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Site Suitability Evaluation for Starting Vineyards in Maryland

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Evaluating Site Suitability for Vineyards in Maryland

Origin and Support

The cooperative mapping project was energetically supported by Senator Donald Munson of Washington County who arranged the connection and interaction between Maryland Department of Planning (MDP) and the University of Maryland Extension (UME). The continuation of the program has been generously supported and funded by the Governor's Commission on the Wine and Grapes, as well and the Maryland Grape Growers Association, and the Maryland Wineries Association.

Maryland Wine & Grape Advisory Committee

MDP Maryland Department of Planning

Maryland Grape Growers Association

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Ask for Maryland Wine

Evaluating Site Suitability for Vineyards in Maryland

Background.

The University of Maryland Extension has initiated a comprehensive extension and research program to promote the planting of grapes in Maryland. The program is designed to allow entrepreneurs to utilize proper research-based information to make decisions on site selection, ground preparation, grape variety, establishment techniques, and have every opportunity to get the new venture off in an efficient and economical manner. The program centers around web-based information, "New Grape Grower Workshops," and "Timely Viticulture," a series of timely email newsletters. More information on starting a vineyard is available at: www.grapesandfruit.umd.edu

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Background.

The most critical part of the decision to plant a vineyard is proper site selection. A good site is necessary for optimizing winter survival and achieving proper grape ripeness. The "Vineyard Suitability Maps" were developed as an important part of this evaluation. The purpose of the maps is to provide a graphic representation of where high quality potential vineyard property exists statewide on a county by county basis.

Maryland has a diverse range of environments which have advantages and disadvantages for the sustainable production of high quality grapes. The following maps and descriptions were developed to walk you through an evaluation of the critical components when evaluating land for suitability for sustainable producing high quality wine grapes in Maryland.

Evaluating Site Suitability for Vineyards in Maryland

Winter injury is the primary restraint to sustainable grape production in Maryland, therefore the long term climate of the region is the first considerations when evaluating a site for a vineyard. When evaluating climate one must consider the macro-climate and meso-climate of that specific site.

The macro-climate refers to the general climate of the region. This would include the minimum/maximum winter/summer temperatures as well as the humidity. The meso-climate is the climate of a specific plot of land. The meso-climate can be different than the macro-climate as it is subject to moderations cause by topographical features such as slope or the presence of a large body of water that can moderate the adjacent area. The meso-climate considerations will be discussed later with the site map layers of altitude, slope and aspect.

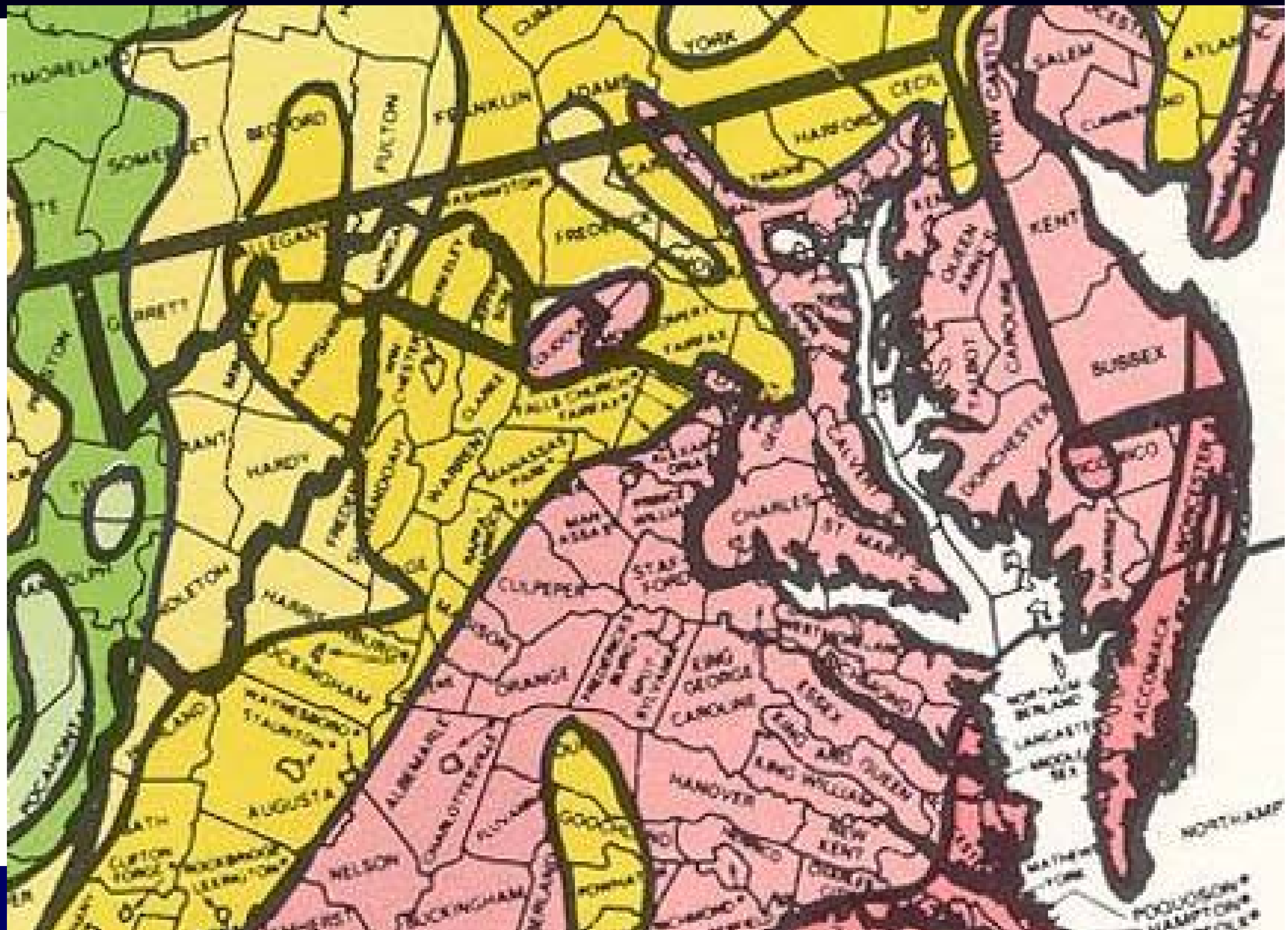
Evaluating Site Suitability for Vineyards in Maryland

Critical Factors

Winter injury is the chief restraint to sustainable grape production in the state. Therefore the macro-climate characteristics of the region such as the minimum/maximum winter temperatures and length of growing season are the primary factors to consider. Different varieties of grape have different temperature tolerance, but in general it is best to locate you vineyard in an area where the minimum winter temperatures do not consistently dip below zero to minus-five Fahrenheit. The following USDA plant hardiness zone map differentiates areas of the state by their minimum winter temperatures and provide a good general guideline. There are some varieties of grape that can be grown in any area of the state, but he demand and profitability may not be desirable.

Maryland USDA Plant Hardiness Zones

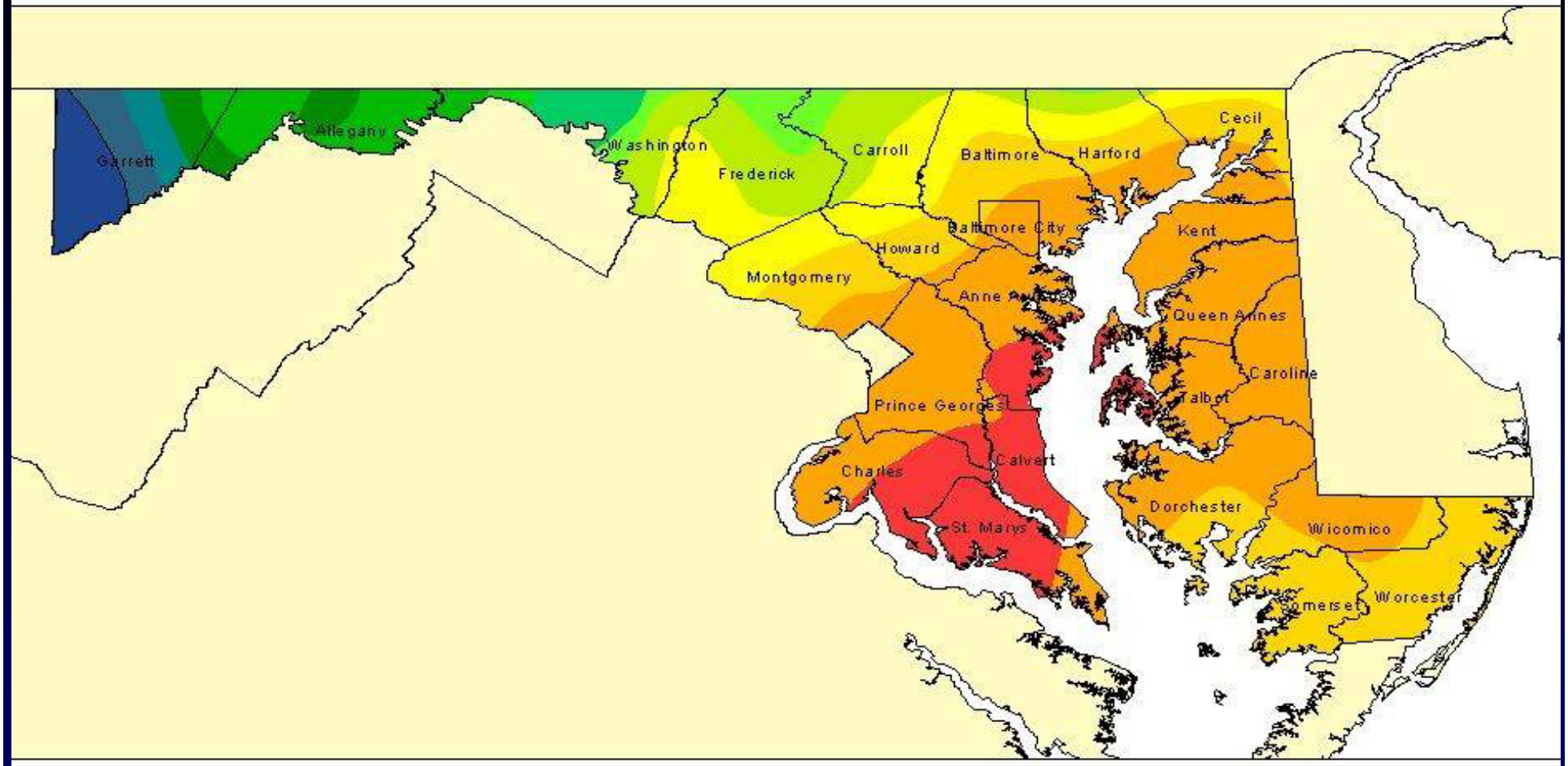
Zone	Temperature (°F)
1	Below -50
2a	-45 to -50
2b	-40 to -45
3a	-35 to -40
3b	-30 to -35
4a	-25 to -30
4b	-20 to -25
5a	-15 to -20
5b	-10 to -15
6a	-5 to -10
6b	0 to -5
7a	5 to 0
7b	10 to 5
8a	15 to 10
8b	20 to 15
9a	25 to 20
9b	30 to 25
10a	35 to 30
10b	40 to 35
11	40 and Above



Evaluating Site Suitability for Vineyards in Maryland

The chief constraint to producing consistently high quality grapes in the state is the length of the growing season. This can be expressed by the number of growing degree hours above 50 degrees Fahrenheit (GGD) or number of days from the last frost in the spring until the first frost in the fall. Different varieties of grape have different number of days from bud break to fully ripe, but in general it is best to locate your vineyard in an area where there is a minimum of 2800 GGD, but preferably around 3400. In terms of frost free days, a minimum of 185 is desirable, and 220+ is preferable. The following growing degree day map provides a good general guideline. The subsequent UC Davis growing zone map differentiates Maryland into four major zones based on GGD, and each zone has a recommended group of varieties that is suited to that length of growing season.

Growing Degree Days - Maryland



Growing Degree Days

< 2500	3100 - 3200
2500 - 2600	3200 - 3300
2600 - 2700	3300 - 3400
2700 - 2800	3400 - 3500
2800 - 2900	3500 - 3600
2900 - 3000	3600 - 3700
3000 - 3100	3700 - 3800

N
W E
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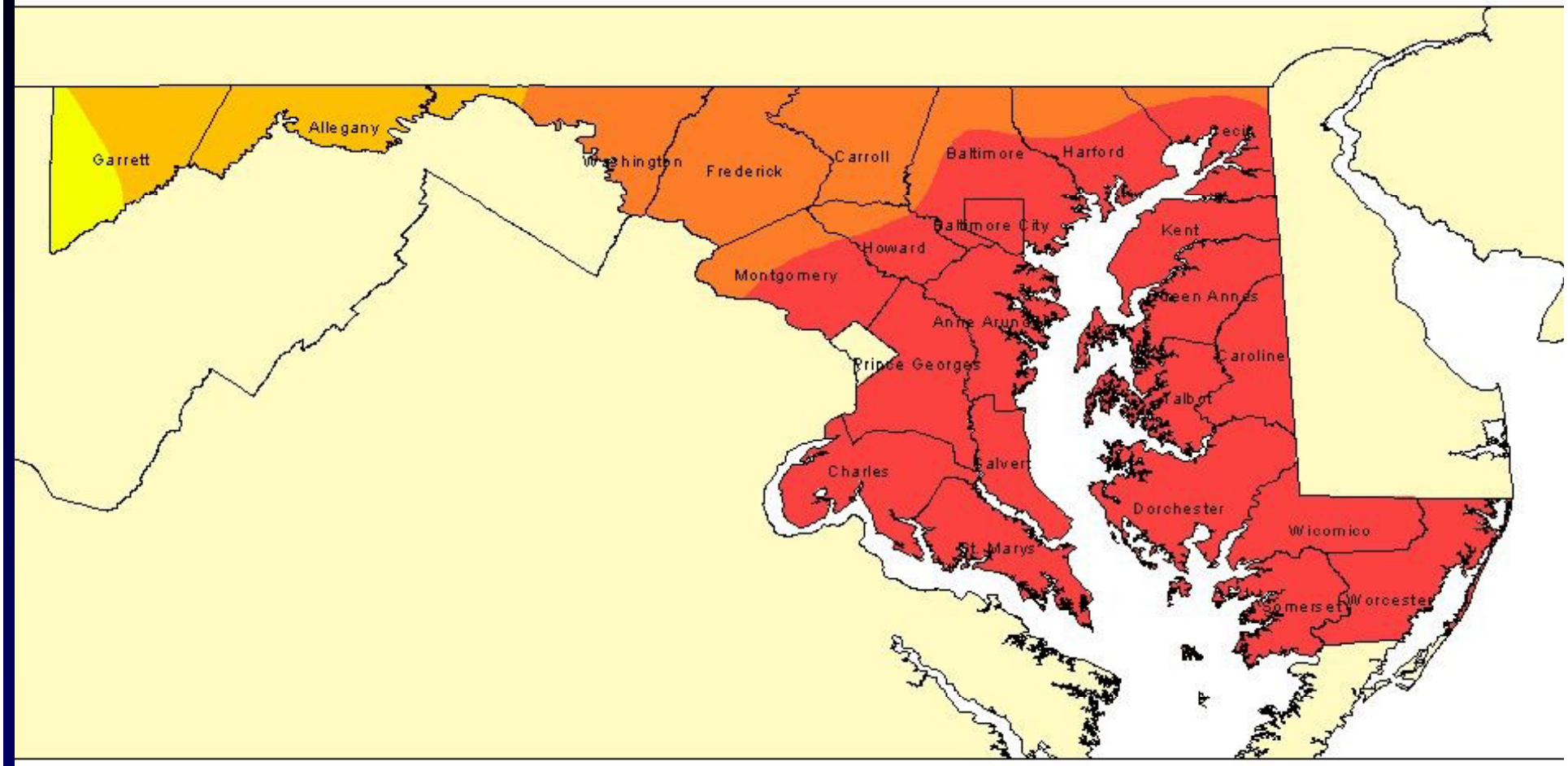
0 30 60 90 120 Mi

UC-Davis Grape Growing Zones for Maryland



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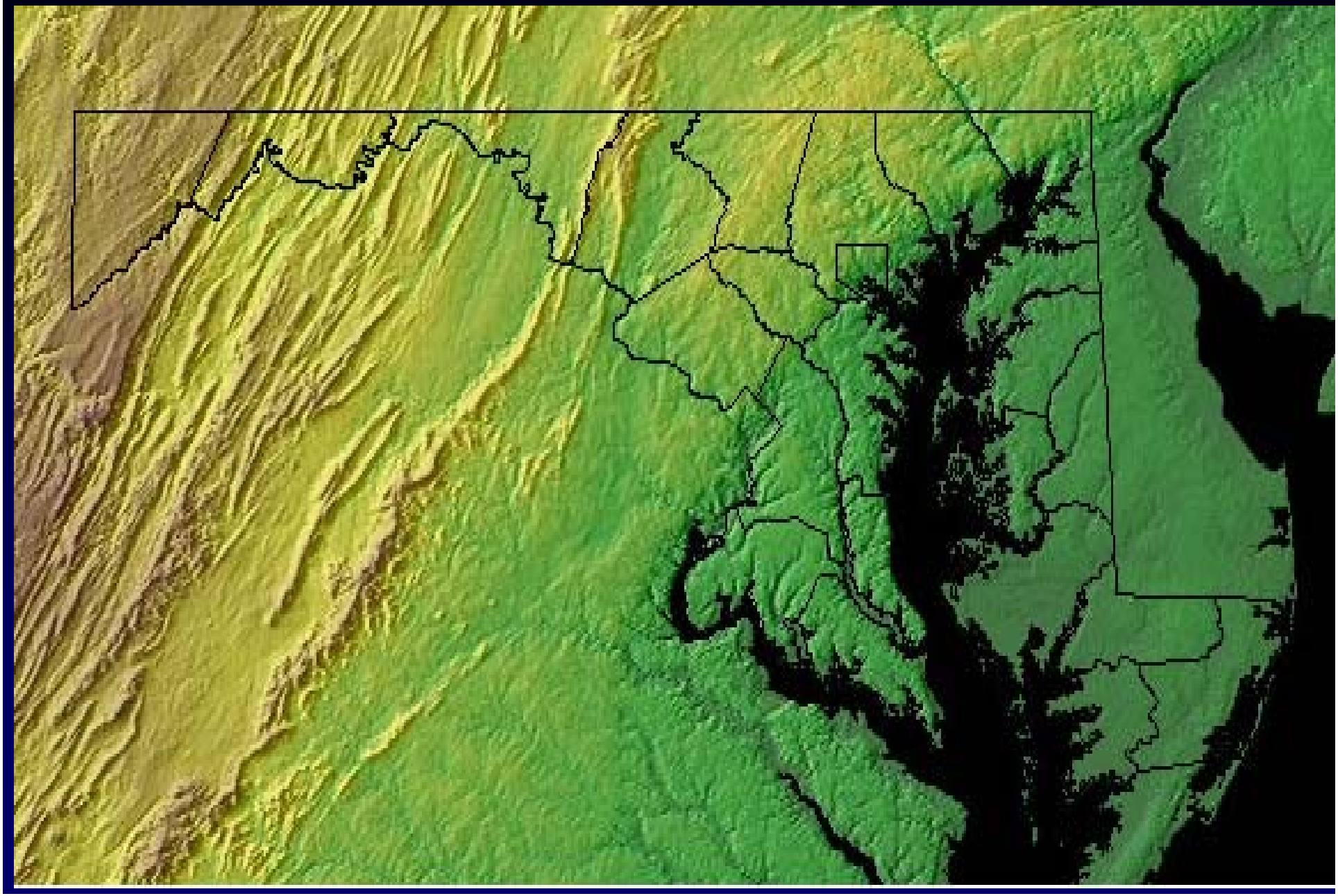
Winter injury and spring frosts are chief constraints to consistent grape production in the state. The majority of the Mid-Atlantic's damaging low temperature events are primarily radiational events, when under calm winds and clear skies, thermal inversions often result.

A primary consideration in vineyard site selection, therefore, is to seek a meso-climate with a relatively high altitude and moderate slope. These sites will offer good cold air drainage and take advantage of the topographical interactions with the inversions to reduce the risk of damage. These site suitability maps are a tool to evaluate the relative altitude, slope, and aspect of a particular parcle of land.

Topographical Map of Maryland



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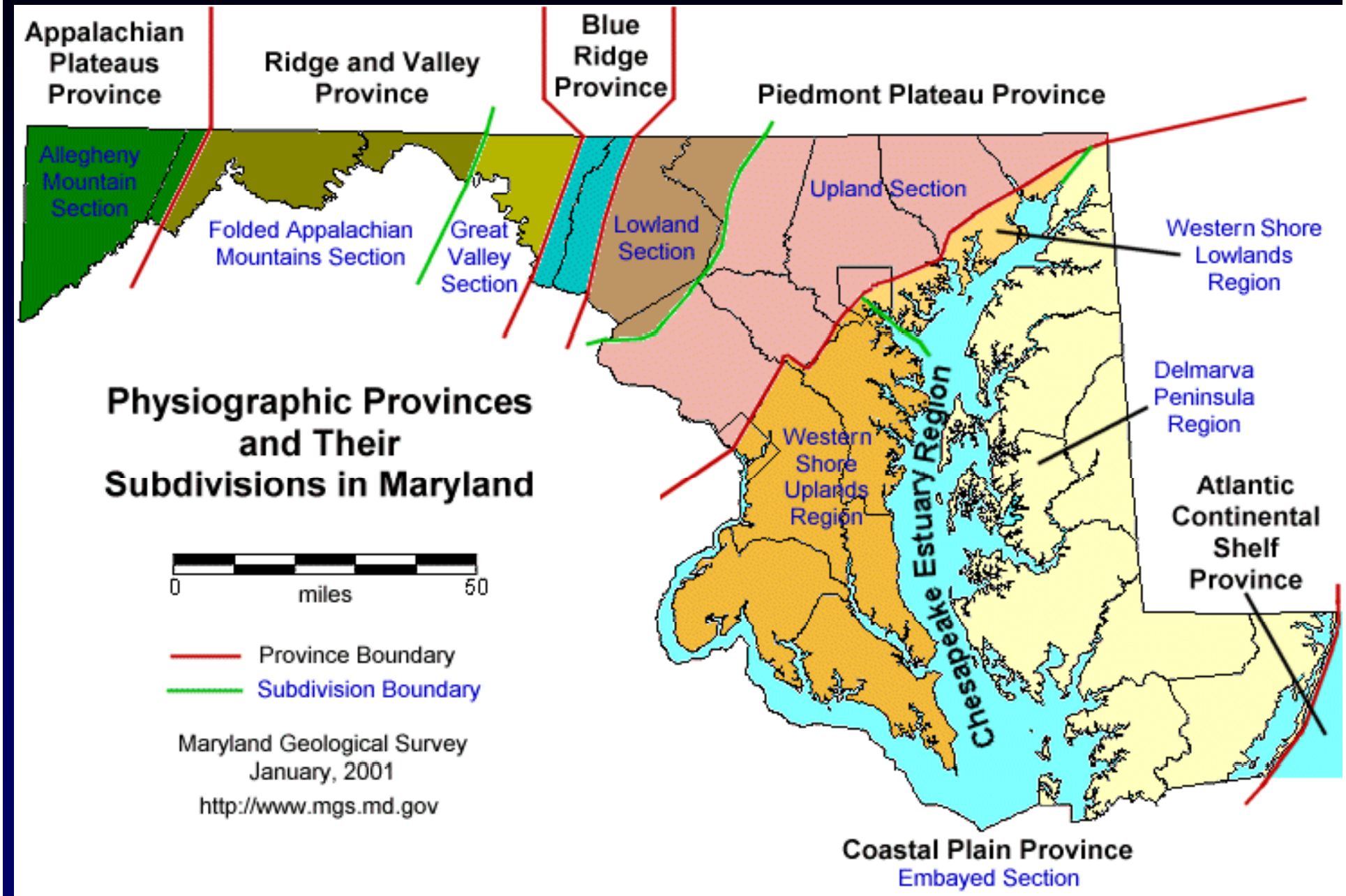
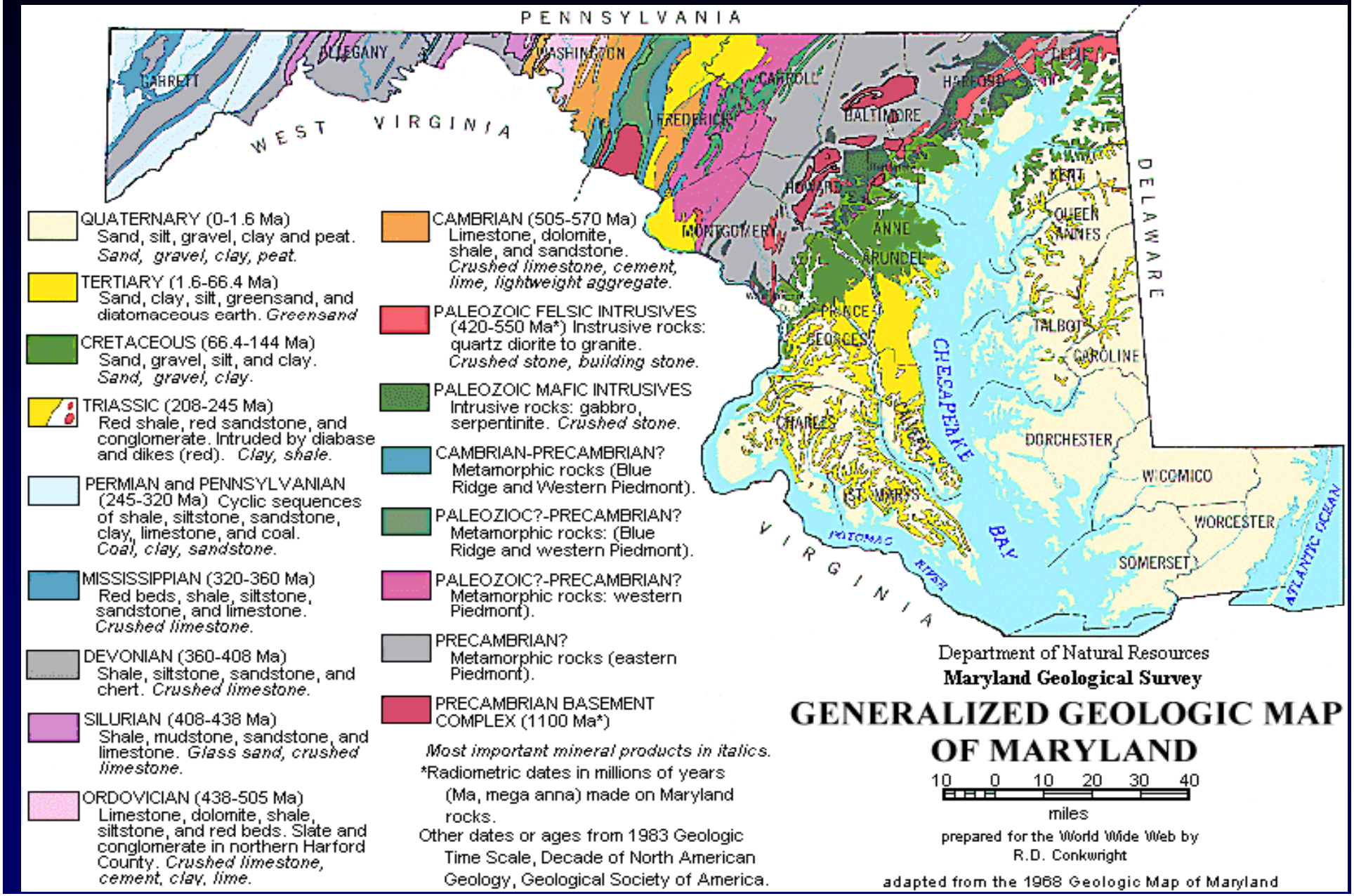
Another critical vineyard site characteristic that is considered in the evaluation is soil suitability. Grapes tend to be deeply rooted and they do not tolerate wet soils, whether due to clay content or annual water table. Deep well drained soils are critical for optimum vine cold hardiness and grape quality. Knowing the geology of the region can help an understanding the general soil features of the region. For example the Cambrian limestone based soils of northeastern Washington county are well drained and high pH, both optimal for grape production.

Geologic Province Map of Maryland



Geologic Map of Maryland



Evaluating Site Suitability for Vineyards in Maryland

Map Components

The maps, generated on a county basis, were produced from a series of physical, digitized databases. The individual databases include slope (percent), aspect (north, east, etc. facing), elevation, soil classification, and land-use classification (e.g. forest, agriculture, urban, etc.). Each of the physical features was assigned a scaled, numerical classification based upon their relative importance. The individual site features were then “layered” or combined to produce a "Viticulture Suitability Ranking" in the final, composite image. The composite image is based on a 0 to 100 score, 100 being potentially most suitable for a vineyard.

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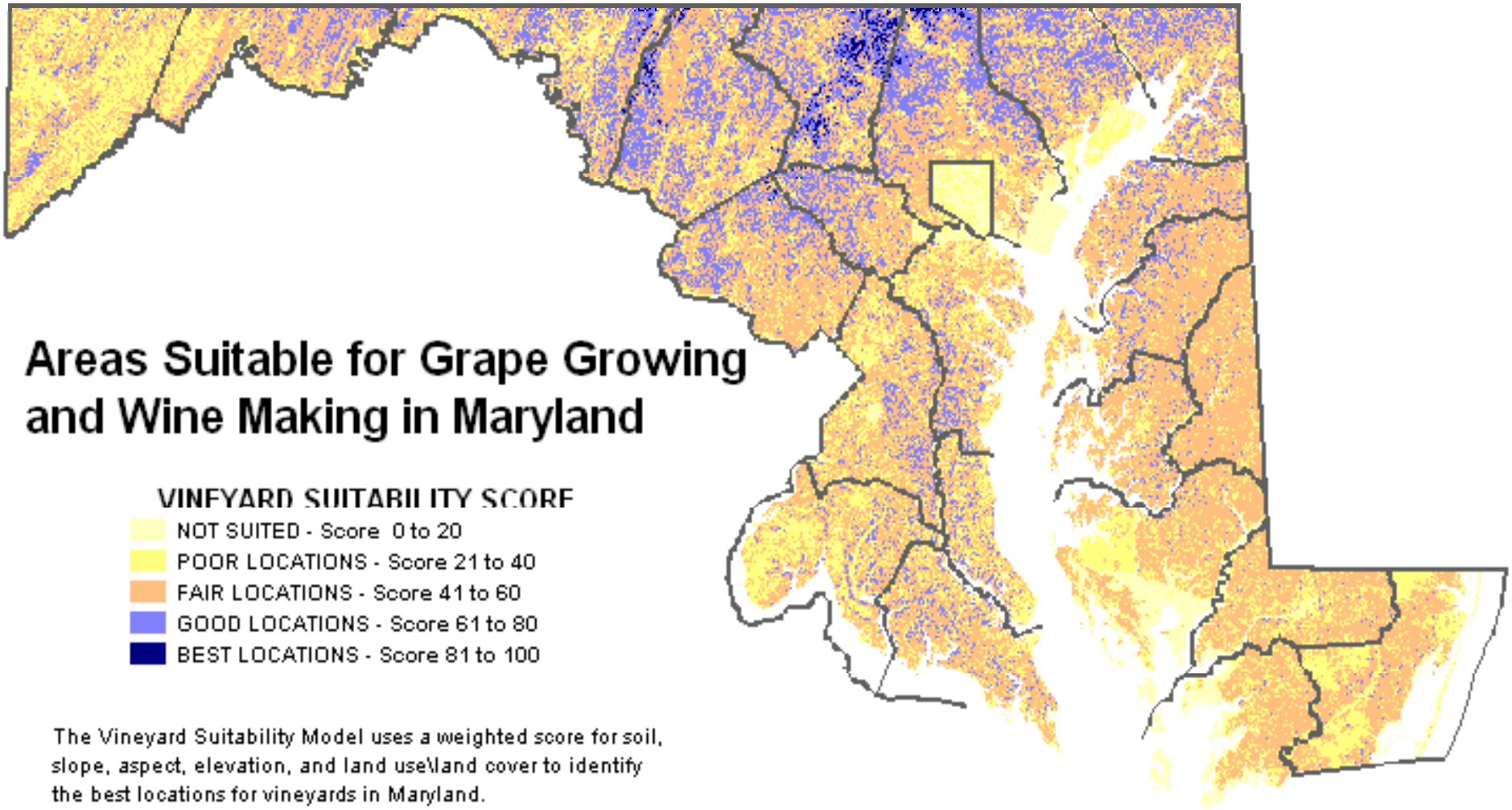
Relative ratings for components

Elevation	30 points
Soils	25 points
Land use/Zoning	20 points
Slope	15 points
Aspect	10 points
Total	100 points

Composite map for Maryland

Not Suited	1-20 points
Poor	21-40 points
Fair	41-60 points
Good	61-80 points
Best	81-100 points

Composite Suitability Map of Maryland



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Thoughts on utilization of the maps:

- The maps are not intended to serve as a roadmap to specific sites but rather to be utilized only as a general indicator of areas or regions of a particular county that may have greater or lesser potential for commercial grape production.
- These maps are not actually predictive tools and there is no substitute for actual performance. There are no guarantees stated or implied that what is classified as an "excellent" vineyard site within the map is, in reality, excellent.
- Altitude, slope, and aspect comprise 55% of the evaluation, therefore the southern and eastern shore will not fare as well as the piedmont and mountain areas. To better assess the southern and eastern shores, the maps are in the process of being redone to make soil type the majority evaluative component.
- No criticism is intended for those landowners whose property is classified as "risky," "poor," or "unsuitable" if their experience proves otherwise.
- The validation of these maps is on-going. Refinements will need to occur as we gain additional experience, especially counties that do not currently have appreciable vineyard acreage. The maps should be used as a supplement to other resources such as site selection bulletins, site visits by local University of Maryland Extension personnel.
- Thorough vineyard site selection must involve a considerable amount of foot-work to ensure that the intended site meets the criteria deemed essential for a good vineyard site.

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