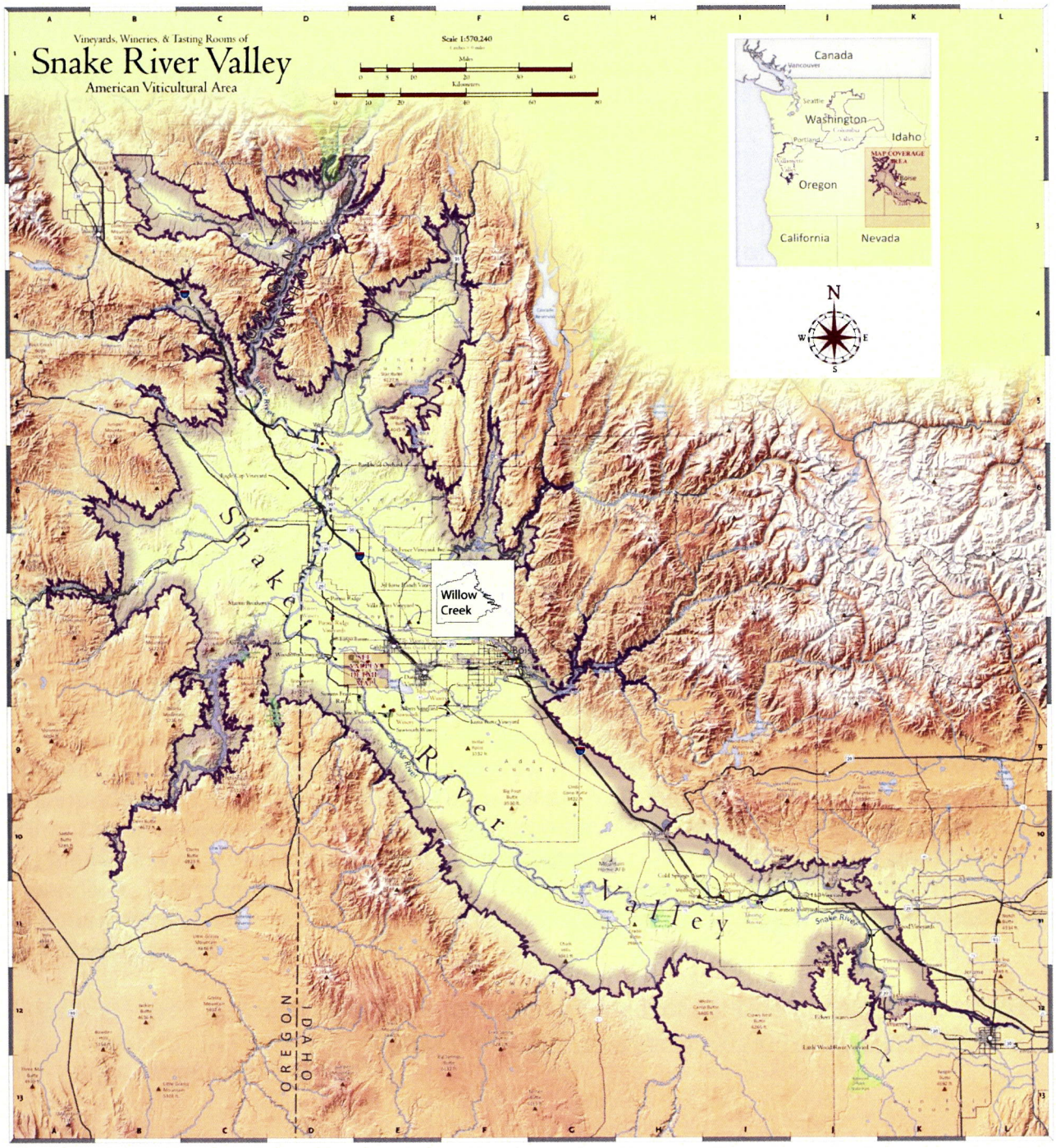
NOTE: The petition for the proposed “Eagle Foothills” AVA was originally submitted under the proposed name “Willow Creek Idaho.” The petitioner later requested to change the proposed name to “Eagle Foothills.” The letter requesting the name change is included, along with the new name evidence, as an appendix to the petition in the public docket.

Please note that the petition, maps, and tables still contain the original proposed “Willow Creek Idaho” name.



Proposal to Establish the Willow Creek Idaho AVA

Friday, May 17, 2013

Alcohol and Tobacco Tax and Trade Bureau
Regulations Division
1310 G Street NW, Room 200-E
Washington, DC 20220

Dear TTB:

I am writing on behalf of the existing and planned owners of vineyards and wineries in the Willow Creek region of Idaho to request an American Viticultural Area designation. The proposed area currently resides in the Snake River Valley AVA (established in 2007), the third largest approved AVA in the western US. Like other large AVAs (e.g., Columbia Valley, Central Coast, Willamette Valley, North Coast, and others) it was originally created to encompass a broad region with general similarities in climate and geography. However, each of these large areas has been sub-divided into smaller AVAs that capture within region differences in climate, geology, and soil. This petition represents the first step for the Snake River Valley AVA by proposing the creation of the Willow Creek Idaho AVA.

Wine production in Idaho has been one of the fastest growing agricultural commodities becoming the 2nd largest fruit crop in the state, representing nearly 20% of the total acreage. Recent research in the Snake River Valley AVA (Jones and Duff, 2011) shows nearly 75,000 acres of land (~2% of the AVA) which has very good to exceptional landscapes for viticulture from a topographic, climate and soil perspective. However, this research also shows that the better sites are found in specific regions within the AVA, of which the proposed Willow Creek Idaho AVA is one.

Currently the proposed AVA has 67 acres of grapes planted with nearly 500 acres planned by both existing and new growers over the next few years. This rapid growth would be supported by the designation of our area as an AVA, helping to solidify the region and further the development and recognition of the broader Snake River Valley AVA. The current and future vineyard owners are unanimous in support of this application and are listed in Appendix A. We propose to name the AVA "Willow Creek Idaho" as mentioned in our previous correspondence and offer the TTB-required points in support of the application on the following pages.

I hope that I have provided all of the information needed for consideration of our proposed AVA. Please do not hesitate to contact me (info@3HorseRanchVineyards.com 208-876-9721) if you need anything else.

Sincerely,

Martha Cunningham
3 Horse Ranch Vineyards

Collaborators:

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TTB American Viticultural Area Proposal Requirements:

Title 27: Alcohol, Tobacco, and Firearms
Part 9 – American Viticultural Areas
Subpart B – AVA Petitions
§ 9.12 AVA petition requirements

a) Establishment of an AVA in general. A petition for the establishment of a new AVA must include all of the evidentiary materials and other information specified in this section. The petition must contain sufficient information, data, and evidence such that no independent verification or research is required by TTB.
   1. Name Evidence
      (i). Name usage
      (ii). Source of name and name evidence
   2. Boundary Evidence
   3. Distinguishing Features
      (i). Climate
      (ii). Geology
      (iii). Soils
      (iv). Physical features
      (v). Elevation
   4. Maps and Boundary Description
      (i). Maps
      (ii). Boundary description

1. Name Evidence:

The Willow Creek area is located within the existing Snake River Valley AVA and adjacent to its northeastern margin, approximately 10 miles northwest of Boise, ID. (Map 1). The purpose of this petition is to request designation of the Willow Creek area as a new AVA within the Snake River Valley AVA, and to document characteristics and features of the Willow Creek area that merit this distinction.

"Willow Creek Idaho" is the distinctive name of the area described by the proposed viticultural area, as shown on the USGS Southeast Emmett Quadrangle map. Willow Creek, a seasonal creek runs in two forks and joins in the middle of the proposed area and then flows to the west to join the Boise River in the town of Caldwell, Idaho.

Listed below are ten sources that refer to Willow Creek in local and national publications, both current and historic. Willow Creek Idaho is mentioned both as a geographic area, and as a qualitative aspect. Copies of the sources are attached as Appendix B.

1) Andy Little Idaho Sheep King. 1990 by Louise Shadduck, The Caxton Printers, Ltd., Caldwell, ID Chapter One "BAPTISED IN WILLOW CREEK" Known as the Idaho Sheep King, in 1894, having missed the stage, Andrew Little walked the Willow Creek route from Caldwell, Idaho to the Aikmen, a ranch on Willow Creek.

2) Idaho Place Names A Geographical Dictionary, 1987by Lalia Boon, The University of Idaho Press, Moscow, ID Gold bearing quartz was discovered on Willow Creek in 1867 and continued to be worked until after the turn of the century in 1907.
3) Maps of Early Idaho. 1972 R.N. Preston, Editor, Western Guide Publishers, Corvallis, OR This guide identifies old gold mines, Indian battle grounds, old military roads, old forts, Overland Stage routes and early towns. The map of the Territory of Idaho 1876 identifies Willow Creek as the creek that flows from east to west in the proposed Willow Creek Idaho AVA, an important stage route to the gold mines
4) Idaho Department of Lands Minerals Program – Gemstone Guide by County http://www.idl.idaho.gov/bueeau/minerals/gem_guide/county_info.htm "Willow Creek has deposits of agatized and opalized wood of high quality...Willow Creek Jasper"
5) Gem Minerals of Idaho,1994 by John A. Beckwith, The Caxton Printers, Ltd, Caldwell, ID
    a. Drawings and Maps of some known locations of Idaho gem minerals. Gem Jasper located on Willow Creek, map of Field Trip 6.
6) Idaho State Historical Society, Stagelines – Southwestern Idaho. 1971 Publications, Boise, ID. Ben Hill Stage Line: "up Willow Creek Bottoms" and John Thomas Stage Line established 1896: Caldwell to Pearl and Willow Creek Mines".
7) www.RareRocksandGems.com , Willow Creek Porcelain Jasper, 2007 by Philip Stephenson "Willow Creek Jasper is one of finest porcelain jaspers in the world." Willow Creek Jasper, The Queen of Jasper
8) Idaho Statesman - December 1, 2011, 1994 New Willow Creek Bridge near Emmett nearly complete. Willow Creek Bridge before construction Photo Courtesy Idaho Transportation Department.
9) Idaho Road and Recreation Atlas The Gem State - Benchmark Maps Third Edition 2012 clearly identifies the North Fork and South Fork of Willow Creek flowing east to west dissecting Willow Creek. They join Willow Creek to the west, crossing under Willow Creek Bridge. Willow Creek Road is clearly identified as the north/south route into Willow Creek.
10) AAA Boise Nampa/Caldwell Idaho Road Map City Series, Boise and Vicinity Map 1 section U2 identifies Willow Creek Road going north into Willow Creek
11) Application for 18th Annual Diabetes Ride (May 2013), with inset map designating Willow Creek Road as part of the directions for the location of the event.
12) Announcement and public invitation to the Eagle Extreme Endurance Ride 2013. Directions make reference to Willow Creek Road.

2. Boundary Evidence:

The proposed boundary of the Willow Creek Idaho AVA encloses an area of 49,815 acres within the regionally extensive Snake River Valley AVA (Jones and Duff, 2011) that has a distinct combination of topography, microclimate, and soils, and it contains a group of existing commercial and private vineyards (with several more planned or in development) linked by geographic and cultural connections (see Map 2). Currently, no other vineyards exist within several miles of the proposed AVA, and the closest vineyards located outside the proposed boundary occur in areas with contrasting soil texture (typically finer grained,

more clay-rich) and topography (relatively flat areas in ancient river flood plains) compared with the proposed Willow Creek Idaho AVA.

The proposed boundary is delineated clearly by a combination of man-made and naturally occurring features that are well marked or easily recognized. The southern margin consists of paved major roadways. Most of the western margin coincides with the north-trending, linear boundary between Canyon County and Ada County, ID, and the remaining section of the western boundary consists of a linear projection due north from the point of intersection of Canyon, Ada, and Gem counties. The proposed northern boundary consists of the drainage divide between Willow Creek to the south and the Payette River to the north. The northeastern margin of the proposed AVA follows the existing boundary of the Snake River Valley AVA along the 1040 m elevation contour, and the southeastern portion of the proposed boundary is marked by the drainage divide between Dry Creek/Spring Valley Creek to the southeast and Woods Gulch to the northwest.

The proposed AVA contains the erosionally dissected highlands on the southwest flank of Crown Point (the local topographic high-point), north of the Boise River plain, and south of the Payette River plain (See Maps 3-5). The network of northeast-trending major drainages (Willow Creek, Big Gulch Creek, Little Gulch Creek, and Woods Gulch) and orthogonal northwest-trending minor drainages creates an unusually hilly and faceted terrain unlike the majority of the area within the Snake River Valley AVA. Furthermore, because of the increased local topography, the soils within the proposed AVA contain a relatively large proportion of detritus, derived and reworked from the local bedrock basement. This material contributes mm-scale grains of quartz and feldspar to the soil, giving it an unusual multi-modal texture, in contrast to the more uniformly fine-grained soils typical of the relatively flat portions of the Snake River Valley AVA adjacent to the proposed Willow Creek Idaho AVA.

3. Distinguishing Features:

Physiographic Region and Features

The proposed Willow Creek Idaho AVA is part of the broad Snake River Plain Level III ecoregion (USEPA, 2000). The Snake River Plain is a geologic feature located primarily within the state of Idaho, stretching roughly 400 miles from Wyoming to the Oregon border in a wide, relatively flat bow-shaped depression, covering about a quarter of Idaho (McGrath et al. 2002). The Snake River Plain lies over the Snake River Aquifer, one of the most productive aquifers in the United States. Due to the underlying aquifer, irrigation water is plentiful in many areas and many of the alluvial valleys along the Snake River are in agriculture, principally growing sugar beets, potatoes, alfalfa, small grains, and vegetables. Areas not in irrigated agriculture are typically covered by sagebrush–grassland and are often used for cattle grazing or in open landscapes (McGrath et al. 2002). Within the Snake River Plain, the proposed Willow Creek Idaho AVA is found in the Unwooded Alkaline Foothills Level IV ecoregion. These areas are more rugged than the Treasure Valley ecoregion landscapes found at lower elevations to the north, west and south of the proposed AVA. The Unwooded Alkaline Foothills Level IV ecoregion contains rolling foothills, benches, alluvial fans, and badlands that are commonly underlain by alkaline lake bed deposits. More typically in rangeland or open wildlife habitat, these areas can support agriculture where enough water is available for irrigation.

The Unwooded Alkaline Foothills Level IV ecoregion contains landscapes that are conducive to viticulture (rolling foothills, benches, and alluvial fans) providing slopes that facilitate air drainage and reduce frost occurrence along with increasing receipt of solar radiation.

Climate

At the broadest scale the weather and climate of the Snake River Valley AVA is driven by its latitude and its location in the westerly winds and the associated seasonality of storms coming off the Pacific. However, the strongest regional influence is the distance from the Pacific Ocean and the rain shadow effects of the mountains to the west, which produces a moderately strong continentality effect. While the broader Snake River Valley AVA has numerous long term stations to characterize the region's climate, the stations nearest the proposed Willow Creek Idaho AVA are found either to the south and west on the Boise River plain (Caldwell and Nampa), to the north on the Payette River plain (Emmett), to the southeast (Boise), or to the east in higher elevations (Boise 7 N) and are not representative of the proposed region (Map 6).

To characterize and depict the spatial climate characteristics in the proposed Willow Creek Idaho AVA, the information below uses a climate dataset called PRISM (Parameter-elevation Relationships on Independent Slopes Model) that is the official spatial climate data set of the United States Department of Agriculture (Daly et al. 2008). The 1971-2000 climate normals data (~400 m, 1312 ft. resolution) reflects the current state of knowledge of spatial climate patterns in the United States. Furthermore, PRISM has been validated using remote vineyard locations (Jones unpublished data), successfully applied in viticulture zoning studies (Jones et al. 2004; Jones et al. 2006), and used by Jones et al. (2010) to characterize the climate of each of 135 AVAs in the western United States.

The PRISM climate data summarized for the proposed Willow Creek Idaho AVA include precipitation, temperature, and the median dates of the first fall and last spring frosts (Table 2). Annual precipitation for the proposed AVA averages 14.3 inches varying from a low of 11.3 inches in the southwestern section of the region to a high of 17.8 inches in the higher elevations in the north and east. Growing season precipitation (April through October) averages 5.9 inches over the proposed AVA with similar spatial patterns shown by annual precipitation. Growing season temperatures average 61.2°F, with a narrow range of 1.8°F over the proposed area. Growing degree-days for the proposed AVA average 2418 over the entire region. The values vary from a low of 2241 in the upland zones to the east and north to 2500 or more along the south-facing slopes in the southern portion of the proposed AVA (Map 7). Both growing season temperature measures indicate the region's ability to ripen early to mid-season varieties (Jones et al. 2010). Frost characteristics for the proposed AVA show that the proposed AVA experiences a median last spring frost (32°F) from early to late May depending on elevation in the region (Table 2; Map 8). The median first fall frost has a narrower range, occurring on average from September 29th to October 7th (Table 2). The number of days between the last spring and first fall frosts is the median frost-free period, which is often considered the length of the growing season. For the proposed Willow Creek Idaho AVA the area averages 144 days with longer periods across the south-facing slope zones and areas with good air flow along the four creek drainages (Map 9).

What sets the proposed region apart climatically from the surrounding areas is the interaction between the local topography and the regional weather patterns which combine to produce pronounced micro-climates in the proposed AVA. These microclimates contribute to a regionally unique phenology and chemistry of wines produced from grapes grown in the Willow Creek area, as described in the supporting letter from winemaker Greg Koenig (Appendix C). Table 3 provides a comparison between the median values for the proposed area and those of the five stations surrounding the area for the 1971-2000 climate normals (Map 6). For precipitation, the stations are relatively similar for both annual and growing season precipitation. The proposed Willow Creek Idaho area has a median annual precipitation that is wetter than the stations in the river plains, but drier than the Boise 7 N station that is at higher elevation to the southeast (Map

6). Growing season precipitation shows a similar pattern, but less variation due to the normally consistent summer dry season (Table 3).

Growing season temperatures show that the stations in the river plains range from 1.5 to 2.5°F warmer than the median of the proposed area (Table 3), and even the warmest locations in the proposed area are less than the four river plain stations (Table 2). The Boise 7 N station's growing season temperatures average 1.0°F cooler than the median of the proposed area and reflect the higher elevation temperature characteristics outside of the Snake River Valley AVA. Map 7 shows the 1971-2000 growing degree-days (GDD) for the region while Table 3 gives the average values for the stations and proposed area. The lower elevation stations (Nampa, Caldwell, Boise Air Terminal and Emmett) have GDD values that range from 2695 to 2939, which are all substantially warmer that the proposed area. These values place the proposed area in a Winkler Region Ib while the other locations are a Winkler Region II (Anderson et al. 2012). The Boise 7 N station is moderately cooler in GDD compared with the proposed area (Table 3). The spatial pattern in Map 7 shows that the proposed area has some similarities with the area just to the west and the southeast along the foothills, but that the boundary broadly captures the relatively cooler zone that lies above the river plains to the north and south.

For last spring frost (32°F) the proposed area has a median date of May 12th which is similar to the Boise Air Terminal (May 10th), earlier than the Boise 7 N station (May 24th) and later than the other three stations (April 24th, May 6th, and May 5th). The spatial pattern of last spring frost again shows some similarities with the area just to the west and southeast, but that the boundary again captures the relatively later frost zone that lies above the river plains to the north and south (Map 8). For the first fall frost date, Table 3 shows that the variation across the region is less pronounced than the last spring frost date (9 versus 32 days); however similar general patterns to that of the last spring frost date are evident. The frost-free period varies from a low of 130 and 133 days at the Boise stations, to 144 for the proposed area, to 153-165 for the three river plain stations (Table 3). The spatial pattern for the frost-free period is similar to that shown for GDD (Map 7) and last spring frost (Map 8) with the area just to the west and southeast along the foothills having similar lengths, but that the boundary again captures the relatively shorter frost-free zone that lies above the river plains to the north and south (Map 9).

The climate of the proposed Willow Creek Idaho AVA enables viticulture and wine production by providing moderate heat accumulation, relatively low frost risk, and growing seasons that are long enough to ripen numerous varieties. The growing degree-days of the proposed area are sufficient to ripen early to mid-season varieties (e.g., Chardonnay, Pinot Gris, Riesling, Syrah, Merlot, etc.).

Geology

As with the Snake River Valley AVA as a whole, the bedrock geology of the proposed Willow Creek Idaho AVA is dominated by fluvial and lacustrine sedimentary rocks of Miocene age that were deposited in ancient Lake Idaho, a fresh-water lake that filled the Snake River Valley to an elevation of approximately 1040m (Othberg, 1994; Wood and Clement, 2002; Gillerman et al., 2006). These rocks are generally well-bedded sandstones, siltstones and mudstones, with local medium to coarse arkosic sandstones and pebble conglomerates (Map 10, unit Tms). Much of the lacustrine section consists of clastic detritus derived from weathering and erosion of the granitic highlands surrounding the lake (unit Kg), as well as reworked volcanic ash produced by Miocene rhyolite eruptions from the Yellowstone hotspot. Miocene volcanic horizons of either basalt (unit Tcr) or rhyolite (unit Tmr) are present locally, and they are generally older than the lacustrine sediments.

Lacustrine sedimentary rocks deposited in areas near the margins of ancient Lake Idaho, such as within the proposed Willow Creek Idaho AVA, tend to have coarser average grain size (medium to coarse sandstone and pebble conglomerate), compared to the fine-grained, more distal sediments (mud and silt) typical of the central, deeper parts of the basin. Thus, one aspect of geology in the Willow Creek area that makes it distinctive compared to the vast, interior portion of the existing Snake River Valley AVA is the composition and grain-size of the lacustrine sedimentary bedrock. In the proposed Willow Creek Idaho AVA (and in other near-shore areas around the perimeter of ancient lake Idaho), the bedrock contains coarser, more immature sedimentary materials, including quartzofeldspathic sands derived from the Cretaceous granite plutonic rocks exposed nearby in the highlands surrounding the Snake River valley. These materials have been reworked into the local soils of the Willow Creek area, giving them a distinctive composition and texture compared to the north and south of the proposed area, as described in more detail below.

The geology of the proposed Willow Creek Idaho AVA has provided the soil foundation (see below) for grapevine nutrition and subsurface drainage that facilitate viticulture management and wine production. The bedrock composition produces soils that have coarse grains which produce good water drainage allowing for the management of vine water status and optimum growth. The geology also provides adequate macro and micro-nutrients for vine growth, and is generally free from extremes of deficits and/or toxic levels to grapevines.

Soils

The soils in the proposed AVA are dominated by loam, sandy loam, coarse sandy loam, and stony loam of the Brent, Cashmere, Haw, Ladd, Lankbush, Lolalita, Payette, and Quincy series. As typical of soils in arid highlands, they are well-drained and rich in rock and mineral grains, with relatively low water holding capacity and low organic matter contents. Previous work examining the soil suitability for viticulture in the Snake River Valley AVA and the proposed Willow Creek Idaho AVA has been done by Jones and Duff (2011). Using Soil Survey Geographic Database (SSURGO) soils data from the Natural Resources Conservation Service the drainage, pH, water holding capacity and depth to bedrock can be assessed. The data show that the proposed AVA has high drainage suitability for viticulture with 86% of its area in moderate or well-drained soil classes. In terms of pH the proposed AVA has values that range from 6.75 to 7.25. Water holding capacity is important in dry regions like the Snake River Plain and values for the proposed AVA range between 0.10 to 0.15 inches of water per inch of soil. Depth to bedrock over the proposed AVA varies mostly from 25-50 inches, but can reach 150 inches or more in the western part of the area due to wind-blown and some alluvial deposition.

The soil characteristics described above are due to the hilly local topography and poorly lithified character of the Miocene bedrock in the proposed AVA, where the alluvium and colluvium contain pebbly granitic rock fragments and mm-scale coarse arkosic sand grains that have been reworked out of the lacustrine sedimentary bedrock and incorporated into the loam and sandy loam soils. These contribute an immature granitic mineralogy and produce an unusual, multi-modal grain-size distribution in many of the soils found within the proposed Willow Creek Idaho AVA. In contrast, soils in the relatively flat areas north and south of the proposed AVA are derived from a larger proportion of active flood-plain alluvium from the Boise and Payette river systems, and they have a more uniform, finer grained texture typical of the loam, clay-loam, silty-loam, and fine sandy loam soils that dominate much of the interior portion of the Snake River Valley AVA. Soils east of the proposed AVA are underlain by and derived directly from rhyolite and/or granite basement rock, rather than from the lacustrine section of Ancient Lake Idaho. Soil (and topographic characteristics) of the proposed AVA also contrast with those to the west, but the changes are gradational rather than abrupt. In general, the soils become

increasingly fine grained to the west, and the topography becomes more subdued. The Canyon County – Ada County line forms the western boundary of the proposed AVA because this demarcation is clear and reflects the general location of the gradational change in soil texture and topography.

Although grapevines can be grown in a wide variety of soil types, the most important characteristics are good internal drainage, adequate depth, decent water holding capacity, and moderate fertility.

Drainage is important because grapevine roots require oxygen obtained from the pore spaces (air spaces between soil particles) in the soil. Poorly drained soils are easily saturated with water, which fills the pore spaces and excludes air. Such soils can remain saturated for extended time periods. Roots with little or no access to oxygen essentially suffocate; initially they cease to function, but after a short while roots begin to die. Due to the underlying geology (see above) the soils of the proposed area provide good drainage and therefore more management of vine water status.

Soil depth for vineyards is important as shallow soils limit development of the root system, resulting in smaller vines and greater sensitivity to changes in soil moisture levels. A larger root system can support a bigger vine and is less sensitive to short-term changes in soil moisture. Soils in the proposed area vary in depth, but overall provide adequate depths for vine root system development and management.

The water-holding capacity of a soil is also an important characteristic. Soils with a relatively high water-holding capacity can hold much of the rainfall that reaches it, making it available to the grapevines. Higher water-holding capacity also provides a larger buffer for water consumption by the vines. Soils with low water-holding capacity will require very frequent irrigation to maintain adequate soil moisture levels for grapevines. While in an arid region, the soils in the proposed area have moderate water holding capacity, providing some buffer to seasonal droughts and helping irrigation management.

Grapevines do not require a fertile soil and are actually easier to manage on soils of relatively low fertility. One aspect of soil fertility that is important is soil pH - an indicator of the soil's relative acidity. Nutrient availability to roots is influenced by soil pH and in highly alkaline soils as soil pH nears 8.0, the mineral nutrients iron and zinc become less available. The soils of the proposed area are generally slightly below neutral pH (6.75-7.25), providing adequate fertility than can be more easily managed.

Elevation, Slope, and Aspect

The proposed Willow Creek Idaho AVA has an average elevation of 888 m (2912 ft.) ranging from a minimum of 758 m (2490 ft.) to a maximum of 1040 m (3412 ft.) above sea level, and it includes the complex topography created by a series of southwest-flowing major drainages and orthogonal second-order tributaries on the southwest flank of Prospect Peak and Crown Point (elevation: 5163 ft.). Prospect Peak and Crown Point are the local high points in a topographic extension of the “Boise Front,” a general term referring to the mountainous topographic escarpment along the northeast margin of the Snake River Valley. The largest and most northerly of the major drainages in the area proposed as a new AVA is Willow Creek, followed to the south by Big Gulch Creek, Little Gulch Creek, and Woods Gulch (see Map 3). These four major drainages and their tributaries incise an arid upland bounded to the south by the Boise River plain and to the north by the Payette River plain, and they create a hilly, faceted

topography in most of the proposed Willow Creek Idaho AVA that contrasts with the relatively subdued topography found in most of the Snake River Valley AVA.

The locally complex topography within the proposed AVA creates a mosaic of surfaces with highly variable slope and aspect (see Map 11).The slopes in the proposed AVA are moderately undulating, averaging 8.7 degrees and varying mostly from 2 to 15 degrees over the area. Given the complex terrain over the region, the proposed area shows both differences and similarities to the regions around it. The northern boundary separates areas that rise to very steep slopes and then drops to the flatter landscapes in the Payette River Plain. Slopes along the southern boundary of the proposed area go from 3-6 degrees to less than 2 degrees to flat outside the boundary along the Boise River Plain. To the west the slopes tend to be similar along the foothills and this boundary line is more tied to the county divide. To the northeast and southeast the slopes are generally similar to those inside the proposed area and the boundaries along these areas are tied to topographical limits due to temperature or natural drainage divisions. Generally south-facing slopes (with aspects of 185° on average in the proposed area) are distributed widely along the northern flanks of the major drainages, and most of the existing and planned vineyards are located in such sites (see Map 2).Both slope and aspect play important roles in sunlight reception, cold air drainage, and frost and wind protection. Growers typically take advantage of sloping sites, which alter the angle of incidence of the sun's rays that strike the surface. This effect can be substantial; a vineyard with a 10 degree south-facing slope can receive as much as 25% more insolation than a flat site. Greater insolation increases the growing degree-days, so a south-facing slope will be warmer, promoting earlier ripening. A sloped site also enables cold air to drain away, reducing the risk of frost damage. Similar to slope, aspects over the proposed area are both similar and different than areas immediately to its north, south, east, and west. But due to the complexity of the landscape the differences are not as great as either elevation or slope.

Ideal landscapes for viticulture and wine production include those that are positioned at elevations that are intermediate compared to the surrounding area, that have moderate slopes, and that are typically oriented to the southeast to southwest. The proposed area provides elevation ranges that are below the cooler upland areas to the north and east, and above the flatter, more frost prone landscapes of the broader Snake River Plain. In terms of slopes, the proposed area provides undulating landscapes with predominately 2-15 degree slopes that allow for a range of planting environments that facilitate air drainage and solar radiation receipt. While the proposed area's undulating landscape provides a range of aspects, much of the area is situated with southerly slopes, which again provide for more optimum vine growth through higher solar radiation receipt.

Summary of Distinguishing Features

a) Northern Boundary – main distinguishing features are a topographical divide, elevation, temperatures, and soils. The proposed northern boundary consists of the drainage divide between Willow Creek to the south and the Payette River to the north. This topographical divide is based on an elevation limit above the escarpment that drops off steeply to the river plain. Temperatures and growing degree-days on the river plain to the north are greater than those within the proposed area. Soils to the north of this boundary are active flood-plain alluvium from the Payette River, while those in the proposed area are more loam and sandy loam from lacustrine sedimentary bedrock.
b) Western Boundary – main distinguishing feature is the boundary between Canyon, Gem, and Ada counties, along with some change in soil texture, slope and air drainage along the Willow Creek outflow to the Boise River Plain. The boundary separates frost prone outflow zones of Willow Creek from those further upstream to the northeast that have greater air

drainage due to the sloping land. Soils to the west show a gradational rather than abrupt change. Crossing the Canyon-Ada county line, the soils become increasingly fine grained to the west, and the topography becomes more subdued.

c) Southern Boundary – main distinguishing features are the paved major roadways, the break in slope to flatter landscapes, soils, and ecoregion. West New Hope and West Beacon Light roads provide a well-known cultural boundary. This boundary also approximates a change from slopes that range above 3 degrees to those that flatten out to the Boise River Plain. Soils to the south of this boundary are active flood-plain alluvium from the Boise River, while those in the proposed area are more loam and sandy loam from lacustrine sedimentary bedrock. The Unwooded Alkaline Foothills Level IV ecoregion within the proposed area also gives way to the Treasure Valley Level IV ecoregion which supports completely different vegetation types.
d) Southeastern Boundary – main distinguishing features are the drainage divide, soils, higher elevation and steeper slopes. This portion of the proposed boundary is marked by the drainage divide between Dry Creek/Spring Valley Creek to the southeast and Woods Gulch to the northwest. Soils to the east and southeast of the proposed AVA are underlain by and derived directly from rhyolite and/or granite basement rock, rather than from the lacustrine section of Ancient Lake Idaho. The elevation along the divide boundary starts to limit temperatures and GDD, and the slopes outside the boundary on the southeast are too steep for viticulture.
e) Northeastern Boundary – main distinguishing features are elevation, temperature, soils, and ecoregion. This boundary is the same as the Snake River Valley AVA, established as the 1040 m elevation contour of the upper limit of Ancient Lake Idaho. This elevation limit also divides those areas that are too cool for viticulture above with those that are warm enough below. Soils to the east of the proposed AVA are underlain by and derived directly from rhyolite and/or granite basement rock, rather than from the lacustrine section of Ancient Lake Idaho. This boundary also divides the Unwooded Alkaline Foothills Level IV ecoregion from the Foothill Shrubland Level IV ecoregion.

4. Maps and Boundary Description:

The proposed "Willow Creek Idaho" AVA falls completely within the existing Snake River Valley AVA (see Map 1 and 2 for a spatial depiction of the proposed boundary relative to the other AVA boundaries) and is located in Ada and Gem counties in southwestern Idaho. Six U.S.G.S. 7.5 minute (1:24000) quad maps that were used to define the boundary are included with this submission and are included in Appendix A: Tables and Maps as digital images showing the proposed boundary in each quad map:

Map 12: Southwest Emmett Quadrangle, 7.5 minute series (1970) 1:24,000 scale
Map 13: Southeast Emmett Quadrangle, 7.5 minute series (1985) 1:24,000 scale
Map 14: Pearl Quadrangle, 7.5 minute series (1985)1:24,000 scale
Map 15: Middleton Quadrangle, 7.5 minute series (1971) 1:24,000 scale
Map 16: Star Quadrangle, 7.5 minute series (1953) 1:24,000 scale
Map 17: Eagle Quadrangle, 7.5 minute series (1998) 1:24,000 scale

Boundary Description
The proposed Willow Creek Idaho AVA boundary shares the majority of its northeastern boundary (nearly half of its perimeter) with the existing Snake River Valley AVA (see Maps 2-5). The description of the proposed boundary is as follows:

(1) The beginning point is on the Southwest Emmett Quadrangle at the intersection of Ada, Gem, and Canyon Counties, at the southeast corner of Section 36, T6N/R2W;
(2) From the beginning point, proceed 1.17 miles straight north to the drainage divide separating the Payette River to the north and Willow Creek and associated tributaries to the south;
(3) Proceed generally northeast along the drainage divide between the Payette River and Willow Creek (crossing over to the Southeast Emmett Quadrangle) to the intersection of the drainage divide with the boundary of the existing Snake River Valley viticultural area at an elevation of 1040 m (3412 ft.) in Section 13, T6N/R1W;
(4) Follow the existing Snake River Valley AVA boundary at 1040 m elevation generally east and south (crossing over to the Pearl Quadrangle) to its intersection with the drainage divide separating Spring Valley Creek to the east and Woods Gulch to the west;
(5) Proceed generally southwest along the drainage divide separating Spring Valley Creek from Woods Gulch (passing briefly onto the Eagle Quadrangle and then back to the Pearl Quadrangle in Section 23, before passing finally onto the Eagle Quadrangle in Section 27, T5N/R1E);
(6) Continue generally to the southwest following the drainage divide along the northwest side of Spring Valley Creek / Dry Creek to the line between Sections 32 and 33, T5N/R1E;
(7) Proceed straight south to the southeast corner of Section 32, T5N/R1E, coincident with the corner of Eagle Road and Beacon Road;
(8) Proceed west 6.5 miles along Beacon Road (passing onto the Star Quadrangle), to the western termination of Beacon Road at the southwest corner of the southeast quarter of Section 32, T5N/R1W;

(9) Proceed straight south 0.25 miles to New Hope Road;
(10) Proceed 1.5 miles west on New Hope Road (passing onto the Middleton Quadrangle) to the line separating Ada and Canyon Counties, which coincides with the boundary between R1W and R2W;
(11) Proceed north 6.25 miles along the line between Ada and Canyon Counties (passing onto the Southwest Emmett Quadrangle), returning to the beginning point.

References:

Anderson, J.D., Jones, G.V., Tait, A., Hall, A. and M.T.C. Trought (2012). Analysis of viticulture region climate structure and suitability in New Zealand. International Journal of Vine and Wine Sciences, 46(3):149-165.

Daly, C., M. Halbleib, J.I. Smith, W.P. Gibson, M.K. Doggett, G.H. Taylor, J. Curtis, and P.A. Pasteris (2008). Physiographically-sensitive mapping of temperature and precipitation across the conterminous United States. International Journal of Climatology, 28(15):2031-2064.

Gillerman, V., Wilkins, D., Shellie, K., and Bitner, R., (2006).Geology and Terroir of the Western Snake River Plain, Idaho, USA.Geoscience Canada, v. 33, no. 1, p. 37- 48.

Jones, G.V, Duff, A.A., Hall, A., and J. Myers (2010). Spatial analysis of climate in wine grape growing regions in the western United States. American Journal of Enology and Viticulture, 61:313-326.

Jones, G.V. and A.A. Duff (2007). The Climate and Landscape Potential for Quality Wine Production in the North Olympic Peninsula Region of Washington. Open Report to the Clallam Economic Development Council. 59 pp.

Jones, G.V. and Duff, A. (2011). The Climate and Landscape Potential for Quality Wine Production in the Snake River Valley AVA.Open Report to the Idaho Wine Commission. 113 pp.

Jones, G.V., Duff, A.A., and J.M. Myers (2006). Modeling Viticultural Landscapes: a GIS Analysis of the Viticultural Potential in the Rogue Valley of Oregon. Proceedings of the VIthTerroir Congress, Bordeaux and Montpellier, France. July 3-7, 2006.

Jones, G.V., Nelson, P. and N. Snead (2004). Modeling Viticultural Landscapes: A GIS Analysis of the Terroir Potential in the Umpqua Valley of Oregon. GeoScience Canada, 31(4):167-178.

Lewis, R., Link, P., Stanford, L., and Long, S., (2012). Geologic Map of Idaho, Idaho Geological Survey, Map 9, Sale 1:750,000.

McGrath C.L., Woods A.J., Omernik, J.M., Bryce, S.A., Edmondson, M., Nesser, J.A., Shelden, J., Crawford, R.C., Comstock, J.A., and M.D. Plocher (2002). Ecoregions of Idaho (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,350,000).

NRCS (2010).Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Gem County Area, Idaho. Available online at http://soildatamart.nrcs.usda.gov. Accessed 11/2010.

NRCS (2010).Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Parts of Ada and Boise Counties, Idaho. Available online at http://soildatamart.nrcs.usda.gov. Accessed 11/2010.

NRCS (2010).Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Ada County Area, Idaho. Available online at http://soildatamart.nrcs.usda.gov. Accessed 11/2010.

Othberg, K.L., (1994). Geology and geomorphology of the Boise Valley and adjoining areas, western Snake River Plain, Idaho: Idaho Geological Survey Bulletin 29, 54p.

U.S. Environmental Protection Agency (2000). Level III ecoregions of the continental United States (revision of Omernik, 1987): Corvallis, Oregon, USEPA – National Health and Environmental Effects Research Laboratory, Map M-1, various scales.
WineMap, (2011). Map of Vineyards, Wineries, & Tasting Rooms of Snake River Valley American Viticultural Area (original scale 1:570,240). Cartography by Jordan Thomas, published by WineMap, Healdsburg, CA.
Wood, S.H., and Clement, D.M., (2002). Geologic and tectonic history of the western Snake River Plain, Idaho and Oregon, in Bill Bonnichsen, C.M. White, and Michael McCurry, eds., Tectonic and Magmatic Evolution of the Snake River Plain Volcanic Province: Idaho Geological Survey Bulletin 30, p. 69-103.
WRCC (2013). Western Regional Climate Center, Cooperative Climatological Data Summaries,
NOAA Cooperative Stations - Temperature and Precipitation. Accessed Spring 2013.

Appendix A: Tables and Maps

Table 1: Existing and planned vineyards in the proposed Willow Creek Idaho AVA. The vineyard IDs given in the first column are represented on Map 2.

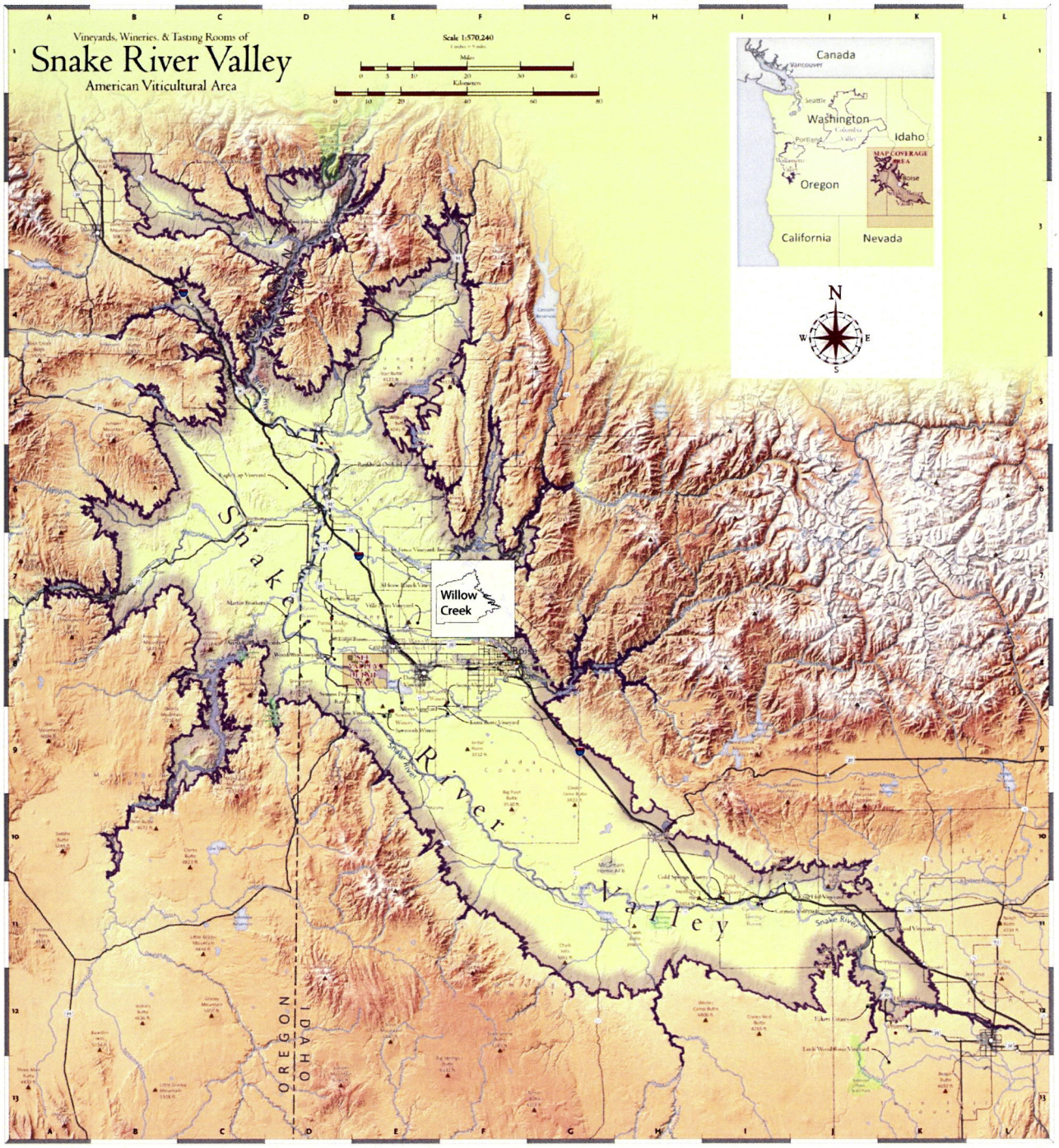
Vineyard ID	Owners	Name of Business	Status	Planted Acreage	Planned Acreage
1	Ron & Mary Slaughter	Stoneyfell Farms	Existing	3	
2	Lloyd Mahaffey	Floating Feather	Existing	5	
3	Gary & Martha Cunningham	3 Horse Ranch	Existing	46	4
4	David & Kelly Gough	Starlight Mountain	Existing	5	
5	Ron & Laurie Beckman	Wood River Cellars	Existing	2	
6	Tom & Cindy McKim	Feiner Vines	Existing	3	
7	Richard Benear	Medowlark Hills	Existing	0.5	
8	John Witte	Curlew Vineyards	Existing	3	
9	Steve Cooper		Existing	1.5	
10	Bill Brownlee	Spring Valley/3M Corp	Planned		400
11	Bob Wright	Kitty Hawk Tree Farm	Planned		3
12	Pat Shirley	Raptor Vineyards	Planned		3
13	John Fiorino		Planned		2
14	Cathy Strange		Planned		4
15	Ted Bierma	Heirloom Vineyards	Planned		20
16	Ron & Laurie Beckman	Wood River Cellars	Planned		40
			Total:	69	476

Table 2: Descriptive statistics for climate variables summarized over the entire proposed Willow Creek AVA for the 1971-2000 climate normal period derived from the PRISM spatial database (see text for details).

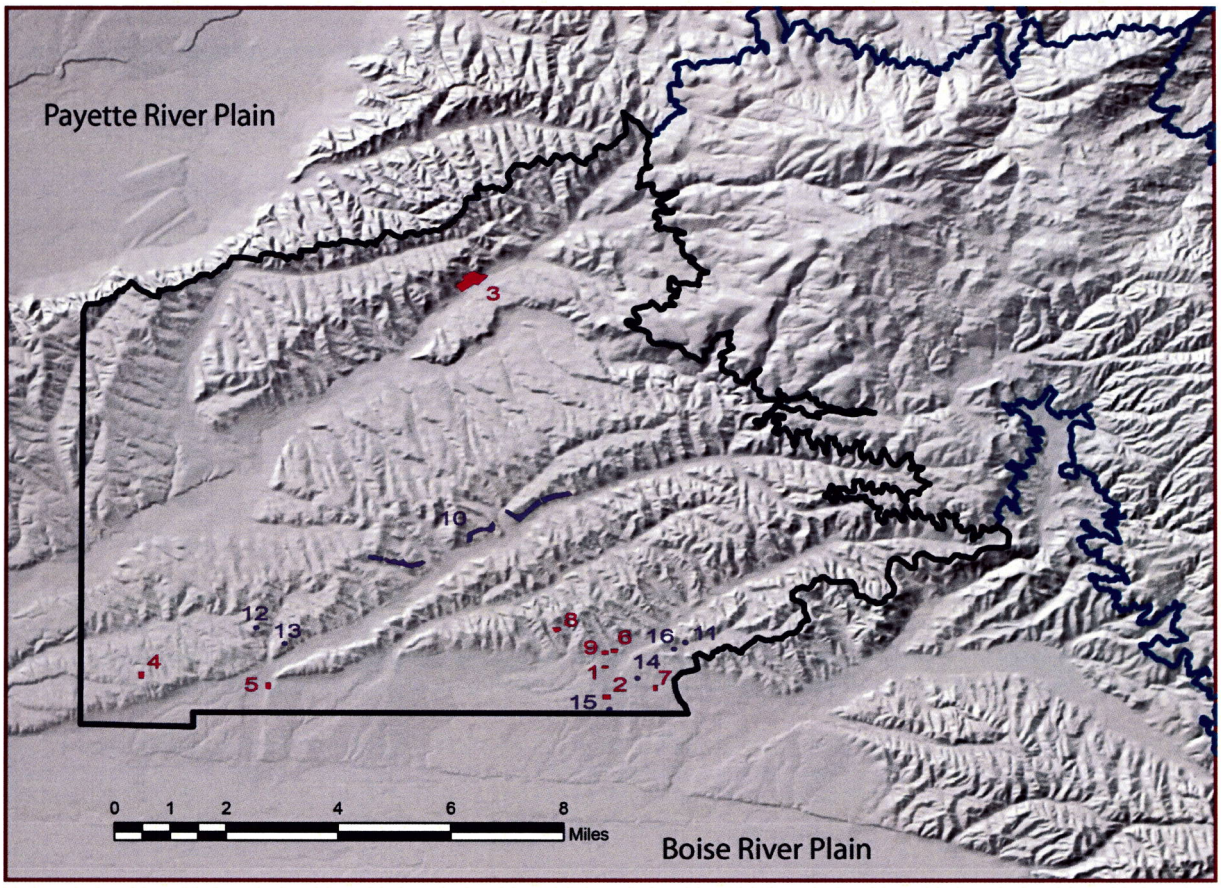
Variable	Mean	Stdev	Maximum	Minimum	Range
Annual Precipitation (in.)	14.3	1.4	17.8	11.3	6.5
Growing Season Precipitation (in.)	5.9	0.5	7.5	4.9	2.6
Growing Season Temperature (°F)	61.2	0.4	62.0	60.2	1.8
Growing Degree-Days (F° Units)	2418	71	2572	2241	331
Last Spring Frost (median date, 32°F or days)	12-May	4	22-May	4-May	18
First Fall Frost (median date, 32°F or days)	3-Oct	2	7-Oct	29-Sep	8
Frost-Free Period (number of days, 32°F)	144	5	156	130	22

Table 3: Descriptive statistics for the proposed Willow Creek Idaho AVA (median) and the five stations surrounding the area shown in Map 6. All data are from the 1971-2000 climate normal period for either the PRISM spatial database (see text for details) or WRCC (2013) for the five stations.

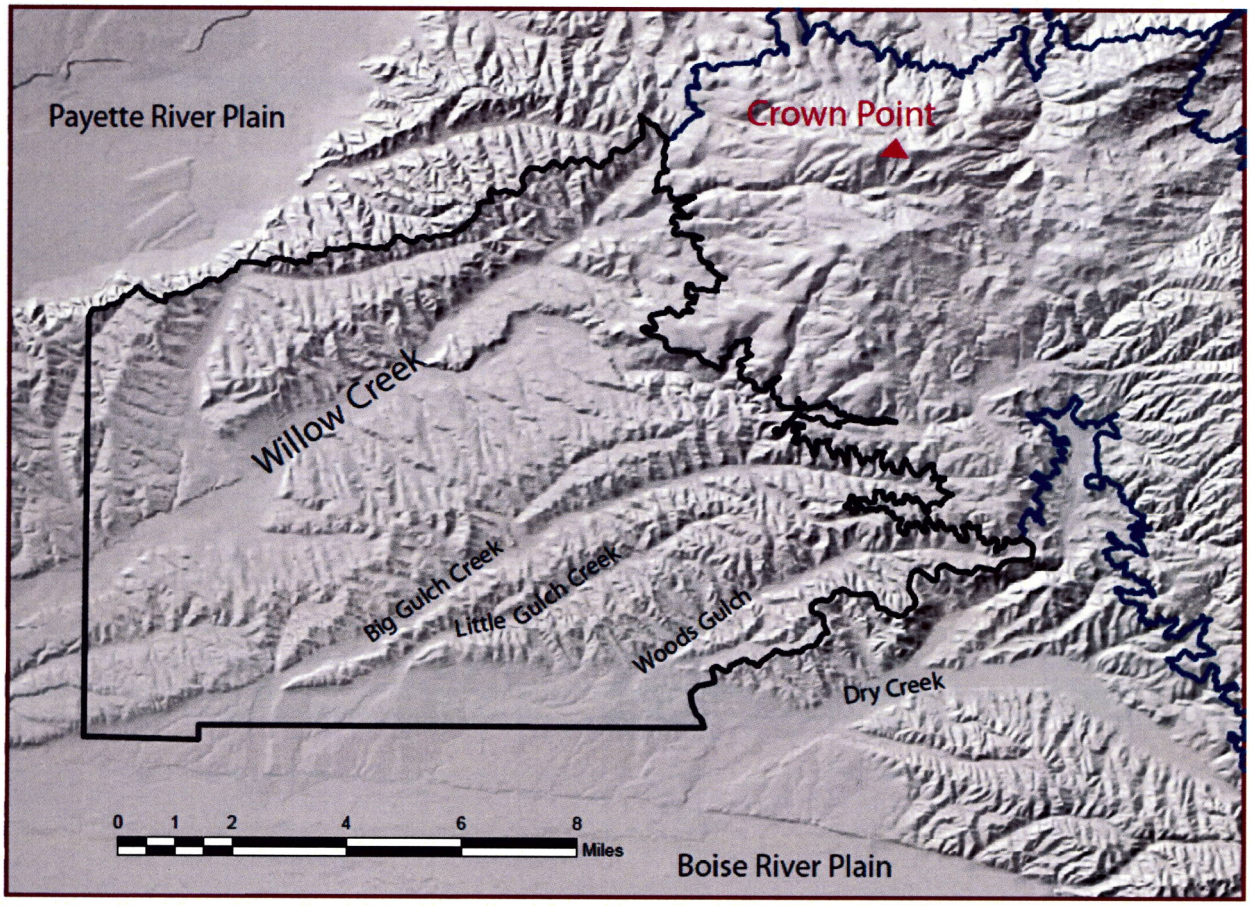
Variable	Willow Creek	Caldwell	Emmett	Nampa	Boise 7 N	Boise Air Terminal
Annual Precipitation (in.)	14.3	11.4	13.8	10.9	19.2	11.7
Growing Season Precipitation (in.)	5.9	4.8	5.5	4.8	8.4	5.2
Growing Season Temperature (°F)	61.2	63.7	62.7	62.6	60.3	63.7
Growing Degree-Days (F° Units)	2418	2939	2728	2695	2299	2930
Last Spring Frost (median date, 32°F or days)	12-May	24-Apr	6-May	5-May	24-May	10-May
First Fall Frost (median date, 32°F or days)	3-Oct	7-Oct	7-Oct	11-Oct	5-Oct	6-Oct
Frost-Free Period (number of days, 32°F)	144	165	153	160	133	130



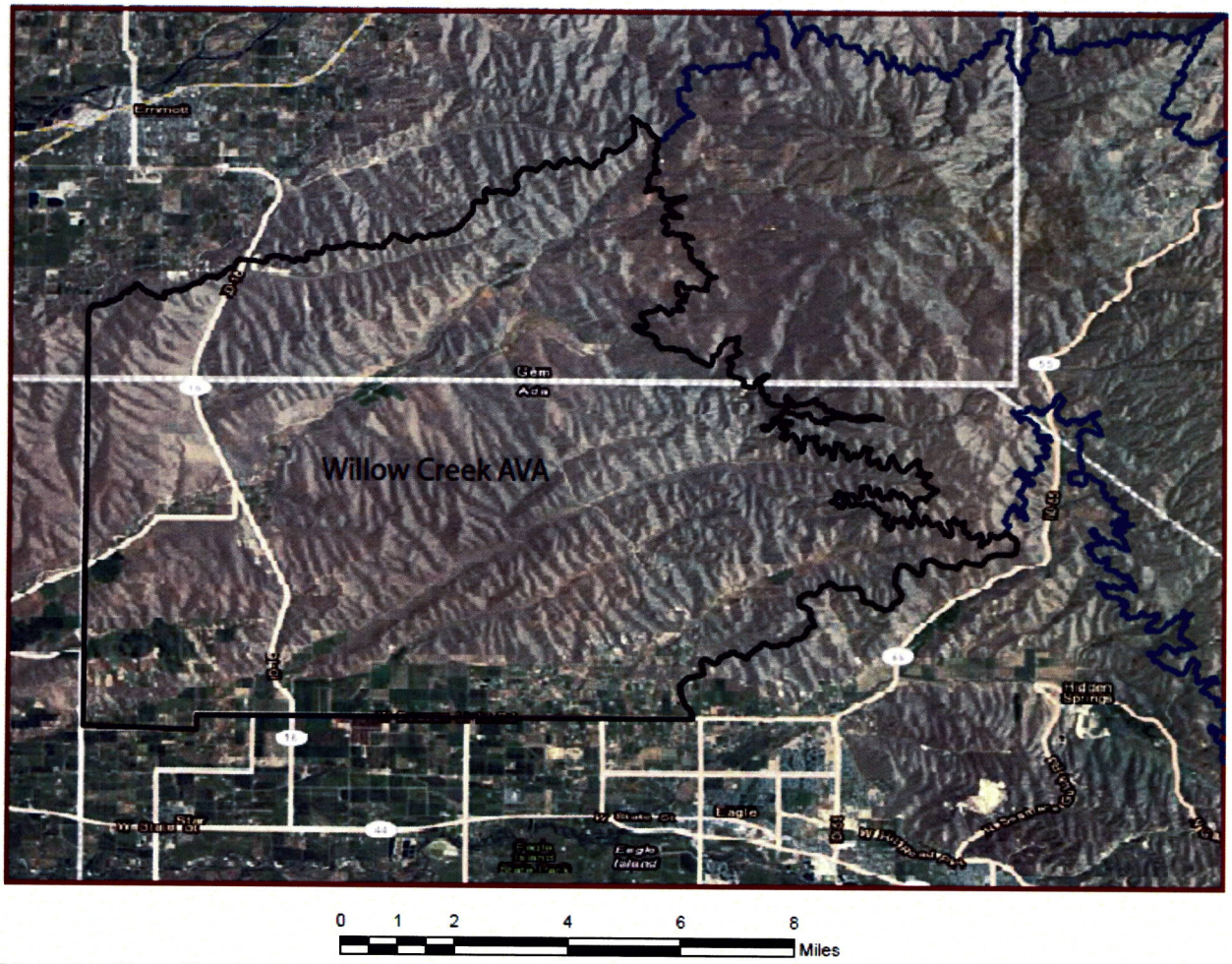
Map 1: Location and extent of the Snake River Valley AVA, showing the proposed Willow Creek Idaho AVA (base map modified from WineMap, 2011). Inset box surrounding the proposed Willow Creek Idaho AVA delineates the area shown in more detail in Maps 3-5.



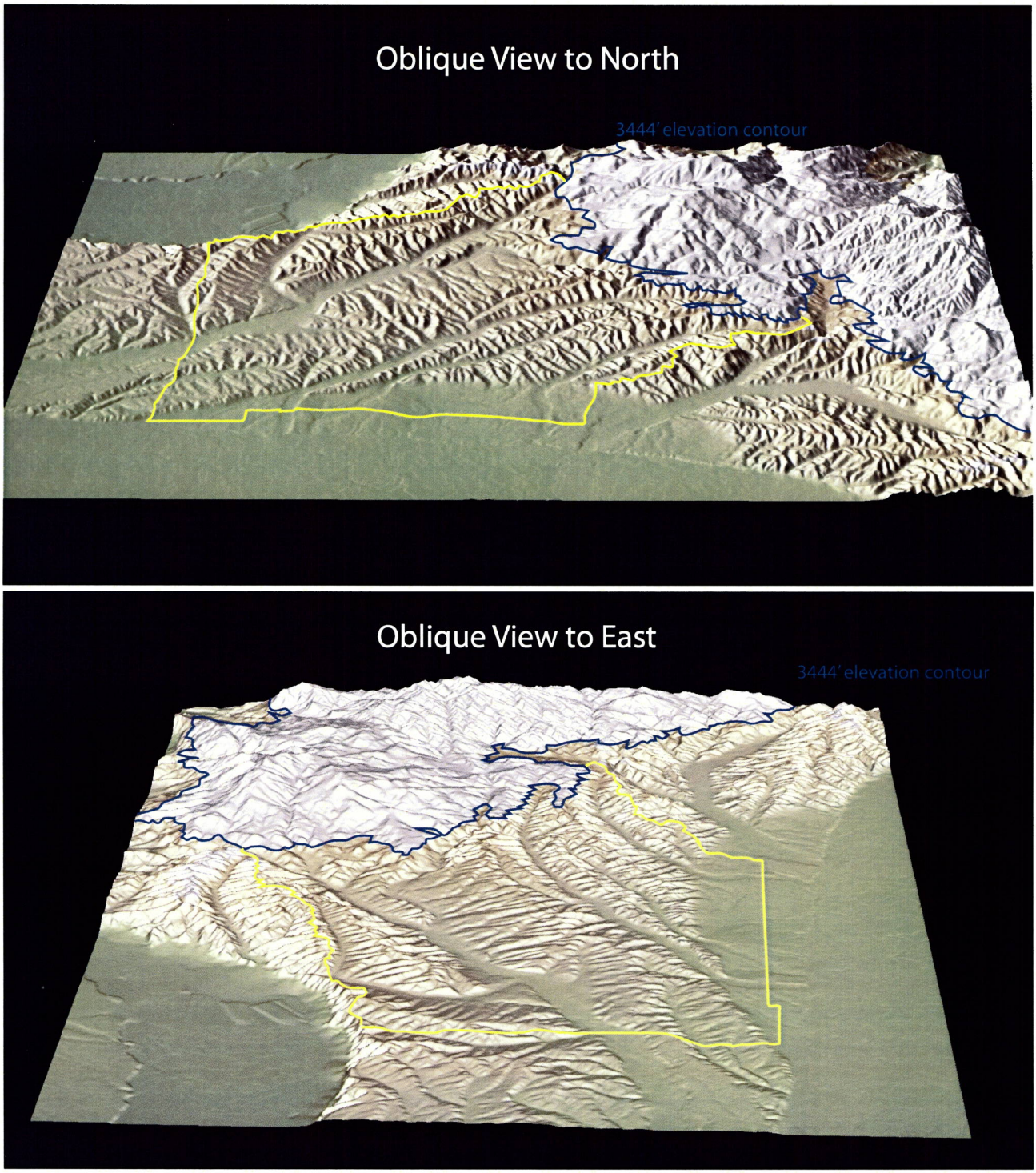
Map 2: Gray-scale hill shade map of the proposed Willow Creek Idaho AVA, surrounding areas, and existing or planned/proposed vineyards as given in Table 1.



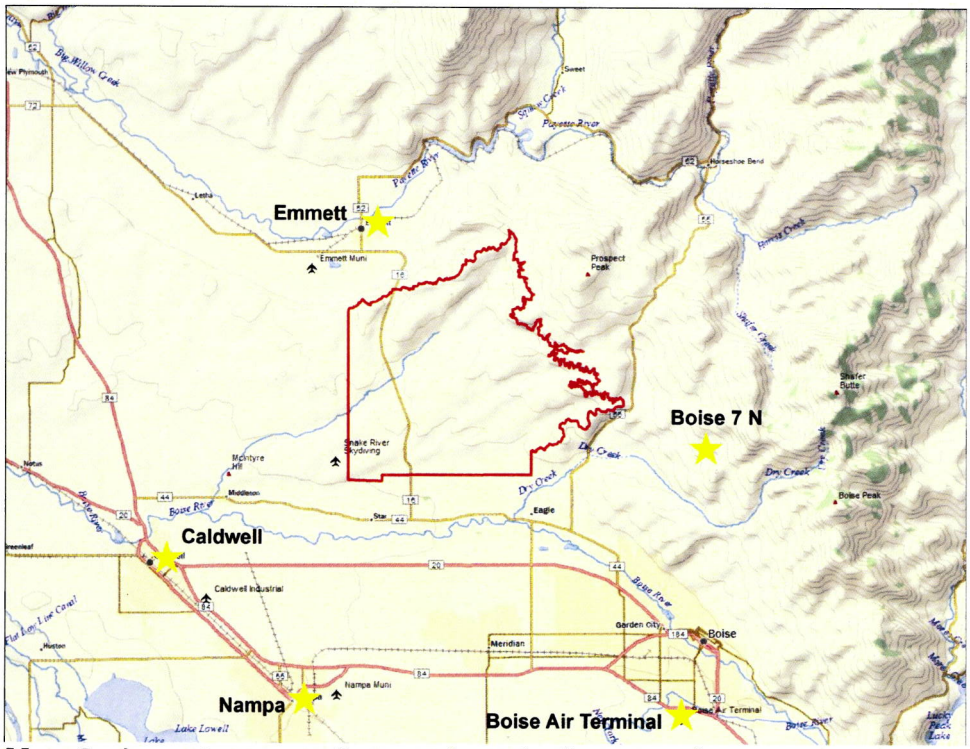
Map 3: Gray-scale hill shade map of the proposed Willow Creek Idaho AVA and surrounding areas.



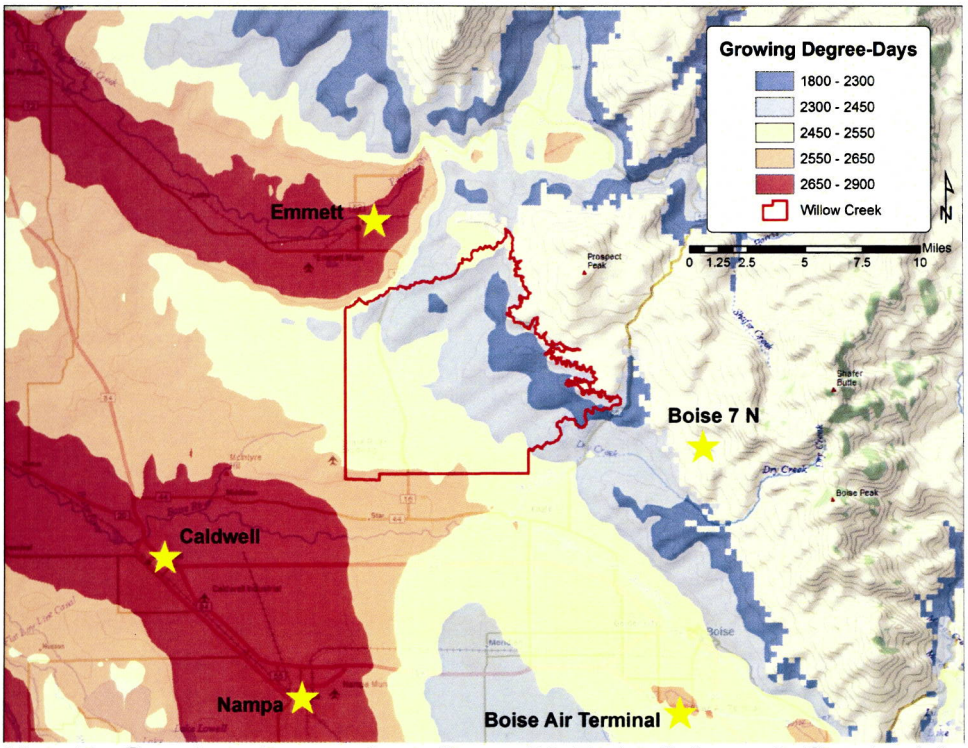
Map 4: Satellite imagery base with overlain county boundaries, roads, and towns in the area of the proposed Willow Creek Idaho AVA.



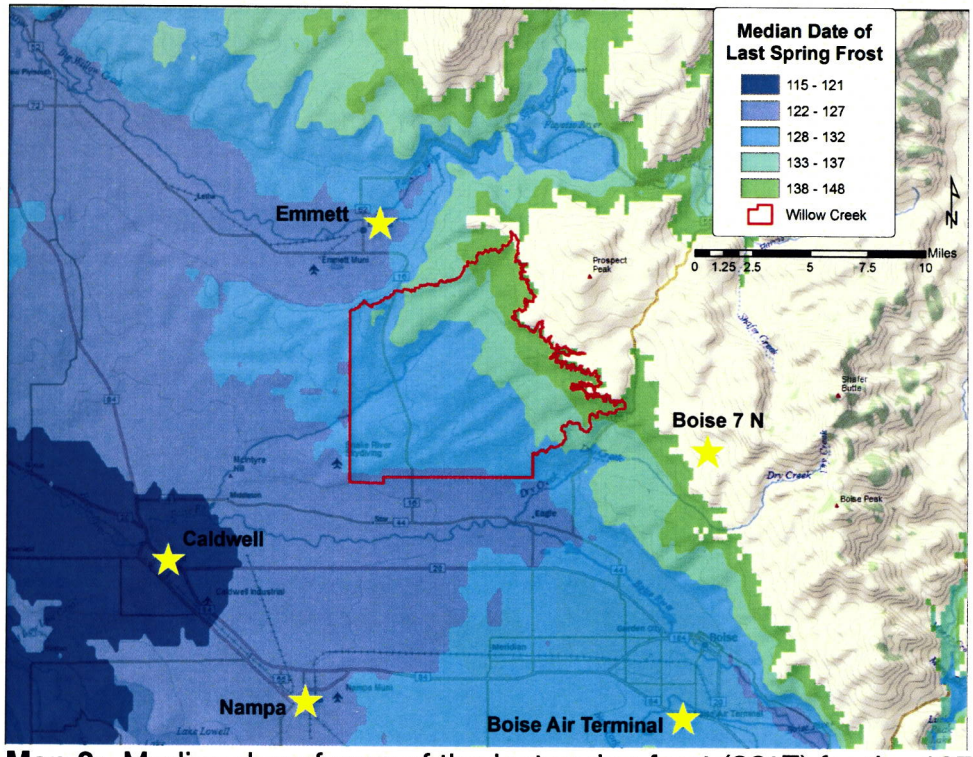
Map 5: 3-D oblique views of the topography in the Willow Creek area illuminated from the west (with 2x vertical exaggeration). The boundary of the existing Snake River Valley AVA is shown at 1040 m elevation, and the proposed boundary of the Willow Creek Idaho AVA is shown in yellow.



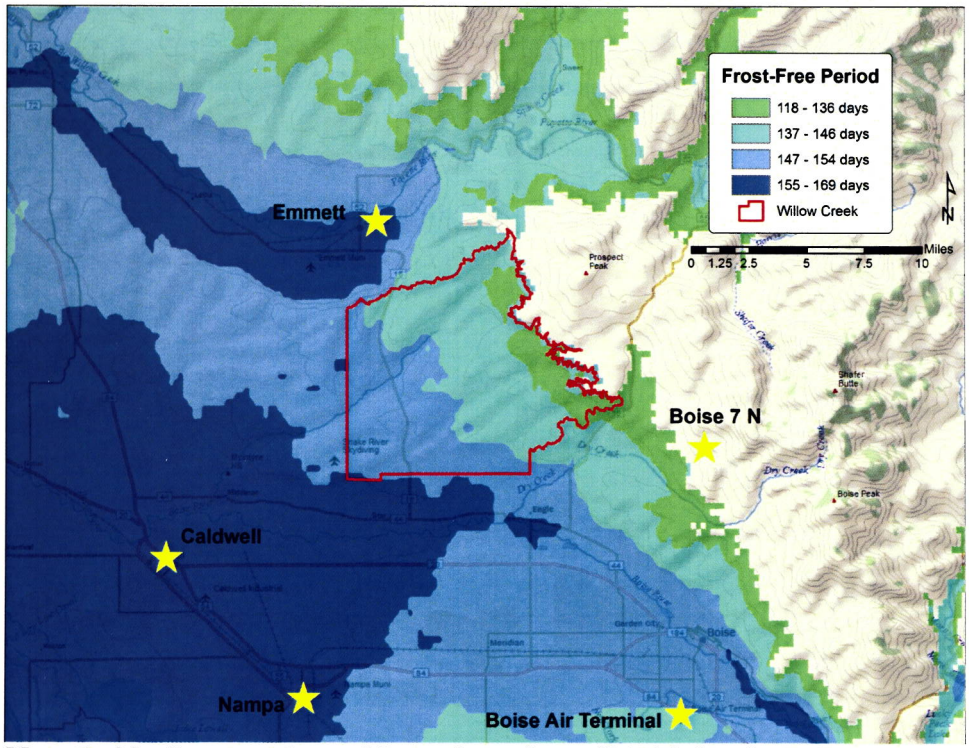
Map 6: Long term weather stations (yellow stars) surrounding the proposed Willow Creek Idaho AVA. Each station has data covering at least the 1971-2000 and 1981-2010 climate normals, but typically longer. (Source: WRCC, 2013).



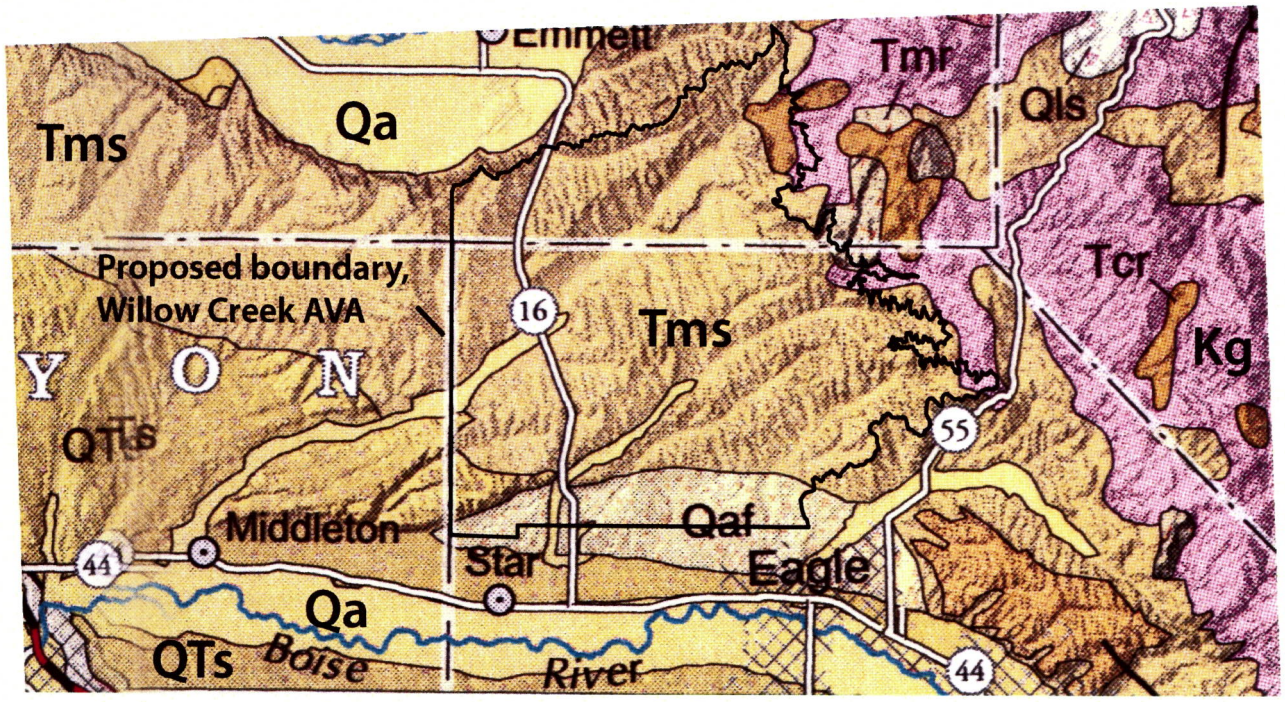
Map 7: Growing degree-days (base 50°F, April through October) for the 1971-2000 climate normals. Data is objectively classified by Jenk's natural breaks (rounded to the nearest 50 or 100 unit). Long term weather stations (yellow stars) surrounding the proposed Willow Creek Idaho AVA. (Source: Daly et al. 2008).



Map 8: Median day of year of the last spring frost (32°F) for the 1971-2000 climate normals (115=April 25th). Data is objectively classified by Jenk's natural breaks. Long term weather stations (yellow stars) surrounding the proposed Willow Creek Idaho AVA. (Source: Daly et al. 2008).



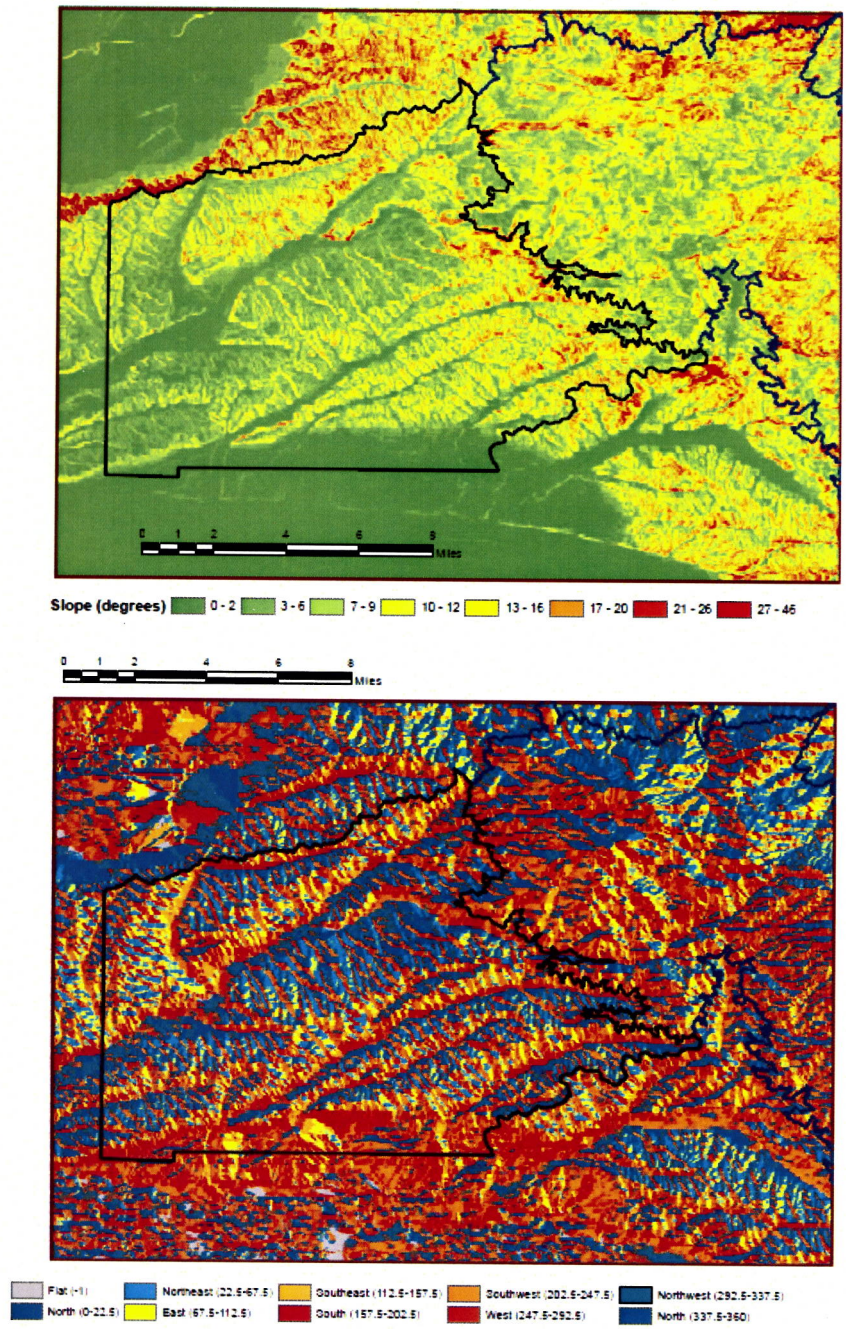
Map 9: Median number of frost-free days (32°F) for the 1971-2000 climate normals. Data is objectively classified by Jenk's natural breaks. Long term weather stations (yellow stars) surrounding the proposed Willow Creek Idaho AVA. (Source: Daly et al. 2008).



Map Units:

- Qa - Quaternary alluvial deposits
- Qaf - Quaternary alluvial fan deposits
- Qls - Quaternary landslide deposits
- QTs - Pliocene & Pleistocene gravel, sand, and silt deposits
- Tms - Miocene fluvial and laccustrine deposits of ancient Lake Idaho
- Tmr - Miocene rhyolite
- Tcr - Miocene Columbia River Basalt
- Kg - Cretaceous granite

Map 10: Geologic map of the Willow Creek area (from Lewis et al., 2012).



Map 11: Maps of surface slope (in degrees; upper panel) and aspect (lower panel) in the area of the proposed Willow Creek Idaho AVA.