Steering Committee Meeting

September 29th, 2016

Past, Present, and Future Tree Canopy Conditions in San Mateo County

- Analysis of the Impacts of Development and Climate Change

Prepared by:

Joe LaClair & Ryan Warmboe

San Mateo County Planning and Building Department

Project Goal

Amend the County's significant and heritage tree removal ordinances, and the Resource Management and Planned Agricultural District zoning ordinances to improve management of individual trees and the tree canopy in the County, and to improve tree removal and trimming permit process, consistent with the County's General Plan.

Steering Committee Goal

Collaborate with County staff by providing input and guidance that helps shape amendments to the County's ordinances governing tree protection and removal, in a manner consistent with the County's General Plan.

Project Objectives

- Implement General Plan policies: (1) conserve, enhance and protect vegetative… and wildlife resources through appropriate regulation of development and control of incompatible vegetation, (2) protect and enhance the natural visual quality of the County; and (3) minimize the removal of trees and vegetation
- Characterize the environmental, economic and aesthetic benefits of tree canopy and individual trees

Project Objectives

- Determine whether there are geographic, ecological or cultural characteristics of trees or tree canopy in the County that warrant different policies for effective management
- Review and improve tree protection requirements for construction and demolition to ensure remaining trees survive and thrive
- Develop flexible, adaptable and appropriate mitigation requirements that sustain and enhance trees and tree canopy

Project Objectives

- Enhance compliance and enforcement
- Facilitate habitat restoration by allowing removal of trees necessary to achieve the ecological goals of an approved restoration project
- Maintain and enhance solar access for energy generation
- Reconcile the amended tree ordinance with other County zoning ordinances

Project Objectives

- Reconcile and integrate with Public Works and Parks Department's plans and policies for tree and canopy management in County parklands, streets and roads
- Create an over the counter permit for certain tree removals
- Develop new tree replacement lists that advance the County's sustainability in light of climate change, and environmental, economic and aesthetic goals

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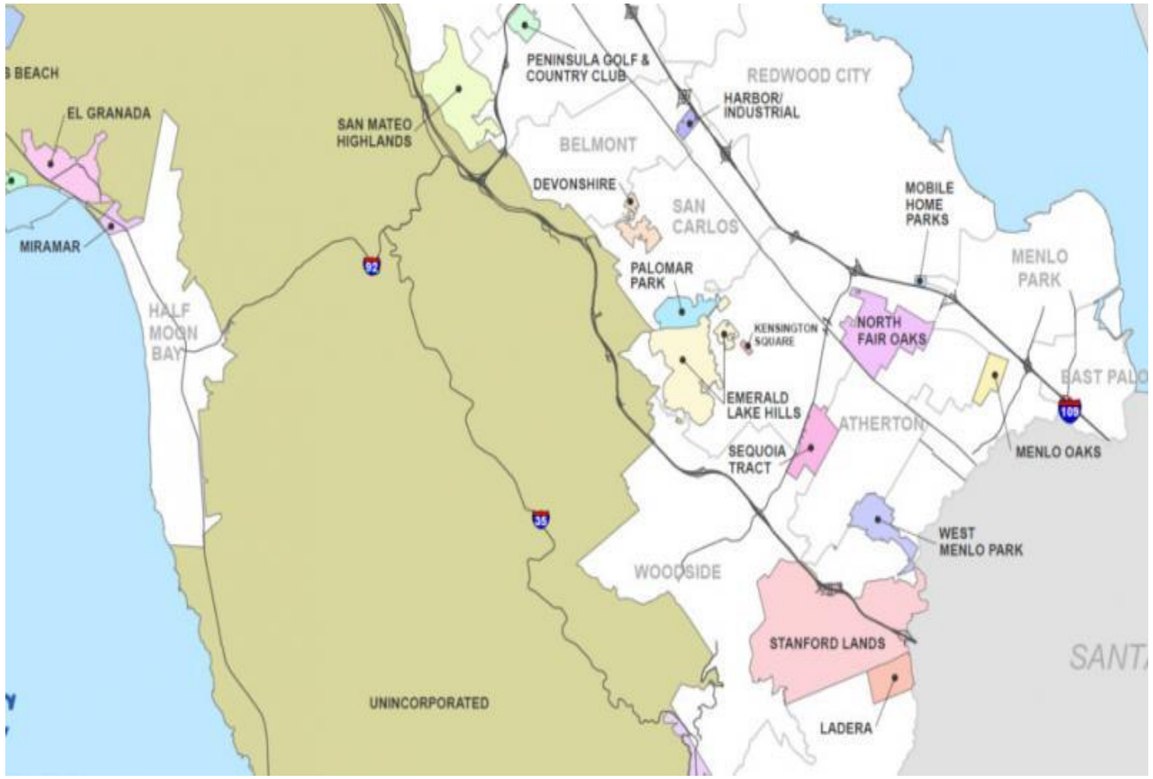
Purpose

- Common understanding
- Characterize changes in tree canopy over time
- Better understand effects of development and climate change
- Inform tree management policies in unincorporated communities



Assumptions

- Tree canopy is a valuable natural resource that must be actively managed and protected
- Construction of residential, commercial, and industrial developments has significantly modified San Mateo County's tree canopy
- Climate change has already caused increased temperatures and modified precipitation patterns
- Climate models project a shift towards more extreme conditions in the future

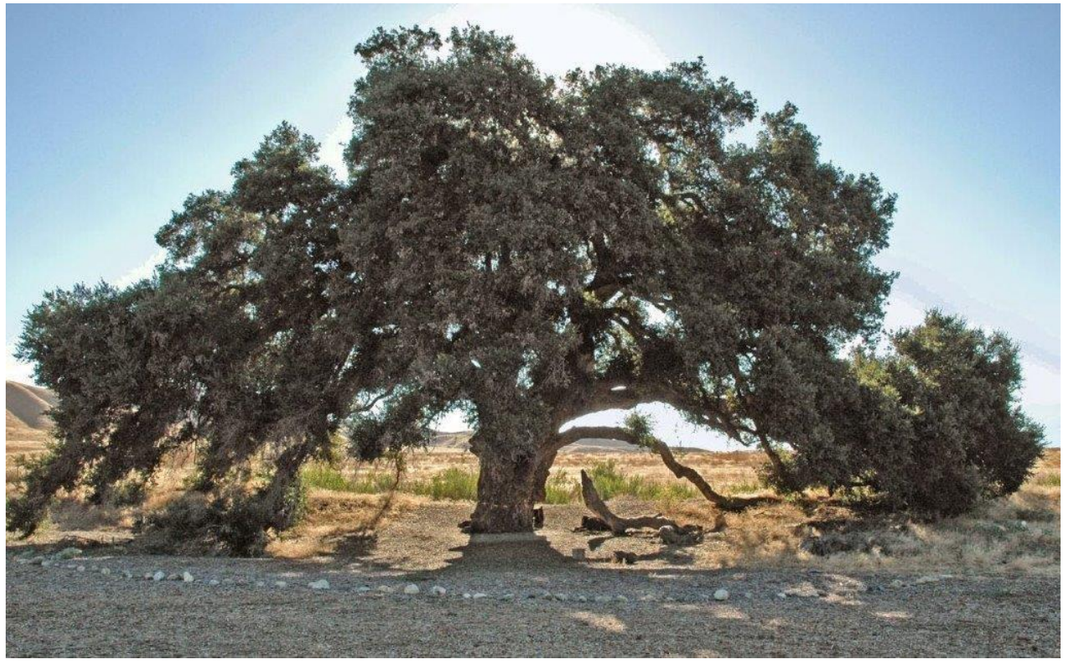
Influences of Change

The natural tree canopy in any area is constantly changing, with degrees of elasticity and vulnerability one would expect from living things. Over time, trees establish patterns of growth that are directly influenced by climatic, geological, hydrological, and biotic activities around them.

Photo: Jesus Monroy Jr

Why Do We Protect Trees?

- Tree canopy contributes to a wide range of ecosystem services
  - Oxygen production
  - Carbon sequestration
  - Lower temperature
  - Wildlife habitat
  - Organic matter for soil
  - Noise barrier
  - Aesthetics and Economic Values



Coast Live Oak

Pre-Settlement Conditions and Management

- Prior to European settlement, six native plant communities dominated the landscape:
  - Mixed conifer/montane hardwood forest
  - Perennial grassland
  - Oak savannah
  - Oak woodland
  - Chaparral
  - Coastal scrub

Looking east from intersection of 92 and 35

- Naturally distributed according to:
  - Movement of surface water
  - Gradients in slope
  - Soil characteristics
  - Precipitation
  - Temperature
  - Elevation
  - Human Management

Early Land Management

- The landscape was managed by native Californians
- They used controlled burns to shape the plant communities that thrived here
- They burned forest understory to encourage greater hazelnut yields
- They managed areas for different successional qualities to exploit different resources
- Spanish settlers forbade the use of fire as a management tool,

Photo from flickr

Past Conditions - Sources

Photo from UCSC Archive – Devonshire to the Bay mudflats

- USDA 1956 and 1943 DDB prints
- Oblique Hatfield prints from the early 1950's
- Wieslander Vegetation Type Mapping project maps and photos from the early 1930's
- Books, Journal Articles and Agency Reports

Past Conditions

Photo from flickr

Photo from ecolibrary

- Northern coastside almost completely devoid of native tree canopy
- Marine terraces and sand dunes from Miramar to Olympic Country Club were naturally covered in perennial grasses, coastal scrub, maritime scrub, or pioneer dune plant communities
- Trees concentrated along creek channels

Past Conditions

El Granada 1956

Photo from Planning Department Archive – El Granada and Miramar

Pilarcitos Lake 1934…

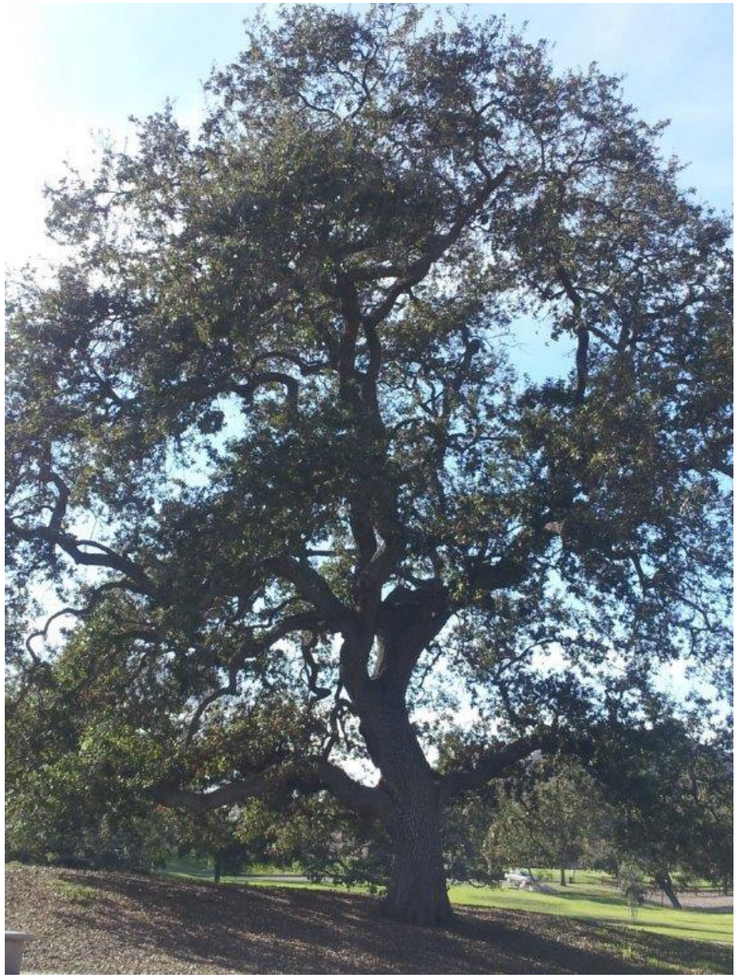
Photo from Wieslander VTM project – Pilarcitos Lake

Past Conditions

Photo from flickr

- Southern coastside had significantly more canopy cover, due to watershed size and elevation
- Pescadero and San Gregorio watersheds drain extensive sections of the Santa Cruz Mountains, where mixed redwood forest became very dense
- Logging for lumber and shakes from 1850 to 1880 mostly eliminated old growth forest

Past Conditions



Valley Oak

Photo from Wikipedia

- Southern bayside communities, of Menlo Oaks, Ladera, Devonshire, Burlingame Hills, and portions of Emerald Lake Hills supported vigorous native oak habitats in San Mateo County
- Bayside Creeks, such as San Francisquito and Redwood Creeks, formed large alluvial plains over time
- Alluvial plains contain rich soils necessary for oak woodlands to thrive
- Oak savannah, perennial grassland, and wetland habitats were also prevalent in this area

Past Conditions

- Ground and surface water resources were intensively developed in order to sustain population and economic growth
- Irrigation infrastructure was built to establish vast orchards on the alluvial plains of the bayside, as well as agriculture up and down the peninsula

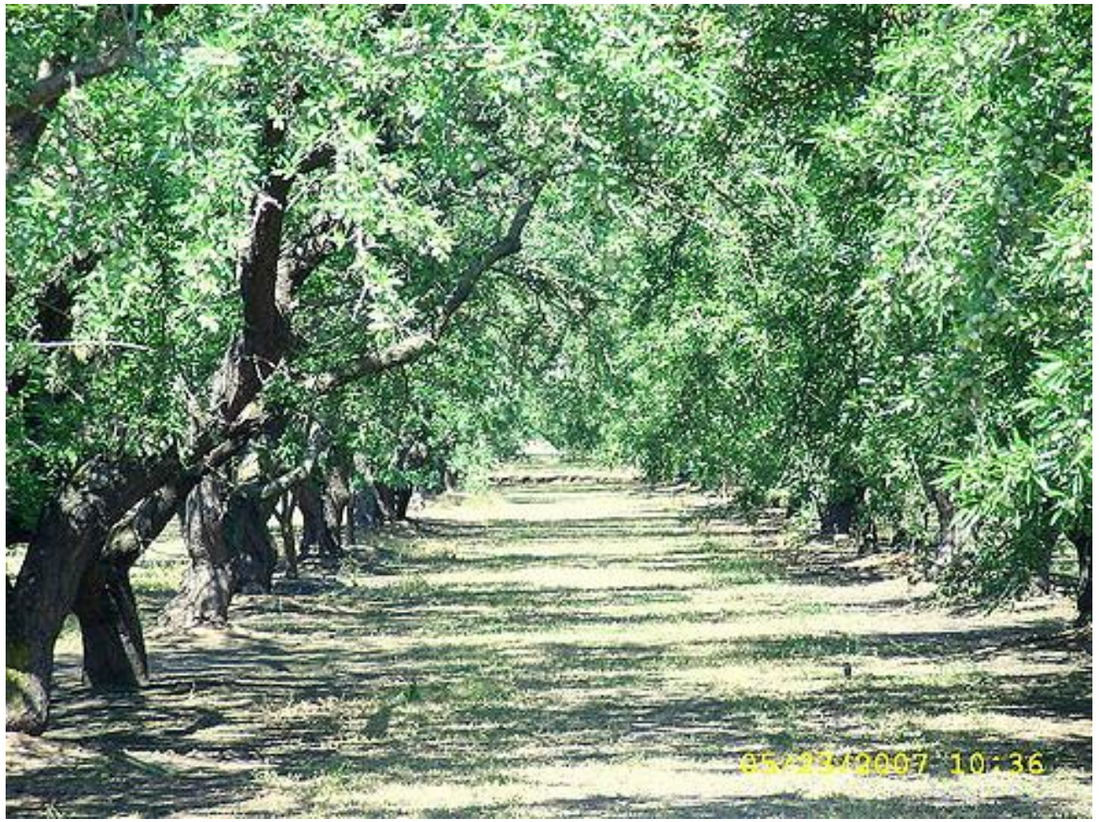
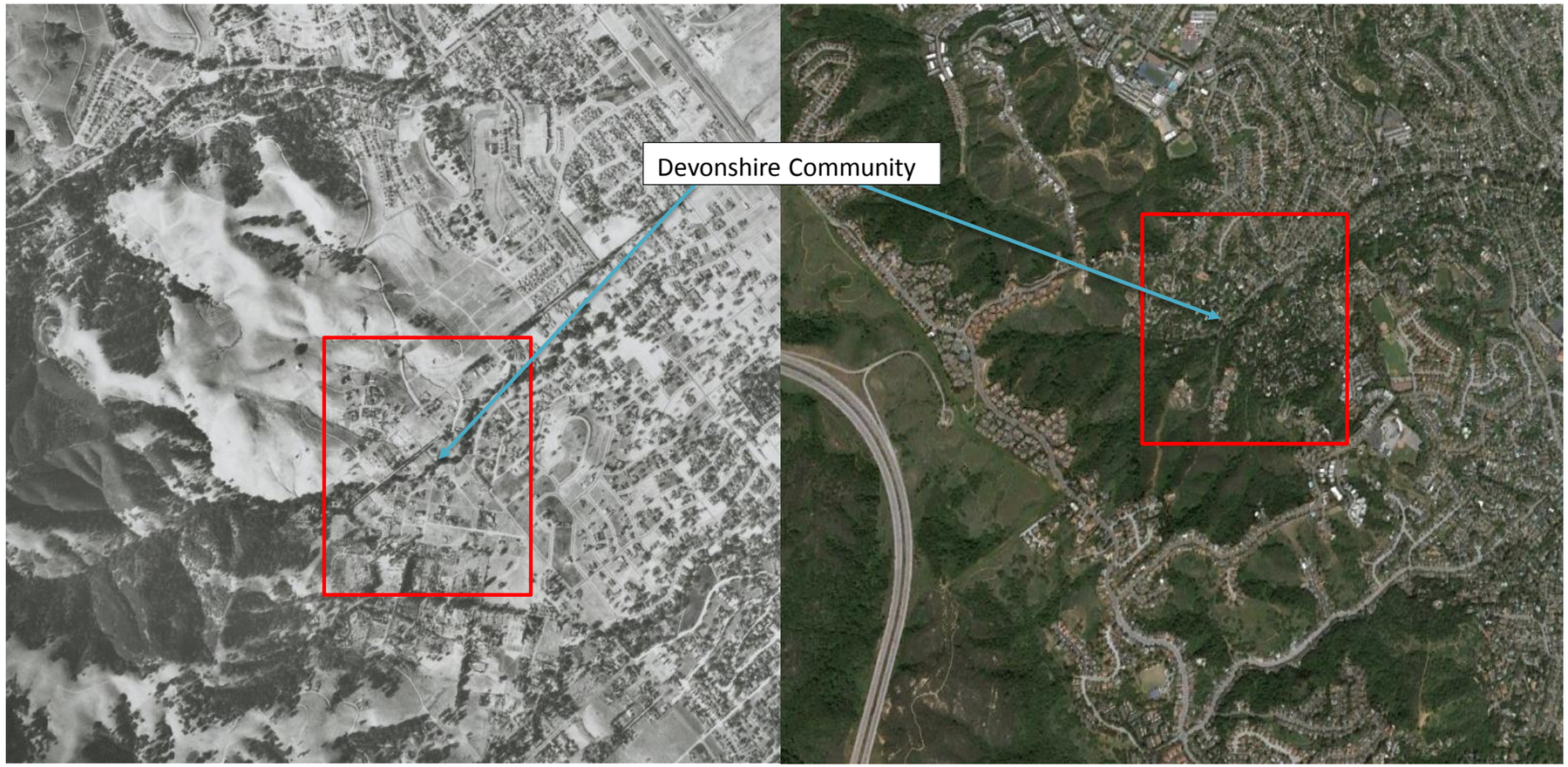


Photo from flickr

Past Conditions

More Historic Aerial Photographs…

1943



2016

Comparison of historic and modern images of Devonshire community and surrounding area

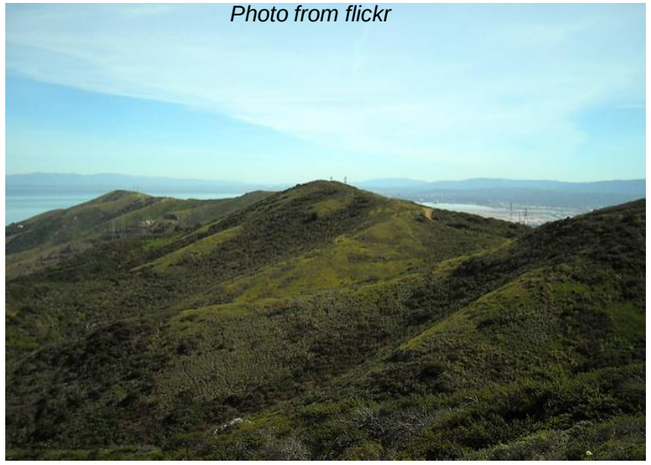
Past Conditions

The developers of the Mills Estate demolished the mansion and stripped the hills of all vegetation. *Image courtesy: Millbrae Historical Society*

Photos from Peninsula Royalty: Founding Families of Burlingame - Hillsborough

An aerial view of the Mills Mansion surrounded by trees in 1953. *Image courtesy: Millbrae Historical Society*

Photo from flickr



- Northern bayside region vegetative communities varied:
- Oak woodland and chaparral in the San Mateo Highlands and Burlingame Hills areas
- Grassland and oak savannah in the San Bruno area
- Riparian corridors supported trees


3-27-56
DDB-2R-6C
San Mateo Highlands


9-56
DDB-3R-106
North Fair Oaks
Menlo Oaks

Current Conditions

Development, land management changes, irrigation, invasive species encroachment and other forces significantly altered habitats:

- Native grasslands diminished by elimination of fire management, introduction of European non-native, annual grasses and development
- Oak woodlands and chaparral -- diminished and made sparser as a result of development
- Oak woodland evolved to oak savannah in some places because of the reduced water availability in areas like West Menlo Park and North Fair Oaks

Photo from flickr

Photo from Wikipedia

Current Conditions

- Coastal scrub habitats are still plentiful and have even spread into areas that once sustained chaparral or forest, though many have been planted with Australian eucalyptus

- A few small groves of old growth forest remaining in San Mateo County, but most of the mountainous area is now covered in second and third growth forest

- Monterey Cypress, Eucalyptus, Monterey Pine and other non-native trees were extensively planted in coastal areas

Photo from flickr

Current Conditions

- Many Bayside neighborhoods include many exotic tree species in addition to remaining native trees.
- Irrigation has enabled a wider variety of trees to flourish in the Bay Area
- Exotic species from five continents and other parts of the US are widely dispersed

Photos from flickr

Current Conditions

- Exotic trees are often planted in spots that will require heavy watering to sustain them and the benefits from their canopy
- In some cases, landscape irrigation water kills endemic trees that did not evolve in constantly damp soils
-

Photo from flickr


Portola Valley


Menlo Oaks


Emerald Lake Hills

Observed Climate Change

Climate change effects are already apparent:

- Five-year drought in California has caused significant damage to vegetation resources
  - Less available water content in soil
  - Increased evapotranspiration
  - Increased overdrafts of groundwater
  - Less surface water from snow melt in the Sierras
  - Increasing Temperatures Year over Year

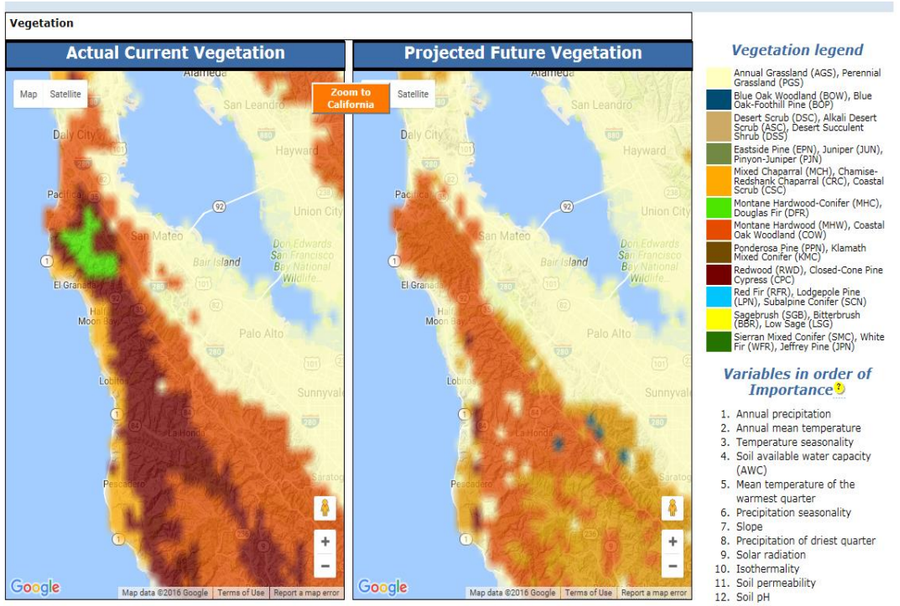
Photo from dairishare.blogspot.com

San Mateo County meets 90% of water demand with imported surface water

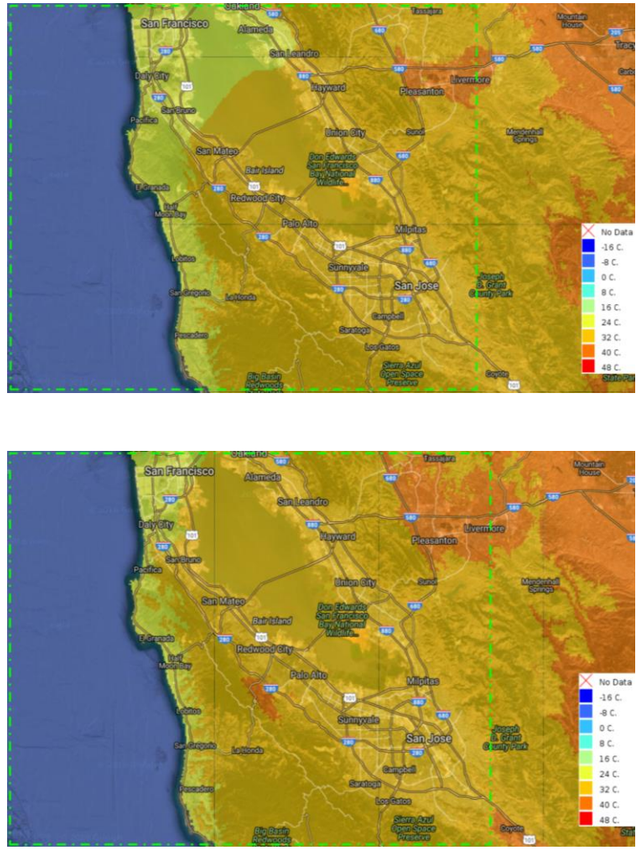
Future Climate Change

Projected Climate change effects :

- Increased Temperature
- Climatic Water Deficit
- Changing Precipitation
- Greater Variability and Increasing Extremes
- More Oaks, Grasslands, Coastal Scrub, and Fewer Redwoods
- Water Efficient Landscape Ordinance



Source: Point Blue



Woodside area and Portola Valley

Opportunities and Challenges

Opportunities

- Watershed Management
- Greater Use of Native and Drought Tolerant Plants
- Green Infrastructure
- Environmental Services from Trees = More Planting

Challenges

- Diseases and Pests (Phytophthora, Beetles, etc.)
- Uncertain Climate Future (Decreasing soil moisture, extreme heat/storms, Air Quality)
- Decreasing Landscape Irrigation Water

Thank you.

For more information about this project, please contact:

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