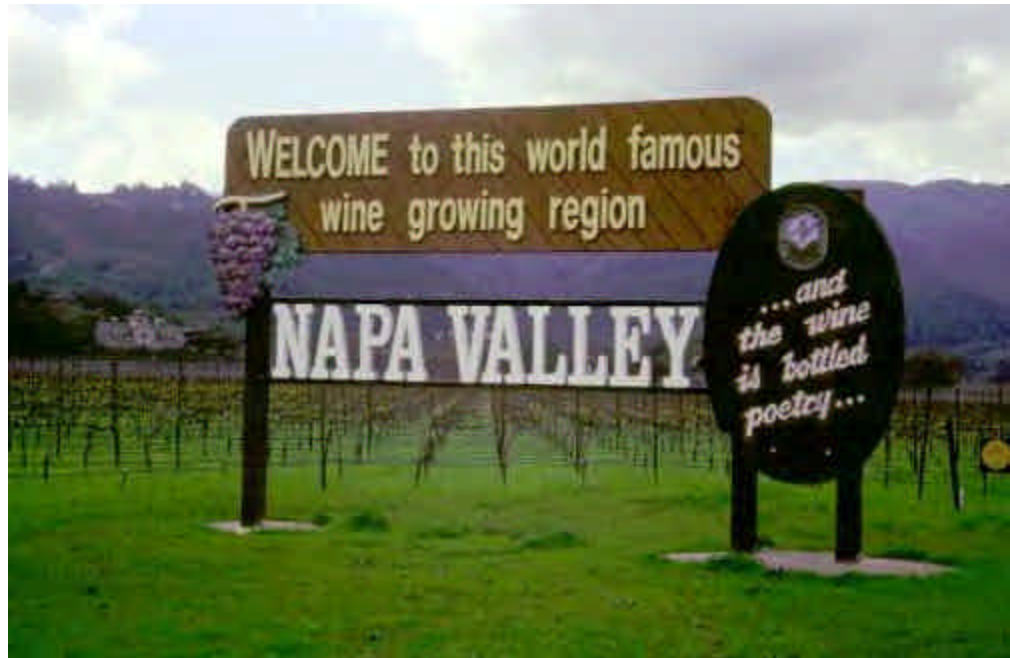


VINTAGE

(Viticultural
Integration of NASA
Technologies for
Assessment of the
Grapevine
Environment)

[Earth Science Division](#),
NASA Ames Research
Center



[Institute of Earth Systems Science and Policy](#), California State University, Monterey Bay

[Numerical Terradynamic Simulation Group](#), University of Montana

The goal of this project is to adapt and promote NASA-developed scientific methods and technologies as tools for site-specific and regional crop stress management, using the premium wine industry as a testbed.

Winegrowers worldwide have recognized for centuries that grapes harvested from different areas of the vineyard can produce wines with unique flavors. Even under constant variety and rootstock, the feel, bouquet, color, body and overall wine quality is influenced by differing physical factors within vineyard: vineyard: microclimate, slope, aspect, soil type and water-holding capacity. In pursuit of final wine quality, winegrowers generally strive to produce and combine grapes of similar biochemical characteristics and ripeness into uniform wine "lots." Also generally speaking, inducement of moderate water stress in the vineyard tends to enhance ultimate wine quality.

Objectives are to develop remote sensing as a tool for field segmentation and optimization of grape harvest, and to adapt and validate an ecosystem model as an additional tool for irrigation management. The project builds on results of [CRUSH](#), a 1997 pilot-project that used remote sensing to map crop vigor in Napa Valley vineyards. Results suggested that remote sensing technology can improve harvest planning with respect to crop and wine-lot uniformity, and positively affect final wine quality. The [Regional Hydro-Ecological Simulation System](#) is used to model water flux and biogeochemical cycling in terrestrial ecosystems. Salient characteristics of RHESSys include: 1) uses remotely sensed input, 2) accounts for topographic controls on hydrology and microclimate, 3) operates at multiple spatial scales, 4) computes complete water (evapotranspiration) budget at daily timestep across the landscape, and 5) has been successfully validated in various natural ecosystems. Project impacts are expected to include 1)

development of improved tools for viticultural (and agricultural) management, 2) increased demand for commercial remote sensing services, 3) increased popular demand for NASA's satellite-based imagery.

Collaborators include the [Robert Mondavi Winery](#) (Oakville, CA), [Vestra Resources, Inc.](#) (Redding, CA) and the not-for-profit [Bay Area Shared Information Consortium](#) (San Jose, CA).

VINTAGE is sponsored by the Applications and Outreach Division of NASA's [Office of Earth Science](#) and is part of NASA's [FFARS Program](#) (Food and Fiber Application of Remote Sensing).

Click [here](#) to view and interact with remote sensing based products for a 500 acre vineyard located in the Carneros region of Napa County!

Research articles (downloads require Adobe Acrobat Reader):

Indirect measurement of leaf area index in California North Coast vineyards, *HortScience* (submitted)

Mapping vineyard leaf area with multispectral satellite imagery, *Computers and Electronics in Agriculture*, **accepted** 2002 [240k] [download pdf](#)

Vineyard canopy density mapping with IKONOS satellite imagery, 2001 Int'l Conf. Geospatial Technologies in Agriculture and Forestry [225k] [download pdf](#)

Toward the improved use of remote sensing and process modeling in California's premium wine industry, 2000 Int'l Geoscience & Remote Sensing Symp. [20k] [download pdf](#)

Remote sensing of vineyard management zones: Implications for wine quality, *Applied Engineering in Agriculture* 17:557-560, 2001 [70k] [download pdf](#)

Adding science to intuition: Application of remote sensing and ecosystem modelling to vineyard management, *Aust. Grapegrower*, 2001 Tech Issue [1.5M] [download pdf](#)

The application of Earth science findings to the practical problems of growing winegrapes, *Geographic Information Sciences* 6:181-187, 2000 [125k] [download pdf](#)

Further information:

Click [here](#) to link to information on the 1993-1995 phylloxera infestation (GRAPES) project. Also see:

Airborne imaging aids vineyard canopy evaluation, *California Agriculture* 50/4:14-18, 1996 [100k] [download pdf](#)

GRAPES Remote Sensing Analysis Summary, NASA Technical Memorandum #112218, 1997 [270k] [download pdf](#)

Response of Grape Leaf Spectra to Phylloxera Infestation, NASA Report #CR-208765, 1999 [40k] [download pdf](#)

Leaf color and vine size are related to yield in a phylloxera-infested vineyard, *Vitis* 35:201-205, 1996.

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