

STARTING A VINEYARD

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**ADAPTED FROM DANA ACIMOVIC'S
PRESENTATION**



Factors to Consider

Site Evaluation

- Macroclimate...
- Mesoclimate...
- Microclimate
 - Soils- Soil Sampling
 - Soil Map Report
 - Test the soil for pH, P, K, Mg, Zn and O.M

One Year in Advance

- Begin planning the vineyard layout
- Choose the varieties
 - Correct any internal drainage problems
 - Amend the soil as needed for pH, P, K, Mg, & Zn
- Order vines



Site Criteria Evaluation



Vineyard profitability and sustainability are ultimately dependent upon selecting an excellent vineyard site.

- Spend as much time as necessary to ensure that the proposed vineyard site at least meets your high and moderate priority requirements.
- Some compromises might be permissible with the low priority features – a perfect site is extremely rare.



General Considerations for Site Selection



Climate

- Macroclimate
- Mesoclimate



- Land use
- Proximity to biotic hazard
- Slope
- Aspect
- Drainage

~~Compromise~~



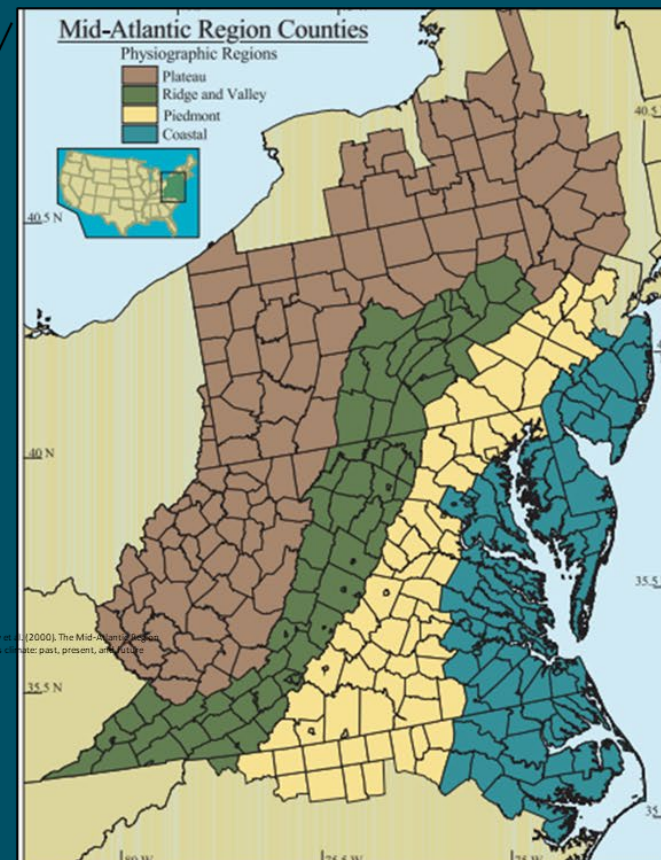
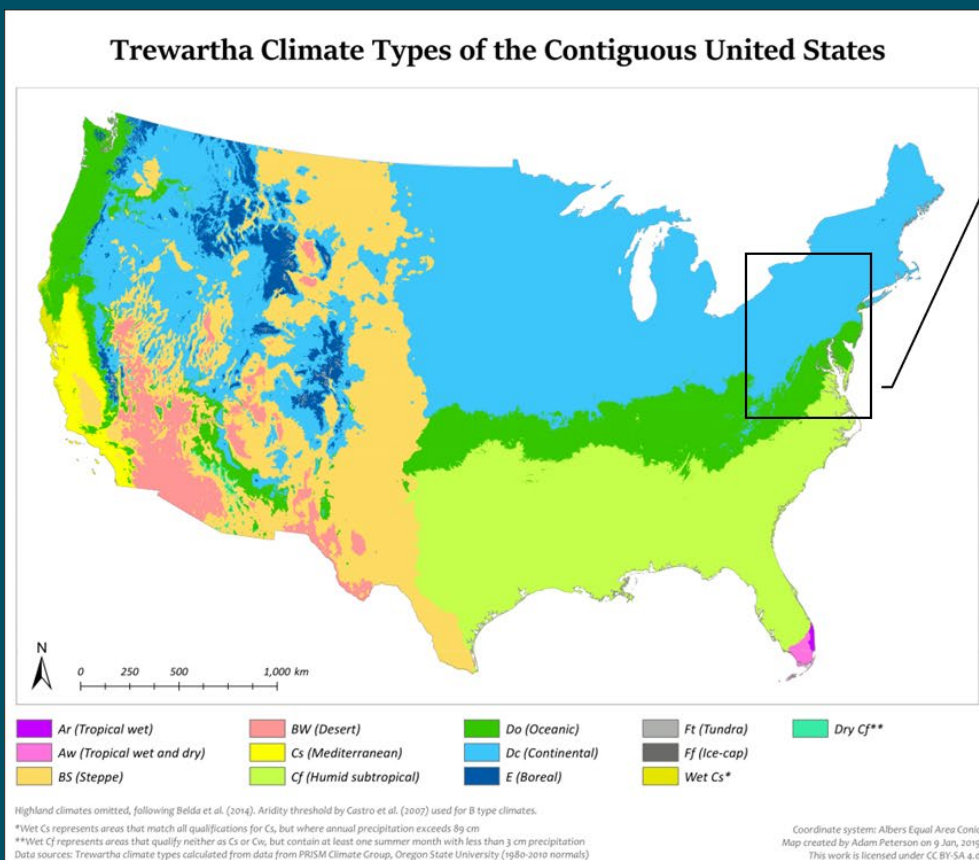
Microclimate

- Relative elevation
- Absolute elevation



Macroclimate

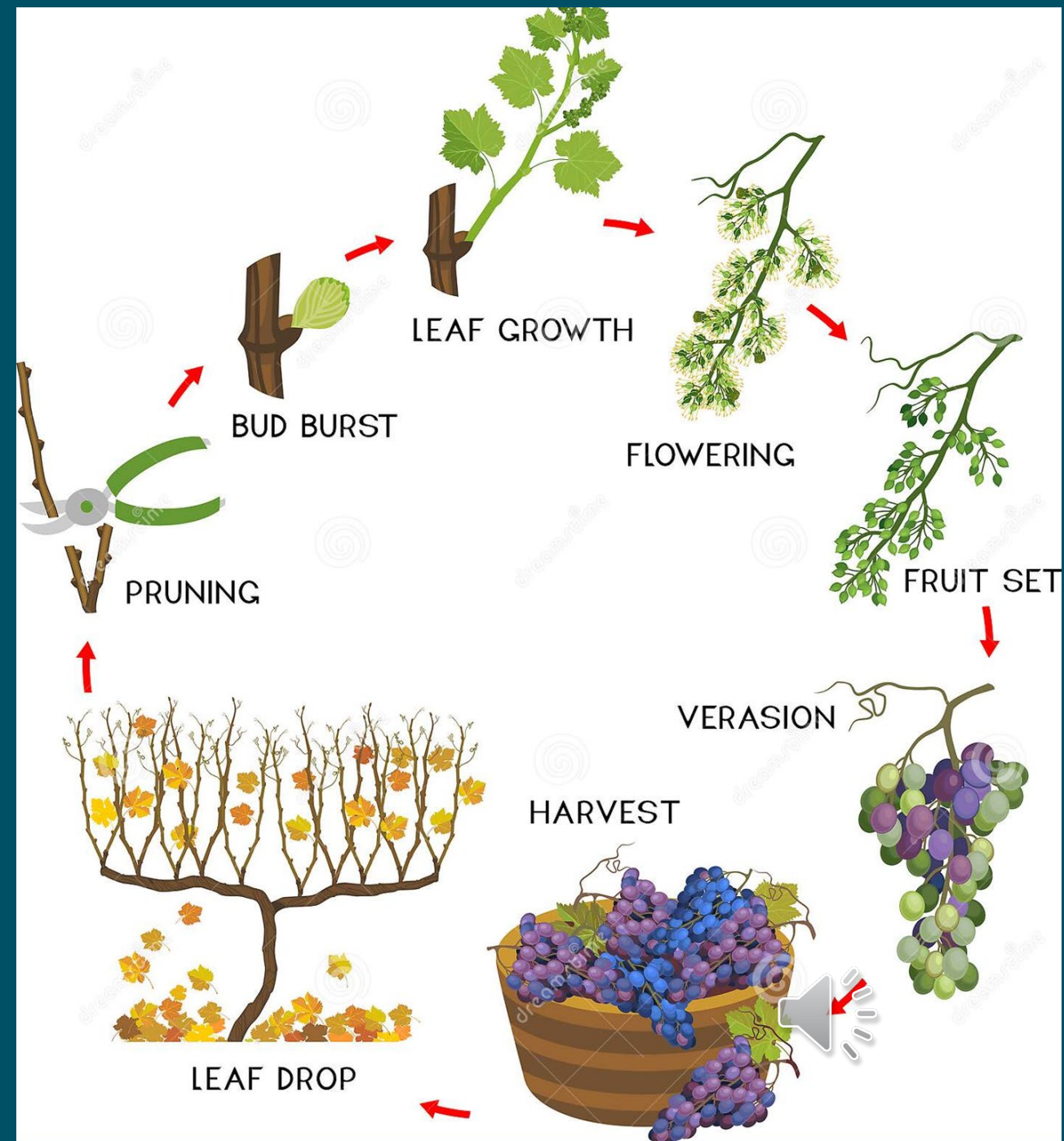
- Length of growing season
- Growing Degree Days
- Frost
- Frequency of extreme low temperatures
- Temperatures from July through October
- Precipitation



Length of Growing Season

Number of frost-free days from the last spring frost (32°F or 0°C) to the first fall frost.

- 165 days generally considered as minimum
 - Early ripening varieties – Muscats, ‘Viognier’, 155 days
- 180 or more days for late-ripening varieties
 - Late ripening varieties – ‘Petit Verdot’ or ‘Norton’








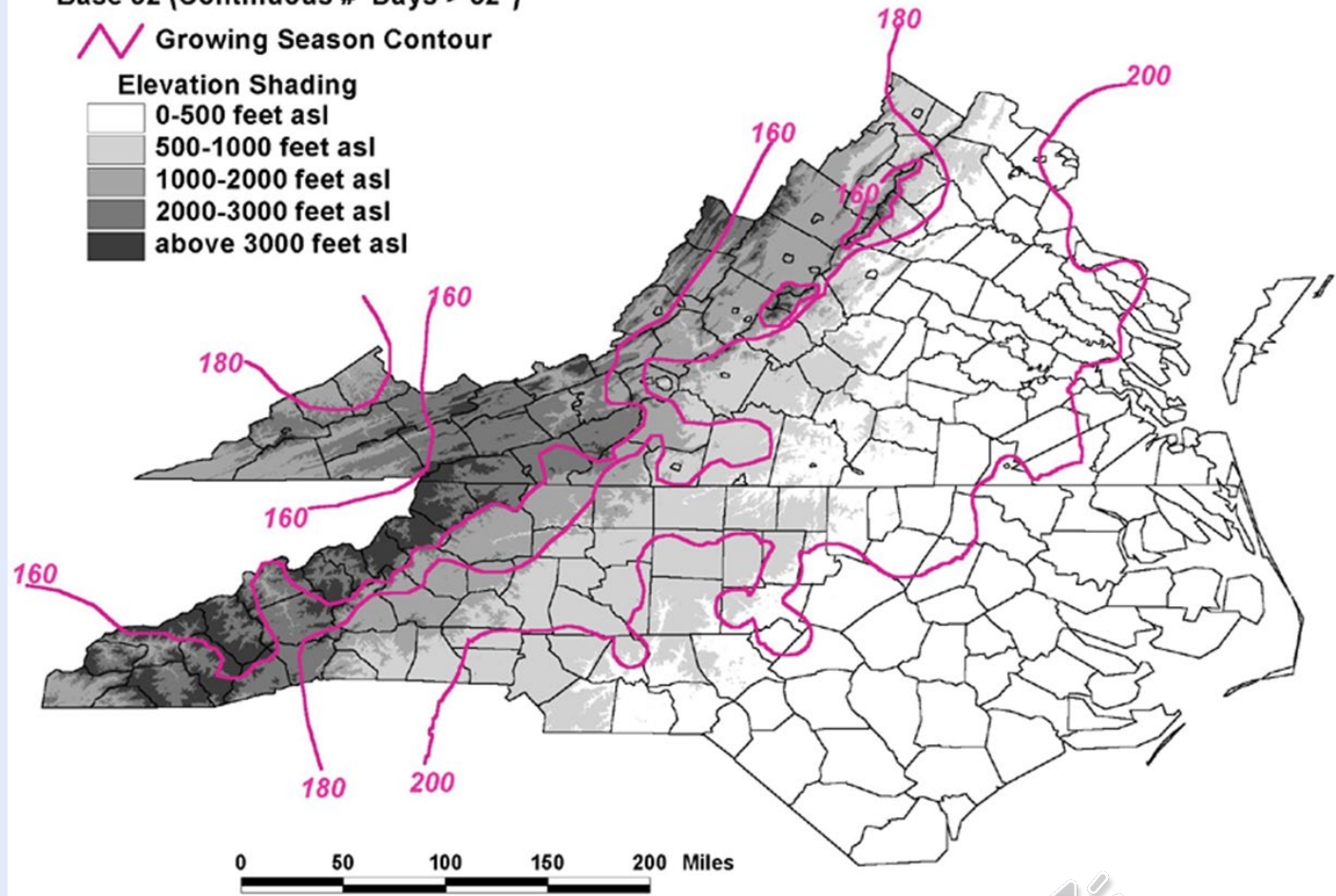


**Median Growing Season Length
Base 32 (Continuous # Days > 32°)**

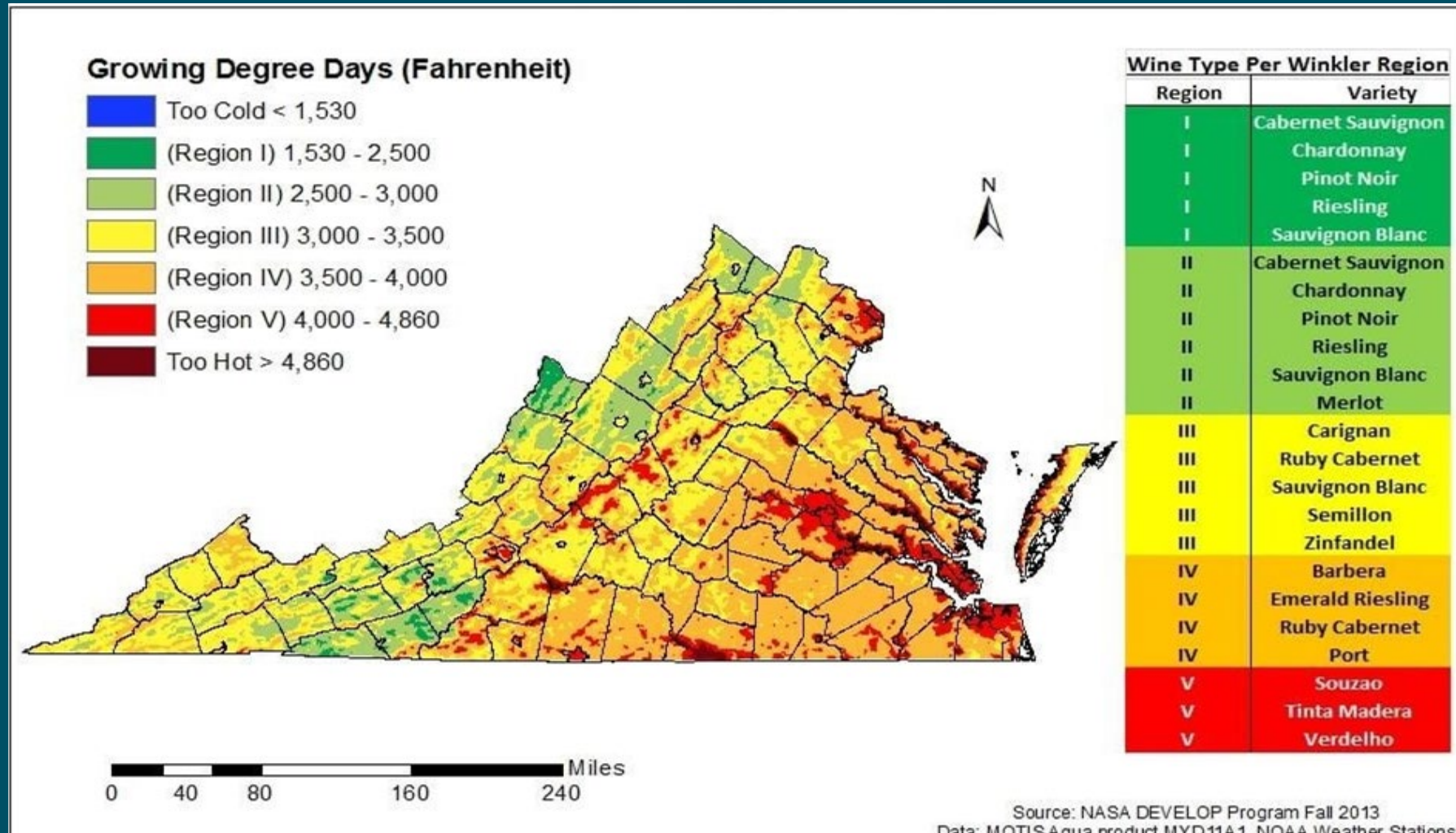
 Growing Season Contour

Elevation Shading

-  0-500 feet asl
-  500-1000 feet asl
-  1000-2000 feet asl
-  2000-3000 feet asl
-  above 3000 feet asl



Mean Growing Degree Days



Frost

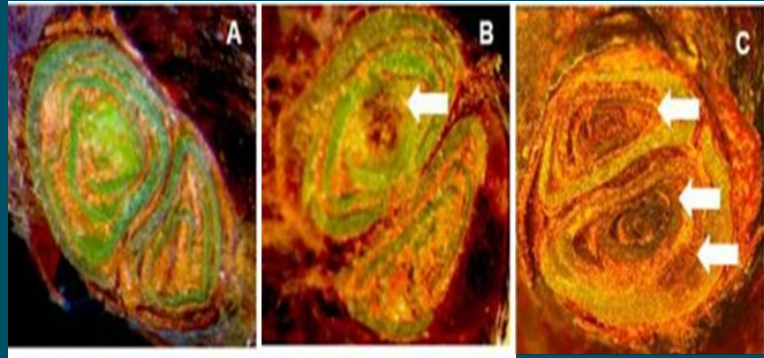
- Spring Frost –sudden dip in temperature (<32°F / in very dry condition <26°F)
- Damage on shoots, leaves, flowers



- Fall Frost – sub-freezing temperature in the early fall
- Damage on leaves results in unripe fruit and limit carbohydrate storage in perennial portion of the vine.



Frequency of Extreme Low Temperatures



(A) Healthy compound bud; (B) Discolored tissues indicating injury to primary bud; (C) Compound bud with cold injury to primary, secondary and tertiary buds. (P. Sabbatini, MSU)

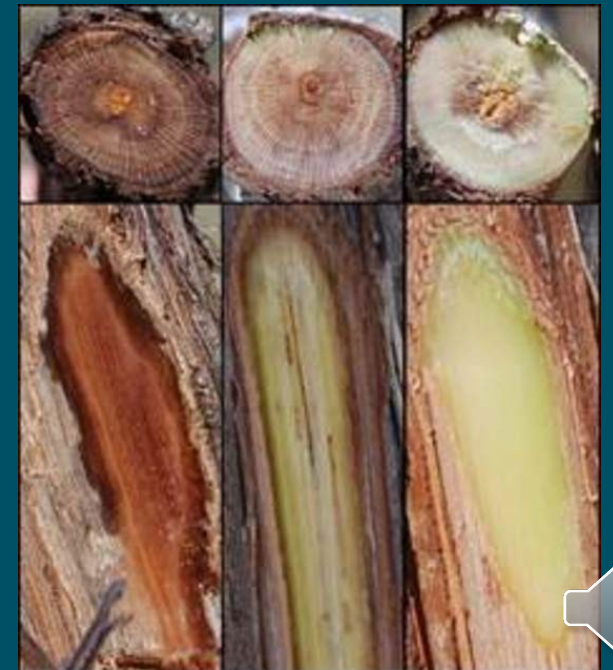


Outer layer of bark cut away and corresponding cross section showing varying degree of freeze damage in grapevine trunks (Left) severe damage, (Middle) moderate damage, (Right) no damage. (L. Haggerty, LERGP)



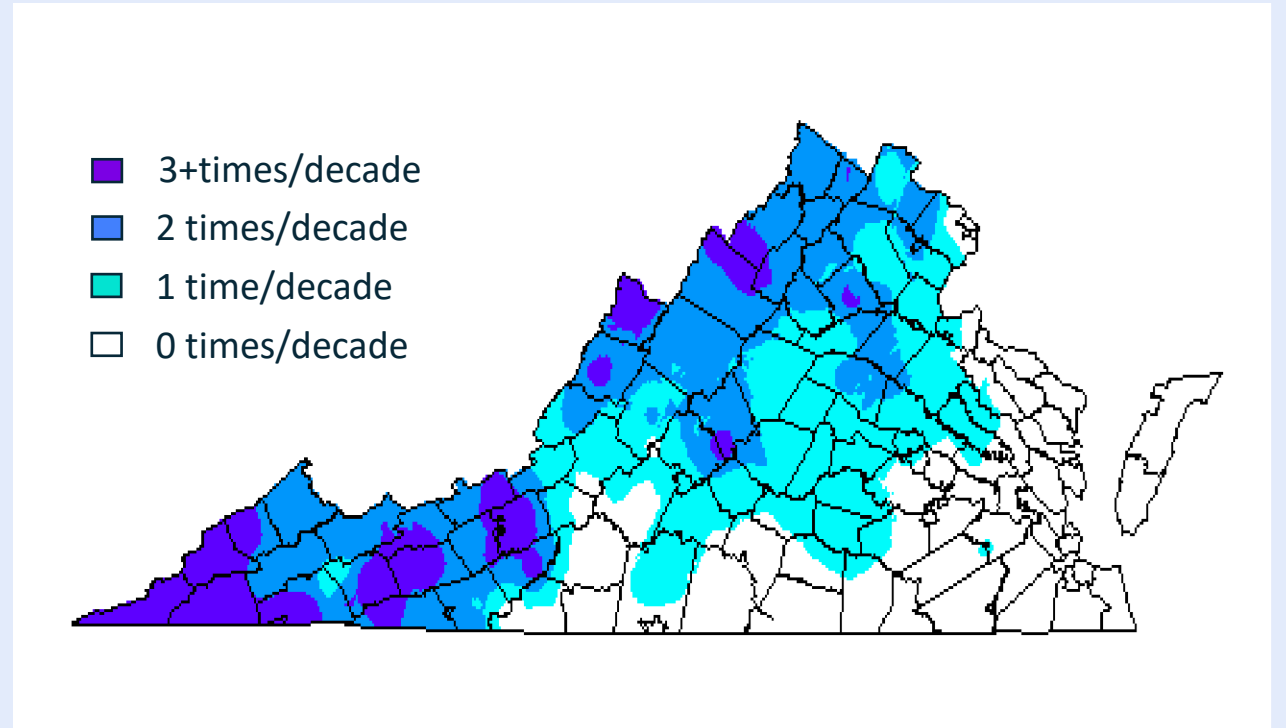
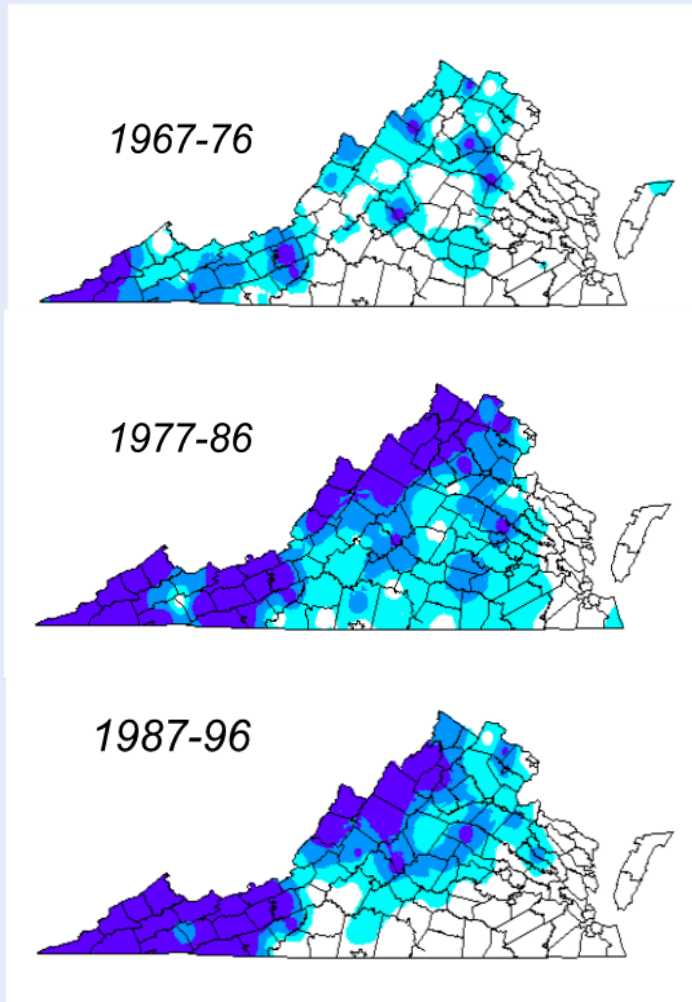
Trunk of Merlot vine That experienced about 1°F on January 7th, 2018

In the front: cold sensitive Syrah (*V. vinifera* L.) vine killed back to the ground. In the back: Healthy cold hardy Marquette (*Vitis* spp.) vines. (<https://extension.psu.edu/grapevine-cold-injury>)



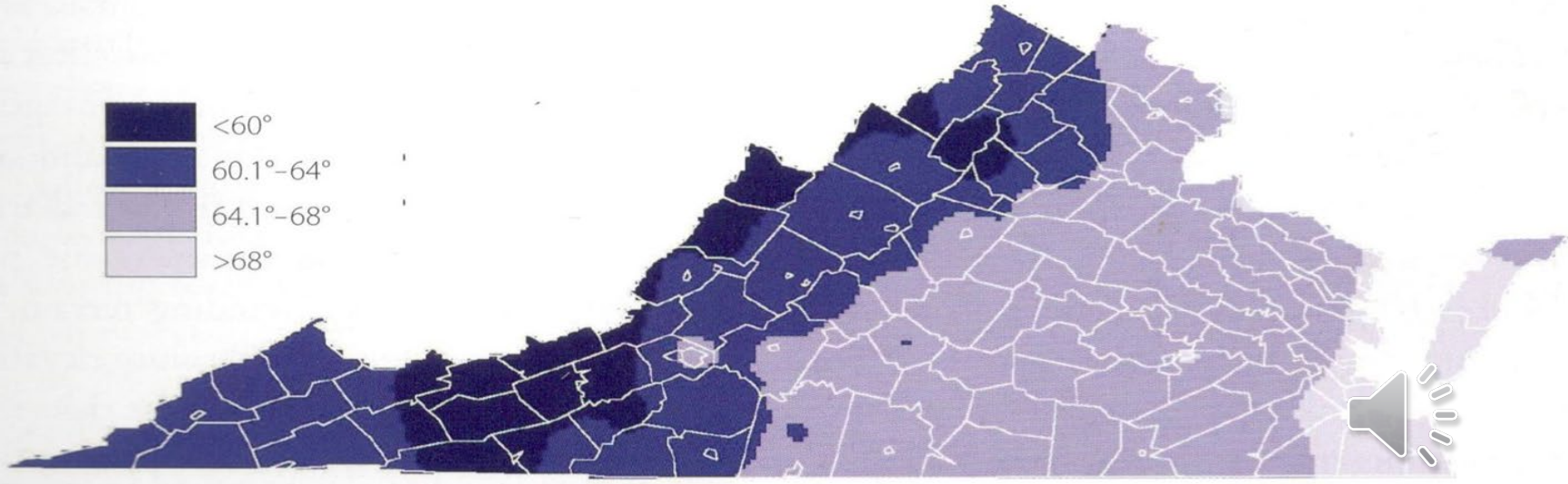
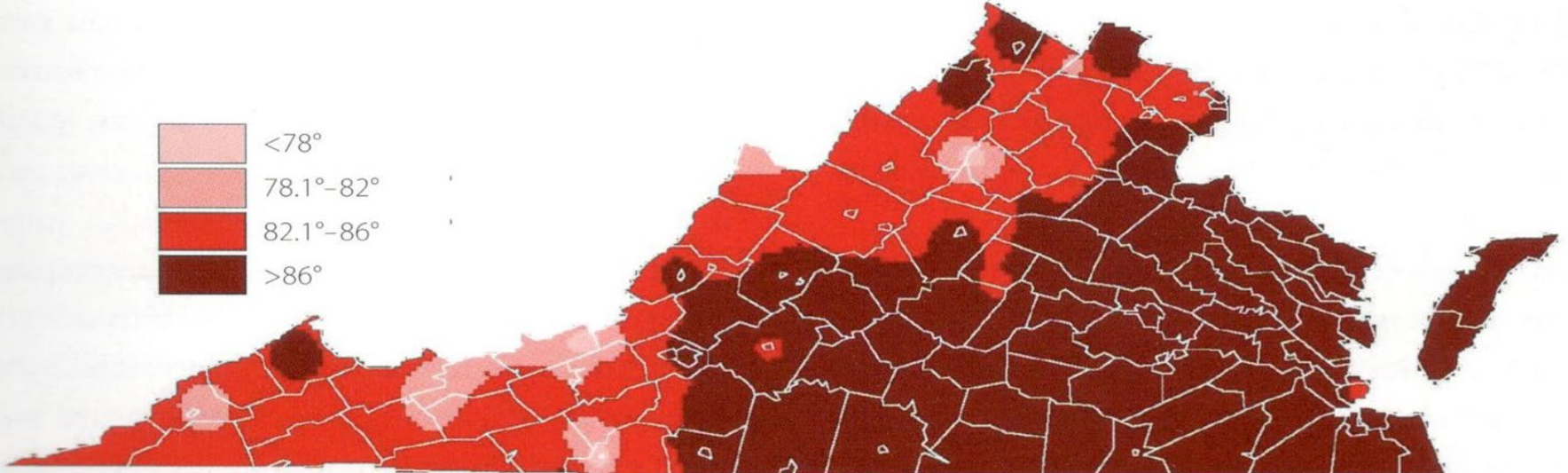
Winter cold hardiness among commercial species

American ssp. > interspecific hybrids > *V. vinifera*

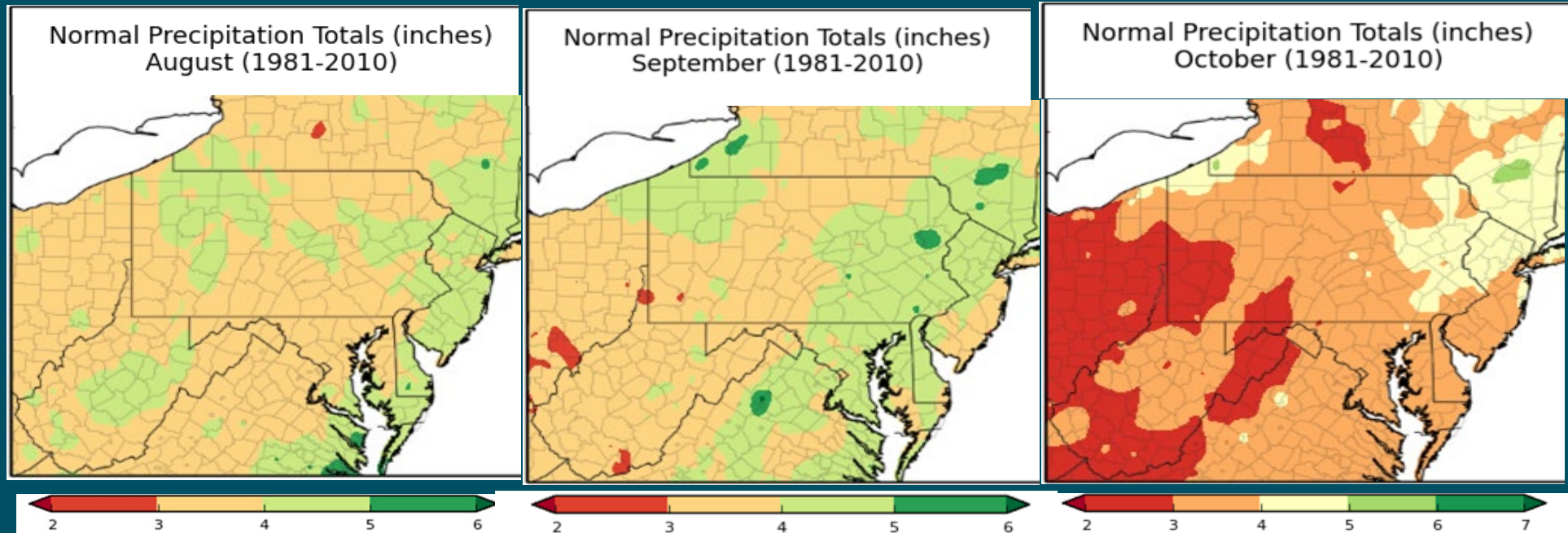


-8°F is a guide for predicting the onset of significant cold injuries in *V. vinifera* varieties grown in Virginia (data based on 15 years of observation).

Temperatures
from July
Through
October

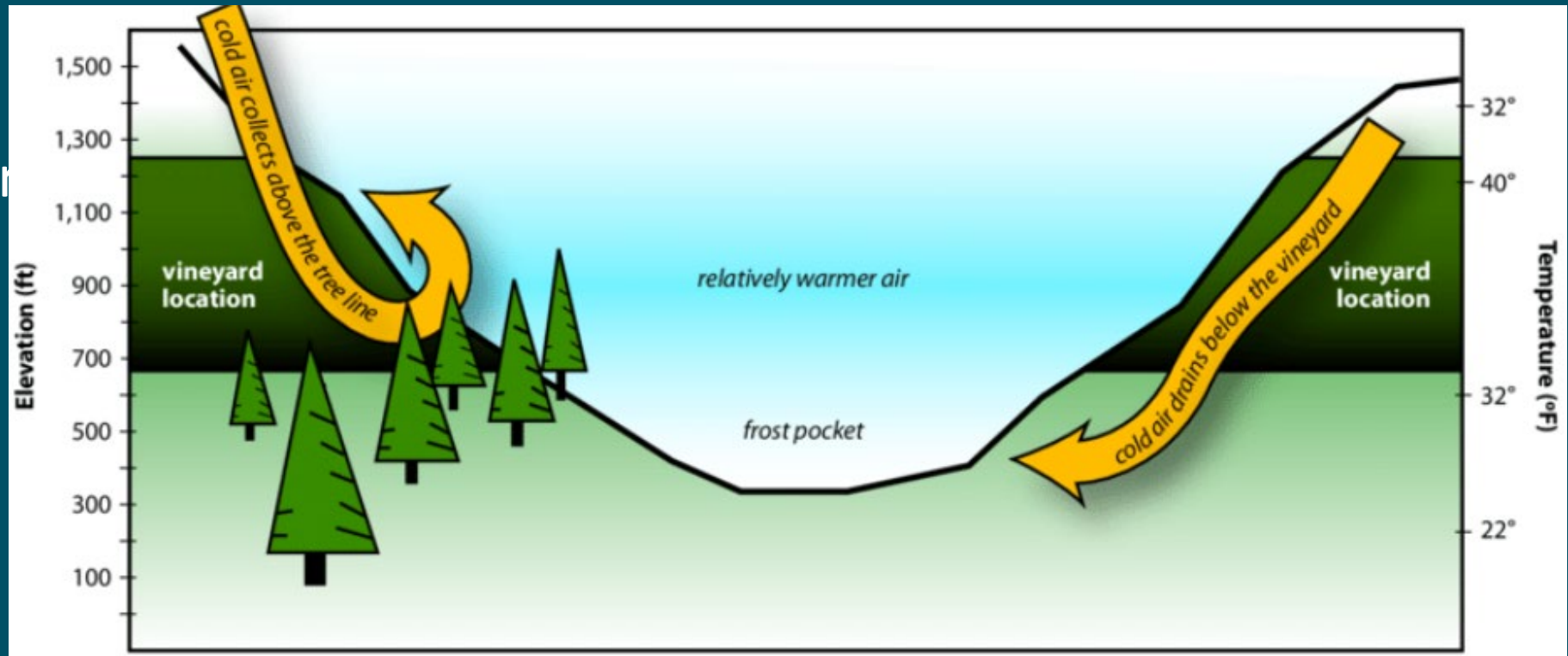


Precipitation



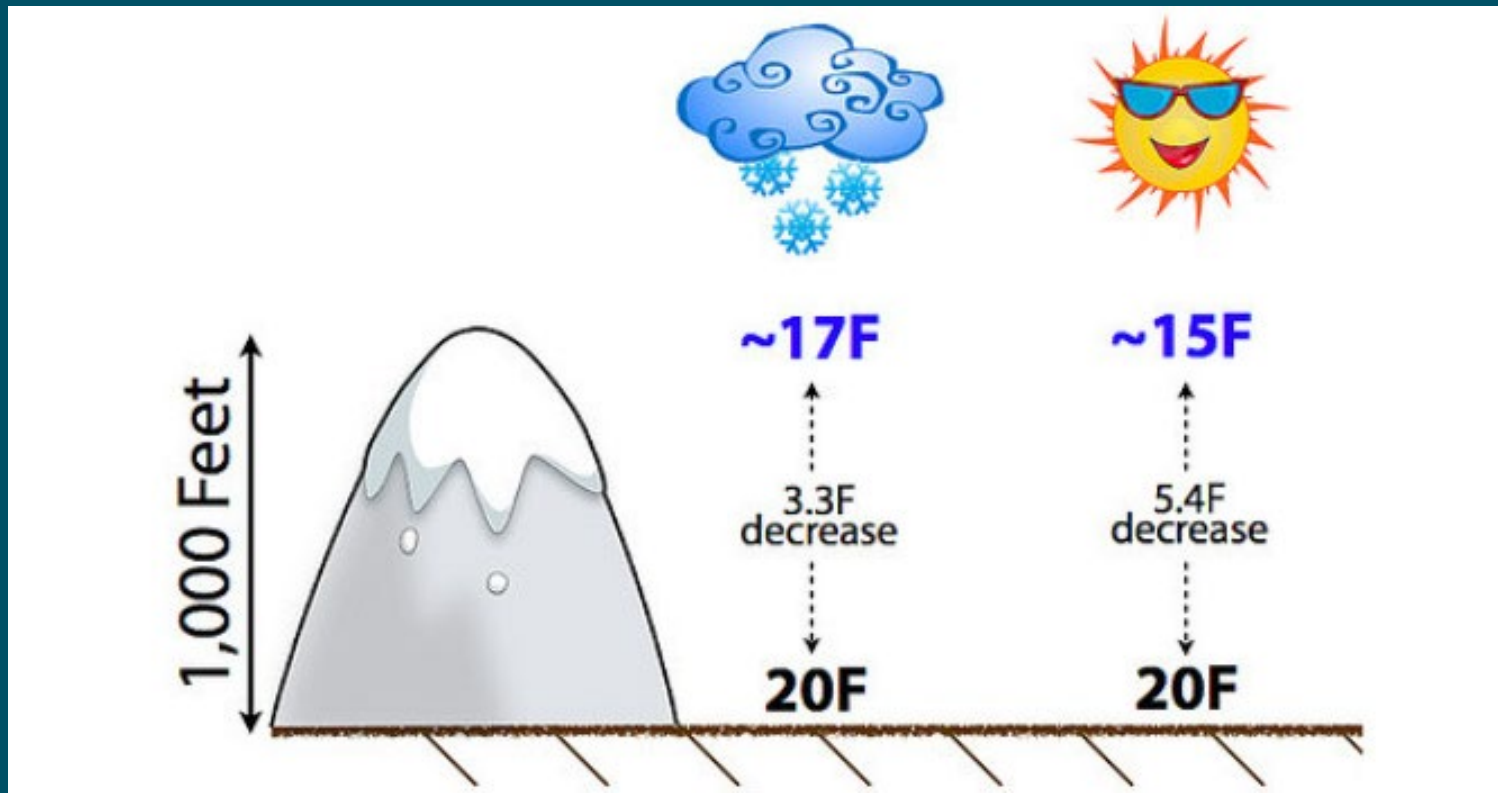
Mesoclimate

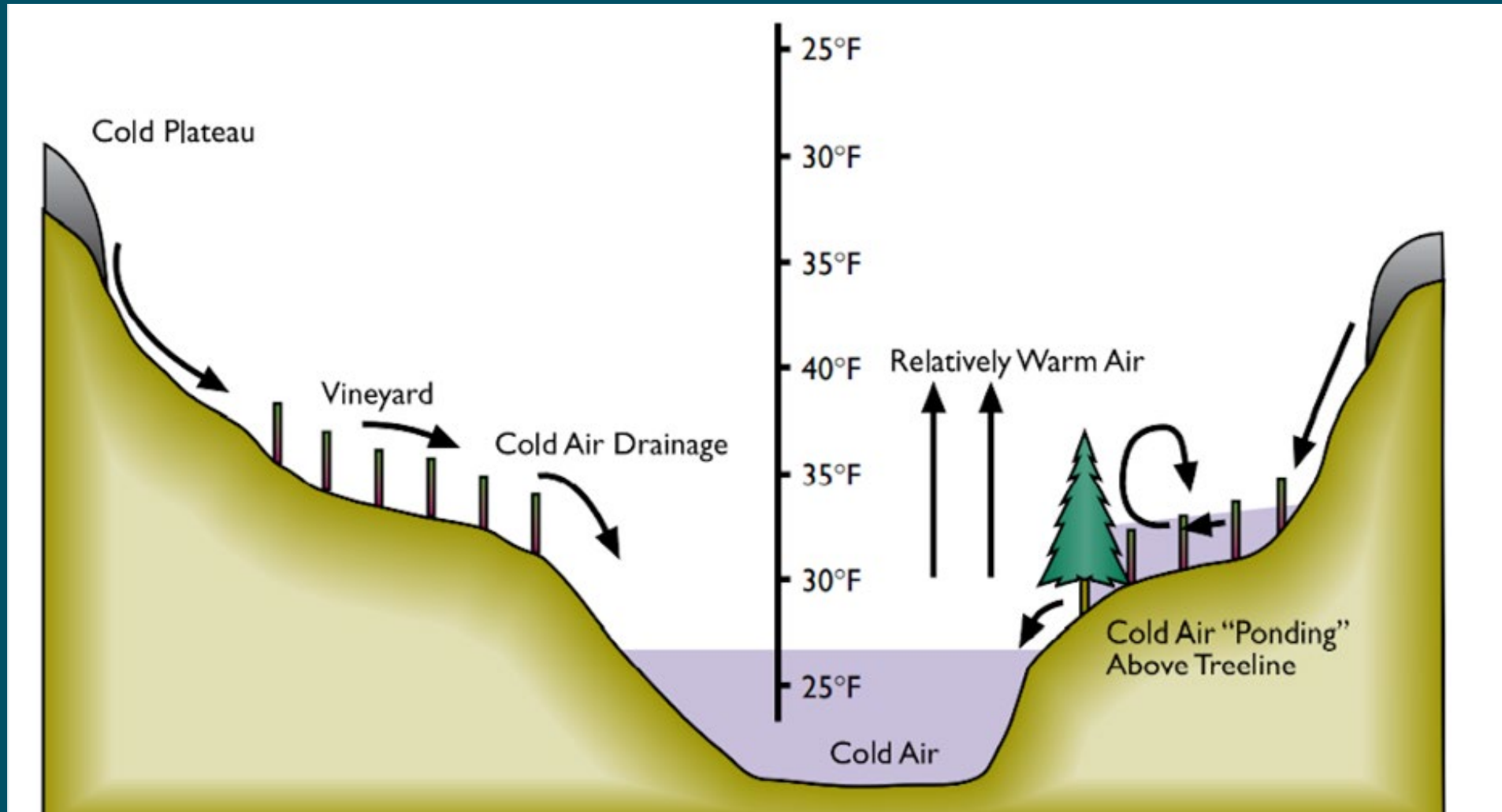
- Altitude
- Land Use
- Topography
- Bodies of Water
- Slope
- Air Movement
- Aspect
- Cloud Cover



Elevation

- Absolute (feet above sea level)
- Relative (to surrounding topography)
- Air temperature decreases with increased elevation
- Environmental lapse rate $\sim 3\text{F}/1000$ feet
- Sets upper limit ($\sim 1800'$ in northern VA) for grapes





Site topography and air temperature during a radiation cooling event



Slope



- Degree of Slope:
 - Rate of air movement
 - Water movement
 - Erosion potential
 - Row orientation
 - Machinery use
- Direction of Slope
 - N, S, E, W
 - Sunlight Reception
 - Total heat balance
 - Prevailing winds



Slope

- Slopes $> 15\%$ *
 - Introduce unique problems but can be used if row orientation is altered.
 - Soil erosion concerns
 - Machinery operation



Aspect

The compass direction that an inclined parcel of land faces, it has an effect on vine phenology and physical parameter

Parameter	Aspect			
	North	South	East	West
Time of bud-break	Retarded	Advanced	Retarded	Advanced
Daily maximum vine temperature	Less	Greater	Less	Greater
Speed of foliage drying in morning	-	-	Advanced	Retarded
Radiant heating of fruit	Less	Greater	Less	Greater
Radiant heating of vines in winter	Less	Greater	Less	Greater
Minimum winter air temperatures	Lower	Higher	-	-
Length of growing season	Shorter	Longer	-	-



Land Use



Biotic Hazard



Microclima



Russian River valley, Lynmar



How to take a soil sample

- Before planting and 4 to 5 years after planting or when a problem is suspected.
- Divide fields into uniform areas: Soil type, slope, crop history, previous lime, fertilizer, manure applications , < 20 acres for a single sample, < 2-3 acres on uneven land.
- Collect 15-20 soil cores per sample Random, zig-zag pattern across the field.
- Sample to a depth of 0 to 8". A second sample, 8 to 16" can also be submitted. Thoroughly mix sub-samples in a clean, plastic container. Submit about a pint of composite sample to testing lab. If soil is wet, air dry.



One Year in Advance Factors to Consider

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 - Amend the soil as needed for pH, P, K, Mg, & Zn
- Choose the varieties
- Order vines



Planning the Vineyard



Choose Varieties and Order Varieties

[Wine Grapes | Virginia Cooperative Extension | Virginia Tech \(vt.edu\)](#)

[Viticulture Extension Resources | Virginia Agricultural Research and Extension Centers | Virginia Tech \(vt.edu\)](#)

[Grape Exchange / Grape and Wine Institute / University of Missouri](#)

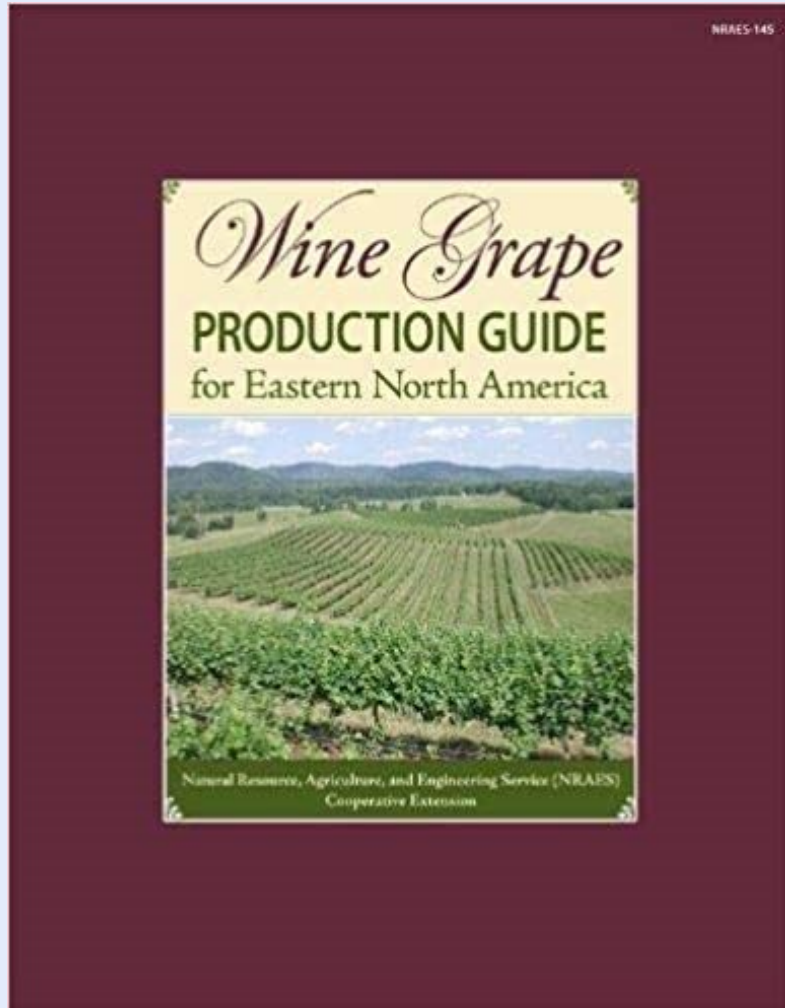


Conclusions

- Site selection should consider the hazards at the macro- as well as meso-scale level.
- Elevation is the most important vineyard feature in the mid-Atlantic region. It impacts length of growing season and frequency of low temperature extremes.
- We attempt to minimize risks.
- Be critical and selective with a potential vineyard site.
- **\$15K- \$20K a.**



Thank you !



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