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Statewide Viticulture Extension

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Macroclimate in New York and Site Suitability

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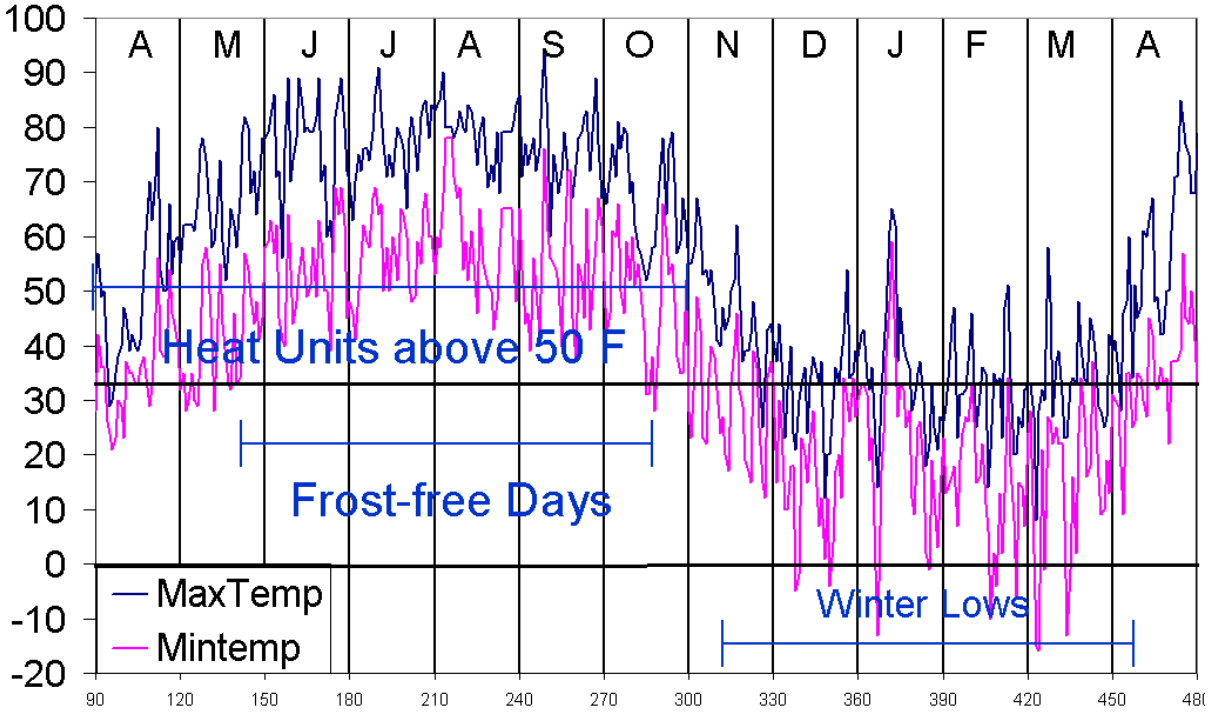
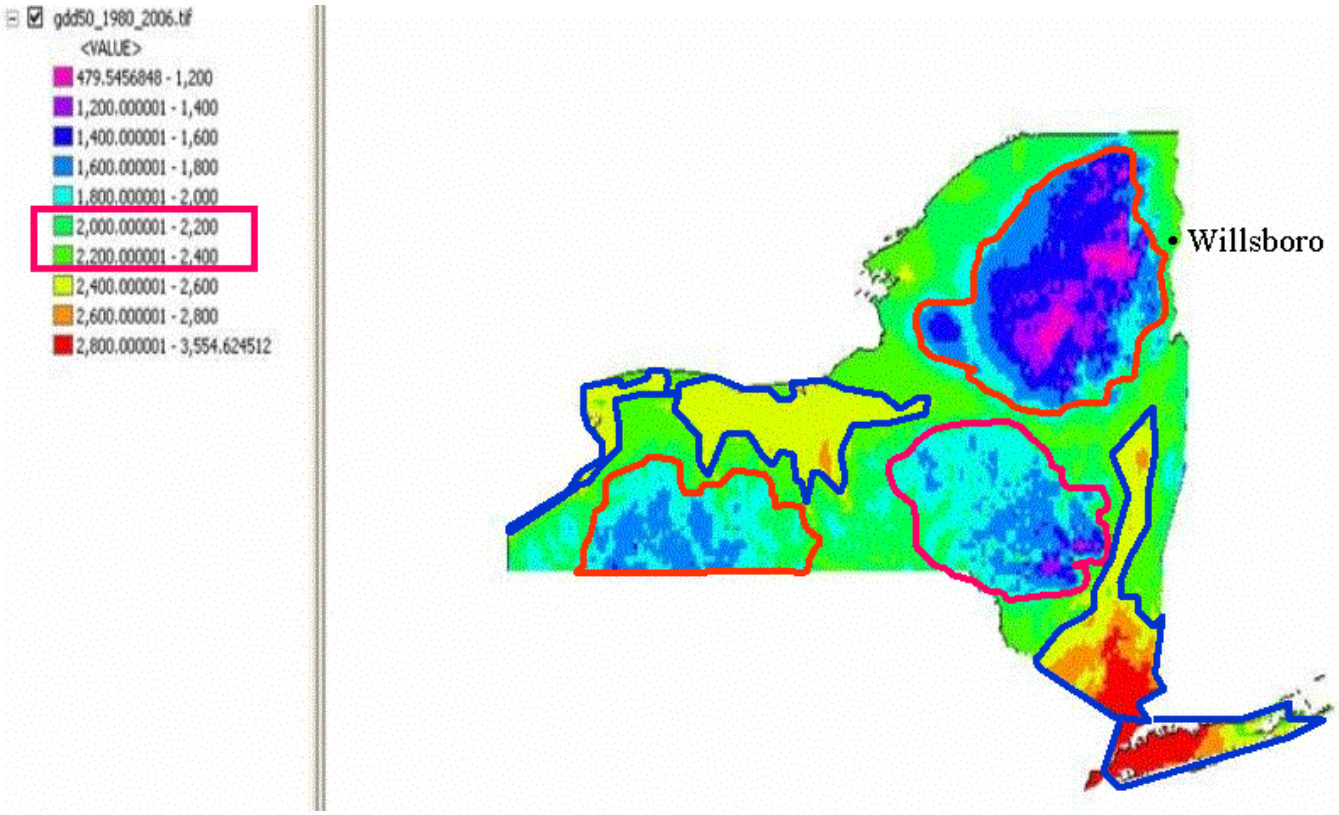
New York's climate determines where grapes can be produced and what varieties can be produced in a given location. Large scale climate pattern is called macroclimate, Here I present maps that show the overall climate patterns in New York state, and illustrate large-scale climate limitations that will determine likelihood of successful grape production.

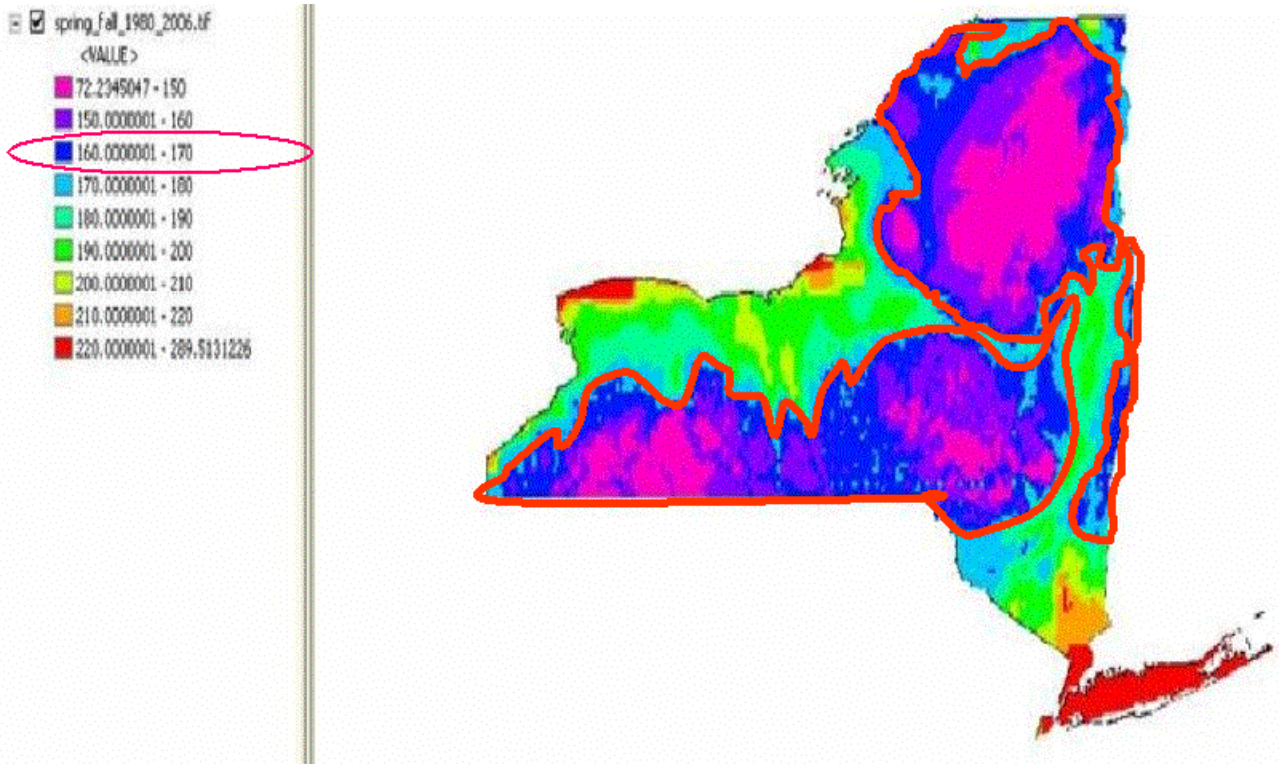
I. **Temperature profiles affecting site suitability:** The graph below shows daily high and low temperatures from April to April in a given year. The three variables illustrated here are number of **Frost-Free days** (days between last 28°F in spring and first 28° F in the fall), **Heat Units** above 50° F (when the daily average number of degrees over 50 is added up from April 1 to October 31, that is the **Cumulative Growing Degree Days.),** and the **Winter Low Temperature** (the lowest temperature of the winter). These three variables are broad indicators of how suitable the macroclimate is for grape production.



II. **Growing Degree Days.** In New York, the number of seasonal growing degree-days varies from less than 1200 to over 3000. A minimum of 1800 GDD is needed for the shortest-season varieties, and GDD of 2400 or more are better for a broad range of varieties. Parts of NY outlined in Red have 1700 growing degree-days or less. The sections outlined in blue have more than 2400 growing degree-days. Most grapes in NY are grown in the zones outlined in blue.

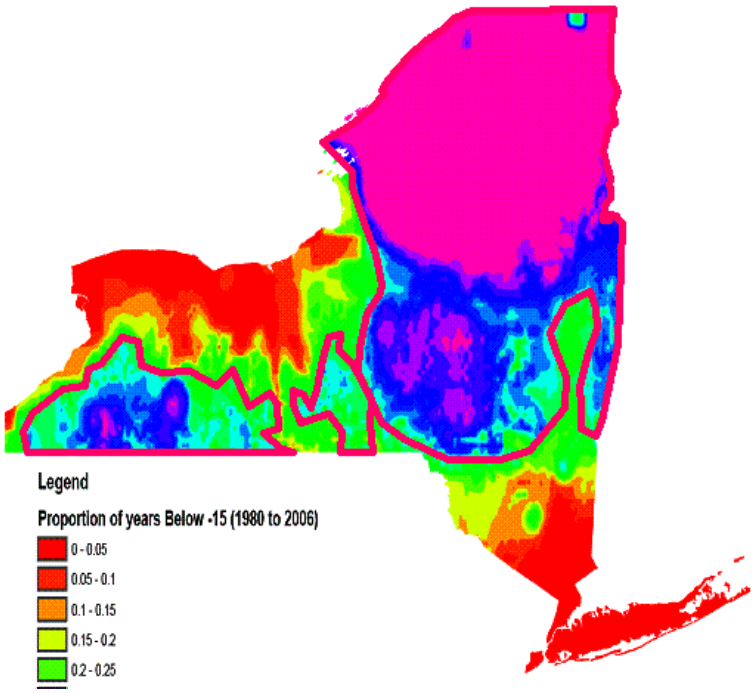


III. Length of Growing Season. Most grapes need 180 frost-free days minimum to ripen. If there are less than 170 frost free days, the season is too short to reliably ripen even short-season grapes.
Areas outlined in red have less than 170 frost-freedays. Suitable microclimates with longer seasons (south facing slopes, mid-slope sites) within these zones may exist.



IV. Winter Low Temperatures. Many grape varieties are sensitive to winter low temperatures, and can suffer winter injury at temperatures below 0° F. Others are hardy down to -15° F, and some cold-climate cultivars survive well at temperatures below -20°F. This map illustrates the probability that temperatures will drop below 15°F. If the expected low temperature drops below -15°F in more than one year in three, then the varieties are limited to hardy hybrids, such as those developed at the University of Minnesota

>35% of years with 1 Winter low Below –15 F



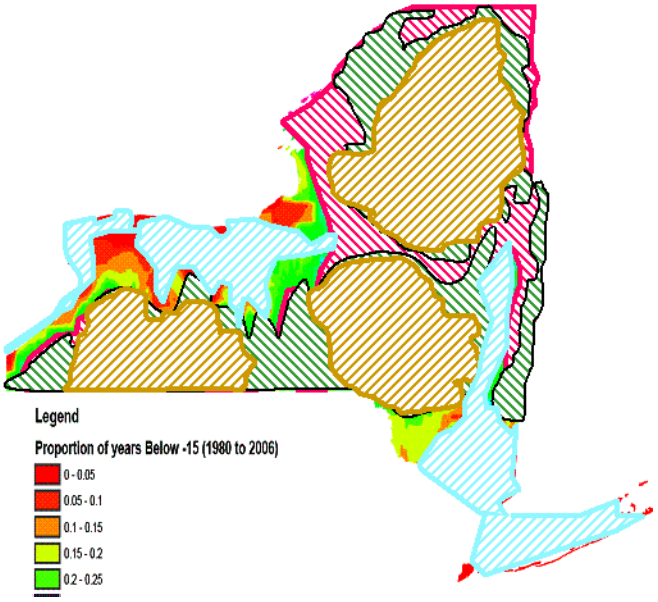
V. Composite Maps. Overlaying the winter low, frost free days, and low (brown) or higher (light blue) growing degree-days map provides an overall picture of where the best areas for growing grapes are (blue hatching) and where the climate limitations are most severe (Allegheny region in SW NY; Catskills; Adirondacks). Most cold-tender grapes (hybrids and V. vinifera) are grown within the blue regions. Additional areas (bottom map) highlighted in black may be suitable (long enough growing season) for more hardy grape varieties such as the University of Minnesota cultivars.

>35% of years with 1 Winter low Below –15F

<160 Frost-Free Days

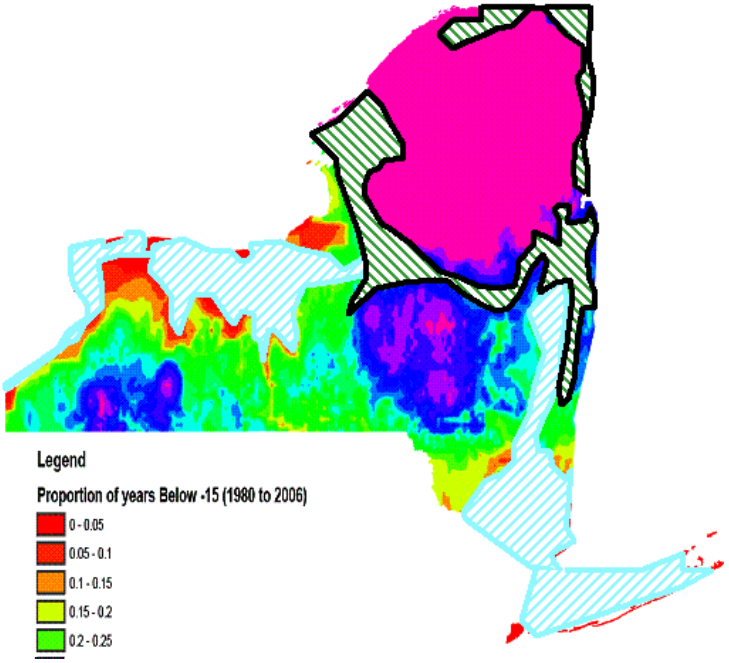
<1900 Growing-Degree Days

>2400 Growing-Degree Days



Minnesota Hybrids and Labrusca

Labrusca, Hybrids, Vinifera (within limits)



VI. Conclusion. These maps, part of the online NY Vineyard Site Evaluation website, provide a broad general guide to areas most likely to have the minimum climate requirements (heat units, frost free days, winter low temperatures) necessary to successfully grow and consistently ripen grapes. Not surprisingly, the areas with the most favorable climates (Lake Erie, Finger Lakes, Long Island, and Hudson Valley) are those where grapes are currently produced in New York. These are also areas adjacent to large or deep bodies of water that moderate winter low temperatures. Higher elevation areas in the Catskills, Adirondacks, and Catskills are less suitable, although specific sites (mid-slope, south facing, good air drainage) may have more favorable mesoclimates (local conditions).