Nella
Chowchilla
El Nido
Madera
Tranquillity
San Joaquin
Caruthers
Burrel
Helm
Raisin
Easton
Herndon
Biola
Santa Rita Park
SALINAS VALLEY
GABILAN RANGE
DIABLO RANGE
SIERRA DE SALINAS
SANTA LUCIA RANGE
SANTA CRUZ MOUNTAINS
SAN JOAQUIN VALLEY
KETTLEMAN HILLS
TEMBLOR RANGE
LA PANZA RANGE
CHOLAME CANYON
FRESNO
MERCED
Kilometers 10 20 30 40 50 Km.
Statute Miles 0 10 20 30 40 50 Mi.
Scale 1:1,000,000
One centimeter represents 10 kilometers.
One inch represents approximately 16 miles.

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Lambert Conformal Conic Projection