Vinewise℠

Washington Guide to Sustainable Viticulture

VINEYARD SITE SELECTION AND ESTABLISHMENT

WHAT DO I NEED TO KNOW WHEN CHOOSING A VINEYARD SITE?

Developing a vineyard is capital intensive, but a well-planned and properly established vineyard can be productive for 20 to 40 years. Taking steps to optimize yield and quality has a direct impact on the long-term economic success of the vineyard.
Before purchasing wine grape property, make sure you have a contract with a winery or have a potential winery interested. Refer to Contracts Checklist.

CHECKLIST OF QUESTIONS TO ANSWER

Vineyard Site Selection

1. Have I reviewed the Soil Management checklist?

2. Is there a winery interested in my site or my potential to grow grapes?

- Have I obtained a winery contract for the site?
- Am I willing to work closely with winemakers as I produce my wine grapes?
- Is my site within an existing appellation or AVA (American Viticultural Area)?

3. What is the site history?

a. Was it a vineyard before? If not, what was the previous land use and is it compatible with grape production?
b. Are water and/or water rights available?
- What is the water quality? Refer to Water Management Checklist.
- What was the site's past irrigation history?
- What were past crop and/or animal use and management practices?
- Past herbicide use and residual carryover potential for each material?
- Has the site been leveled, eroded, or altered in any significant way?

4. What is the surrounding property like?

a. Can you describe the land use, general geography, neighboring property uses?
b. What other crops are grown in the area? Is there potential for incompatibility issues from herbicides used in other crops, e.g. 2,4-D drift?
c. Is the area susceptible to deer and elk predation?
- Will fences need to be erected to protect the vineyard?
- Is the area heavily wooded or treed and will bird netting be needed?

5. What are the potential site risks?

a. Describe the demographic characteristics of the site (distance to urban activities, schools, dwellings, etc.).

b. Identify potential environmental risks, such as, proximity to protected waters, endangered species, or need for buffer zones along waterways

c. Identify possible water risks (high water table) from nearby creek or natural springs on property.

- Consider conducting an environmental survey (Natural Resources Conservation Service can help in conducting the survey).

d. Describe the geographic characteristics of the site slope versus valley position, slope direction (aspect), neighboring agricultural activities that could impact viticulture production (such as wheat farming).

6. What is the mesoclimate of the site?

A site that provides enough heat units to fully ripen the varieties planted is the first criteria in choosing a site. A limiting factor to growing grapes in eastern Washington is cold injury, therefore, great attention must be paid to the mesoclimate
(climate of the local area) and microclimate (climate of small area, such as part or all of a single vineyard block) before planting.

- What is the average length of growing season (number of days above 50°F) for my site?
- What is the accumulation of heat throughout the growing season (called degree days) for my site?
- What were the temperatures for my site from previous cold winter events?
- Is there enough slope to provide good cold air drainage? Slope greater than five percent is preferred.
- What is the elevation of the site? Suggested elevation is between 600 and 1,200 feet.
- Is the site in a windy location? Windy areas tend to have less frost but wind can reduce vine vigor and growth.
- Is the site near a large body of water or large rock formation to help temper climate in the immediate vicinity?

7. What varieties are suitable for my site and are they the varieties that are desired by wineries?

- Do I know the relative cold hardiness and heat unit requirements of the varieties I am interested in planting?
- Do I know what varieties are in demand by wineries?

Relative cold hardiness of varieties		
Low	Moderate	High
Chenin Blanc	Sauvignon Blanc	Riesling
Merlot	Lemberger	Chardonnay
Sangiovese	Cabernet Sauvignon	Gewurztraminer
Semillon	Cabernet Franc	Pinot Noir
Syrah		Pinot Gris
Viognier		Pinot Blanc

Heat unit requirements of varieties		
Low	Moderate	High
Riesling	Chardonnay	Cabernet Sauvignon
Gewurztraminer	Lemberger	Cabernet Franc
Pinot Noir	Syrah	Sauvignon Blanc
Pinot Gris	Merlot	Semillon
Pinot Blanc		Chenin Blanc
		Sangiovese

Growing Grapes in Eastern Washington, Watson, J., 1999, Good Fruit Grower

8. What is the site's proximity to labor, good roads, supplies, and wineries?

Remote vineyard sites will incur increased labor and transportation costs.

9. Do local zoning codes limit farming or urban encroachment?

Vineyard Establishment

1. Where am I sourcing my plant material?

Use only clean plant material. Start with clean (disease- and pest-free) plant material to protect the health and quality of the wine industry. Viruses, such as grapevine leafroll virus, the bacterial disease crown gall, or the soil-born louse phylloxera can devastate grape production regions because once established, infected vines cannot be cured.

- Have I planned ahead to have the best plant selection? Popular varieties can have a two-year wait period when ordering.

Nursery source

a. Buy "certified" grape plants from nurseries to ensure that plants have been tested for viruses.
   - If certified stock is not available, stock can be indexed or tested for virus to give assurance that material is clean.

b. Seek out reputable nurseries.
   - Visit the nursery one to two years in advance of plant material purchase, looking at plant material to evaluate the overall health status of nursery stock.
   - Ask for grower references from the nursery.

c. Receive documentation if planting material is certified.

d. Do I know the difference between certified, registered, or foundation block cuttings? (See Definitions.)

e. Have I complied with royalties and nursery propagation agreements?

Plant quarantine laws

Am I complying with plant quarantine laws? Plants shipped into the state must meet Washington State Department of Agriculture's grape quarantine and phytosanitary regulations and come from a "certified" source.

- Check with WSDA before importing material from out of state to obtain proper documentation and inspection.

2. What is needed for site preparation?

a. Collect information on past cropping history, pesticide usage, fertilizer amendments and refer to the Soil Management Checklist for site preparation needs.

b. Before vines are planted, soil should be sampled for nematodes, especially if tree fruit or crops susceptible to nematodes were previously grown. Include old roots of the previous crop in the sample if possible. If the site was an orchard at one time, consider sampling for arsenic.

c. Use an electromagnetic conductivity survey—either a VERIS or EM38 soil survey—to help identify where to dig soil pits. Soil pits dug with a backhoe will help determine variability of soil properties, such as rooting depth, water holding capacity, and other factors.

d. Collect soil samples at depths of one to two feet and test for soil properties (organic matter, pH, nutrients) and soil qualities. If samples indicate a need for soil amendments, add before planting.

e. Is soil fumigation necessary? Decision depends on history of site.

- Virgin ground is generally not fumigated but fumigation can be necessary in replant situations.

f. Does the soil need ripping?

- Rip only if there are compacted soil layers.

g. Does the site have any major removal issues (orchard stumps, rocks, etc.) that should be considered?

3. How do I lay out the vineyard?

A soil survey map from county Natural Resource Conservation Service offices is a useful first step in segregating blocks into units with uniform soil qualities and water holding ability.

a. Survey total area. GPS and GIS technology (Global Positioning System and Geographic Information System) can be used to map and grid vineyard and irrigation system.

b. Determine row orientation- orientation is influenced by slope, variety, and topography

- South facing slopes are generally sought.
- A northeast-southwest row orientation is often used to minimize afternoon sun exposure and maximize morning sun exposure.

c. Is terracing or following hillside contours necessary?

d. Have you allowed enough room for equipment to turn around at the ends of the vineyard rows.

e. What is your vine spacing?

- Most new vineyards are high-density (between five to seven feet between rows and three to six feet between vines).
- Equipment needs and additional vine costs must be considered if planting higher density, narrow rows.

4. What kind of trellis system should I use?

Trellis systems support the vines and must last the life of the vineyard. They are also used to mount irrigation systems and can aid in mechanical harvest and vine sun exposure.

a. Does the winery require a specific trellis system?

b. Is the design suitable to mechanized cultural practices like mechanical pruning, leaf removal, and harvest?

- Consider simple trellises because they are easiest for retraining winter-injured vines and lend to mechanical harvest.
- Systems range from simple, single posts with an undivided canopy and one or two lateral wires to complex T, Y, sloped, gabled, double curtain, or fan-shaped designs with multiple wires.
- Shoots can be trained to an upright position (Vertical Shoot Positioning) or nothing at all (sprawl)
- Trellis height and configuration depends on the training method selected, vigor of the vine, harvest method, and intensity of mechanization.

c. Be aware of any restrictions of material use for wine grape production, (e.g. organic wine grape production prohibits use of treated wood posts).

d. Windy sites may require extra trellis support. Consider wind management issues in windy sites.

e. Consider not only initial costs of trellis system but also longevity of materials (wood vs. steel posts), long-term management, and maintenance costs.

5. What's involved in planting grape vines?

a. Planting is generally done in the spring. Growing a healthy, vigorous vine is the priority in the early stages of a vine's life—harvesting a large crop in the second year is discouraged. A full production year should occur in the fourth leaf. Varieties chosen should be based on broad market trends, winery demands, and most importantly, site.

- Consider the benefits and risks of using different types of nursery stocks (one-year hardwood cuttings, greenhouse potted plants, rootstock/scion combination).
- Orders should be placed 12 months or more in advance for best selection.

b. Do I have access to facilities needed to handle grape material, providing the proper temperature and moisture for storage until planting? Handling grape planting material properly is extremely important.

c. Am I following nursery guidelines for planting and watering?

- Frequent, light watering is important after planting vines because young root systems only explore a small soil area.

d. Do I have a plan for training vines in the first year or will they be allowed to grow as a bush for one year before training?

e. Am I prepared to install the trellis system before training of vines?

f. Have I considered protection of young vines?

- Young vines need protection from rodents, wind, pests (insects and diseases), and herbicides.
- Grow tubes and milk cartons can provide such protection and assist in early growth.
- Remove the tubes before winter to aid in winter hardiness.
- Carefully research grow tubes; some work better than others.

g. Is my irrigation system is installed and ready when vines will need moisture. (Refer to the Water Management Checklist.)

h. Have I considered viticultural needs of young vines?

- Weeds compete with young vines and can delay vine growth and production.
- Is a cover crop being planted? (Refer to Soil Management Checklist.)
- Pest control is needed, focusing on gophers, cutworms, and mildew.
- Weak or dying vines should be replanted throughout the growing season.

6. Is cold protection needed?

If the site and variety have been carefully chosen with temperature, slope, and drainage as primary criteria, cold problems are minimized. However, many vineyards need protection from cold temperatures in winter, spring, and fall. Cold protection tools include wind machines, heat (propane burners), overhead sprinklers, and a combination. Sprinklers used for frost protection must have a water source in early spring or late fall (when water may not always be available from irrigation districts).

- Accelerating vine dormancy and lignification of the shoots is important to avoid winter injury, and is especially important in non-fruiting vines.
- Using sprinklers for fall frost protection can delay vine dormancy.

DEFINTIONS

American Viticultural Area AVA: A designated U.S. wine grape growing region distinguishable by geographic features. The federal Alcohol and Tobacco Tax and Trade Bureau approves boundaries at the request of wineries and growers.

Aspect (of slope): the direction, such as north or south that a slope faces with respect to the sun.

Cold hardiness: ability to resist injury during exposure to low temperature. The hardiness of grape wood and bud varies with species and variety. The vine must mature properly at the end of the growing season and must harden to be able to withstand the cold winter temperatures. In late winter or early spring, the vine will lose hardiness and resume growth when conditions are favorable. At any given time during this seasonal cycle, different plant parts will vary in hardiness. The primary bud is more susceptible to cold injury than the secondary, which is in turn less hardy than the tertiary bud. The wood of the grape is more resistant to injury than are the buds.

Degree-days: Also known as growing degree-days, is a measure of heat accumulation to predict plant and pest development rates, such as the date a crop will reach maturity. GDD are calculated by taking the average of the daily maximum and minimum temperatures compared to a base temperature (50°F). To learn more visit: http://wine.wsu.edu/research-extension/weather/growing-degree-days .

Macroclimate refers to the climate of a region.

Mesoclimate describes the climatic conditions of a specific smaller geographical area than

macroclimate, be it an appellation or a hillside or a valley and is used to refer to a potential vineyard site.

Microclimate describes the physical environment, from the size of a single leaf up to the size of a vineyard block, and thus, is often confused with mesoclimate. It refers to distinct climatic conditions within a very specific area, sometimes no larger than a few feet across but often as much as a number of acres. With reasonable effort, the vineyard microclimate can be altered through farm management practices. The same cannot be said of mesoclimate. Microclimate helps convey the potentially profound effects on wine due to slight differences in soil, sun exposure, temperature, and elevation.

Slope refers to an elevated geographical formation.

Certified material means grape planting material has been certified in accordance with the regulations of an official grapevine certification program that includes inspection and testing methods approved by the Washington State Department of Agriculture Director for fanleaf, leafroll, and corky bark viruses. An official certification issued by the plant protection organization of the state of origin that certifies that the grapevines meet the requirements of Washington State quarantine regulations must accompany the grapevine planting stock into the state.

Foundation block describes a planting of grape vines established, operated, and maintained by Washington State University or other equivalent sources approved by the director of the Washington State Department of Agriculture, that are indexed and found free from the major viruses.

Lignification refers to the process of depositing lignin in cell walls, which converts the canes into wood. Woody canes are ready for dormancy and better protected from cold temperatures.

Registered block is a planting of grapevines maintained by a nursery and used as a source of propagation material for certified grapevines.

Registered vine means any vine propagated from an approved foundation block, identified to a single vine source, and registered with the Washington State Department of Agriculture.

2,4-D drift: Grapevines are especially sensitive to herbicide drift (movement of herbicide off site where applied) of the growth regulator 2, 4-D or dicamba. Such herbicides are commonly used in wheat and forage production. Drift can occur after application or when the herbicide volatizes and can move in the atmosphere at great distances. The chemical can damage grapevine foliage, shoots, flowers, and fruit.

RESOURCES

Watson, J. Growing Grapes in Eastern Washington. Proceedings from a Washington State University short course for establishing a vineyard and producing grapes. 1999. Good Fruit Grower, Yakima, Washington.

Site selection bulletins from Washington State University:
Considerations and Resources for Vineyard Establishment in the Inland Pacific Northwest – PNW634
Site Selection for Grapes in Eastern Washington – WSU EB1358
Vine to Wine: Successfully Establishing a Vineyard and Winery (DVD) – WSU DVD007
Growing Wine Grapes in Maritime Western Washington – WSU EB2001

Establishing a vineyard, considering geology and climate:
An interactive website of the Natural Resources Conservation Service allows users to find their locations with searchable web maps
AgWeatherNet website
WSU Cold Hardiness website
Western Regional Climate Center contains historical information regarding growing degree days, temperature, precipitation, wind speed, and directions for a number of locations in the Western United States.
Normal Climate Maps for United States website provides frost/freeze and precipitation data for the past 30 years.
USDA Plant Hardiness Zones website provides 30-year average minimum temperatures in an area.
Geologic Map of Washington describes the geological features of the state in a zip file from the WA Department of Natural Resources.
Establishing a vineyard – WSU website

Plant material selection:
Clean plant selection – current availability of clean varieties grown in the Washington State Grape Foundation Block
A list of certified nurseries in the Pacific Northwest
Washington State Department of Agriculture regulations on grape plant quarantines for phylloxera and grape viruses

Trellis information:
Training and Trellising Grapes for Production in Washington EB0637
Choosing a trellis system – eXtension website

Smart, R. and Robinson, M. 1999. Sunlight into Wine: a Handbook for Winegrape Canopy Management. Winetitles, Adelaide, South Australia.

Complete listing of WSU grape bulletins