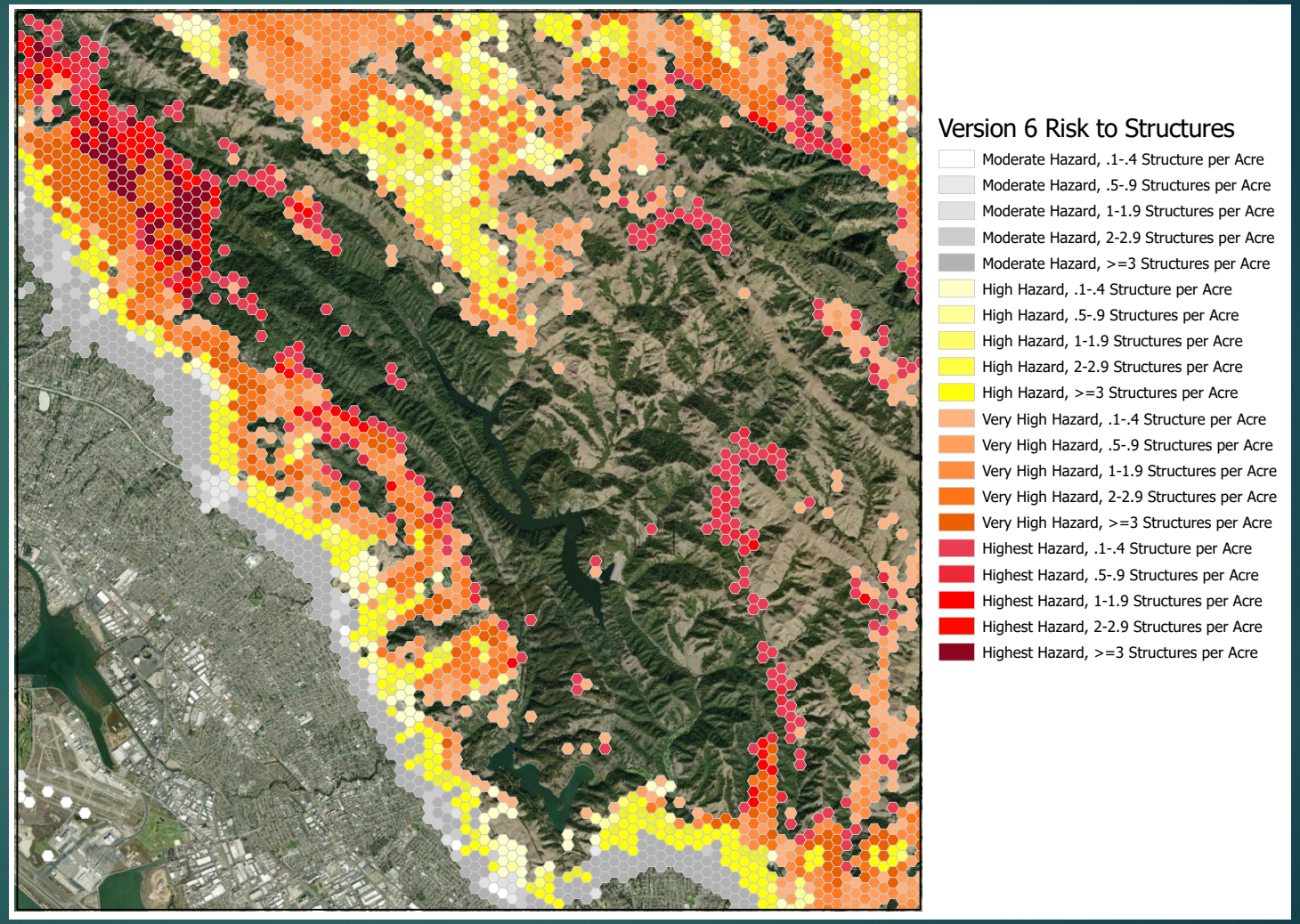
Data to Support East Bay Wildfire Prevention Planning

Wildfire Risk to Structures,
Alameda and
Contra Costa Counties



CAL FIRE

East Bay Regional Park District

EBWC MEETING – OCTOBER 21, 2024

MARK TUKMAN, TUKMAN GEOSPATIAL

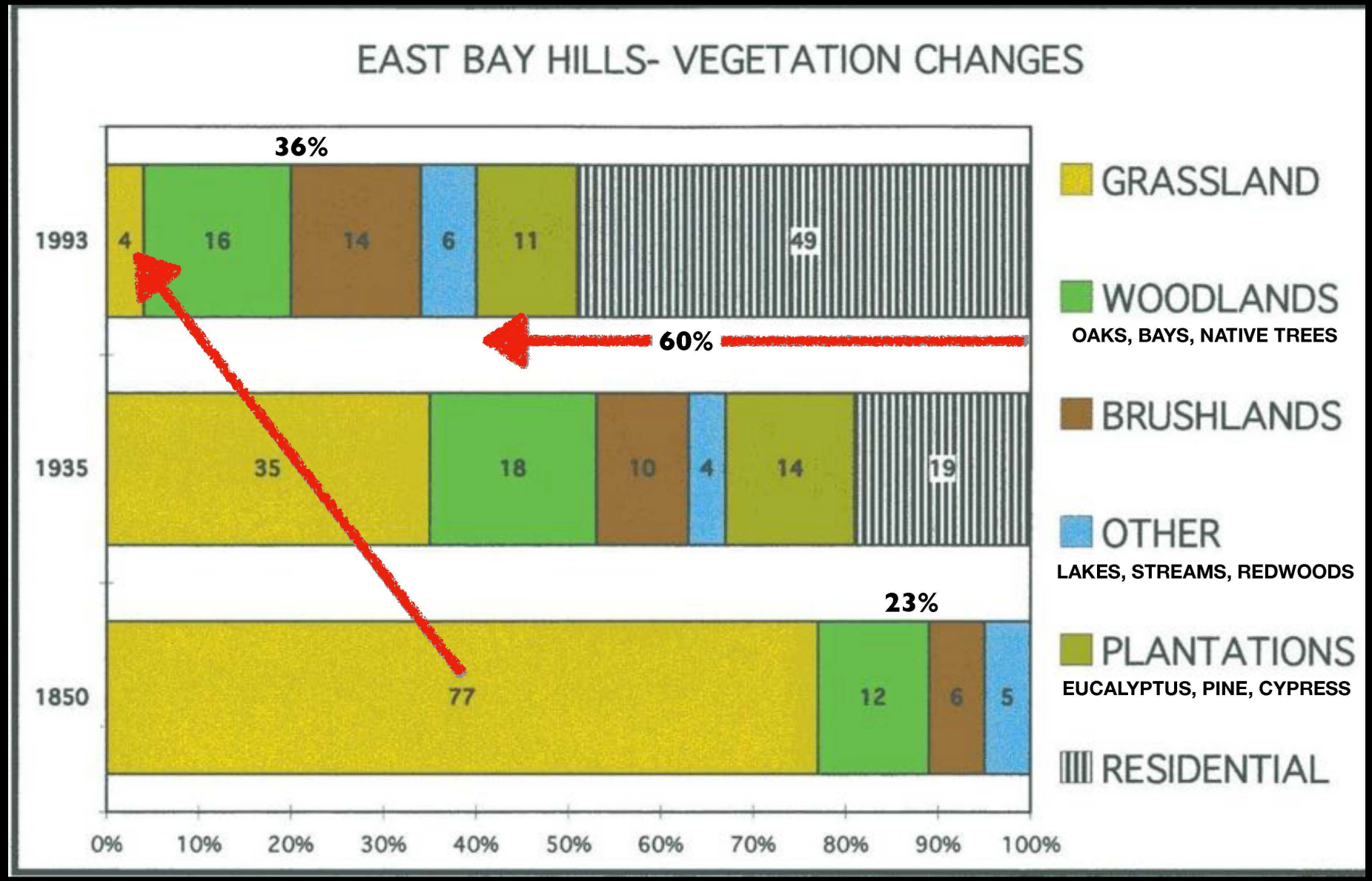
Agenda

- East Bay Fuels and Fire History (Real Quick!)
- What can we do to mitigate catastrophic wildfire?
- New datasets to help with fuel reduction planning in Contra Costa and Alameda Counties
  - Wildfire Hazard and Risk Data
  - New Vegetation, Impervious Surfaces, and Fuels Data
  - Wildfire Fuel Mapper for Parcel Level Mapping

East Bay Fuels and Fire History

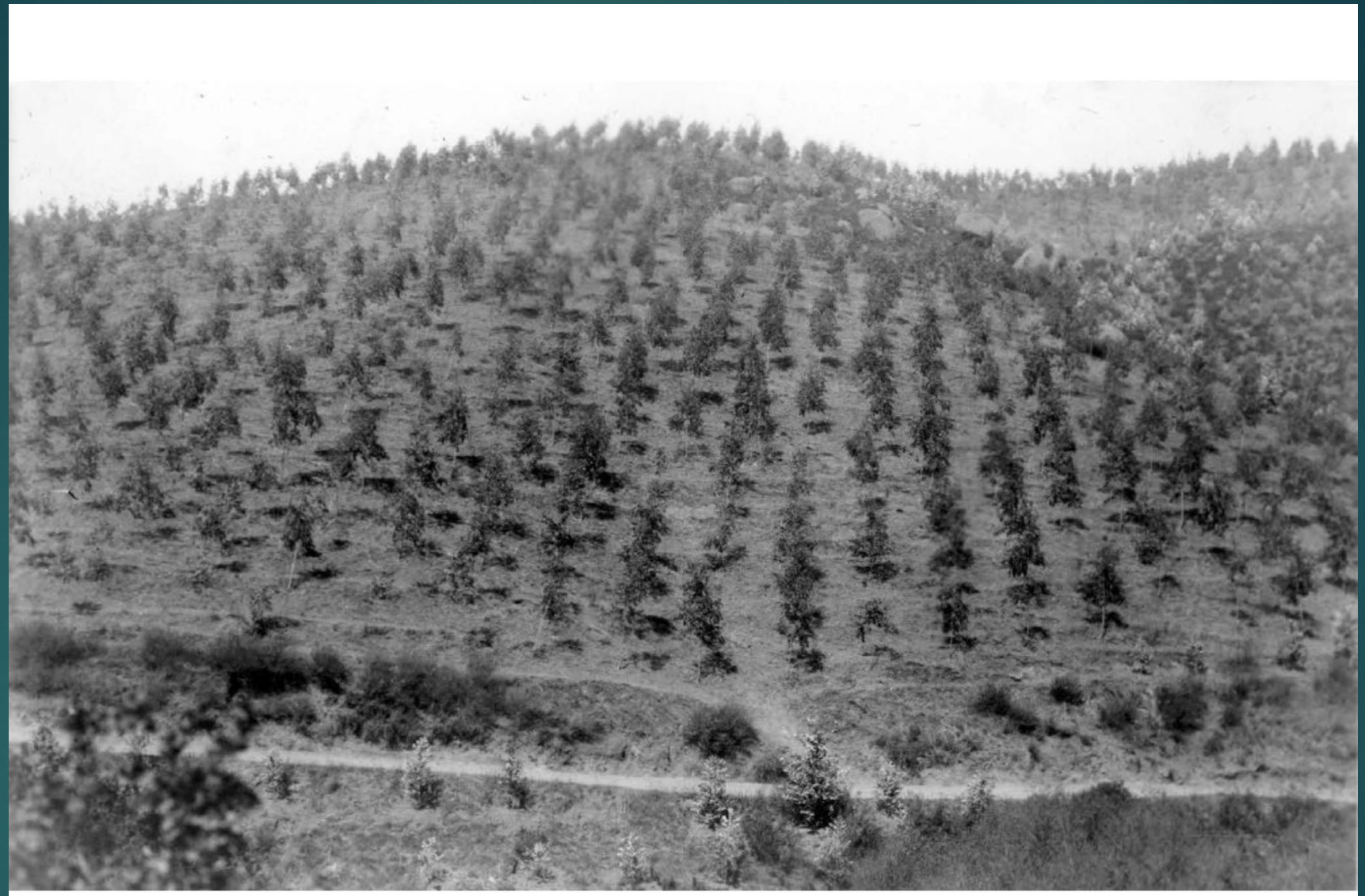
AFTER THE MISSIONS CLOSE IN 1830

200 YEARS OF CHANGE IN THE EAST BAY HILLS



Courtesy
of Jerry Kent

Courtesy
of Jerry Kent



BY 1913- 3 MILLION TREES HAD BEEN PLANTED BY FRANK HAVENS

Courtesy
of Jerry Kent

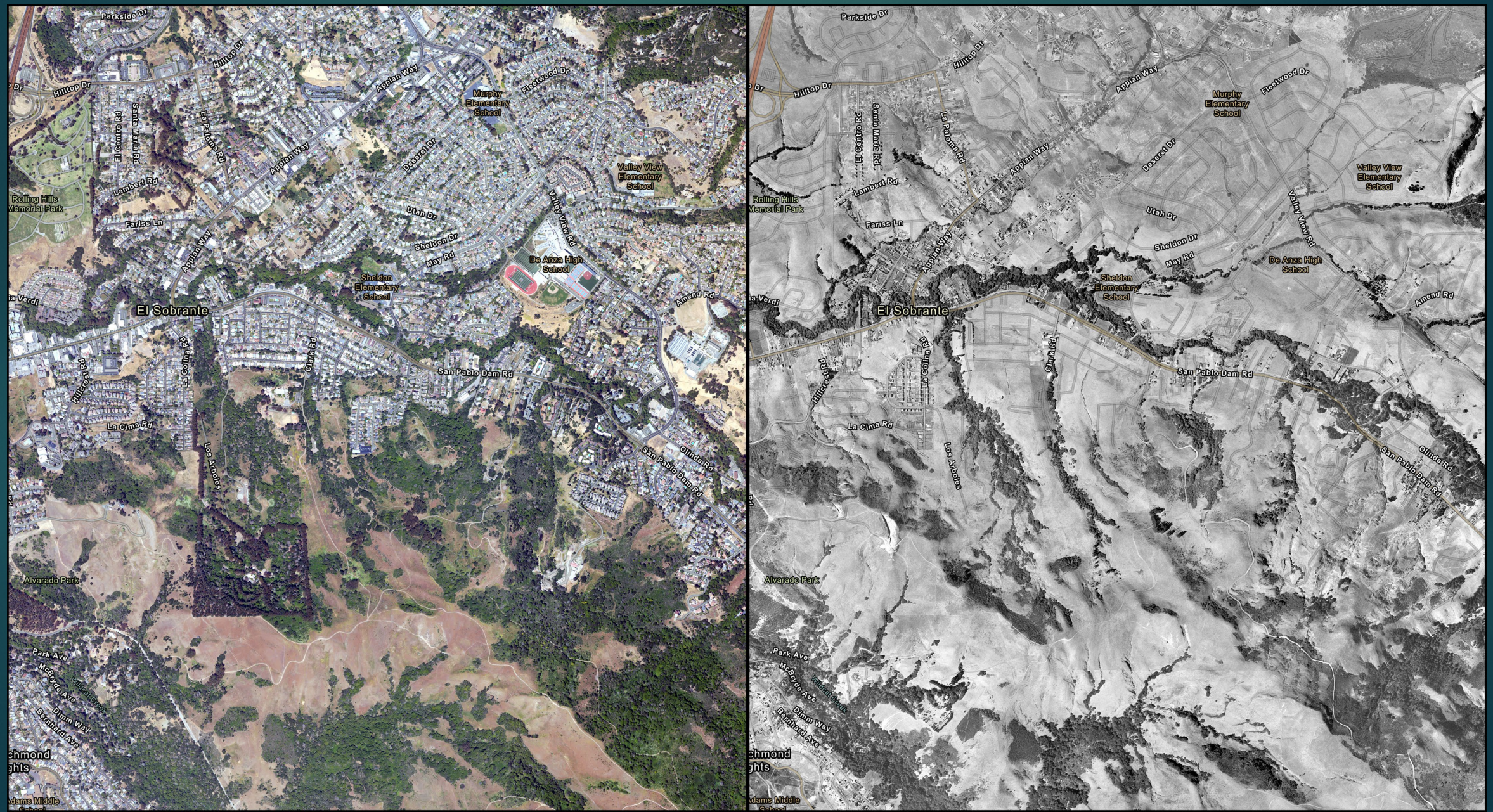
DOWNTOWN OAKLAND AND ITS “BEAUTIFUL” HILLS- 1903

Courtesy
of Jerry Kent

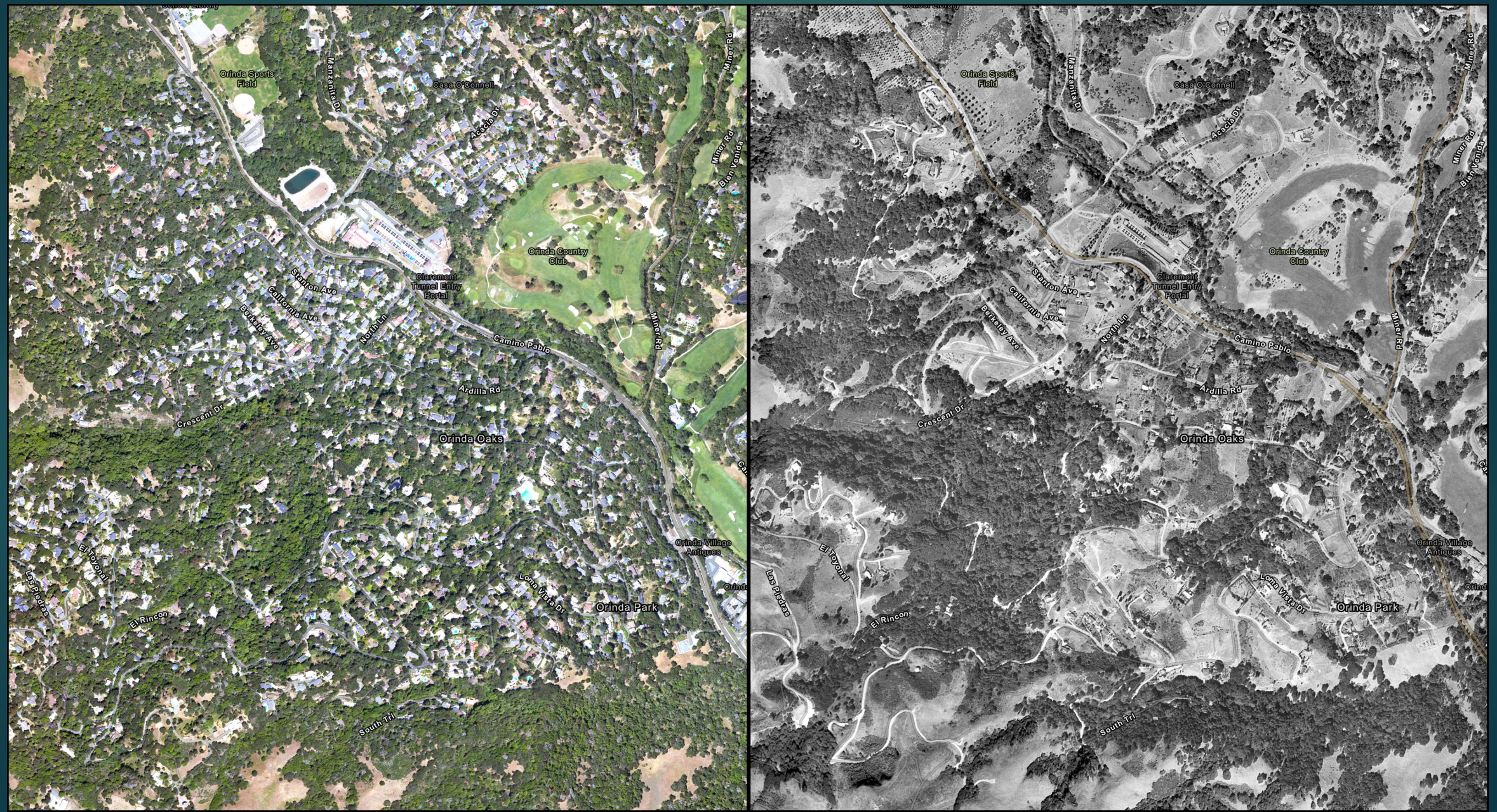
THE 1903 OAKLAND HILLS SKYLINE

THE FRANK HAVENS OAKLAND HILLS SKYLINE 2024

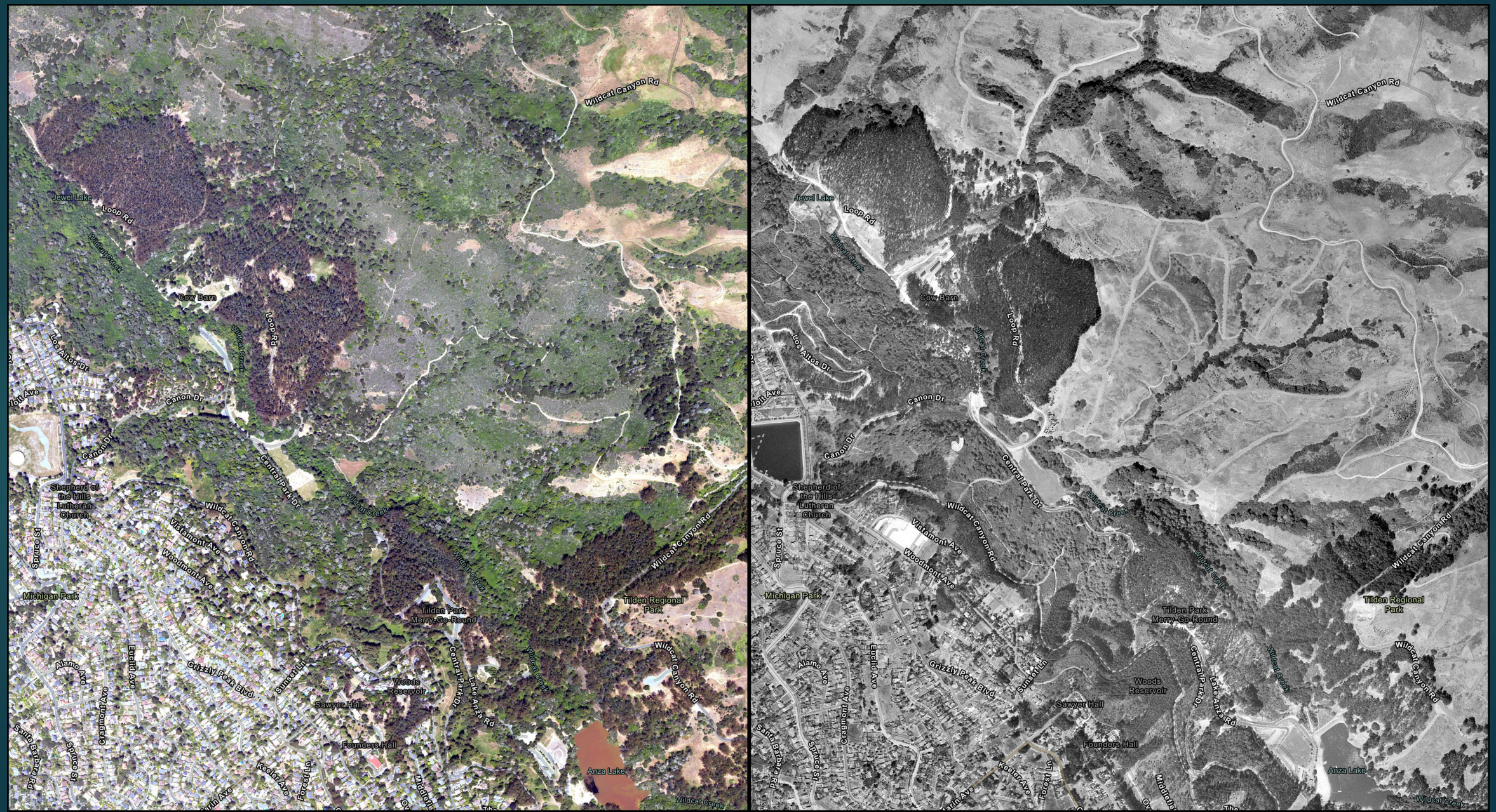
Land Cover Change 1946-2022: El Sobrante



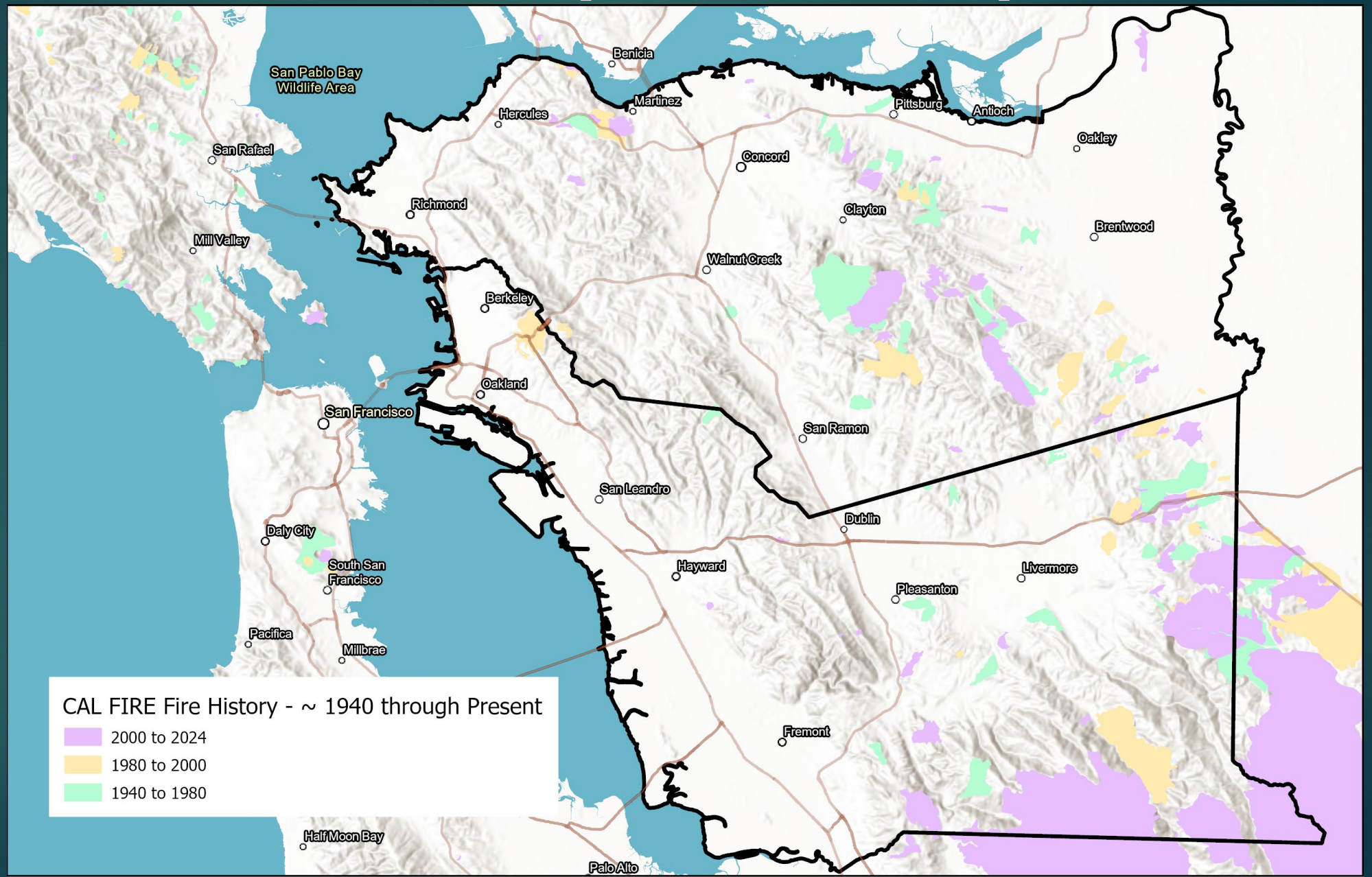
Land Cover Change 1946-2022: Orinda



Land Cover Change 1946-2022: North Tilden

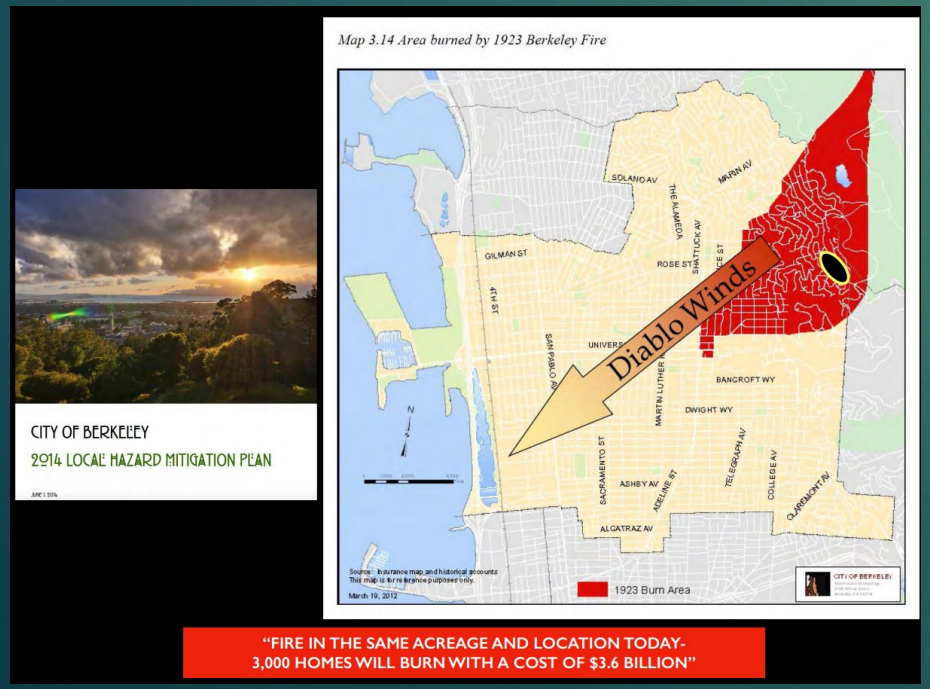


Contra Costa County Fire History



Fire History

- East Bay communities are vulnerable to a catastrophic fire that begins as a vegetation fire but turns into an urban conflagration
- The area is prone to Diablo wind events
- Fires in 1923, 1937, and 1991 are harbingers of future, more destructive fires



Courtesy
of Jerry Kent

What Can We Do to Mitigate Catastrophic Wildfire?

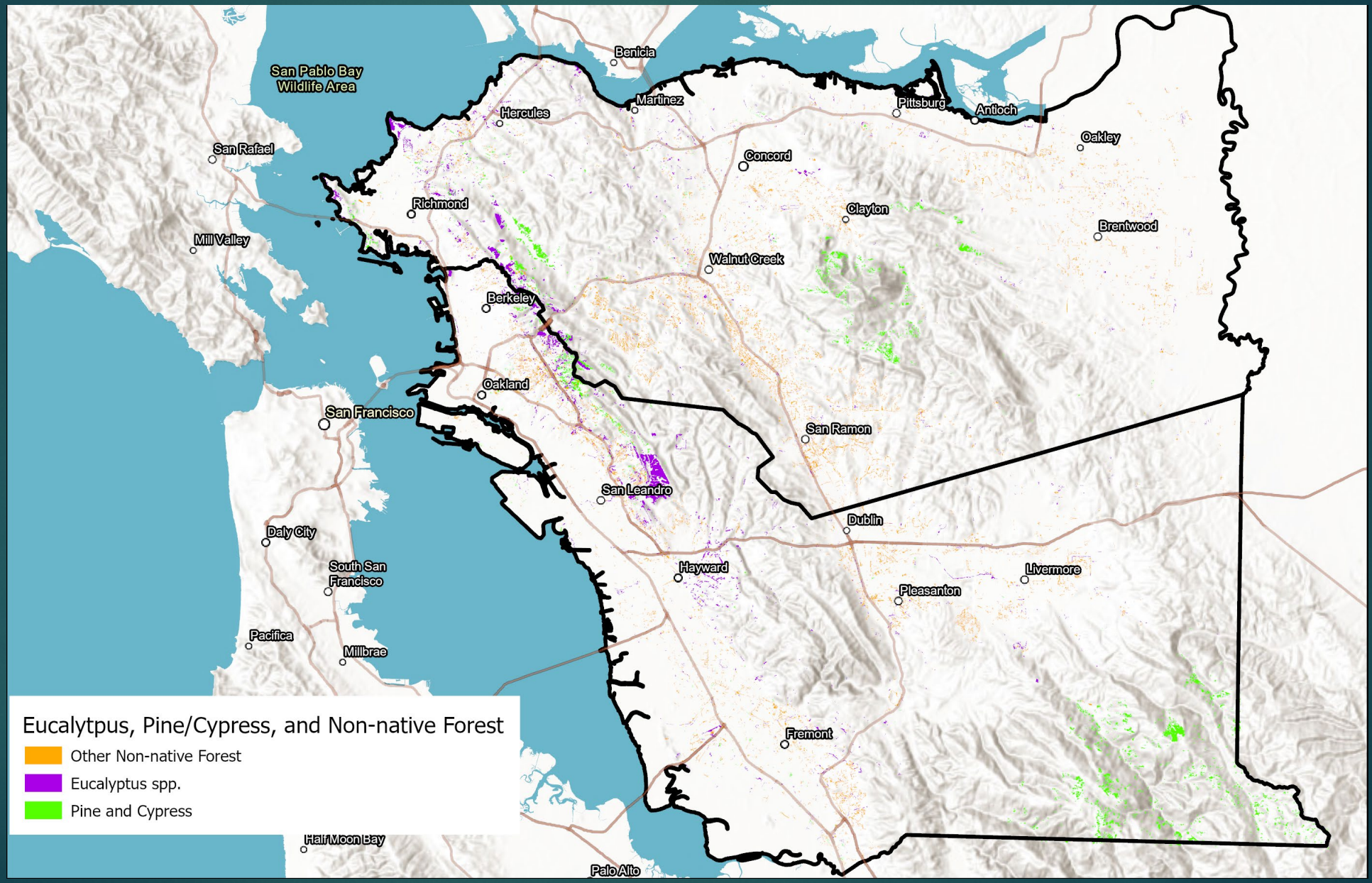
East Bay Fire Safe Coalition Objectives

- Overall Objective:
  Prepare for and prevent a catastrophic East Bay Wildfire
- Sub-Objectives:
  - Understory thinning and ladder fuel reduction
  - Accelerate the removal of hazardous trees (e.g., Eucalyptus, Monterey Pine)
  - Enforce defensible space programs
  - Implement home hardening
  - Enhance coordination and management of evacuations
  - Seek state and federal insurance solutions
  - Develop and implement an overall regional wildfire prevention & mitigation plan

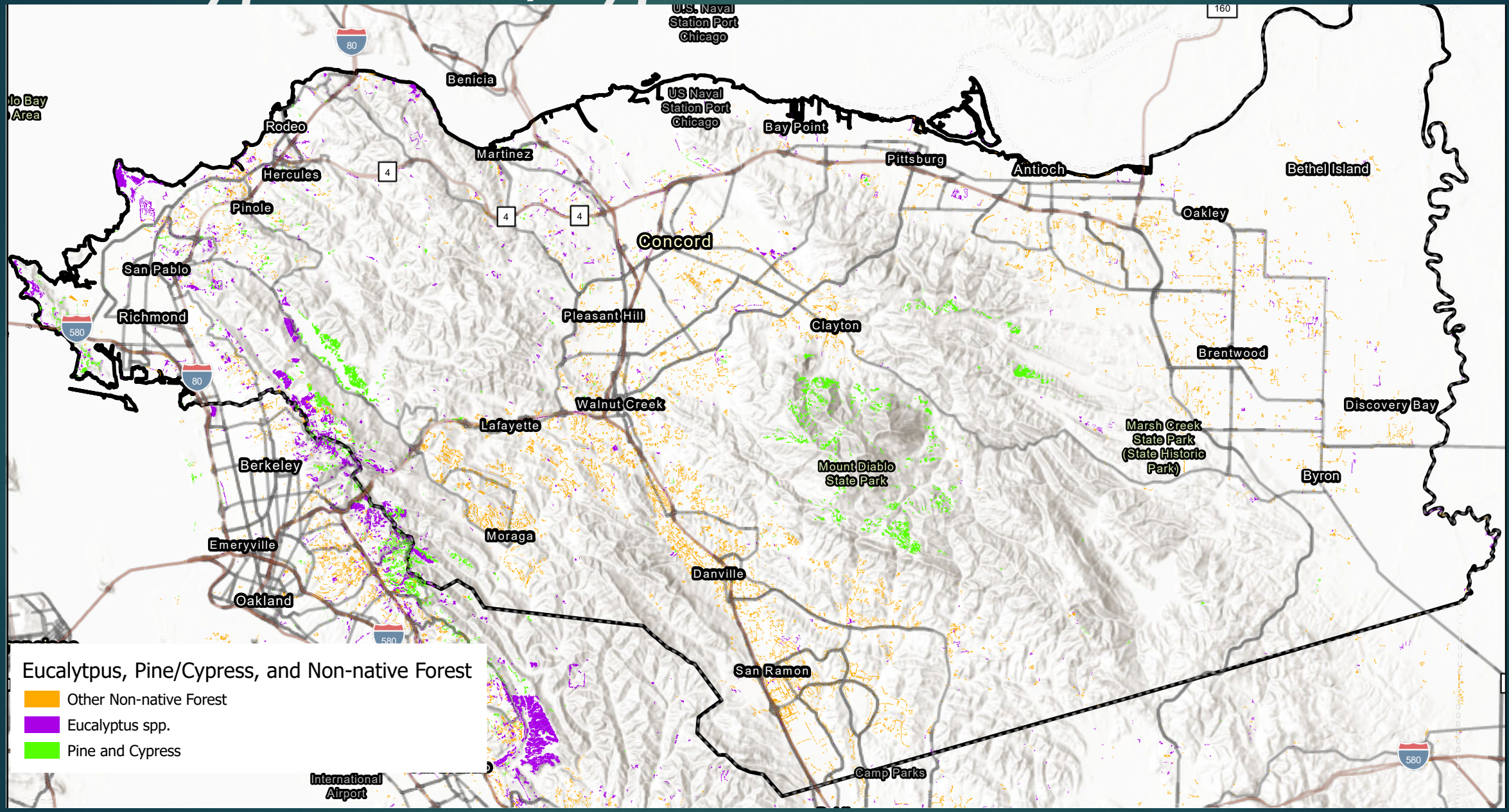
New Datasets & Tools for Contra Costa and Alameda Counties

- Eucalyptus, Pine/cypress, and Mixed non-native trees
- Impervious Surfaces
- Wildfire Hazard & Wildfire Risk to Structures
- Wildfire Fuel Mapper
- Other Datasets
- These datasets are a result of investments by EBRP, CAL FIRE, the State Coastal Conservancy, and others

Eucalyptus, Pine/Cypress, and Mixed non-native

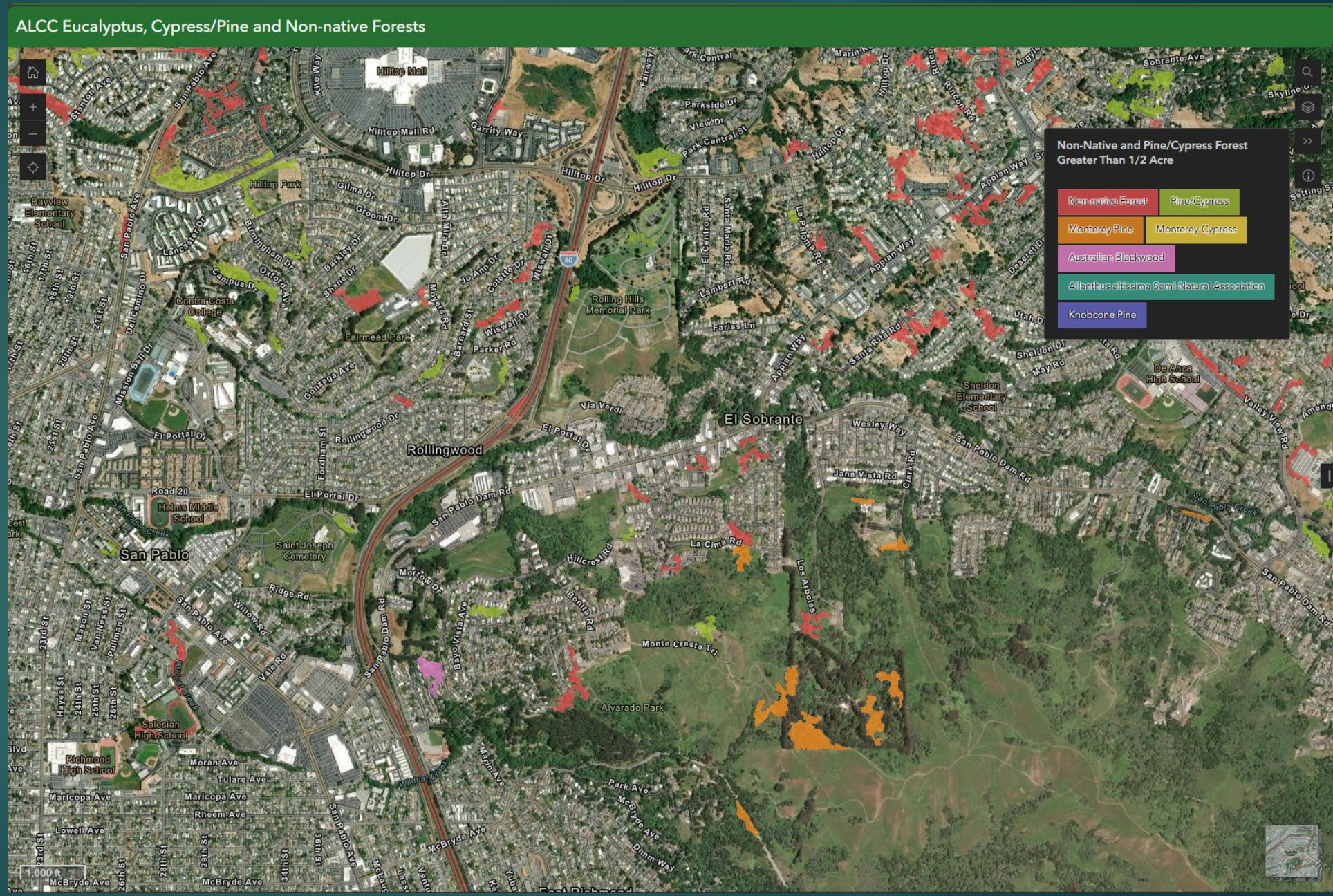


Eucalyptus, Pine/Cypress, and Mixed non-native



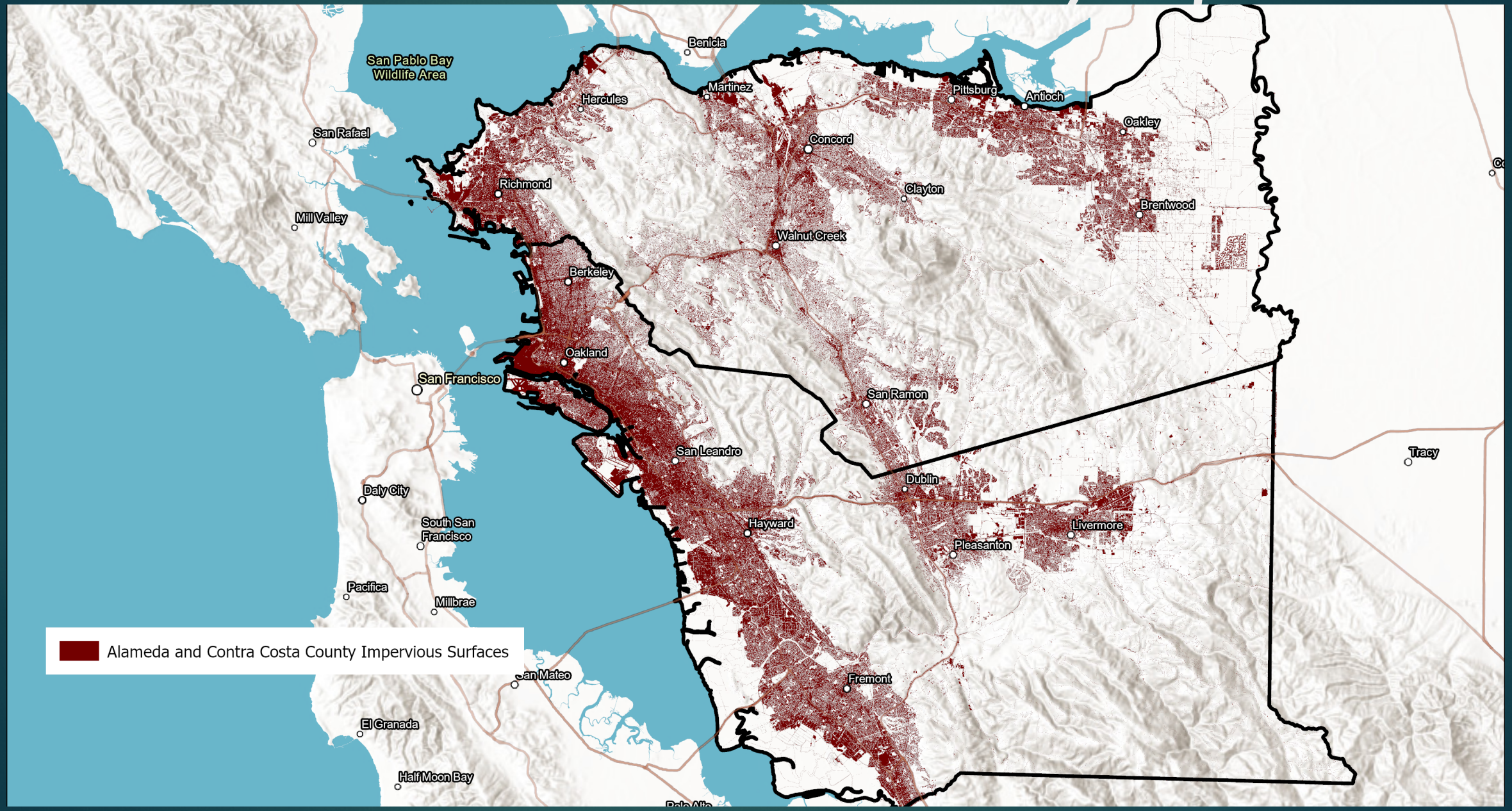
Data Access

- Eucalyptus and other hazard trees Web App
- Lidar-derived veg height
- Access to non-GIS users here:

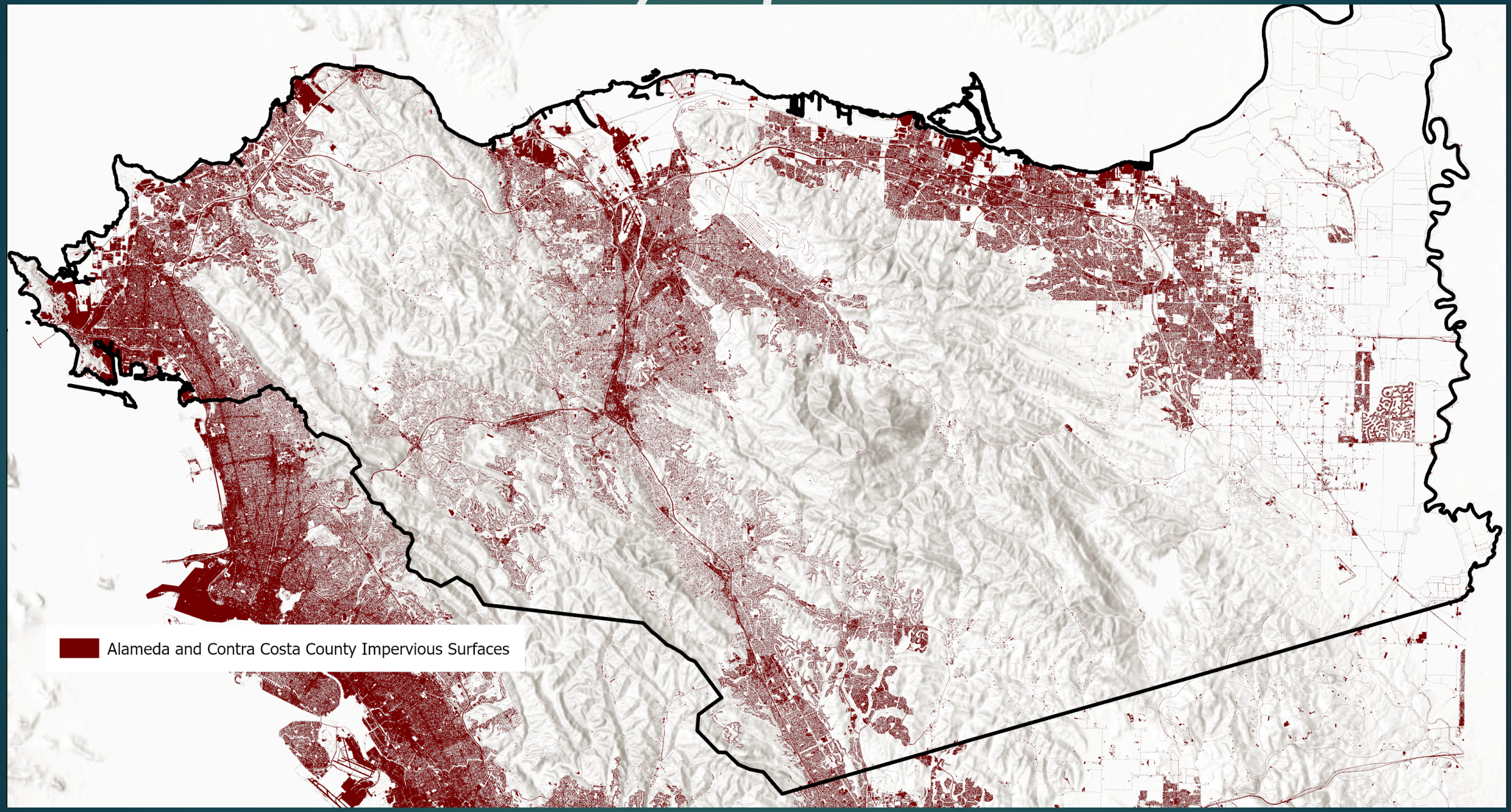


https://fuelsmapping.com/alcc_eucalyptus

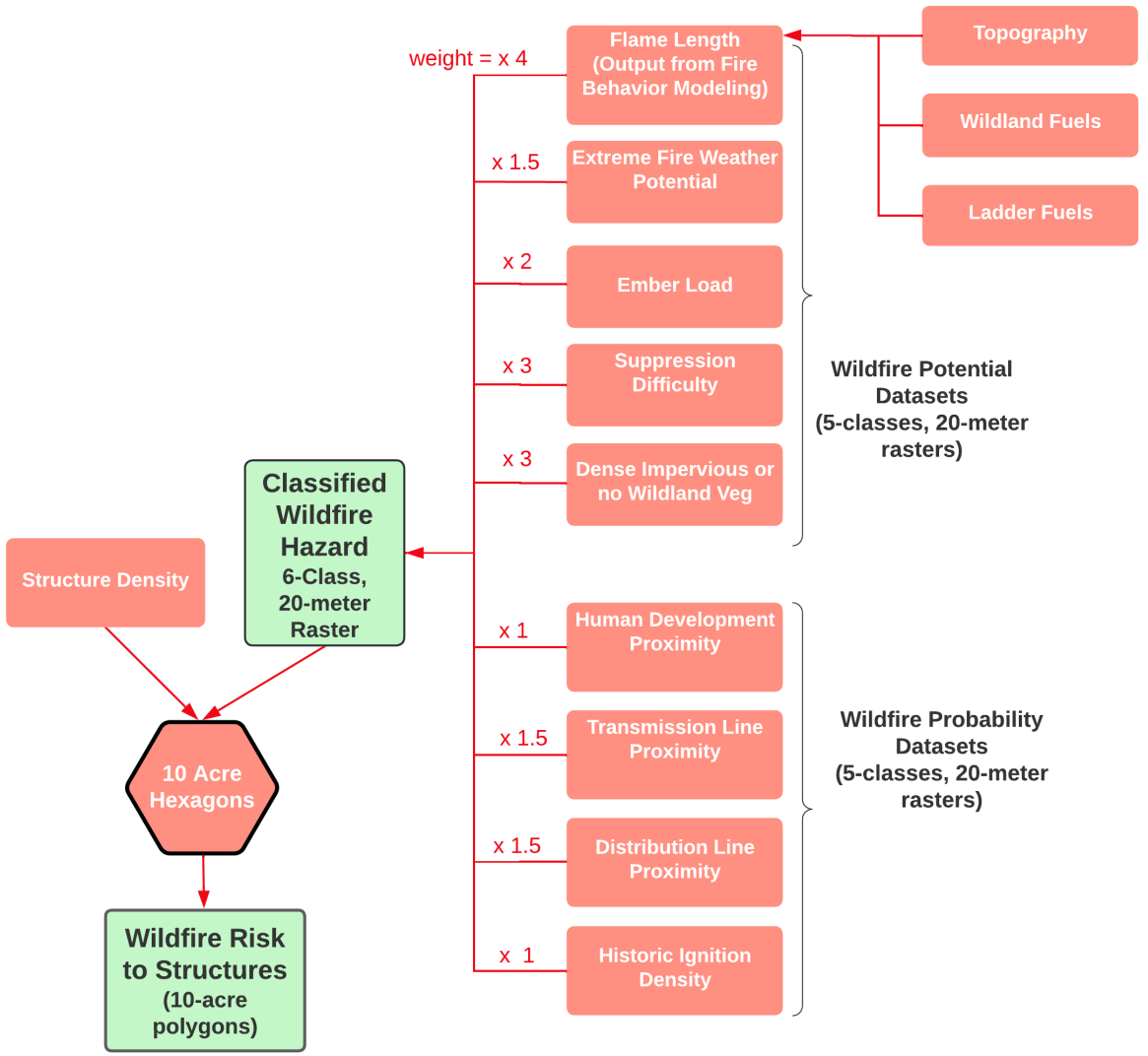
Alameda and Contra Costa County Impervious



Contra Costa County Impervious Surfaces



Wildfire Hazard and Risk to Structures



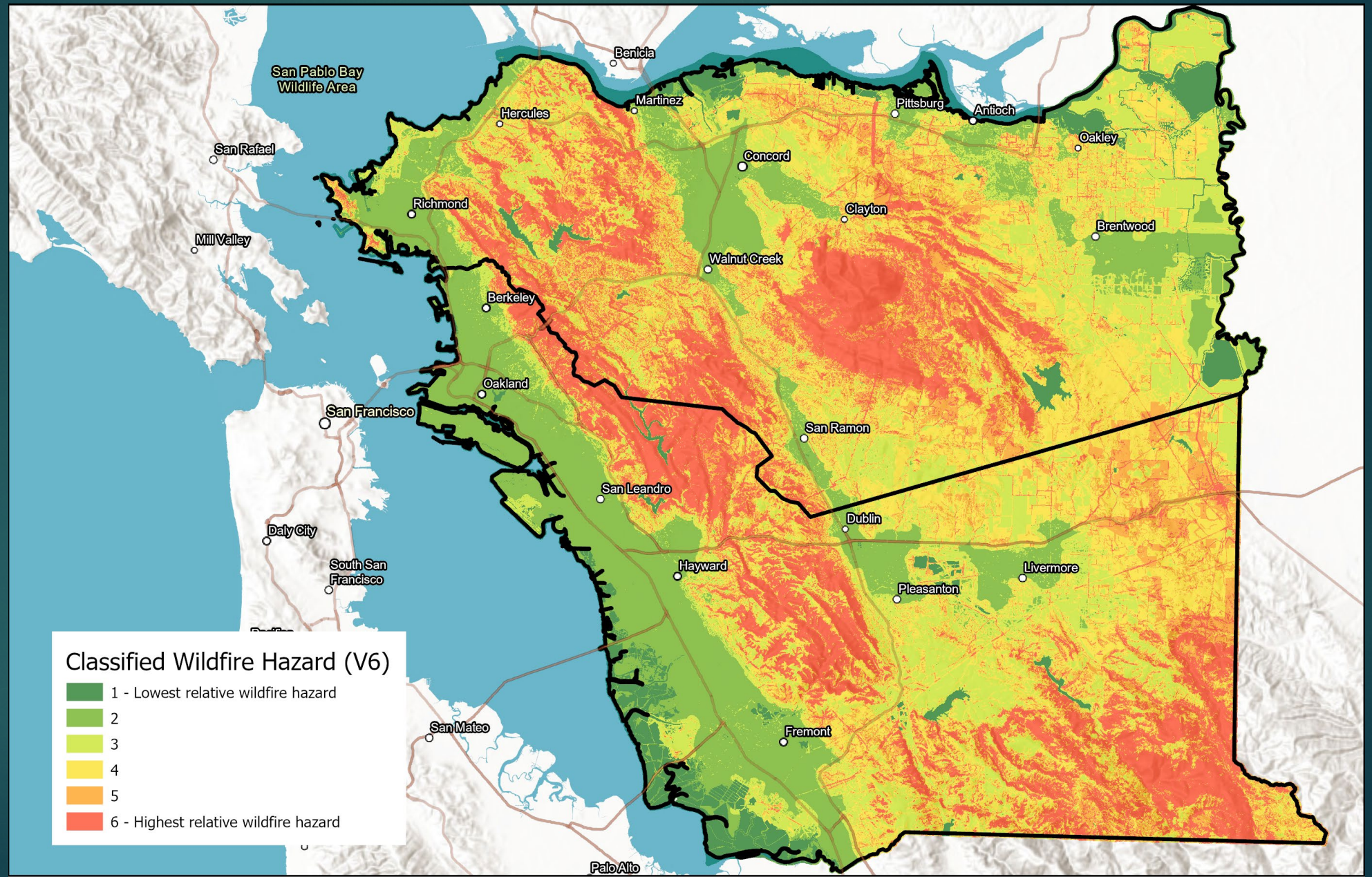
Hazard/Risk Input Data Sets and Data Sources

Risk Index Input	Source
Flame Length	Derived by running Flammap on the Alameda/Contra Costa 5-m fuel model (2020 ground conditions).
Extreme Fire Weather Potential	David Sapsis, CAL FIRE FRAP
Ember Load	Pyrologix - Contemporary Wildfire Hazard Across California (2021 ground conditions)
Suppression Difficulty	Pyrologix - Contemporary Wildfire Hazard Across California (2021 ground conditions)
Dense Impervious or no Wildland Veg	Alameda and Contra Costa impervious and enhanced lifeform maps (2020 ground conditions)
Human Development Proximity	Alameda and Contra Costa impervious maps (2020 ground conditions)
Transmission Line Proximity	Pacific Gas and Electric
Distribution Line Proximity	Pacific Gas and Electric
Historic Ignition Density	CALFIRE (2019), USDA

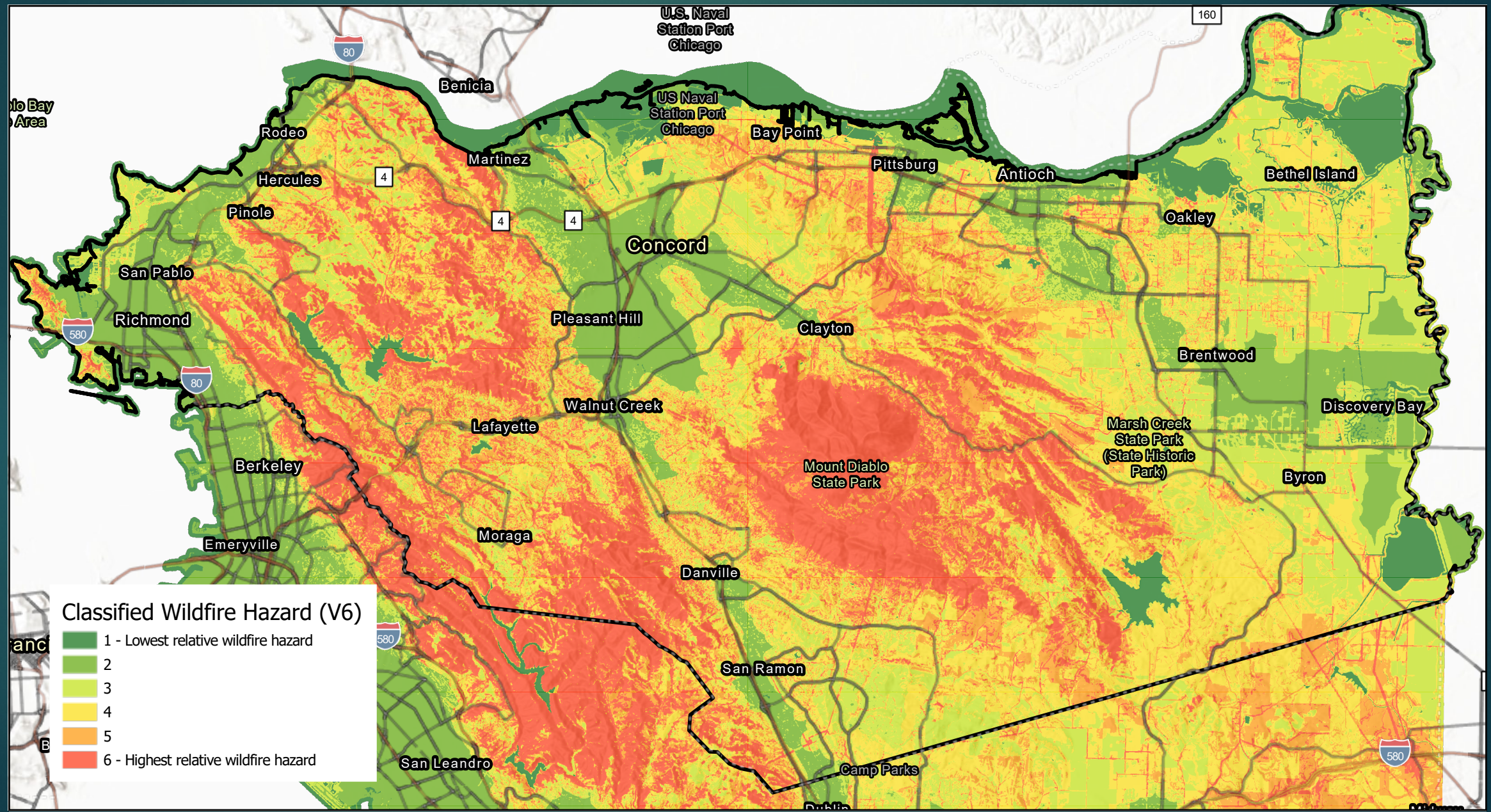
Wildfire Hazard Inputs and Scoring

Flame Length	Extreme Fire Weather Potential	Ember Load	Suppression Difficulty	Dense Imperv. / No Wildland Veg	Human Development Proximity	Transmission Proximity	Distribution Proximity	Historic Ignitions	Total Possible Hazard
4 x 4 = **16**	1.5 x 4 = **6**	2 x 4 = **8**	3 x 4 = **12**	3 x 4 = **12**	1 x 4 = **4**	1.5 x 4 = **6**	1.5 x 4 = **6**	1 x 4 = **4**	16+6+8+12+12+4+6+6+4 = **74**

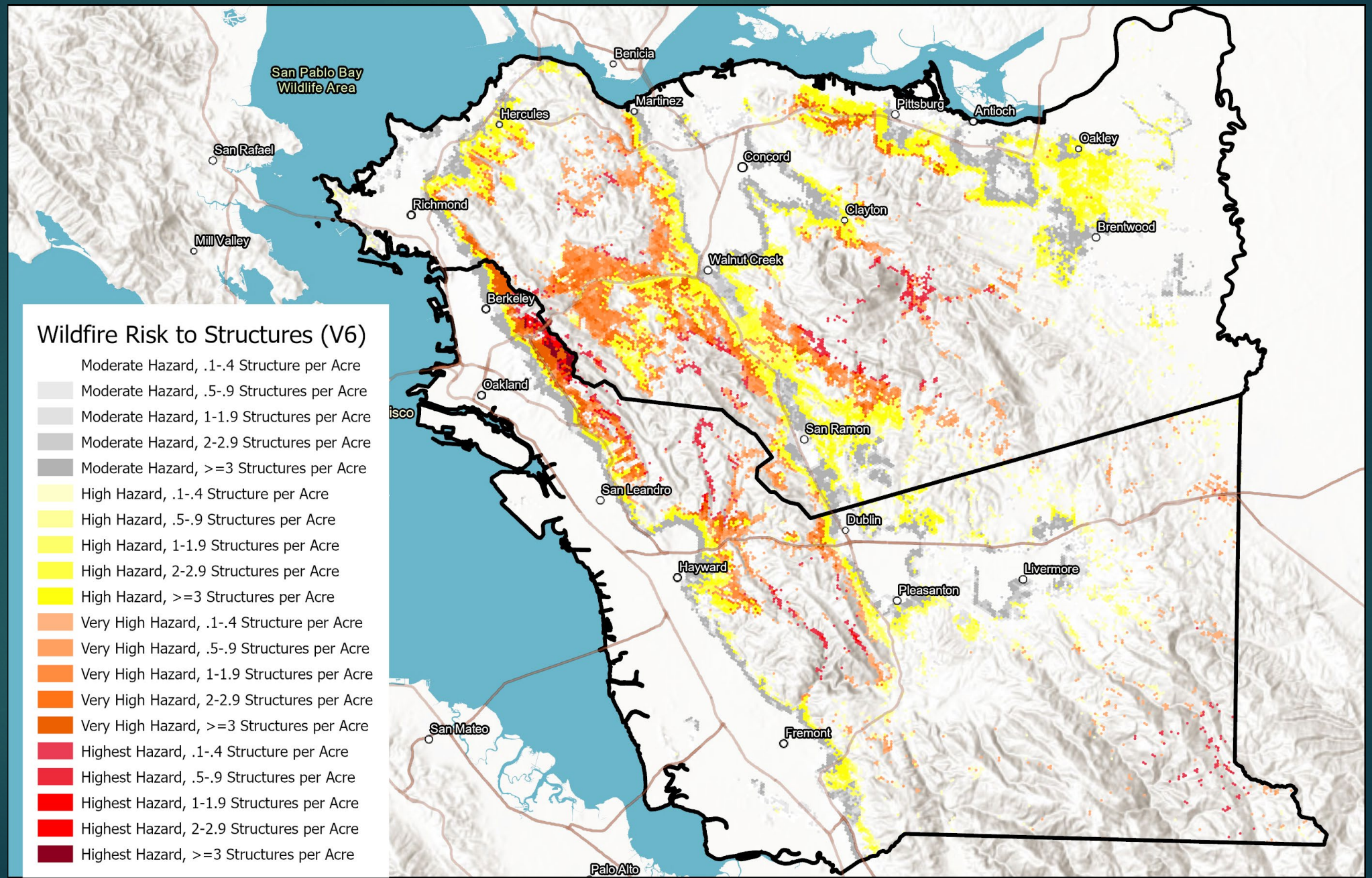
Alameda and Contra Costa Wildfire Hazard



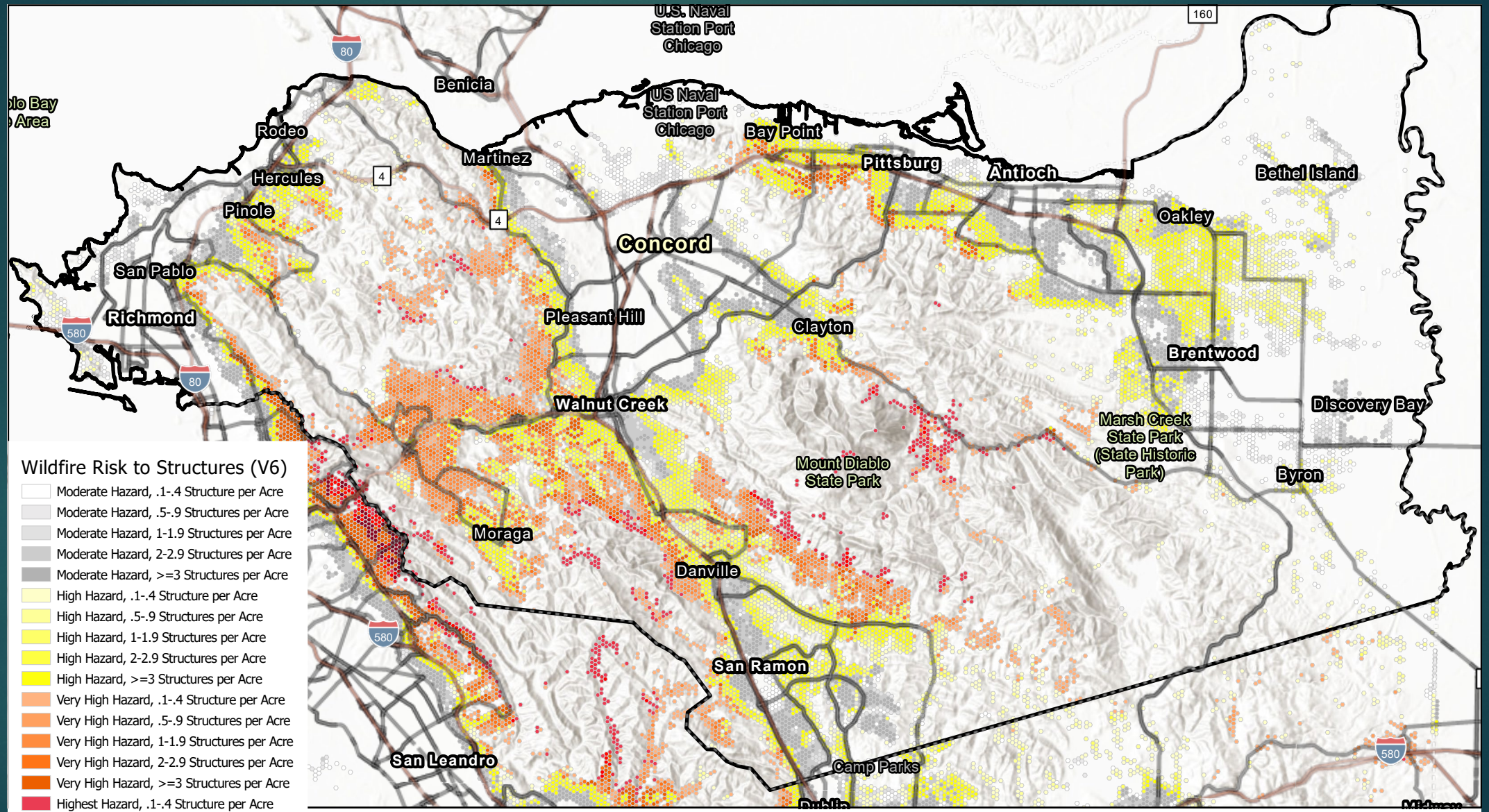
Contra Costa Wildfire Hazard



Alameda - Contra Costa Wildfire Risk to Structures

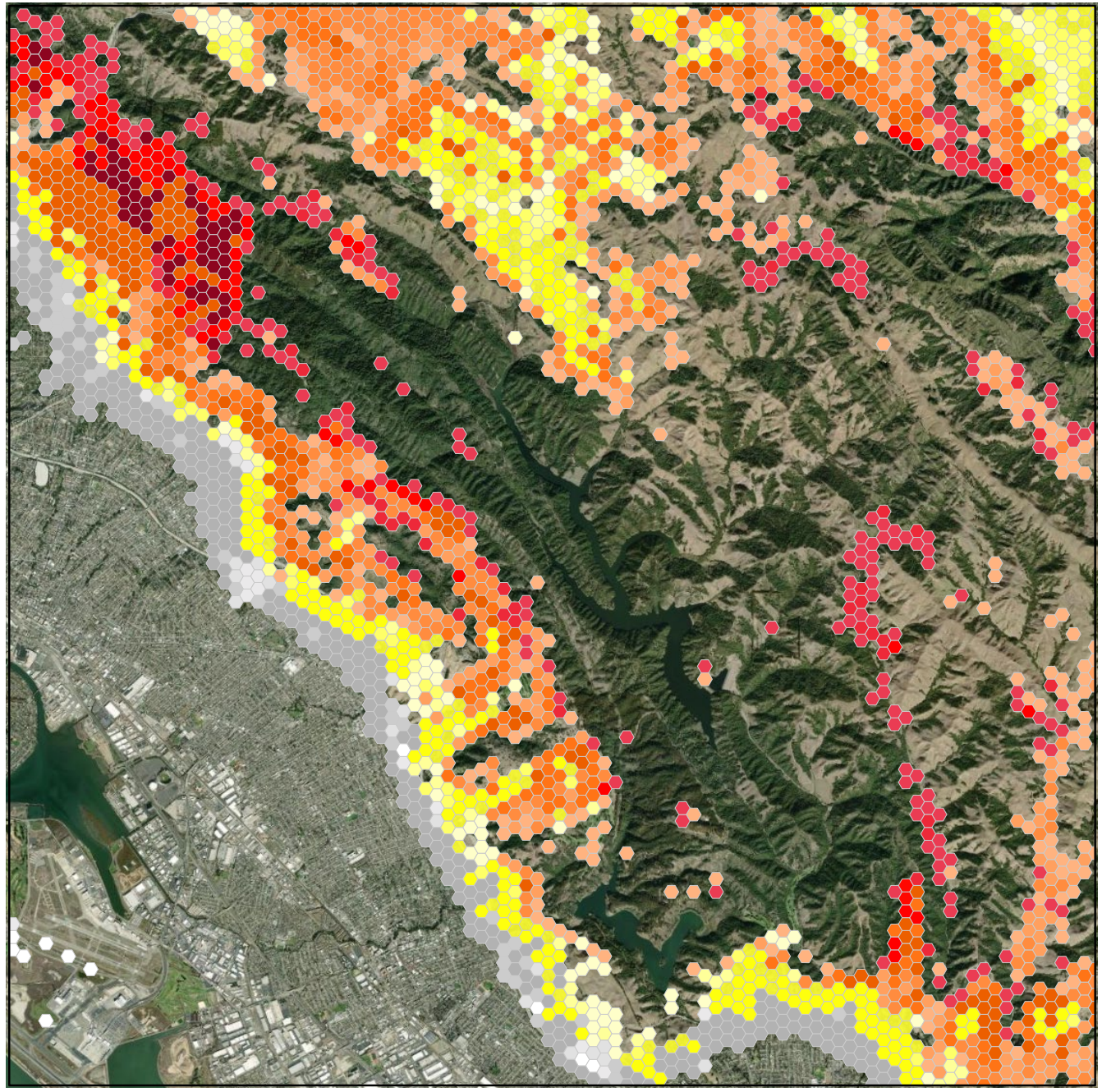


Contra Costa Wildfire Risk to Structures



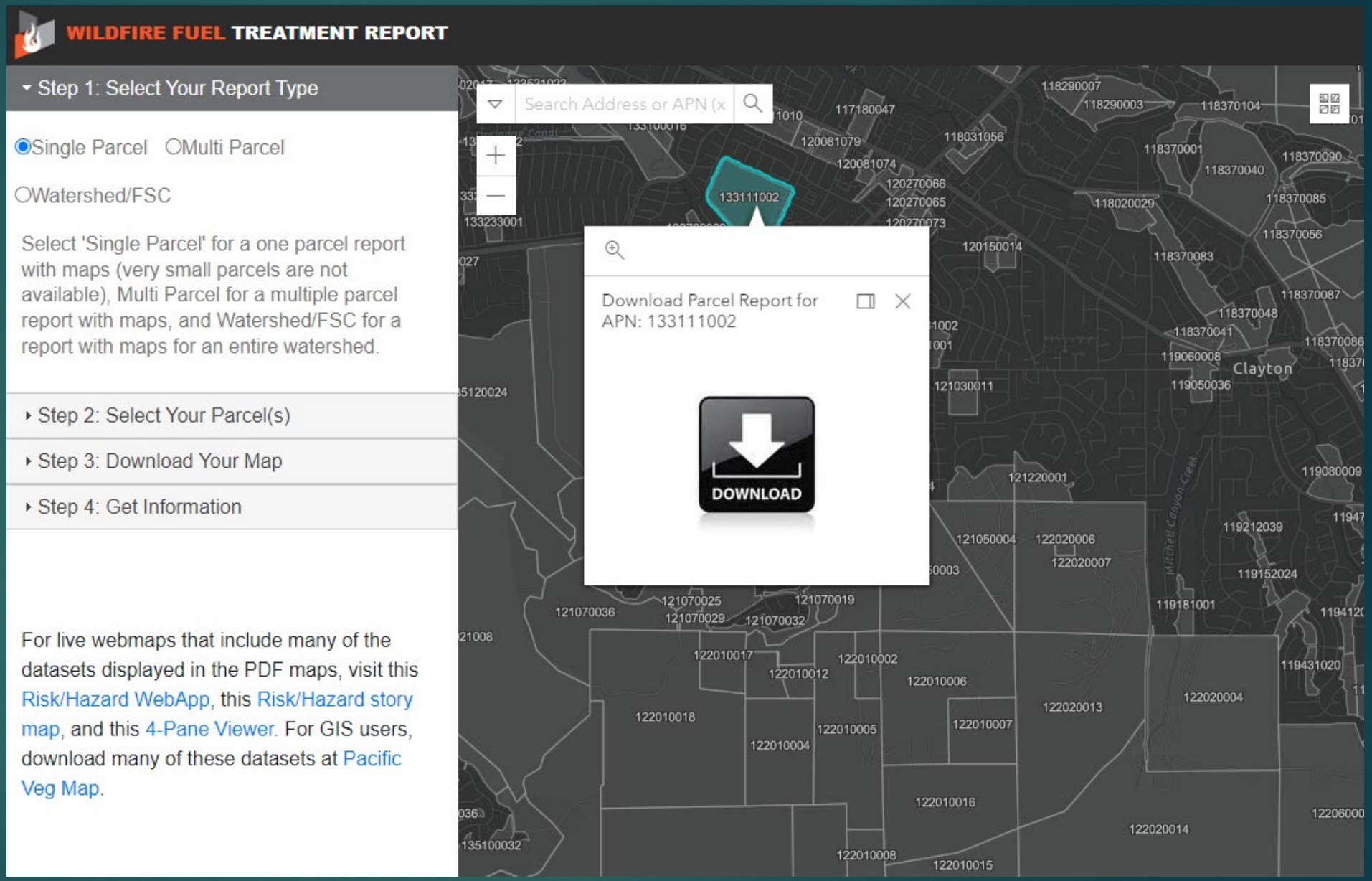
Data Access

- Wildfire Risk to Structures Web App
- Access to non-GIS users here:



https://fuelsmapping.com/alcc_risk_webapp

Data Access



- **Wildfire Fuel Mapper**
- **Parcel reports!**

https://wildfirefuelmapper.org

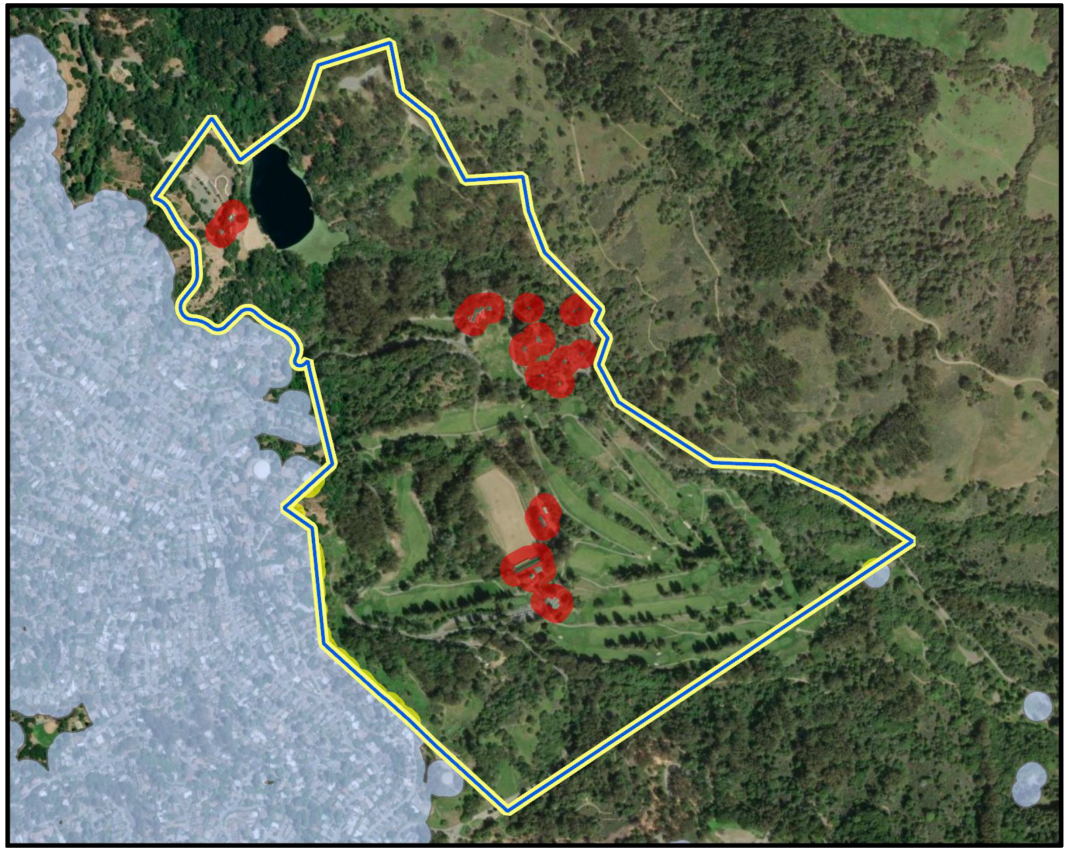
Alameda-Contra Costa Counties Wildfire Fuel Mapper Parcel Report

APN	267010008
Current Address	WILDCAT CANYON
Acres	328.79
Structure Count	20

Report Contents

This report contains fire hazard related information, including maps of the parcel's defensible space (this page), and maps on the following pages of the parcel's physical geography, vegetation, soils, wildfire hazard, and risk to structures. Each map provides insight into landscape characteristics that can help assess fuel and fire hazards and can be used to aid in planning fuel treatments and natural resource management. This report is provided for informational purposes only and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. This report is not intended to replace a formal physical inspection of the parcel, its structures, and surrounds.

Defensible Space Zones and Vegetation



LEGEND — Parcel of Interest; Category 1 Def Space; Category 2 Def Space; Category 3 Def Space; Def Space - Other Parcels

"**Defensible space**" is the area around a structure within a minimum of 100-foot radius or to the property line, whichever is less, in which combustible vegetation and other prohibited materials must be treated, cleared, or reduced to slow the spread of fire to and from the structure. Distances can be increased depending on fuel load, fuel type and topography.

There are 3 types of defensible space that are summarized in this report:

1. Defensible space on the parcel of interest associated with structures within the parcel (**Category 1**)
2. Defensible space on the parcel of interest associated with structures on adjacent parcels (**Category 2**)
3. Defensible space on adjacent parcels associated with structures within the parcel of interest (**Category 3**)

Property owners are responsible for the first two categories. For example, if a neighboring parcel has structures with a 100-foot buffer that radiates into your property, you are responsible for clearing that defensible space as well as the defensible space around structures within your property. If you have structures on your property whose 100-foot buffer extends into adjacent parcels, your neighbors are responsible for clearing that defensible space on their parcel.

Structures and their buffers are from two sources: 2017-2022 lidar and Microsoft building footprints that represent 2019-2020 ground conditions. The data includes both false positives and false negatives: buildings that exist on the ground are occasionally omitted from the dataset and buildings may exist in the dataset that don't exist on the ground. Recently built or destroyed structures may be incorrect.

Acres of Category 1 Defensible Space	Acres of Category 2 Defensible Space	Acres of Category 3 Defensible Space
16.35 acres	3.69 acres	0.01 acres
Total acres of Defensible Space within 267010008 (Category 1+2): 20.04 acres		

Defensible Space Within Parcel by 2017-2022 lidar Vegetation Height		
Acres by Veg. Height	**% Total Defensible Space**	**Example Treatment Recommendations**
9.02 acres of vegetation >15 ft	45.0% of defensible space	Trees are generally greater than 15 feet in height. In general, prune limbs up to at least 6 feet above the ground (as required by local code) and thin understory trees and shrubs to reduce ladder fuels. Single conifers should be well spaced (> 10 feet apart).
3.12 acres of vegetation 1-15 ft	15.6% of defensible space	Shrubs are generally 1-15 feet in height. This stratum also includes tall grasses and short trees. Shrubs and other plants should be a minimum of 4 feet below the bottom of the tree canopy. Thin shrubs for horizontal spacing to reduce continuity of shrub fuels.
7.91 acres <1 ft	39.5% of defensible space	Grass is generally below 1 foot in height. This stratum also includes short shrubs and unvegetated areas. Cut and maintain all annual grasses to 4 inches or less in height. Keeping grass short reduces flame lengths and rate of fire spread.

More Information

For more resources and information about fuel reduction projects in Alameda and Contra Costa Counties, visit the Diablo Firesafe Council Website: https://diablofiresafe.org

Tools to Access Data for Non-GIS Users

- **Hazard and Risk to Structures Story Map**: https://fuelsmapping.com/alcc_hazard_draft
  - Describes the methods used to create the draft hazard and risk to structures in less technical detail than the technical report
- **Hazard and Risk to Structures Webapp**: https://fuelsmapping.com/alcc_risk_webapp
  - Provides direct access to hazard and risk to structures in a webapp (no GIS required)
- **Hazard and Risk to Structures Technical Report:** https://fuelsmapping.com/alcc_risk_report
  - Technical report (PDF) with detailed methods on hazard and risk to structures datasets

Tools to Access Data for Non-GIS Users

- **Eucalyptus and Other Hazard Trees Webapp:** https://fuelsmapping.com/alcc_eucalyptus
  - Provides direct access to hazard and risk to structures in a webapp (no GIS required)

- **Alameda-Contra Costa Wildfire Fuel Mapper:** https://wildfirefuelmapper.org
  - Provides access to parcel-based PDF maps of hazard, risk, topography, vegetation, fuels, slope, etc. No GIS required.

Final Draft Hazard and Risk to Structures – Spatial Data (for GIS people)

Description	Relative Wildfire Hazard (raster)	Wildfire Risk to Structures (polygon)
ArcGIS Pro Map Package	https://fuelsmapping.com/alcc_risk_mpk	https://fuelsmapping.com/alcc_risk_mpk
Feature or-Map Service	https://fuelsmapping.com/alcc_hazard_ms	https://fuelsmapping.com/alcc_risk_fs

Other New Spatial Datasets for Alameda and Contra Costa Counties

- 5-meter Scott and Burgan Fuel Model
- Impervious surfaces map
- Lidar derived veg height and density
- Fine scale vegetation map (coming next summer)
- And more!
- Thanks to EBRP, CAL FIRE, SCC, and CDFW for funding!
- All these datasets available at: **https://pacificvegmap.org/**

Q&A / Discussion