

**Proposal to establishment the
Manton Valley
American Viticultural Area**



Manton Valley Vineyard and Mount Lassen

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Pursuant to the provisions of 27 CFR sections 9.3 and 4.25(e)(2) I, Mark Livingston and Cedar Crest Vineyards on behalf of the vineyards and winery owners in the Manton Valley respectfully petition the Alcohol and Tobacco Tax and Trade Bureau (TTB) to establish a viticultural area (AVA) to be named “Manton Valley”

Overview

The proposed Manton Valley American Viticultural Area comprises an area of 9,841 acres in Shasta and Tehama counties from an elevation of approximately 2000 feet to an elevation of approximately 3500 feet. The Valley is named after the small community of Manton, California, located in Tehama County. The valley is orientated East-West with the North and South Forks of Battle Creek forming natural borders. Several other streams, principally, Digger Creek, Bailey Creek and Rock Creek, transect the valley from East to West. The Manton Valley has a unique climate that contrasts with the climatic conditions of the Central Valley to the West and the higher elevations of the Southern Cascade Range and Mt. Lassen to the East. The area is significantly cooler than Red Bluff 25 miles to the West and warmer on average than Lassen National Park 20 miles to the East.

Manton Valley has a well-established viticulture history with the distinction of having been chosen by University California at Davis professor Lloyd Lider as “ a perfect

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location for growing grapes of exceptionally high quality”¹. The valley’s well drain volcanic soils currently supports 6 bonded wineries with associated vineyards as well as a number of established vineyards, the oldest being the Dobson Vineyard established in 1972.



Dobson Vineyard

¹ Dobson Vineyard Website. <http://dobsonvineyards.com/index.html>.

² Information obtained from Alger Vineyard website. <http://algervineyards.com/>

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Manton Valley Bonded Wineries and Vineyards

Alger Vineyards- This bonded winery and vineyard has plantings date back to 1971.

According to owner John Alger the vineyard includes plantings of 12 acres of Petite Sirah dating from 1971, 12 acres of Syrah planted in 1992, 3 acres of Zinfandel, 1 acre of Voignier, ½ acre of Malbec, ¼ acre of Pinot Grigio, ½ acre of Syrah Noir, ½ acre of Mourvedre and ½ acre of Tuoriga, for a total cultivation of over 30 acres.²



Alger Vineyard

² Information obtained from Alger Vineyard website. <http://algervineyards.com/>

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Cedar Crest Vineyards- This bonded winery and vineyard currently has over 4 acres of grapes in cultivation, which include Voignier, Cabernet Franc, Cabernet Sauvignon, Petite Sirah and Tempranillo.³



Cedar Crest Vineyards

³ Information on plantings based on personal interviews with area wineries and vineyards.

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Indian Peak Vineyards- This bonded winery and vineyard has over 8 acres under cultivation with varietals including Merlot, Cabernet Sauvignon, and Pinot Noir



Indian Peak Vineyards

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Shasta Daisy Vineyards- This bonded winery and vineyard located at a slightly higher elevation currently has 8 acres under cultivation including Sauvignon Blanc and Pinot Noir.



Shasta Daisy Vineyard

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Ringtail Vineyards- This bonded winery and vineyard currently has 3 acres under cultivation including Gewürztraminer and Petite Sarah.

Mt. Tehama Vineyards- This bonded winery and vineyard currently has 12 acres of Syrah and Petite Sirah in cultivation.

Dobson vineyards- This vineyard established in 1972 has over 95 acres planted in chardonnay, syrah and viognier.

Digger Creek Vineyard- This vineyard has over 30 acres planted in chardonnay, syrah and Bordeaux varietals.

A number of other vineyards ranging in size from 3 to 10 acres supply additional fruit to Manton Valley vineyards.

With over 200 acres of wine grapes under cultivation⁴, and six bonded wineries, the Manton Valley represents the one of the largest viticulture areas in Northern California. The number of varietals that have been successfully cultivated in the valley is a testament to ideal conditions, which distinguish the Manton Valley from the surrounding region.

⁴ Information of total plantings based on estimates given from vineyards and wineries in the Manton Valley.

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In addition to the large number of different varieties that have been grown successfully, Manton Valley wines exhibit outstanding and unique characteristics that set them apart from other wines grown in the region. A cooler climate and larger temperature differential between daytime highs and overnight lows combined with well-drained volcanic soils and plentiful water allow for superior fruit and the production of award winning wines. The average yield per acre for the Manton Valley is much lower than that of vineyards found at lower elevations, with typical yields being only 1-3 tons per acres contrasted with yields of well over 5 tons or greater typical of Sacramento River valley vineyards. The small yields of Manton Valley vineyards acts to concentrate the color and flavor of the fruit resulting in a more intense and vibrant wine.

Unfortunately, there is not currently an appellation that would allow consumers to choose Manton Valley wines based on their unique characteristics or differentiate these wines from those in surrounding areas of Shasta and Tehama counties. The problem with labeling and branding has been further exacerbated due to the fact some wines are made using fruit from both the Shasta and Tehama sides of the proposed AVA, meaning that branding is even more ambiguous with those wines being labeled as either Shasta/ Tehama or simply "California". The Manton Valley is not currently adjoined to or part of any existing AVA.

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Name Evidence

The name “Manton” is used by the United State Geographical Survey for this area of Shasta and Tehama counties. The name “Manton” is used to refer to both the small township located within the valley and the valley itself including “Manton Road”. The U.S. Board on Geologic Names recognizes 4 features named “Manton” within the proposed AVA. These are “Manton”, a populated place located at (402607N, 1215212W), Manton Elementary School located at (402557N, 1215201W), Manton Census Designated Place located at (402513N, 1215114W) Tehama County Fire Department Manton located at (402607N, 1215211W).

Other areas known as Manton include populated places in Kentucky, Road Island, Minnesota and Missouri. No reference to “Manton Valley” is made in the Geographical Name Information System (GNIS). None of the other places named Manton have active viticulture and none are likely to be confused geographically with Manton Valley, California.⁵

The USGS map for the area does not identify this valley. The valley is however readily identified on USGS maps and is well know by that name by area locals. The name “Manton Valley” offers a better descriptive name for the area, which is located in a clear geographic valley, and further distinguishes the location from that of other “Manton’s”.

⁵ <http://geonames.usgs.gov>

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The name Manton Valley has been used by locals for many years and is referred to as the “Manton Valley” by official community website “visitmantonca.com” and is commonly referred to by that name in print and internet advertisements including those for vacation rentals and winery tours which often refer to “Manton Valley Wineries”⁶. Bailey Creek Lodge, and exclusive fly-fishing destination describes their location as being “*Nestled in the quiet Manton Valley of Northern California's...*”⁷ The Shasta-Cascade Viticulture Association describes two Manton wineries as being “... *found in the same beautiful volcanic valley surrounded on three sides by volcanic cones.*”⁸ The Tehama County branding project has also identified Manton as a valley “... *at the mouth of Manton Valley, where Mt. Lassen provide a spectacular, ever-present backdrop*”⁹ Therefore the names “Manton” and “Valley” are both tied to the viticultural reputation of the area and are further identified by geographical boundaries to the North and South and elevation to the East and West.

⁶ <http://visitmantonca.com/>

⁷ <http://www.baileycreeklodge.com>

⁸ <http://shastacascadeviticultureassociation.org>

⁹ <http://destinationtehama.wordpress.com/>

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Historical Evidence

Viticulture in the Manton valley may have occurred prior to 1970 however evidence is almost entirely anecdotal. After 1970 the history of Manton Valley viticulture is well documented as the area was specifically chosen as being the best location for growing exceptional quality grapes by experts at the department of viticulture and enology at the University of California at Davis. Jerome Dobson founded the first major vineyard in 1971-72 after an extensive survey of surrounding areas, near perfect conditions rivaling those found in Napa Valley and the Grand Cru estates of France were found in Manton Valley. Dobson vineyard today encompasses 95 acres in four blocks. (Exhibit D)

At the same time additional planting of 12 acres of Petite Sirah were planted on what is now known as the Alger Vineyard. This vineyard totaling over 30 acres under cultivation includes a wide number of varietals, which are a testament to the areas potential as a wine-growing region.

Beginning in the early 2000's a number of other vineyard and wineries began cultivations in the valley with most major varietals being grown depending on elevation. Currently the 6 wineries in the valley along with vineyards have over 200 acres under cultivation.

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Geography

The proposed AVA is limited to a single unique geomorphologic landform carved out from volcanic tufts by the North and South Forks of Battle Creek and a number of tributary streams. The volcanic activity in the area has caused the development of a unique watershed that provides the valley with year-round water. The Battle Creek watershed exhibits a unique hydrology as a result of percolation of snow-melt through volcanic strata which then emerges throughout the watershed as cold springs that ensure high stable base flows.



Overview of Manton Valley from Shingletown Ridge

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Geology and Soils

The geology of the proposed Manton Valley viticultural area is dominated by volcanic lava and pyroclastic deposits from a number of past volcanic eruptions in the Cascade Range. The underlying stratum consists of a number of geologic formations including the Tuscan formation, the Chico Formation and the Red Bluff formation.

The Tuscan formation is comprised of basalt and basaltic andesite interspersed with mudflows from volcanic eruptions and is responsible for the formation of a stable aquifer due to the ability for this formation and more recent volcanic outpourings to hold large quantities of water. This formation is most responsible for the numerous springs that occur throughout the area as well as the even constant flows found in the major streams and tributaries flowing through the Valley. The aquifer, which supports these numerous streams and springs is a critical feature for the area in that without the plentiful year-round water supply the irrigation water necessary for viticulture would not be available.

The underlying Chico formation is comprised almost entirely of sedimentary rocks and was formed during a time when the area was underwater. Exposure of this formation occurs at several places along Battle Creek and tributary streams.¹⁰ The erosion of this deposit along with the underlying Red Bluff formation, which is also sedimentary in nature, explains the various soils found in the Manton Valley.

¹⁰ <http://www.battle-creek.net/>

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Soil survey data indicates that the majority of the geological formations within the proposed Manton Valley AVA are of volcanic origin, with the principle parent material being comprised of residuum weathered from volcanic rock (Cohasset gravelly loams), residuum weathered from rhyolite (Forward sandy loams), consolidated andesitic volcanic ash (Manton sandy loam)¹¹. Additional soils derived from the exposure of marine sediments from the Chico formation are interspersed throughout the proposed Manton Valley AVA and include Kilarc sandy clay loams and Millsholm gravelly loams.

There are 28 different soils¹² within the proposed Manton Valley AVA. Most of these soils are attributed to volcanic activity in the area in conjunction with the exposure of sedimentary deposits by erosion. The diversity of soil types explains the diversity in vegetation and the successful propagation of a wide range of grape varieties.

Of the many different soils represented in the proposed Manton Valley AVA the top 4 comprise approximately 81% of all soils found in Manton valley are characterized as either gravelly loam or sandy loam, all are well-drained and similar in composition to the soils occurring in many of the top viticulture areas around the world. The predominant soils in the Manton Valley are Cohasset gravelly loams, which occur in conjunction with Forward Sandy Loam, and Manton Sandy Loam.

¹¹ Clynne, M and Muffler, L.J; Geologic Map of Lassen Volcanic National Park and Vicinity, California. Scientific Investigations Map 2899. USGS 210.

¹² Web Soils Survey, National Cooperative Soils Survey. websoilsurvey.nrcs.usda.gov

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Manton Valley Soils

Soils	Acres	Percent
Cohasset gravelly loam	6185.8	56.66%
Forward sandy loam	1536	14.07%
Cohasset stony loam	834.7	7.65%
Aiken stony loam	313.6	2.87%
Manton sandy loam	277.6	2.54%
Guenoc very rocky loam	260.9	2.39%
Guenoc stony loam	220	2.02%
Rockland	196.7	1.80%
Toomes very rocky loam	190.4	1.74%
Aiken loam	165.9	1.52%
Supan stony loam	134.6	1.23%
Toomes very rocky silt loam	81.9	0.75%
Supan very stony loam	78	0.71%
Cohasset very stony loam	75.8	0.69%
Toomes very stony loam	62.7	0.57%
Nanny gravelly loam	44.1	0.40%
Cohasset loam	42.3	0.39%
Guenoc very stony loam	42	0.38%
Kilarc sandy clay loam	35.3	0.32%
Anderson gravelly sandy loam	31.8	0.29%
Inks very stony loam	29.4	0.27%
Anita very cobbly clay	21.2	0.19%
Toomes rocky loam	20.3	0.19%
Shingletown clay loam	17.5	0.16%
Jiggs stony sandy loam	14.9	0.14%
Millsholm gravelly loam	3.8	0.03%

Total Acreage- 10,917

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The soils to the east and northeast of the Manton Valley are primarily comprised of Sheld series soils which are classified as class 7 soils and are unsuitable for agriculture. These soils are generally associated with mountain flanks and are heavily forested.

Soils to the north are dominated by Windy and McCarthy stony loams. These series are generally associated with higher elevations and conifer forest. Both the Windy and McCarthy series are volcanic in origin, as is common with most soils of the Southern Cascade range.

Soils to the south in the area of Paynes Creek are primarily comprised of Supan and Toomes series loams, neither of which is suitable for agriculture. The Toomes series in this area is almost entirely rocky or very rocky loam and is a class 7 soil. The Supan series is also a class 7 soil and is unsuitable for viticulture. There are small pockets of alluvial soils along the South Fork of Battle Creek and Paynes creek that do support a few small vineyards, however these are the exception and the majority of the area is given over to cattle grazing due to the rocky nature of the soils.

The soils immediately west of the Manton Valley are almost entirely of the Guenoc and Toomes series, both of which are generally unsuitable for cultivation. These soils tend to be very rocky, filled with boulders and somewhat nutrient deficient and are primarily used for cattle grazing. Further to the west the landform becomes dominated by the Sacramento River Valley with soils being comprised of deep quaternary sediments.

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The well-drained volcanic soils, which occur along with alluvial soils, primarily from the underlying Chico formation, have proven excellent for viticultural, due in part to the predominance of gravelly loams, which act to limit fruit production. The soils tend to be rather nutrient poor as compared with the sedimentary soils found in California's Central Valley, and are generally shallow. These type of soil conditions limit yields in Manton Vineyards to less than 3 tons per acre as compared to upwards of 15 tons per acre on the Sacramento Valley floor. These small yields have the effect of concentrating flavor and intensity in the fruit which is an expression of the area's uniqueness or terrior. In fact while all of the Manton Valley vineyards share similar characteristics in terms of fruit profiles, and the small yields allow for differentiation between different block within the same vineyard.

A detailed soil survey map provided by the USDA for the entire proposed Manton Valley AVA and immediate surrounding area is included. These soil surveys are offered as evidence in support of the unique and distinctive characteristics found in the proposed Manton Valley AVA. The soil surveys of individual vineyards taken in conjunction with the soil survey of the entire AVA graphically illustrates and compares the soils found in the Manton Valley with those of the surrounding region.

Topography.

The Manton Valley is a stream cut valley bordered by the two main forks of Battle Creek. Terrain ranges from rolling hills in the center of the valley to vertical canyons on the North and South sides. Major terrain transitions on the Northern and Southern sides of the valley are attributed to the actions of carving by the North and South Forks of Battle Creek and fault lines, which run East-West along the two major tributaries. In general, the terrain through the majority of the valley is relatively flat in the West and becomes progressively steeper heading East towards Lassen Peak and the headwaters of the Battle Creek Watershed.

The Battle Creek watershed, which forms the Manton Valley, begins at high elevations in and near Lassen National Park (elevation 5660ft) and terminates at the confluence with the Sacramento River at 320 feet of elevation.¹³ The Manton Valley between approximately 2000 feet in elevation to 3500 feet in elevation offers the greatest distinction from the surrounding area in terms of viticulture. Below 2000 feet the terrain, climate and soil conditions are not conducive to high quality grape cultivation and the area above 3500 feet becomes too steep and prone to frost and heavy snows.

The area immediately to the north of the North Fork of Battle Creek is known as the Shingletown Ridge, and is characterized by very steep terrain, rocky soils and higher elevations. The Area immediately south of the South Fork of Battle Creek is at a lower

¹³ <http://www.battle-creek.net>

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elevation features a warmer climate and as part of the Paynes Creek watershed is therefore geologically distinct for the Manton Valley.¹⁴

Numerous streams, which bisect the valley, provide year-round irrigation water, supplying a number of irrigation canals that in turn feed irrigations ponds and small lakes. Streams, which occur throughout the Manton valley, are principally spring fed and therefore provide drought protection for valley agriculture, as these waterways are not completely dependent on annual snow pack. These springs, which occur throughout the valley are responsible for the remarkable even year-round levels in the valley's many streams and are an important feature in the areas agriculture. Spring fed waters from the slopes of Lassen Peak provide not only the needed irrigation water, but act to transport vital minerals that have significant impacts on the quality of fruit production.

The overall topography of the Manton Valley has a profound impact on the overall climate of the area and the many microclimates that are found throughout the valley. Steep terrain and increases in elevation to the immediate north of the Manton valley along the Shingletown Ridge provide substantial protection from storm systems, which generally originate to the Northwest, the shadowing effect acts to minimizing incidences of springtime frost.

Elevation increases to the eastern flank of Lassen Peak, between Brokeoff Mountain and Gray's Peak act as a natural funnel for cool mountain air moderate mid-summer

¹⁴ <http://websoilsurvey.nrcs.usda.gov>

temperatures. It is this phenomenon of down-slope cool air drainage¹⁵ and the shape of the valley that acts to trap the cool air and explains the large temperature differentials, which exist only in this limited geographical area.¹⁶

Large plateaus to the west and the escarpments and canyons to the south act as natural barriers to warm up-slope air from lower elevations during peak summer heat waves, which over prolonged periods can slow or prevent the normal down-slope flows via high pressure ridge formation at higher elevations. Such phenomenon can be observed to the North and South of the Manton Valley, areas that do not have natural barriers to prevent or slow intrusions of warm Sacramento Valley air during the summer.

The distinct topographical and geological differences isolate the Manton Valley from surrounding areas in a very pronounced ways. These dramatic changes are evident when entering the valley from any direction, as the natural features associated with valleys are evident to even a casual observer.

¹⁵ Durrant, D. Downslope Winds. University of Washington. (2002)
<http://www.atmos.uw.edu>

¹⁶ See temperature differential graph and attached tables.

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Climate

The climate of the Manton Valley contrasts sharply with that of surrounding region in terms of growing degree-days, diurnal temperature differential and precipitation. Each of these climatic aspects has a profound impact on quality fruit production and differentiates the Manton Valley from other nearby viticulture areas. Tehama and Shasta county climates are dominated by the Sacramento River Valley and are generally considered to have a region V climate as defined by the Winkler-Amerine system (greater than 4000 growing degree-days), with progressively shorter growing seasons observed traveling East into the Cascade range and higher elevations.

It is important to recognize the effects that terrain and exposure have on weather stations. Data collected from the Volta power station located within the proposed AVA is an example of how station placement can have a large effect on readings. Volta, located less than two miles from the Alger vineyard typically shows accumulations of 3950 growing degree days, as compared with readings taken by John Alger for the period between April 1st and October 31 recording 3428 growing degree days for the same period. This bias is explained by the station's placement on an exposed South-facing slope in a swale which acts to trap warm air. Daily readings at Volta are often in excess of 10F higher than the surrounding vineyards and help explain this anomaly.

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John Alger, the owner of Alger's Vineyard, located at 2200 feet on the Western side of the proposed AVA, has maintained accurate records for his vineyard using the Winkler system. Based on these records the average as calculated for the ten year period 2002-2011 is 3428 growing degree-days. Records obtained from the Tehama Farm Bureau for Dobson Vineyard located 2 miles to the East of the Alger Vineyard at an elevation of 2800 feet record an average of 2871 growing degree days. The records for the Dobson Vineyard are for a three year period 1971-1973, and while these records are not from the same period as the data obtained from the Alger vineyard there is no reason to suspect that they do not reflect the current conditions as there have been no indications of any major shifts in harvest times that would indicate any type of major climatic shift. This places the Manton Valley solidly in viticulture regions II and III and contrasts with the surrounding regions to the North, South, East and West as detailed below.

The Sacramento Valley, including the cities of Redding and Red Bluff located 25 to 30 miles West of the proposed AVA is characterized by hot summer days and warm nights. Average growing degree-days between April 1st and October 31st calculated using data obtained from the Western Regional Climate Center show an average of 4651 degree-days for Redding California, and 4712 degree-days for Red Bluff California for the ten year period 2002-2011.

The temperatures to the East of the Manton Valley decrease dramatically as elevation increases. The closest weather station to the East with available data is located at Manzanita Lake in Lassen National Park at an elevation of 5657 feet, approximately 11

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miles East of the eastern border of the proposed AVA . Data from the Manzanita station indicates the this area averaged only 1285 growing degree days per year (Region I) for the ten year period 2002-2011, far too few to support viticulture.

To the immediate South of the Manton Valley are the Los Molinos and Chico areas, which are part of the Sacramento Valley and are approximately 45 miles South of Manton. This area is considered region V with an average of 4200 growing degree-days for the ten year period 2002-2011 as measured by the Western Regional Climate Center in Chico California. Accurate data from the Paynes Creek watershed, which is immediately South of the proposed AVA, were not available.

Temperature data obtained from Black Butt, several miles to the North of the proposed Manton Valley AVA show a direct correlation with degree-days and elevation for the surrounding region with an average of 3400 growing degree-days at 2150 feet for the period between 2008-2011, the only data available for this area. This corresponds to similar elevations and heat summations recorded in Manton Valley; however while the heat summations may appear to be almost identical, the progression of degree-day accumulation is occurs at a faster rate, which explains why Black Butt and the surrounding vineyards generally harvest several weeks earlier than Manton vineyards.

The primary reasons for the dramatic differences in observed degree-days are the effects of the Manton Valley's geographic orientation to the East-West and the proximity of higher elevations to the immediate North and East. Cold air drainage off the slopes of

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Lassen Peak and Shingletown Ridge provide overnight cooling to Manton Valley vineyards and explain the high diurnal temperatures observed. This effect acts to decrease the degree-day accumulation and provides one of the more important components in high quality fruit development as discussed later. The measured diurnal temperature difference in the Manton Valley is much greater than that found in the Sacramento Valley to the West; Manton vineyards on average experience a 38.3 F temperature differential from daytime high to overnight low during peak season (July) compared to Red Bluff or Redding to the West, which averaged 32.3 F for the same period. To the immediate North near Black Butt the diurnal temperature difference is even more pronounced with Black Butt averaging 28 F compared with the 38.3 F observed in Manton. To the South near Chico the temperature difference is almost identical to Red Bluff, and to the East at Manzanita Lake the diurnal temperature for July is typically 30F. The temperature differentials were calculated as an average for the month of July utilizing the same data and the same time periods that were used to calculate growing degree-days.

With the exception of the areas near and around Black Butte and Inwood, the majority of viticulture in areas surrounding the Manton Valley occurs at lower elevations with greater heat summations. For example the nearest vineyard to the West is along Ash Creek at an elevation of 800 feet and in the Paynes Creek area the vineyards are at 1000 feet. These conditions lead to much earlier bud break and a correspondingly earlier harvest because average daytime temperatures are warmer at these elevations and therefore the effects of downslope cooling is not as pronounced. Lower elevations tend, in general to have higher daytime temperatures as well as warmer overnight temperatures. In fact harvest times

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may differ by more than a month. While specific dates for harvest vary from year to year, it is very typical for most of the lower lying vineyards in hotter climates to harvest the majority of their fruit starting in late August and early September, conversely Manton vineyard typically do not begin harvest until very late September or October with the last fruit often being picked in early December. For example the 2011 harvest at Cedar Crest Vineyard, located at 2850 feet, did not begin until mid-October and was completed in the first week of November and Alger Vineyard did not complete harvest until December 5th. The ability to harvest this late in the year is due to the cool dry conditions which predominate in the area in the fall. Most vineyards can not risk the chance of late season berry rot due to mold associated with late season precipitation, however this is not a problem in the Manton Valley where late season precipitation seldom if ever leads to berry rot because rains are almost always followed by periods of low humidity that quickly dry the fruit. The ability to allow the fruit to hang for a longer period of time after veraison is a key component in the development of unique flavor profiles.

Another component in fruit development associated with an extended growing season is the ability to maintain acid levels, and pH as the fruit ripens and sugar percentages increase. The relationships between acid, pH and sugar are critical for high quality fruit. Generally, in regions surrounding the proposed AVA, where viticulture occurs at lower elevations and warmer climates it is difficult to manage these components because as the sugar increases the total acid tends to decrease in a way that is non-linear. This is a function of how the season progresses in terms of growing degree-days. This means that fully ripened fruit is low in total acid and has a relatively high pH; this makes for poor

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quality wine that lacks balance. The best historical example of the inability to produce high quality fruit on the warm valley floor and region V climates is that of the Vina vineyard built by Leland Stanford in the 1880's. Vina located approximately 25 miles to the Southwest of Manton, was at one time the worlds largest vineyard; however it became apparent that production of high quality wine was not possible primarily due to climate, which is why the entire crop was used to produce brandy instead of fine table wine. The climate in Manton, like that of other well regarded viticulture areas, in particular the mild, dry fall season, allows the fruit to fully ripen without a pronounced decrease in total acid or pH. This phenomena is exhibited in almost every harvest in the Manton valley where fully ripened fruit is harvested at between 23 and 26 brix with a pH between 3.3 and 3.6 and total acid between .6 and .8 percent. In comparison, fruit from the nearby Sacramento Valley floor, to the West of Manton is often high in sugar, high in pH and low in total acid which makes the production of high quality wines a challenge. The trade off is to harvest the fruit before it has reach maximum intensity, flavor and ripeness in order to maintain the pH and acid.

Manton Valley has an average annual rainfall of 33.65 inches per year as averaged over a ten-year period from 2002-2011 using data from John Alger at Alger's Vineyard. Most of precipitation occurs during late winter and early spring. This contrasts with Shingletown 8 miles to the North, which receives an annual rainfall of 45.81 inches per year and Red Bluff 25 miles to the West, which receives only 23.2 inches per year. Paynes Creek to the South receives similar precipitation but does not have the soils to support viticulture. To the East is Lassen National Park, the weather station at Manzanita lake records 42.43

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inches per year and is subject to heavy winter snows. Of particular importance to Manton Valley vineyards is the low precipitation generally associated with the end of the growing season, relatively dry late summers and autumn minimize the risks associated with molds and other diseases that can affect grape harvest in more humid climates or areas which have a greater chance of precipitation during this critical time. To compare, Red Bluff receives significantly less rainfall than Manton, however the close proximity to the Sacramento River and increased average temperatures lead to an increase in relative average humidity during the fall, which in turn increases the risk of bunch and berry rot.

Average Rainfall Comparison

	Manton	Paynes Creek	Red Bluff	Shingletown	Manzanita Lake
Jan	5.47	5.62	4.45	7.7	8.3
Feb	4.83	4.29	3.75	6.31	7.02
March	4.33	4.33	2.9	5.66	3.88
April	2.88	3.08	1.63	3.95	3.4
May	2.04	1.24	1.05	1.88	2.32
June	0.99	0.47	0.46	0.82	2.6
July	0.12	0.15	0.07	0.24	1.5
August	0.27	0.32	0.14	0.72	0.9
Sept.	0.83	0.96	0.46	1.2	1.4
Oct	2.21	2.33	1.37	3.38	3.76
Nov	4.25	4.49	2.9	6.78	3.45
Dec	5.43	5.63	4.02	7.17	6.86
Average annual inches	33.65	32.91	23.2	45.81	42.43

Location reference: Paynes Creek is 6 miles to the South of Manton; Red Bluff is 25 miles to the West of Manton; Shingletown is 7 miles to the North of Manton; Manzanita Lake is 25 miles to the East of Manton

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The low summertime rain fall would ordinarily pose a problem for if precipitation were the major source of irrigation water, however the plentiful water supplied by streams and springs as described in previously provide abundant year-round water which eliminates reliance on rainfall and allows for more consistent irrigation regimes. Because most of the surrounding region experience long periods of drought like conditions it is the abundance of year-round water that allows viticulture to thrive in Northern California.

Another element, which distinguishes Manton from the surrounding areas, is the roll that springtime frost plays on viticulture. Vineyards in areas surrounding the proposed AVA are generally at lower elevations, which minimized the risk of late season frost due to warmer overnight temperatures. To the North in the area near Inwood approximately 10 miles from Manton, the vineyard elevations are slightly lower and the springtime temperatures are warmer. For example the Anselmo Vineyard is located at 1850 feet which is several hundred feet lower than the lowest Manton vineyard and does not require frost protection. Temperature records for the past 5 years taken at a weather station located at 2000 feet along the Shingletown Ridge near Inwood show no evidence of springtime frost; overnight lows for April and May never decreasing below 30 F. Vineyards to the South and to the West are sufficiently low enough in elevation that late season frost does not occur, the only vineyard in the Paynes creek watershed 6 miles South of Manton is located at 1066 feet. The nearest vineyard to the West of the proposed AVA is on the valley floor at an elevation of 515 feet. To the East due to higher elevations and steep terrain, no viticulture occurs.

Manton Valley A VA Proposal

Frost protection in the early spring can be important in some year, while in other years no frost occurs. In some years overnight lows after bud break can decrease enough to damage the young buds, a situation, which would limit fruit production and damage or possible kill young plants. This problem is mitigated through the use of overhead sprinklers, which effectively cover the new buds with a protective layer of ice which prevents the temperature around the bud form falling below about 27 F. The use of overhead sprinkler systems for frost protection is a well established method but is one that requires large supplies of water this is the primary reason for the number of irrigation ponds in the valley, most of which were built specifically for providing large quantities of water on demand to provide frost protection in the spring. As previously stated vineyards which do not have large amounts of available water use other methods to provide frost protection. Vineyards that do not have available water utilize other methods for frost protection such as eliminating ground cover between rows of plants, however for most Manton vineyard the use of water for frost protection is important.

Manton Valley AVA Proposal

Vegetation

Vegetation is a useful indicator of climatic conditions, especially in foothill transitional zones. Manton Valley lies in the transitional zone between the Sacramento valley floor and the western slopes of the southern Cascade Range. This shift is apparent in the transition from grasslands to mixed oak woodlands to conifer forest as the elevation increases and the average temperatures decrease. The Battle Creek watershed encompasses all of these features with the small area in and around the Manton Valley being comprised of Blue Oak woodlands and grasslands at elevations below 2000 feet transitioning to Ponderosa pine and Cedar forests at higher elevations. This transition from scrubland and open oak woodlands below 2000 feet to conifer forest starting at elevations slightly greater than 2200 feet is dramatic evidence for the varied climatic conditions within the valley that allow such a wide range of grape varieties to be grown. Along with the forested areas, the Manton Valley features a number of relatively low elevation meadow areas that are the result of previous pyroclastic flows and naturally occurring springs and small streams.

Manton Valley AVA Proposal

Boundaries defined

Proposed Manton Valley AVA encompasses an area of approximately 11,178 acres. The proposed borders are outlined on map. Elevation and Lat/Long have been included to better define unmarked areas such as service roads.

1. Start at the Junctions of Forward Road, Manton Road and Rock Creek Road; also known as "Manton Corners" located at 40°26'05.11"N, 121°52'11.89"W at an elevation of 2007 feet.
2. Continue North on Rock Creek Road approximately .83 miles to junction of Wilson Hill Road.
3. Continue Wilson Hill Road in a generally northerly direction approximately 4.12 miles to the point where Volta Powerhouse power lines cross Wilson Hill Road at 40°27'53.03"N, 121°53'12.15"W at an elevation of 2575 feet.
4. Continue East-southeast along Volta Powerhouse power lines for 1.09 miles to the point at which power lines cross outflow canal of Volta Powerhouse located at: 40°27'33.73"N 121°52'03.67W at an elevation 2224 feet.
5. Continue South along Volta Powerhouse outlet canal for .68 miles to the point at which outlet canal joins the North Fork of Battle Creek located at: 40°27'07.44"N, 121°51'40.88"W at an elevation 2080 feet.
6. Continue North along the North Fork Battle Creek for approximately .25 miles to the confluence of Bailey Creek located at: 40°27'19.12"N,121°51'30.98"W at an elevation 2149 feet.
7. Continue East-northeast along Bailey Creek for approximately 2 miles to the point at which the road marked Manton Ponderosa Way crosses Bailey Creek located at: 40°27'42.61"N,121°49'44.52"W at an elevation 2641 feet.
8. Continue South along Manton Ponderosa Way approximately 1.9 miles to junction of Forward Mills Road.
9. Continue East along Forward Mills Road 4.5 mile to junction of Forward Mills Road and Forward Road located at: 40°26'07.52"N,121°44'05.17"W at an elevation 3500 feet.

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10. Continue West along Forward Road approximately 4.9 miles to junction of Forward Road and Ponderosa Way.
11. Continue South along Ponderosa Way approximately 1.75 mile to unmarked dirt Pacific Gas and Electric service road located at: 40°24'07.52"N, 121°48'54.41"W at an elevation 2536 feet.
12. Continue West along service road approximately 2.25 miles to the point at which Pacific Gas and Electric service road crosses the canal marked on USGS Manton Quadrangle maps as Union Canal located at: 40°23'59.92"N, 121°51'16.06"W at an elevation 1988 feet.
13. Continue West along Union Canal service road 1.35 miles to the junction of service road with South Powerhouse Road.
14. Continue North along South Powerhouse Road approximately 2 miles to the junction of South Powerhouse Road and Manton Road.
15. Continue East along Manton Road for .1 miles to start point.

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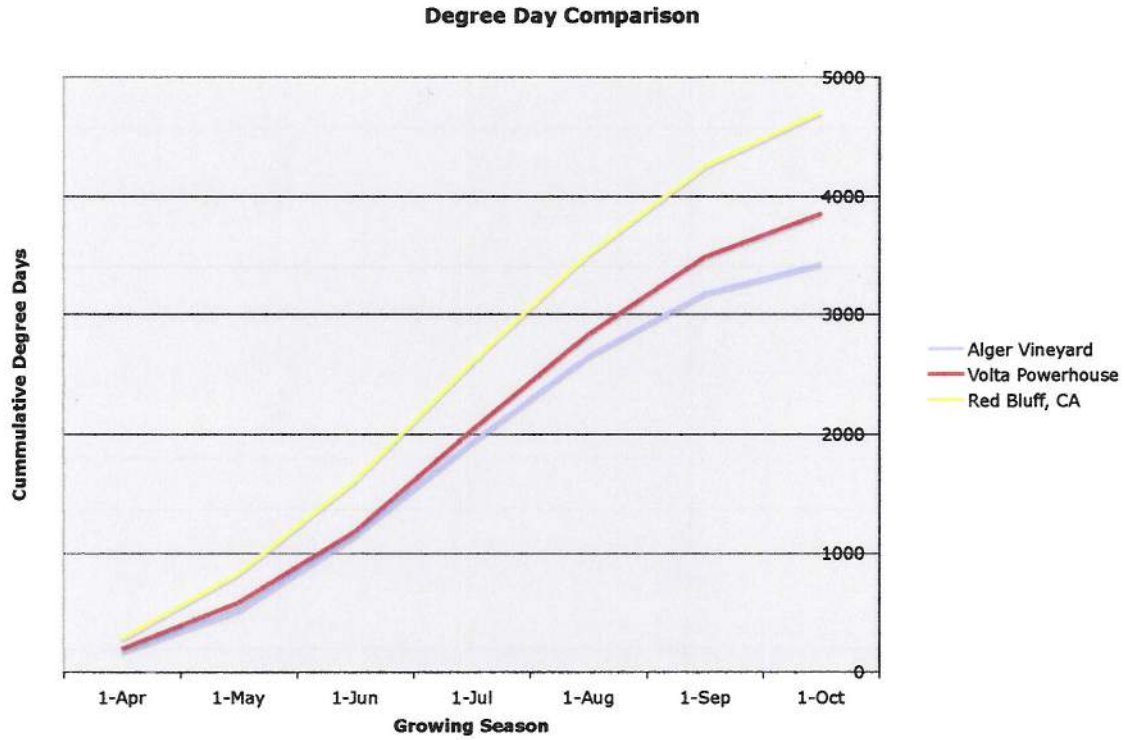


Exhibit A¹⁷

Growing Degree Day Comparison

	April	May	June	July	August	Sept.	Oct.
Alger Vineyard	178	524	1150	1933	2654	3179	3428
Volta Powerhouse	197	590	1186	2035	2836	3487	3853
Red Bluff	285	835	1610	2595	3511	4254	4712

Note: Alger Vineyard and Volta Powerhouse are within the proposed AVA, Red Bluff is approximately 30 miles to the West.

¹⁷ Data collected from Western Regional Climate Center for Red Bluff (40°15'N, 122°25'W. Elevation 347 feet) Volta Powerhouse (40°28'N, 121°52'W. Elevation 2050 Feet) Data Collected from Alger Vineyard 2000-2011 (40°26'N, 121°51'W. Elevation 2250 Feet)

Degree Day Comparison

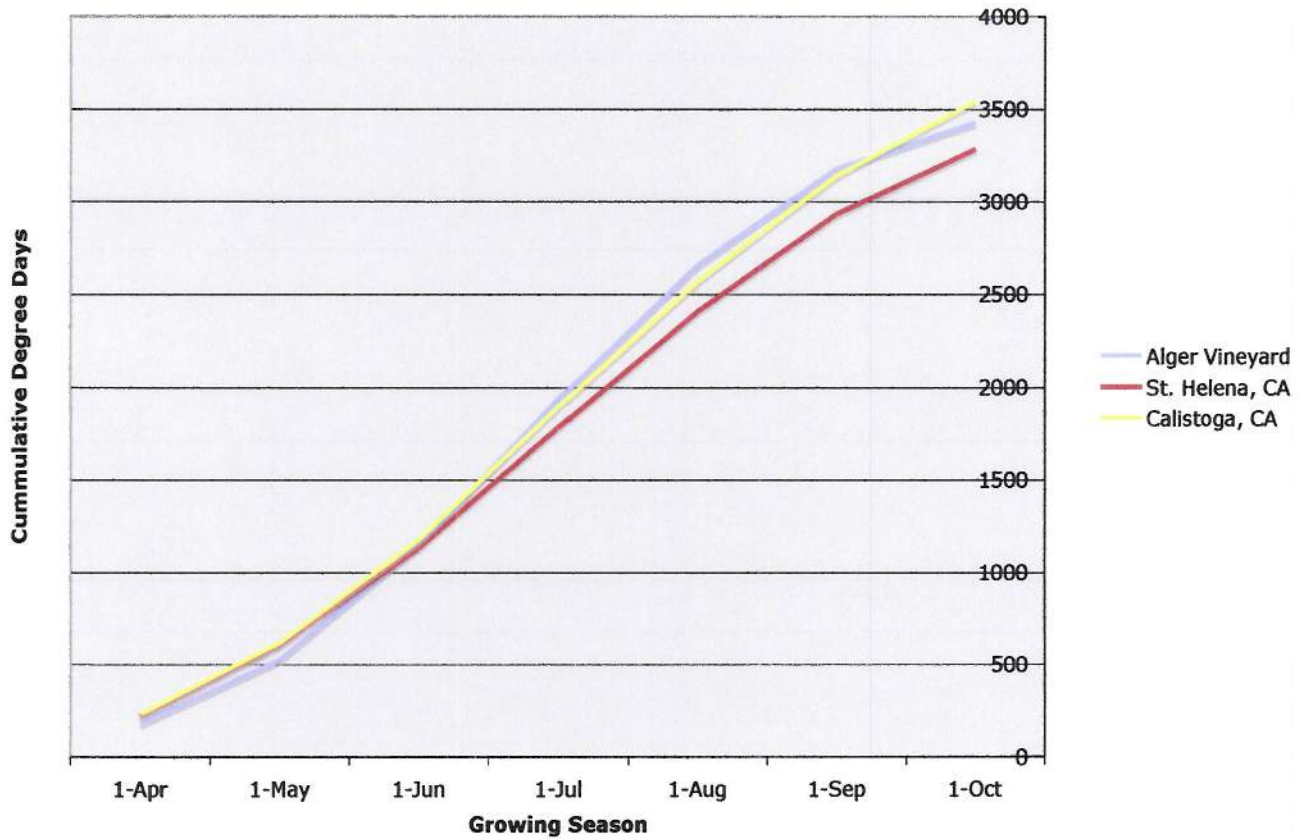


Exhibit B¹⁸

Growing Degree Day Comparison

	April	May	June	July	August	Sept.	Oct.
Alger Vineyard	178	524	1150	1933	2654	3179	3428
St. Helena	220	604	1133	1781	2406	2932	3285
Calistoga	231	617	1175	1892	2566	3140	3544

Note: This is a comparison of Alger vineyard and two areas in the Napa Valley 120 miles to the Southwest.

¹⁸ Data collected from Western Regional Climate Center for St. Helena California (38°30'N, 122°28'W. Elevation 250 Feet). Calistoga California (38°35'N, 121°35'W. Elevation 340 Feet).

Manton Valley AVA Proposal

Average Temperature Differential

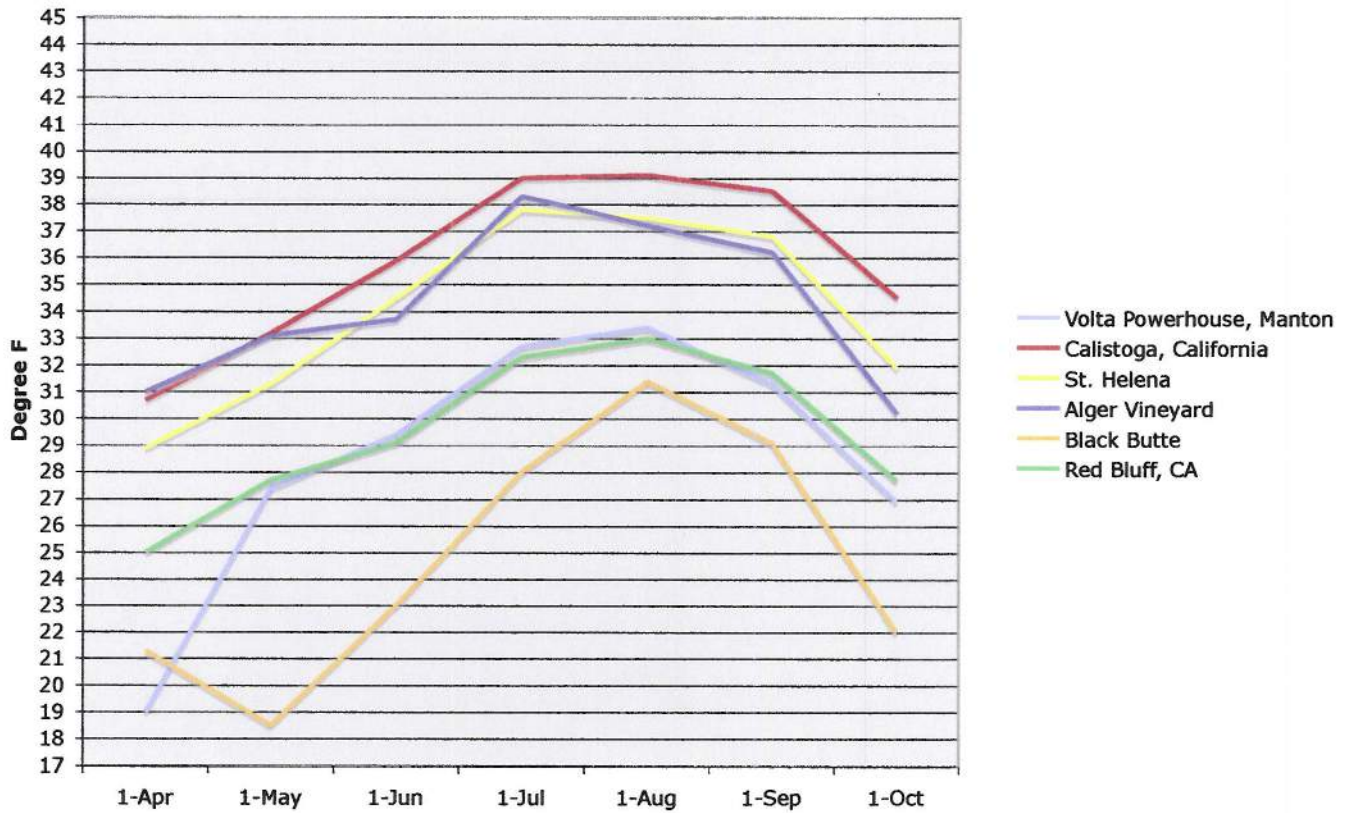


Exhibit C

Differential Temperature Comparison

	April	May	June	July	August	Sept.	Oct.
Alger Vineyard	31	33.1	33.7	38.3	37.2	36.6	30.2
Volta Powerhouse	19	27.4	29.4	32.7	33.4	31.3	26.9
Black Butte, CA	21.3	18.5	23	28	34.1	29.1	22.2
Calistoga, CA	30.7	33.2	35.9	39	39.1	38.5	34.5
St. Helena, CA	28.9	31.3	34.5	37.8	37.5	36.8	31.9
Red Bluff, CA	25	27.7	29.1	32.3	33	31.7	27.7

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Note: Alger Vineyard and Volta Powerhouse are within the proposed AVA. Black Butte is 7 miles to the North and Red Bluff is 30 miles to the West. Calistoga and St. Helena are located in the Napa Valley approximately 120 miles to the Southeast.

