ECOSYSTEM MANAGEMENT RECOMMENDATIONS FOR PHILLIPS RANCH, POMONA, CA

GREEN CITY STUDIO
CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

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ECOSYSTEM MANAGEMENT RECOMMENDATIONS FOR PHILLIPS RANCH, POMONA, CA

STRATEGIES FOR MITIGATING WILDFIRE HAZARD AND REDUCING MAINTENANCE COSTS

GREEN CITY STUDIO
CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

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Finally, appreciation is extended to all of the MLA Graduate Students who contributed to this project, an experiment with a new structure for LA 6451. Your work and insights greatly informed and shaped this report.

The research team out in the field, October 2025.

About the Green City Studio: The Green City Studio is a project of the Department of Landscape Architecture at California State Polytechnic University, Pomona, led by Dr. Kyle D. Brown, dedicated to contributing to community resiliency and opportunity. Projects, publications, and articles are prepared by students in Dr. Brown's courses, and published for public distribution on the Green City Studio web site (https://greencityblog.com/).

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INTRODUCTION

Project objectives

In December, 2024, the Phillips Ranch Assessment District Oversight Committee in the City of Pomona, California, contacted the Green City Studio in the Department of Landscape Architecture at Cal Poly Pomona University, for assistance with long-term management of the Assessment District Landscape. Fire hazard mitigation and minimization of costs associated with irrigating and maintaining the landscape were cited as primary concerns. Dr. Kyle D. Brown collaborated with a subcommittee of the Oversight Committee to develop a proposal for a scope of work to be performed. The proposal was presented to the subcommittee in spring, 2025 and the pro bono services of Green City Studio were initiated in summer, 2025. This report represents a summary of the investigation, analyses and recommendations developed, focused around five primary objectives:

1. *To reduce wildland fire hazard on Assessment District property to protect local residents and public infrastructure.*
2. *To minimize Assessment District water costs associated with management of their landscape.*
3. *To preserve, reintroduce and enhance native plant assemblages within Assessment District property.*
4. *To develop ecosystem management guidelines for Assessment District property that minimize costs and categorize the landscape by priority.*
5. *To identify key areas for landscape improvement that enhance the beauty of Phillips Ranch.*

The Phillips Ranch Assessment District

Phillips Ranch was developed as a planned suburban community beginning in 1965 by Louis Lessor Enterprises, Inc. (Los Angeles Times, 1964) (https://phillips-ranch.org/2022/01/31/history/). The plan included a mixture of low and medium-density housing, limited commercial and institutional space, and substantial open space to provide aesthetic and recreational amenities, as well as preserve steep hillsides and hydrologic function. Frank Radmacher & Associates prepared the Master Landscape Concepts & Design Criteria for the project (undated). Most development occurred during the 1970s and 1980s. In 1994, the City adopted the Phillips Ranch Specific Plan to further regulate the area, and subsequently updated it in 2015.

The public amenities were designated as public land under the ownership of the City of Pomona, but supported by a special assessment on all private property owners within the Assessment District, first adopted in 1990 (DTA Municipal Solutions, 2024). This assessment was fixed at the time of adoption, and has not adjusted for increased costs or increased risks associated with a landscape that has exceeded maturity. Voter approval of all property owners within the District is required to increase the assessment, and recent efforts to do so have been unsuccessful. As a result, the resources of the Assessment District have been stretched, resulting in reduced irrigation and maintenance. This decline in servicing has also increased the risk of wildland fire in the District. As a result of these financial challenges, the District recently relinquished approximately 17 acres of land known as Greenbelt Park, to the City of Pomona, to be included in their park system. This land, which had significant irrigation and maintenance costs associated with it, due to its extensive turf, is no longer included in the responsibilities of the Oversight Committee. While this relieves some obligations, the District continues to be challenged with limited financial resources to support open space management. These challenges are compounded by recent fire hazard severity designations in and around Phillips Ranch, which may increase management obligations to comply with Los Angeles County Fire mandates.

The Assessment District includes approximately 220 acres of designated open space requiring management by the Oversight Committee.

Phillips Ranch is located in Pomona, CA, approximately 25 miles East of downtown Los Angeles.

Study Area

In addition to the public open space included in the Assessment District, substantial open space is located nearby. The areas known as Westmont Hill and Elephant Hill are adjacent to the District and include hundreds of acres of open space under the ownership of the City of Pomona and private landholders. These open space resources impact the ecological function as well as the wildland fire hazards of Phillips Ranch. In light of these impacts, the study area for this project was expanded beyond the boundaries of the Assessment District, to include these nearby resources. It is understood that the District does not manage these lands, however recommendations are offered for consideration by the City of Pomona, in an effort to effectively serve Phillips Ranch, nearby Westmont, and the broader community.

Organization of this Report

This report is organized to address the objectives of Green City Studio's work. The section on Wildland Fire Hazard details fire history, official fire hazard severity, and the Green City Studio's model for prioritizing fire hazard management. The section on water resources reports on precipitation, evapotranspiration, and runoff patterns, as well as water needs of current and historic vegetation assemblages. Finally, the section on ecosystem management guidelines summarizes key recommendations for consideration by the Assessment District leadership.

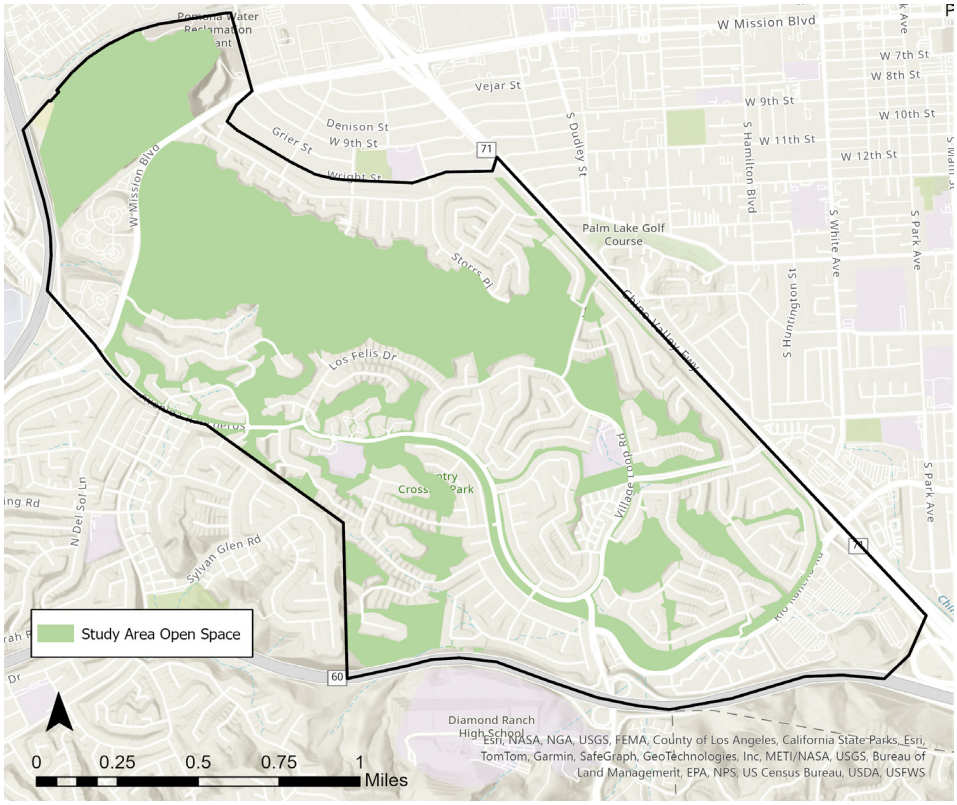
Limitations of this Report

While this report provides useful information and guidelines for action by the Assessment District, there are a number of deficiencies in information that limit the detail of our findings. First, there was a lack of detailed information about existing vegetation in the open space areas managed by the Assessment District, which limited our ability to estimate current fire fuel loads and irrigation needs.

Second, the location, extent, and operability of existing irrigation systems managed by the Assessment District was not provided, limiting our ability to incorporate this factor into our fire risk assessment or our priorities for action. Third, little information was provided by the city regarding current fuel modification activities and scheduling, beyond a map of sites managed for fuel modification. As such, current management practices and frequency were not evaluated, or factored into our analysis. As a result, it is likely that some recommendations we offer are already in effect, or covered by other management practices.

Finally, changes in State law required the mapping of new Fire Hazard Severity Zones within Local Responsibility Areas, including the Phillips Ranch Study Area. This mapping was completed in spring, 2025 and recently adopted. It includes significant revisions that apply to the study area, including the designation of new High and Moderate Fire Hazard Severity Zones within Local Responsibility Areas. Information about specific management practices that will be required by the locally responsible agency, Los Angeles County Fire Department, are unclear at the time of writing this report. The City and Assessment District may need to modify management guidelines to adjust to new standards applied by the Fire Department in 2026.

The open space in the study area frames some spectacular views of the Pomona Valley.



The project study area includes open space managed by the Phillips Ranch Assessment District, as well as large open spaces in the surrounding area.

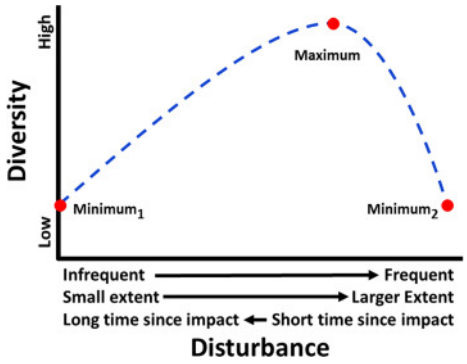
WILDFIRE HAZARD

Ecological Benefits of Fire

While communities are understandably concerned about the threats of wildfire to life and property, scientific research has documented numerous ecological benefits. Wildfire is considered a disturbance mechanism in landscapes, along with other events, such floods and wind storms, which introduce substantial landscape change in short period of time. As landscapes burn, vegetative cover is removed. This cover may be replaced in party by fire-resistant plants that resprout from their roots, their protected trunks, or from banks of seed residing in the soil. But they may also be replaced by new plant species that colonize these disturbed sites as seeds from nearby plants are introduced via wind or animals. The result is often greater biodiversity, defined as the number of different species present on the site. Plant biodiversity is commonly recognized an important measure of healthy ecosystems, which support a diverse array of animal species, and provide resiliency against disease or other disturbances which may affect specific species.

While these disturbance mechanisms and the resulting landscape change often provide biodiversity benefits, the frequency and extent of disturbances matters. Small, infrequent fires typically result in a static landscape, where plants that are present are allowed to persist for significant amounts of time. Opportunities for new species to be introduced are diminished, resulting in low biodiversity. In contrast, larger, more frequent fires typically results a landscape that favors a few select "Pioneer Species" that quickly establish themselves and have short life cycles. This includes many weeds and invasive species, and also results in low biodiversity.

Some researchers have argued that biodiversity is maximized at intermediate frequencies or intensities of disturbance. Known as the Intermediate Disturbance Hypothesis, it was initially illustrated in the 1970s using what has been referred to as a "hump-backed model" which graphed the proposed relationship between diversity and disturbance.



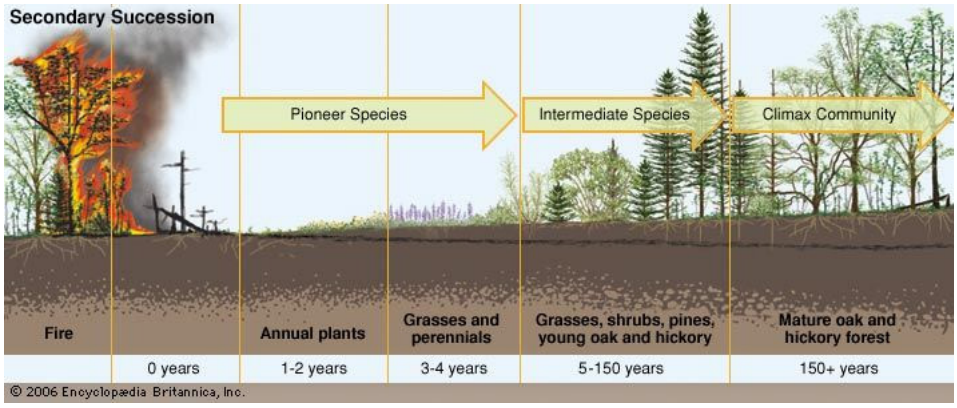
The Intermediate Disturbance Hypothesis argues that biodiversity is optimized when disturbances, such as fire, occur at moderate frequencies or intensities.

While some have argued that the Intermediate Disturbance Hypothesis often does not reflect real-world situations, the relationship between diversity and disturbance is well-established.

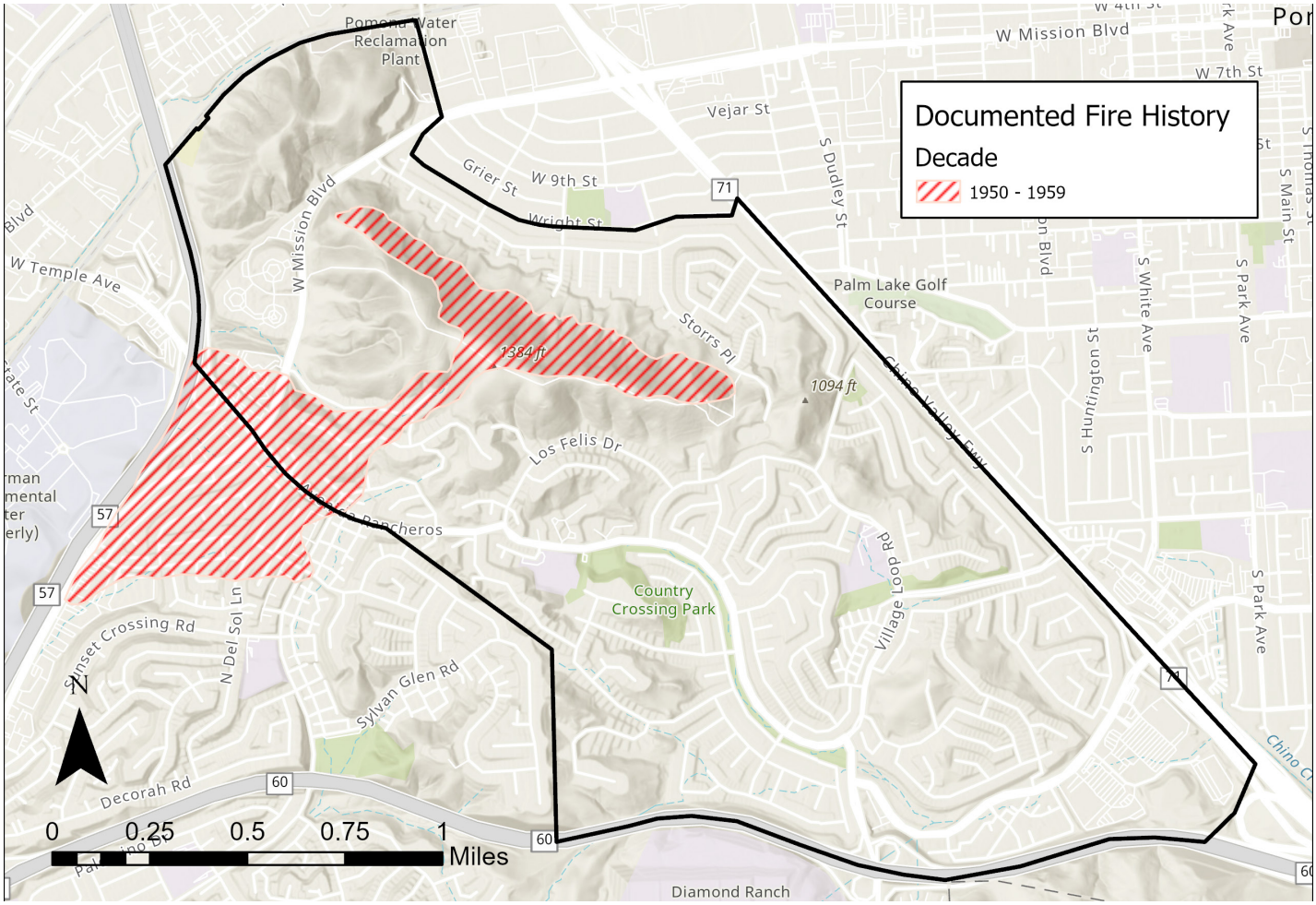
In addition to biodiversity, fire frequency also influences hazard to human life and property resulting from wildfires. Less frequent fires result in a substantial fuel load of vegetative biomass (mature trees and shrubs), which may contribute to hotter, more intense fires, capable of spreading more quickly, thus posing greater risks to nearby homes.

In the absence of frequent fires, fuel modification is typically performed in high fire hazard areas, to reduce vegetative biomass as a form of disturbance introduced by humans. While it might be optimal from a fire protection perspective to provide annual removal of most, if not all vegetation, this is often costly, and does not support other objectives, such as biodiversity or aesthetics. As a result, such practices tend to be more selective, focusing on removing biomass that is more easily burned (dead material) and that which promotes fire extending into the crown of trees where it is more easily spread to nearby areas.

While this approach to fuel modification remains essential, a multi-objective approach to wildland management would consider biodiversity, scenic resources, and fire protection. In our study area, this requires us to examine fire history, current management practices, and factors contributing to fire risk.



This model illustrates the phases of succession that typically occur in wildland areas after fire. While management focused exclusively on protection of human life and property may prefer frequent fires or fuel modifications that favor pioneer species, a multi-objective management plan may prefer intermediate frequencies of fire or fuel modification which moderate fuel loads while also supporting biodiversity.



Over 280 acres burned in 1957, including the area now known as Mission Hills Estates, and the woodland on the Eastern side of Westmont Hill.

Fire History

While wildland fire is generally considered a natural hazard, research has shown that the overwhelming majority of wildfires in the California Mediterranean ecosystem are caused by human activity. It is broadly accepted that indigenous people actively managed the landscape of Southern California through the use of fire (SOURCE). However specific fire records for the study area are only available since 1950. That record shows a number of documented fires over the past 75 years. Please note that smaller incidents that were extinguished before significant burning may not be included in this data.

Prior to the development of the Phillips Ranch planned community, one fire was documented. In 1957, 281 acres were burned, including a significant portion of the study area, extend from the area near what is now the 57 Freeway and Temple Avenue, through the northern portion of what is today Mission Hills, to the eastern slope of Westmont Hill. Its cause is unknown. No fires were documented during the decade of the 1960s.

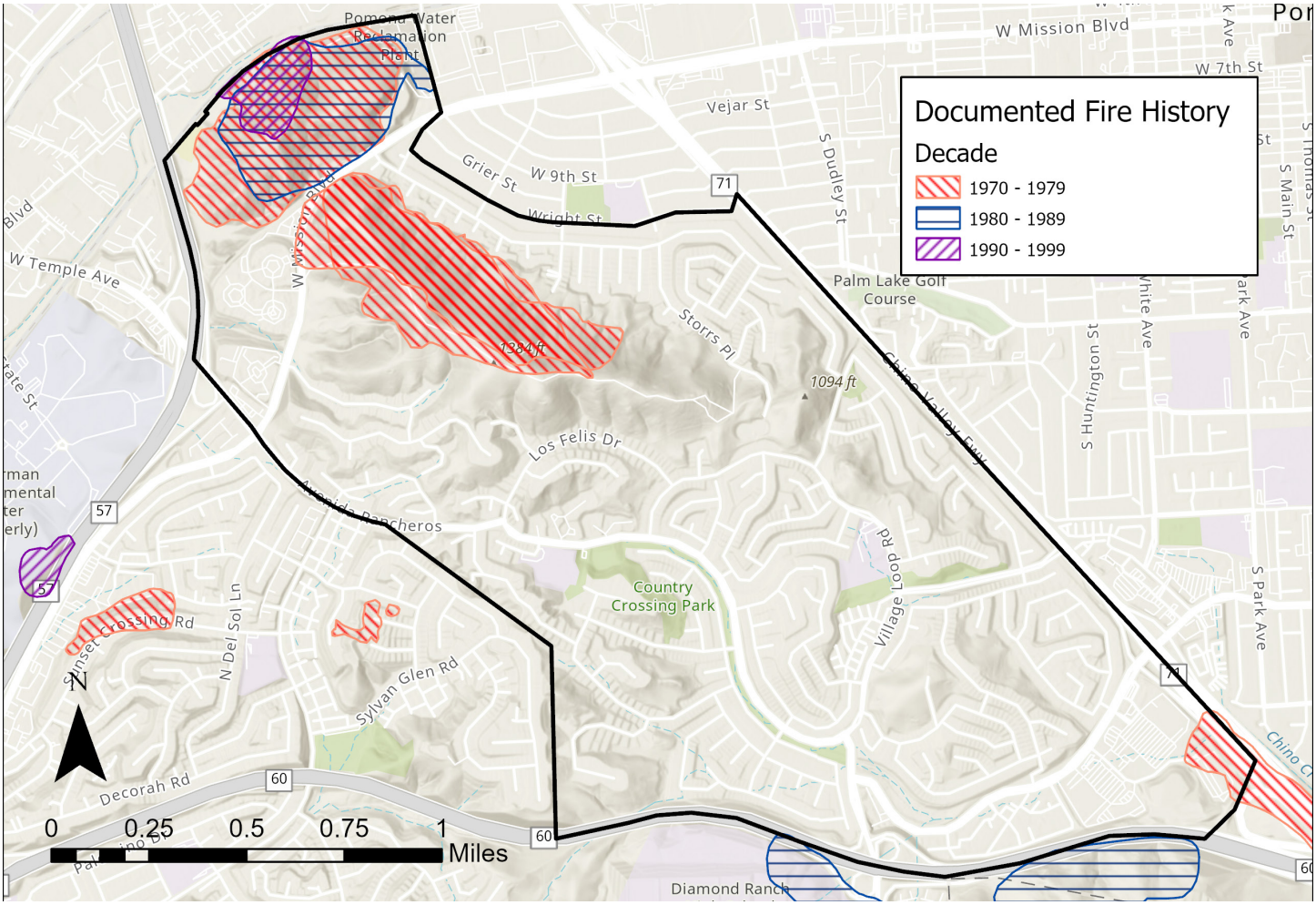
Six fires were documented in the study area between 1970 and the year 2000. Westmont Hill burned twice: 108 acres In 1971, and 98 acres again in 1974 with nearly the same boundaries. Nearly the entirety of Elephant Hill, 112 acres also burned in 1974. In 1977, 34 acres burned along the 71 freeway, just North of the 60 Freeway. Over 89 acres of Elephant Hill burned again in 1985, and another 22 acres of it burned in 1995. The cause of each of these fires is unknown.

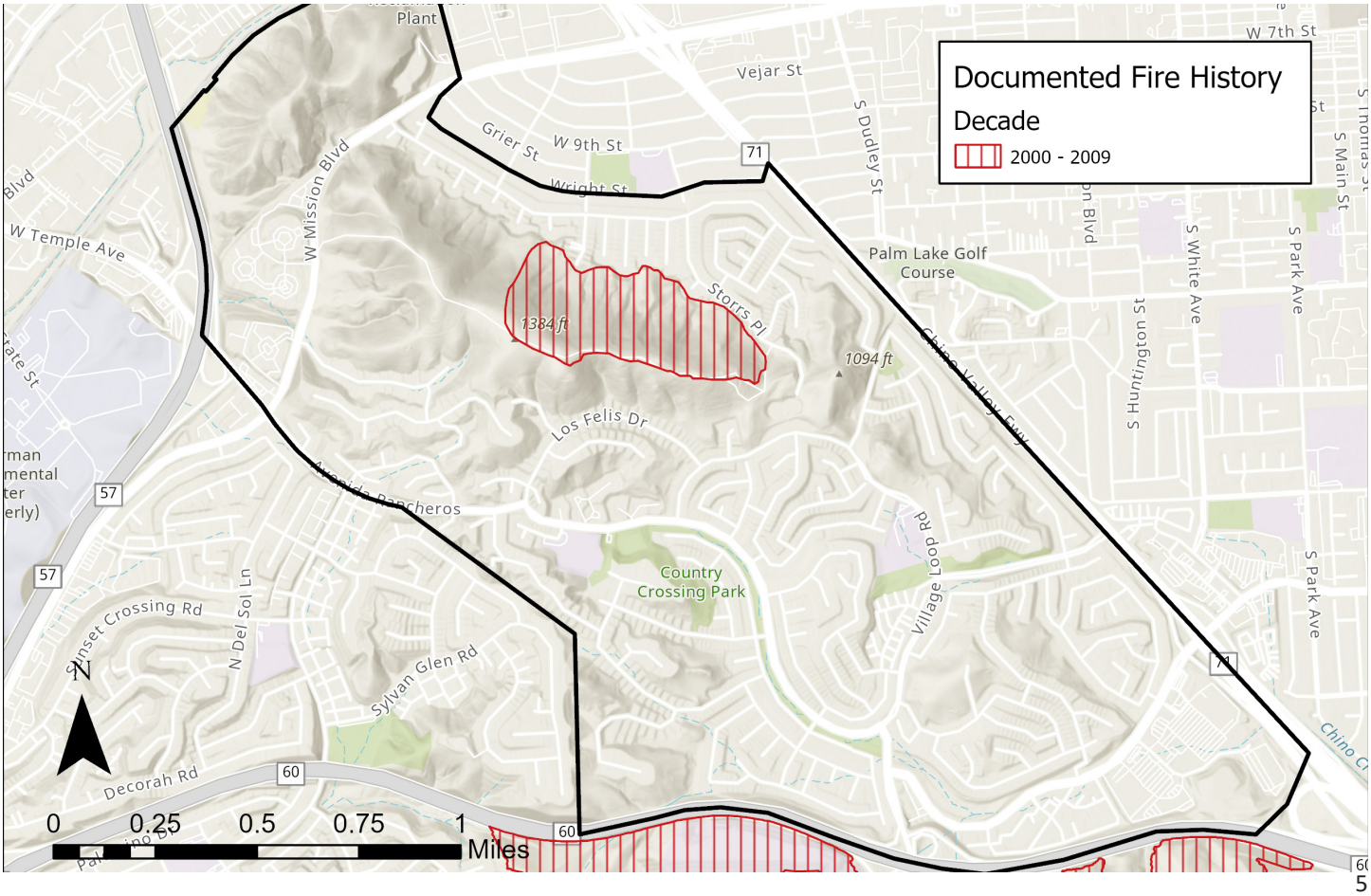
Over the past 25 years, only one documented fire occurred, again on the eastern slope of Westmont Hill. Nearly 82 acres were burned in 2008. Again, the cause of this fire is unknown. In 2009, a 155-acre fire occurred south of the 60 Freeway, in close proximity to the study area, caused by vehicle activity.

This fire history suggests that significant portions of Westmont Hill have burned four times in approximately 70 years. Elephant Hill has burned three times in 40 years. While this history suggests a fire recurrence rate of 18 years for Westmont Hill and 13 years for Elephant Hill, the history also shows that recurrence intervals were highly variable, with return periods being as short as 3 years. It should also be noted that no portion of the study area has burned significantly in nearly 18 years.

Top right (page 5): Six fires were documented in the study area between 1971 and 1995. Westmont Hill burned twice, and Elephant Hill burned three times. Several smaller fires occurred nearby in Diamond Bar and Chino Hills.

Bottom right (page 5): Since 2000, only one fire has been documented, along the Eastern portion of Westmont Hill. Other fires have also occurred just south of the 60 Freeway.


Documented Fire History
Decade
1970 - 1979
1980 - 1989
1990 - 1999
Pomona Water Reclamation Plant
W Mission Blvd
W 7th St
Vejar St
Grier St
W 9th St
Wright St
71
S Dudley St
S Main St
W Temple Ave
W Mission Blvd
Palm Lake Golf Course
Storrs Pl
1384 ft
1094 ft
Los Felis Dr
Chino Valley Fwy
S Huntington St
S White Ave
S Park Ave
Avenida Rancheros
57
Country Crossing Park
Village Loop Rd
Sunset Crossing Rd
N Del Sol Ln
Sylvan Glen Rd
Decorah Rd
60
N
0 0.25 0.5 0.75 1 Miles
Diamond Ranch


Documented Fire History
Decade
2000 - 2009
Plant
W 7th St
Vejar St
Grier St
W 9th St
Wright St
71
S Dudley St
S Main St
W Temple Ave
W Mission Blvd
Palm Lake Golf Course
Storrs Pl
1384 ft
1094 ft
Los Felis Dr
Chino Valley Fwy
S Huntington St
S White Ave
S Park Ave
Avenida Rancheros
57
Country Crossing Park
Village Loop Rd
Sunset Crossing Rd
N Del Sol Ln
Sylvan Glen Rd
Decorah Rd
60
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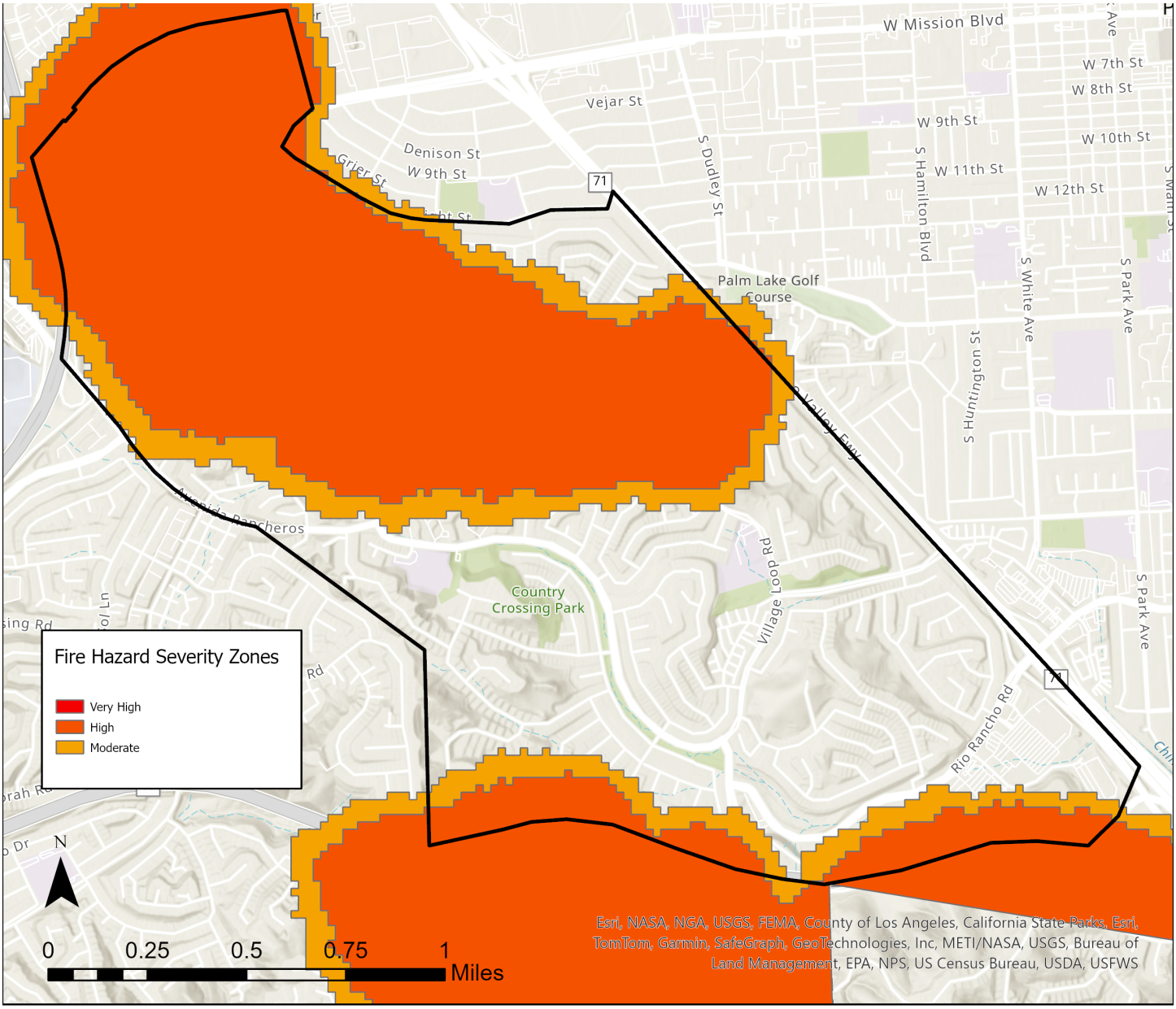
0 0.25 0.5 0.75 1 Miles



Significant portions of the study area are located within High and Moderate Fire Hazard Severity Zones, as mapped by CalFire in 2025, which evaluated sites larger than 20 acres in size.

Fire Hazard Severity Zones

The State of California maps fire hazard severity in and around wildland areas, covering areas of state responsibility, as well as those of local responsibility, which are to be regulated by local fire agencies. They categorize fire prone areas into three classifications of hazard severity: Very high, high and moderate. These are based on an analysis that considers fire history, topography, vegetation that contributes to fuel load, and other factors. In the past, only very high fire hazard areas were mapped in most urban locations. However, a change in state law triggered an update of these maps and also required the mapping of high and moderate fire hazard severity zones in the urban areas of local responsibility. In these areas, only sites greater than 20 acres in size are included.

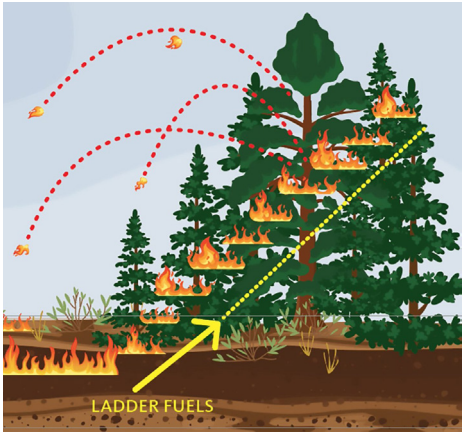
Fire Hazard Severity Maps of the study area were released in March, 2025. The results showed a significant portion of the study area falling within the High Fire Hazard Severity category, in and around Elephant and Westmont Hills, surrounded by a smaller band of Moderate hazard severity. In addition, high and moderate hazard severity zones extend along the 60 freeway in the southern portion of the study area, reflecting larger fire hazards in Diamond Bar and Chino Hills.

Management implications of these fire hazard severity designations are unclear at the time of writing this report. CalFire regulations do not mandate defensible space standards (fuel modification) in areas of High a Moderate Hazard Severity, however local fire agencies may choose to require these. It is expected that Los Angeles County Fire will require defensible space in high and possible moderate zone areas, which typically include clearance of dead and highly flammable vegetation within 100 feet of structures. However, their guidance suggests that this zone may be extended to 200 feet in areas of “extra fire hazard.” It is unclear if extra hazard applies only to very high hazard zones (of which there are none in the study area), or if they will also apply to other zones. Specific guidance from Los Angeles County Fire may not be available until spring, 2026, when their property inspection process begins with these new maps.

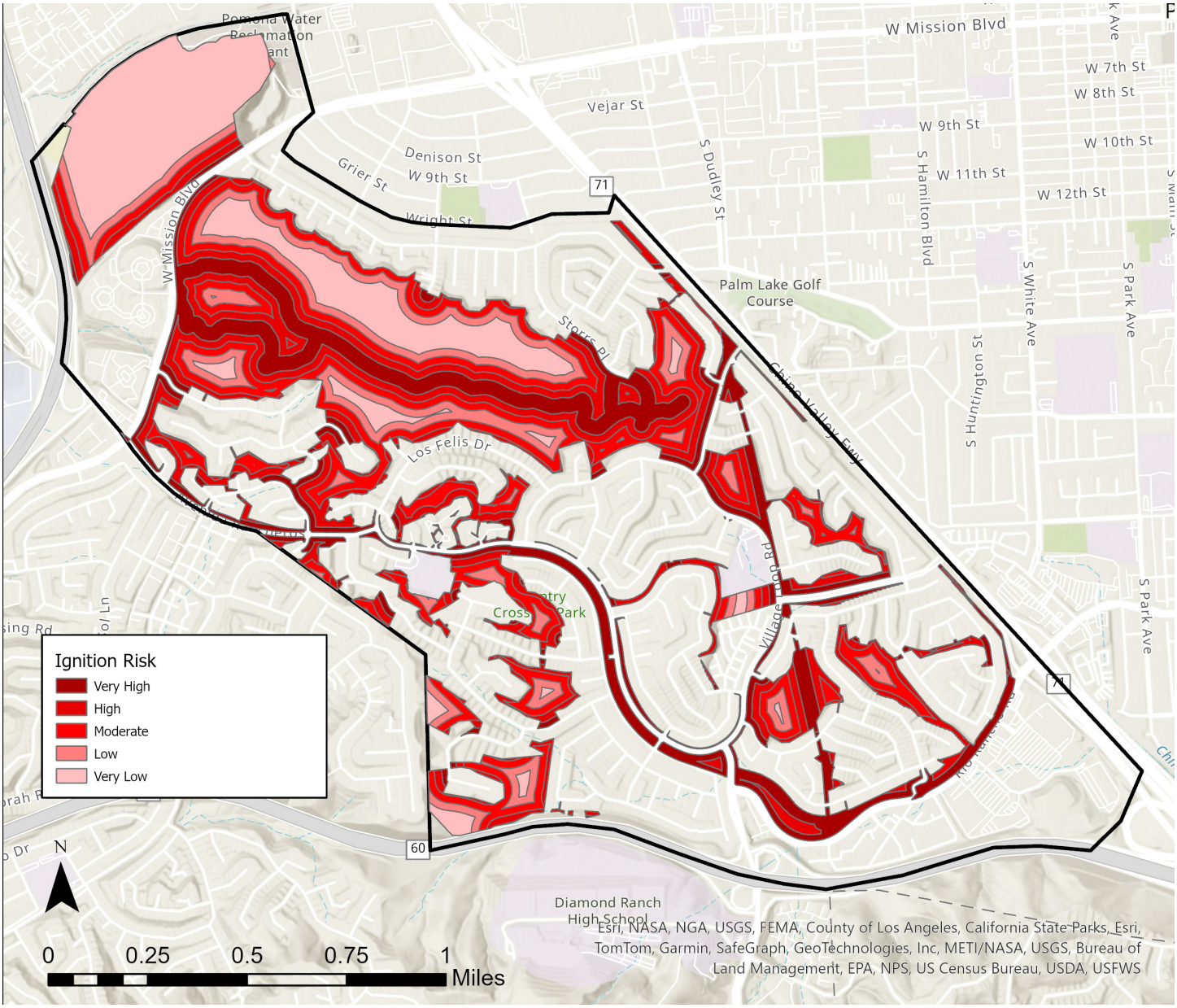
The City's current contract with Brightview identifies 32 open space sites for fuel load management.

Current Fuel Load Management Practices

The City's current contract with Brightview identifies 32 open space sites for fuel load management. As described by the City's Park and Facilities Manager, these sites are managed annually, focusing on removal of dry fuel within 100 feet of structures, to ensure compliance with Fire Marshal orders. This includes mowing/tilling of herbaceous areas typically dominated by Wild Mustard, as well as the removal of dead wood within this zone. The City is currently contemplating the extension of these managed areas to within 200 feet of structures, if so ordered by the Fire Marshal.



Fuel modification strategies typically include mowing or discing herbaceous plants to reduce their biomass when they dry out later in the season, as well as removal of dead wood and understory vegetation which may result in a "fire ladder," where fire moves from the ground level up into the crown of trees.



Since the vast majority of fires are ignited by human activity, areas in close proximity to hiking trails, streets, and high-voltage power lines were identified as areas of highest risk.

Factors Contributing to Fire Risk

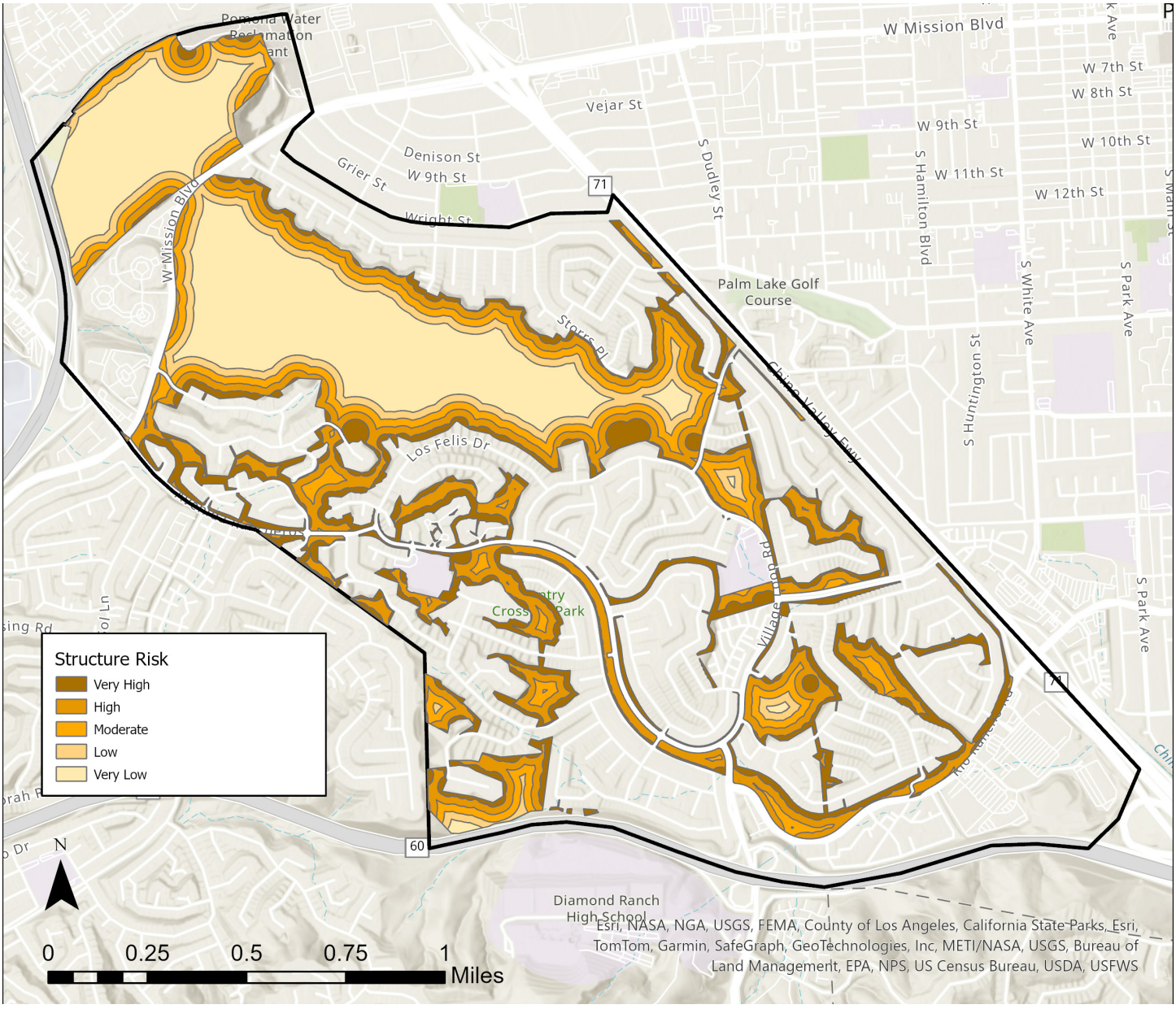
To assess the potential risk from wildfire, we developed a model that considers key factors in determining how to prioritize management areas. While fire hazard risk prevention commonly focuses on managing the load of available fuel (dry vegetation) in proximity to structures, other factors contribute to fire risk. These include the potential ignition or triggering of fire events, and the potential rapid spread of fire. These risks can be categorized as either risk associated with human activity, or risks inherent in landscape characteristics.

Human Activity and Fire Risk

The first human activity we considered was fire ignition. While fire may originate from natural sources, primarily dry lightning strikes and volcanic activity, these occurrences are extremely rare in Southern California. A study in the Proceedings of the National Academy of Sciences in 2017, showed that 97% of wildfires in the Mediterranean California Ecoregion between 1992-2012 were ignited by human activity. The most common forms of human activity that ignite wildfires include electrical transmission line malfunction, vehicles or other mechanical equipment failure, fireworks, discarded cigarettes, unattended campfires, the burning of garbage or debris, sunlight-concentrating litter, or intentional ignition such as arson.

If we can manage fuel availability in proximity to areas of risky human activity, we can potentially reduce ignition risk. Therefore our model prioritizes areas in proximity to high-voltage transmission lines, streets, and hiking trails. Areas within 100 feet are designated with “Very High” priority, 100-200 feet are designated “High” priority, 200-300 feet “Moderate” priority, 300-400 feet “Low” priority, and areas beyond 400 feet are “Very Low” priority.

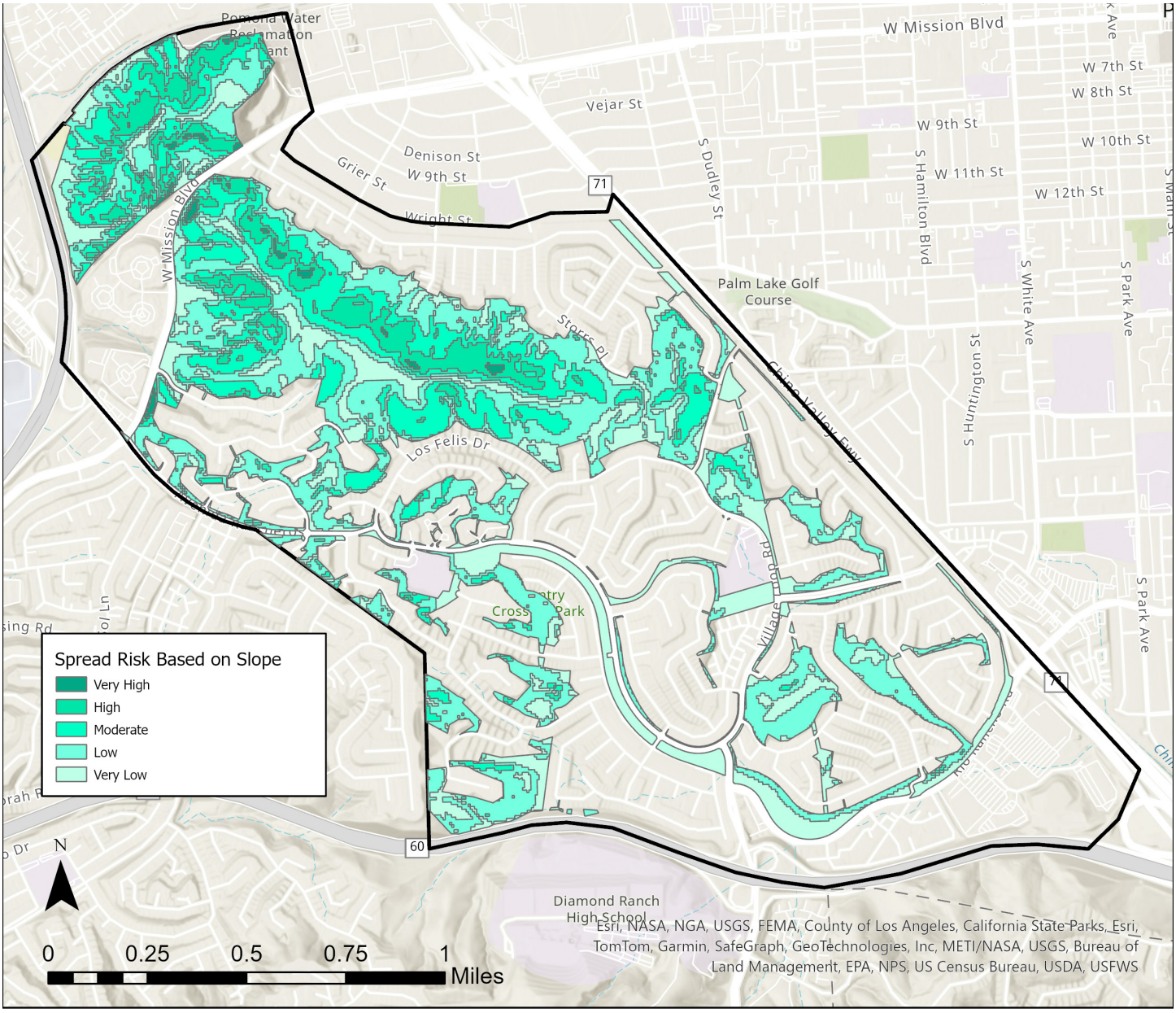
The second human activity our model considered was life and property. Reducing fuel availability in proximity to structures is dictated by Fire Marshal orders and is the basis of defensive space practices that divide the landscape up



Areas in close proximity to structures were identified as highest risk.

into zones, extending 100-200 feet from existing structures. Our study does not address the management of private lands within Phillips Ranch, but we prioritize the management of public lands in proximity to existing structures. Areas within 100 feet of structures are designated with "Very High" priority, 100-200 feet are designated "High" priority, 200-300 feet "Moderate" priority, 300-400 feet "Low" priority, and areas beyond 400 feet are "Very Low" priority.

In Southern California, 97% of wildfires are ignited due to human activity or from human infrastructure, such as powerlines.



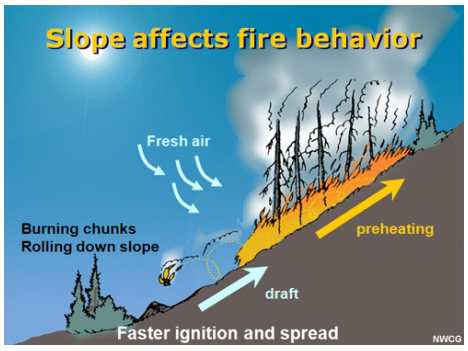
Hillside slopes are a major contributor to rapid fire spread. Areas with the steepest slopes are identified as the highest risk for rapid fire spread.

Landscape Characteristics and Fire Risk

Our model considers the potential for rapid fire risk based on landscape characteristics. Wind, moisture and slope are the most significant factors in understanding the rate of spread of wildfire. Wind and moisture are highly variable and difficult to adequately assess differences across the landscape without extensive field study. However slope is a predictable constant, that can be easily assessed. When fire moves upslope the fuel ahead of the flame is closer than if the landscape was flat. This allows upslope fuel to "preheat" and increases the rate of ignition. The steeper the slope, the greater the proximity of the upslope fuel, and the greater the risk of rapid spread.

If we can manage the fuel load on steeper slopes, we can reduce the risk of rapid fire spread, thus reducing the risk from wildfires which occur. Our model identifies slopes greater than 80% as "Very High" risk, 60-80% as "High" risk, 40-60% as "Moderate" risk, 20-40% as "Low" risk, and less than 20% as "Very Low" risk.

A second Landscape characteristic considered is the overall fuel load in a given area. Fuel load refers to the quantity of material that has the potential to burn, including vegetation and debris on the ground, such as leaves, needles, dead wood or other biomass. This potential may vary considerably based on plant species and management practices, as available moisture in plants is an important factor. Well-irrigated vegetation, or



some native plants that effectively store moisture will be more fire resistant than dead or drought-stricken plant material. As such, extensive field study and information about irrigation use are critical to accurately assessing current fuel load. Unfortunately, we lack the resources or data to conduct such an assessment.

As an alternative approach to estimating risk from fuel load, we considered the extent of fuel present to sustain fire, with assumptions that more manicured and highly-maintained open space areas within the Phillips Ranch neighborhood were well-irrigated, while surrounding open spaces were less intensively managed and lacked irrigation. This may mean that some of these surrounding open spaces that do receive irrigation may present a lower risk than we evaluated, but our approach represents a conservative estimate that considers the potential for broken or abandoned irrigation resulting from limited management budgets.

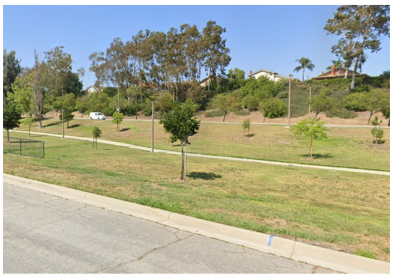
If we can manage fuel load, we can reduce the risk of fire, or reduce the temperatures of fires that do occur, reducing their potential for spread or damage to structures. To make this assessment, we identified five landscape types of varying risk. Woodland areas, defined as unmanaged or lightly-managed areas with greater than 75% tree canopy coverage were classified as "Very High" fuel load. Savannah areas, defined as unmanaged or lightly-managed areas with 25-75% tree canopy coverage, and a mix of grassland and forb cover, were classified as "High." The Grassland/Forb landscape type represents unmanaged or lightly-managed annual grassland and/or forb landscapes with predominantly herbaceous plants and less than 25% tree canopy coverage, and were classified as "Moderate." The Roadside Plantings landscape type represents actively managed tree landscapes with shrub understory, common along major streets in the Phillips Ranch neighborhood, were classified as "Low" fuel load risk. And Turf & Tree landscapes that are actively managed as park-like landscapes with irrigated turf cover and widely-spaced trees, were classified as "Very Low" fuel risk. These areas included the three public parks in the Phillips Ranch neighborhood.

Fuel Load (FL) – Phillips Ranch Landscape Types

Turf & Tree

Actively managed park-like landscape with irrigated turf cover and widely-spaced tree cover (park-Like)

- Greenbelt Park
- Country Crossings Park
- Phillips Ranch Park



Fuel Classification = "Very Low"

Roadside Plantings

Actively managed Tree landscape with shrub understory – Higher fuel load than Turf & Trees, but assumes Irrigation is provided

- Village Loop Road
- Avenida Rancheros
- Phillips Ranch Road
- Old Pomona Road
- Rio Rancho Road
- Ped Trail between Village Loop Road and Phillips Ranch Park

Fuel Classification = "Low"

Grassland/Forb

Unmanaged or lightly-managed annual grassland and/or forb landscapes with predominantly herbaceous plants and less than 25% tree canopy coverage.

- Many sites dominated by invasive mustard
- Tree species commonly Coast Live Oak and Southern California Black Walnut

Fuel Classification = "Moderate"

Savannah

Unmanaged or lightly-managed mix of grassland/forb cover with 25%-75% tree canopy coverage.

- Many open areas dominated by invasive mustard
- Tree canopy typically from the Phillips Ranch Planting Palette, including Eucalyptus species
- Could have considerable duff, litter or fine wood debris on surface

Fuel Classification = "High"

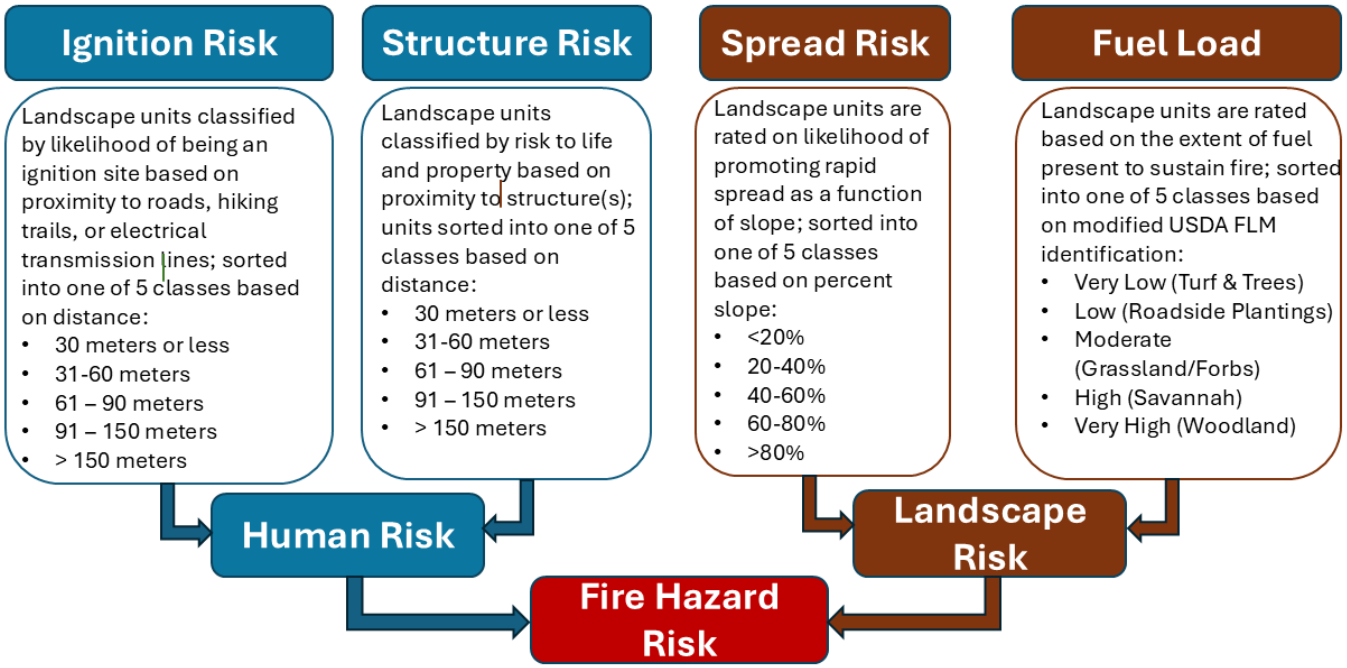
Woodland

Unmanaged or lightly-managed landscape with more than 75% tree canopy coverage.

- Potential for substantial fuel load from fallen wood, duff, litter and fine wood debris
- Sites near residential parcels tend to have tree species from the Phillips Ranch Planting Palette, including Eucalyptus species
- Substantial walnut/oak woodland on east slope of Westmont Hill
- Lowland woodland along Rio Rancho road with numerous exotics and invasives, including Tree of Heaven

Fuel Classification = "Very High"

Green City Studio Fire Hazard Risk Assessment Model



Wildfire Hazard Risk Prioritization Model

In order to prioritize areas for wildfire management, we constructed a model to assess fire hazard risk within the study area. We mapped the identified risk from each of the four factors, ignition risk, proximity to structures, rapid fire spread, and fuel load. We combined the assessment from ignition and structure risk into a Human Risk assessment, focused on factors associated with human activities. We also combined the assessment from spread risk and fuel load into a Landscape Risk assessment focused on hazards associated with landscape features.

We then combined the Human Risk and Landscape Risk assessments into an overall composite risk assessment for the purposes of prioritizing management for wildfire hazard risk.

The results reveal that all 31 of the current fuel load management sites include areas of mostly high risk, providing support for continued annual management of all of these sites. A few of these sites include areas identified as very high risk in our model. These areas may be considered for special management attention. They include:

Site 21, Rio Rancho Road: The site along Rio Rancho Road, east of Phillips Ranch Road, includes substantial woodlands, in close proximity to trails and nearby homes. Locals report that this site has previously experienced fires ignited by encampments. Significant fuel modification was conducted a few years ago, but the site has substantially revegetated, with a large population of the invasive Tree of Heaven (*Alianthus altiissima*).

Site 19, Meadow View/Rainbow Ridge Road: The site between Meadow View Drive and Rainbow Ridge Road is characterized by substantial woodlands and some steep slopes, in close proximity to homes. Woodlands include fire-prone species and dry duff material.

Site 19 includes Eucalyptus trees, dry duff material on the ground, and understory plantings.

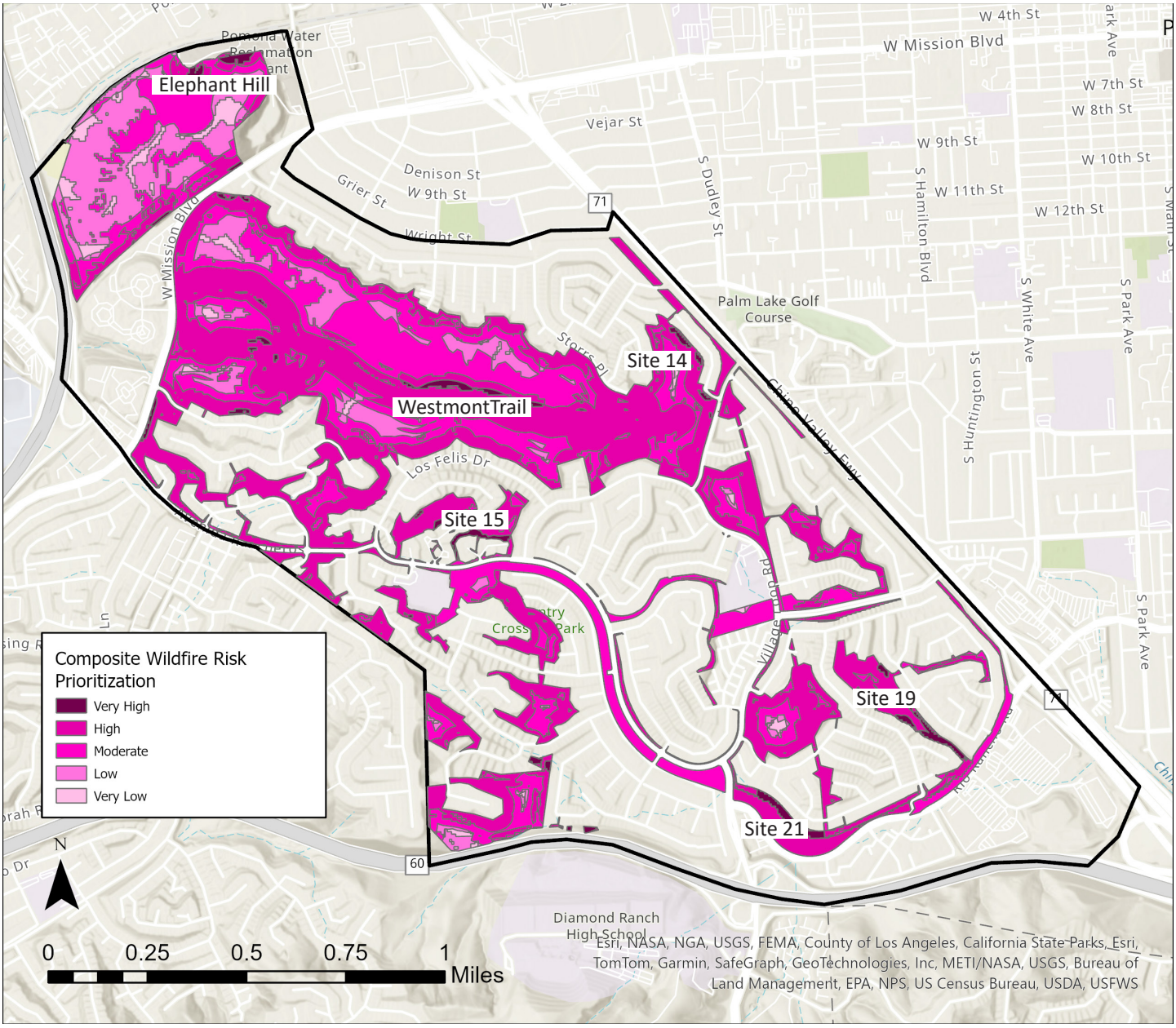
Site 15, Los Felis/Cil del Mar: While much of this site is fairly open, with herbaceous plant cover, the edges are heavily wooded, with fire-prone species.

The edges of Site 15 are heavily wooded with fire-prone species.

Site 14, Sage Canyon Road: This site adjacent to homes along Sage Canyon Road is heavily vegetated.

In addition to these management sites within the Assessment District, two other sites within the study area were identified for substantial very high risk areas:

Westmont Trail/Woodland Edge: The upper edge of the walnut/oak woodland along the eastern slope of Westmont Hill is in close proximity to the hiking trail through this site. This location has burned several times over the past 70 years. While these tree species are fairly fire resistant, dead woody material litters the ground. This site is public land managed by the City of Pomona.



The walnut/oak woodlands along the eastern slope of Westmont Hill includes dead woody material, in close proximity to a hiking trail.

Elephant Hill: This privately-owned site has burned several times over the past 70 years. Woodland areas are in close proximity to the Pomona Reclamation Plant, although these are largely fire-resilient native species..

Fire-Prone and Fire-Resistant Plant Species

Los Angeles County Fire Department has published a list of fire-prone plant species with guidance that these species should not be part of an approved fuel modification plan, including the area within 100-200 feet of structures (depending on hazard severity). They stress this list is not exhaustive, and that some cultivars of these species may be acceptable. Four of these species were included in the Phillips Ranch Planting Palette. Four are plants native to the Phillips Ranch study area.

While no plants are fire-proof, some species have been recognized for their resistance. Most notably the Coast Live Oak, *Quercus agrifolia*, has been shown to be quite fire resistant.

Fire-Prone Species Identified by L.A. County Fire.

Common Name	Scientific Name
Chamise	*Adenostoma fasciculatum**
Red Shank	*Adenostoma sparsifolium**
California Sagebrush	*Artemesia californica**
Common Buckwheat	*Eriogonum fasciculatum**
Pampas Grass	*Cortaderia spp.***
Cypress	*Cupressus spp.***
Eucalyptus	*Eucalyptus spp.***
Italian Jasmine	*Jasminum humile*
Cape Plumbago	*Plumbago auriculata*
Cape Honeysuckle	*Tecoma capensis***

* Native to Phillips Ranch Study Area.
** Included in Phillips Ranch Planting Palette.
Source: https://fire.lacounty.gov/wp-content/uploads/2020/05/Plant-Selection-Guidelines.pdf

WATER USE ASSOCIATED WITH THE LANDSCAPE

The Phillips Ranch Assessment District is interested in minimizing costs associated with management of their landscape. However, to provide resistance to fire ignition and fire spread, it is important that plants have access to adequate moisture. Plants vary widely in the irrigation needs required to sustain them. Native plants, and those adapted to Mediterranean climates have minimal irrigation needs. In contrast, many exotic plants have considerably higher water needs, particularly in warmer weather.

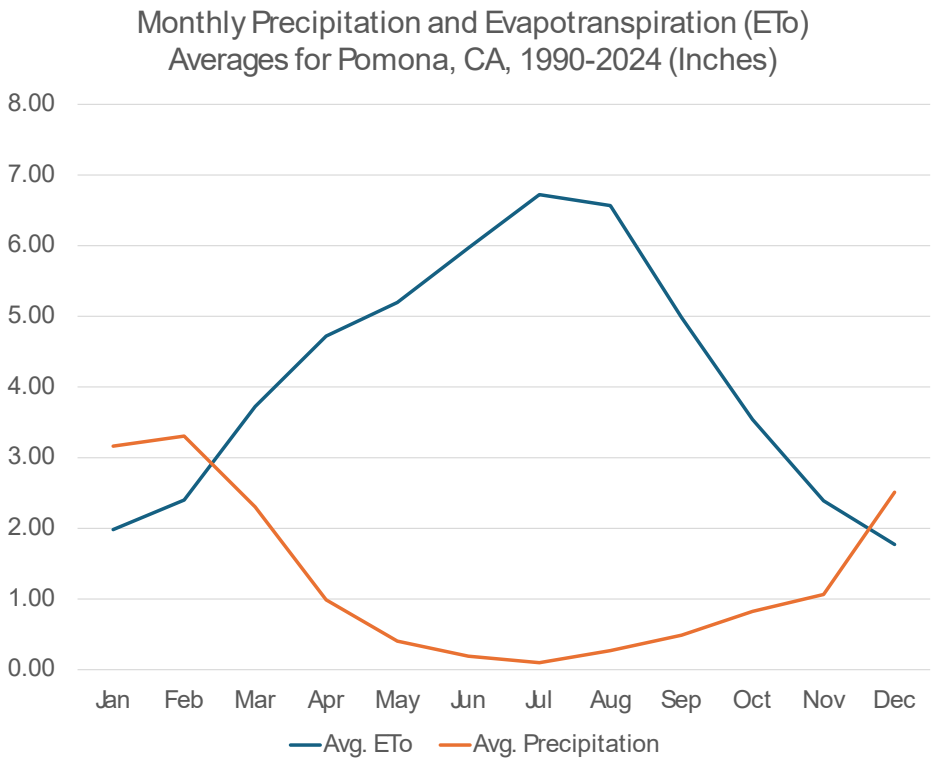
In order to develop a strategy to minimize water usage, it is important to consider seasonal patterns of rainfall and evapotranspiration, as well as the specific needs of plant species.

Climate Patterns

Located within the inland valley portion of the Los Angeles Basin, the project study area is characterized by an arid Mediterranean-type climate, featuring hot, dry summers, and mild, wet winters. In understanding fire hazard as well as water resources, it is particularly useful to consider patterns of precipitation and evapotranspiration on a month-to-month basis, recognizing the variability in precipitation and solar radiation throughout the year.

Monthly precipitation and evapotranspiration data from the past 35 years (1990-2024) was obtained from the California Irrigation Management Information System (CIMIS) station #78, located on the campus of California State Polytechnic University, Pomona, approximately 2 miles northwest of the study area.

Average monthly precipitation in the form of rainfall ranges from a high of 3.31 inches in February, to a low of 0.10 inches in July, reflecting the Mediterranean-type climate, with the wet period extending from November to March. It should be stressed that these patterns reflect a 35-year average, with some years exhibiting drought conditions with far less precipitation, and others exhibiting higher than average precipitation.



Historically, precipitation exceeds evapotranspiration rates in Pomona during winter months (December through February). March through November, evapotranspiration rates exceed precipitation, meaning that many plants require supplemental irrigation during this period.

Evapotranspiration (ETo), defined as water returning to the atmosphere from soils and plants, is closely associated with exposure to solar radiation and air temperature. Sunny, hot conditions, such as those experienced during the summer months, increase water loss due to evaporation off surfaces and transpiration by plants as they release water vapor into the atmosphere through their leaves. These two factors are combined into a single evapotranspiration figure in inches of water loss, which can be used to estimate water needs of plants that are not dormant. Average monthly ETo ranges from a high of 6.72 inches in July, to a low 1.77 inches in December.

When monthly precipitation and evapotranspiration quantities are compared, they can be used to identify potential irrigation needs of some plants. In the study area, monthly evapotranspiration rates exceed precipitation rates March through November. This means many non-native (exotic) plants must be supplemented with irrigation during this period in order to remain robust. In contrast, many native plants are adapted to this pattern of wet winters and hot, dry summers, and go dormant during the summer months. This greatly reduces their transpiration rates during this time period, and typically greatly reduce or eliminate their need for supplemental irrigation, once established.

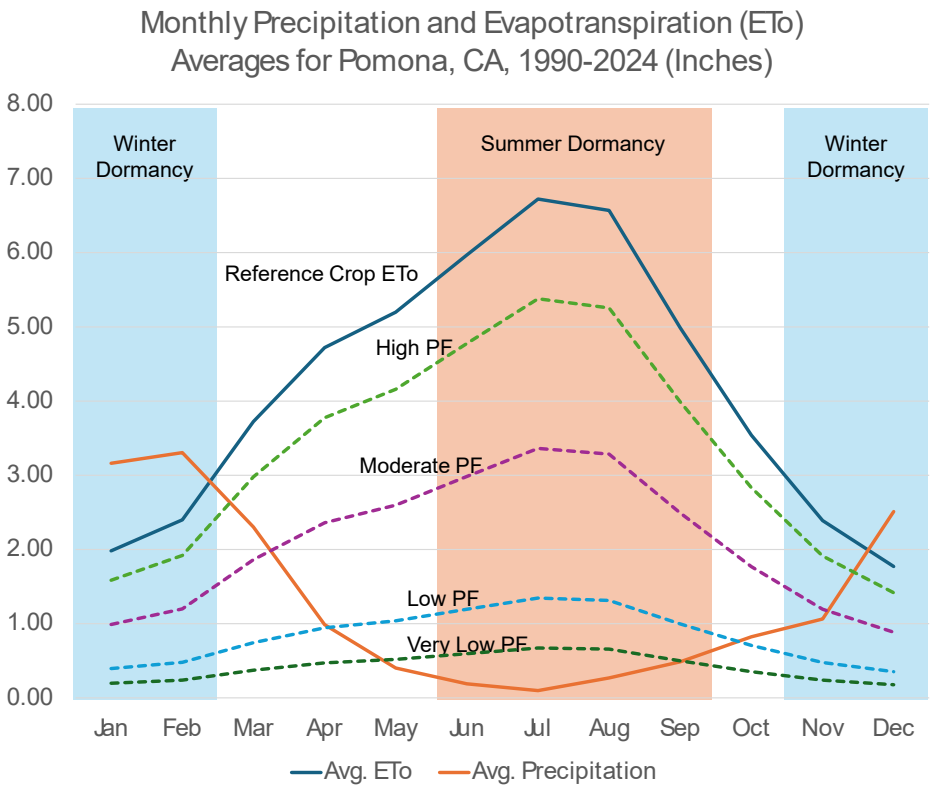
Water Use Classification of Landscape Species (WUCOLS)

Evapotranspiration data provided by CIMIS are based upon a reference species, typically a grass or forage crop common in agricultural applications. These reference crops typically have higher rates of transpiration, thus requiring more water to sustain productivity, than trees, shrubs or groundcovers commonly used in landscape plantings. To estimate the water needs of landscape species, the State of California relies upon the Water Use Classification of Landscape Species (WUCOLS) rating system managed by the University of California at Davis (https://wucols.ucdavis.edu/). This statewide initiative evaluates the water needs of common landscape species in different regions, and describes them as a ratio in comparison to reference crops. Species are broadly rated as very low, low, moderate, or high water need plants based on this ratio. These WUCOLS ratings are referred to as Plant Factors (PF) that are used in estimating irrigation demand.

When ETo rates of different WUCOLS plant factors are compared to the reference crop, we see lower irrigation demand, even for plants with "High" plant factors. Still, this data suggests that even plants with "Low" or "Very Low" plant factors still require summer irrigation. However this does not take into account summer dormancy, which greatly reduces water needs during summer months of many low-water plants. In our analysis, the dormancy period (summer, winter, or never dormant) are considered in evaluating each species.

Native Plant Palette

Remnant native plant assemblages in undeveloped portions of the study area, such as Elephant Hill and Westmont Hill, as well as natural history sources can be used to identify plant species that would have been prevalent prior to displacement from agricultural activity and housing development. Based on this information, it is expected that north and east-facing slopes would have been dominated by Southern California Black Walnut (*Juglans californica*) and Coast Live Oak (*Quercus agrifolia*) plant assemblages, south and east-facing slopes would have consisted of California Sage Scrub assem-



Evapotranspiration rates of landscape species based on their plant factors are lower than the reference crop. Patterns of dormancy may also be a factor, as many native and low-water plant species go dormant during summer months, further reducing the irrigation demand during this period.

Water Use Classification of Landscape Species (WUCOLS).

WUCOLS Rating	Water Use (% of ETo)	Plant Factor (PF) Used in this Report
Very Low	< 10%	0.10
Low	10 - 30%	0.20
Moderate	40 - 60%	0.50
High	70 - 90%	0.80

Like many native plants, the Coast Live Oak typically does not require irrigation once established. Thick, leathery leaves reduce water loss.

Landscape Species Included in the Native Plant Palette.

Common Name	*Scientific Name*	Plant Factor (PF)
Black Sage	*Salvia mellifera*	0.2
California Buckwheat	*Eriogonum fasciculatum*	0.1
California Sagebrush	*Artemisia californica*	0.1
Coast Brittle-bush	*Encelia californica*	0.2
Coast Live Oak	*Quercus agrifolia*	0.2
Coyote Bush	*Baccharis pilularis*	0.2
Engelmann Oak	*Quercus engelmannii*	0.2
Golden Yarrow	*Eriophyllum confertifolum*	0.1
Southern California Black Walnut	*Juglans californica*	0.2
Western Sycamore	*Platanus racemosa*	0.5
White Sage	*Salvia apiana*	0.2

blages, and riparian washes throughout the study area may have included more water-dependent plants, such as Western Sycamore (*Platanus racemosa*). With the exception of riparian plants, these species tend to be low or very low in water needs, and often go dormant during the hottest, driest summer months, further reducing their need for water.

WUCOLS ratings of key indicator species within these plant assemblages can be evaluated to establish a baseline of irrigation demand for a landscape that emphasizes native plants.

Phillips Ranch Planting Palette

We lack planting plans or data that illustrate the number and location of plant species used in the original design of Phillips Ranch. However the Phillips Ranch Master Landscape Concepts & Design Criteria document provides a description of nearly 5 dozen trees, shrubs and groundcovers used in the original design. While the planting palette includes a number of native species, the range of species is significant, including a number of plants from Mediterranean environments around the world, as well as some plants with greater water needs. We analyzed the WUCOLS ratings of all species in this planting palette, taking into account seasonal dormancy, as a comparison to baseline native planting regimes.

City of Pomona Planting Palette

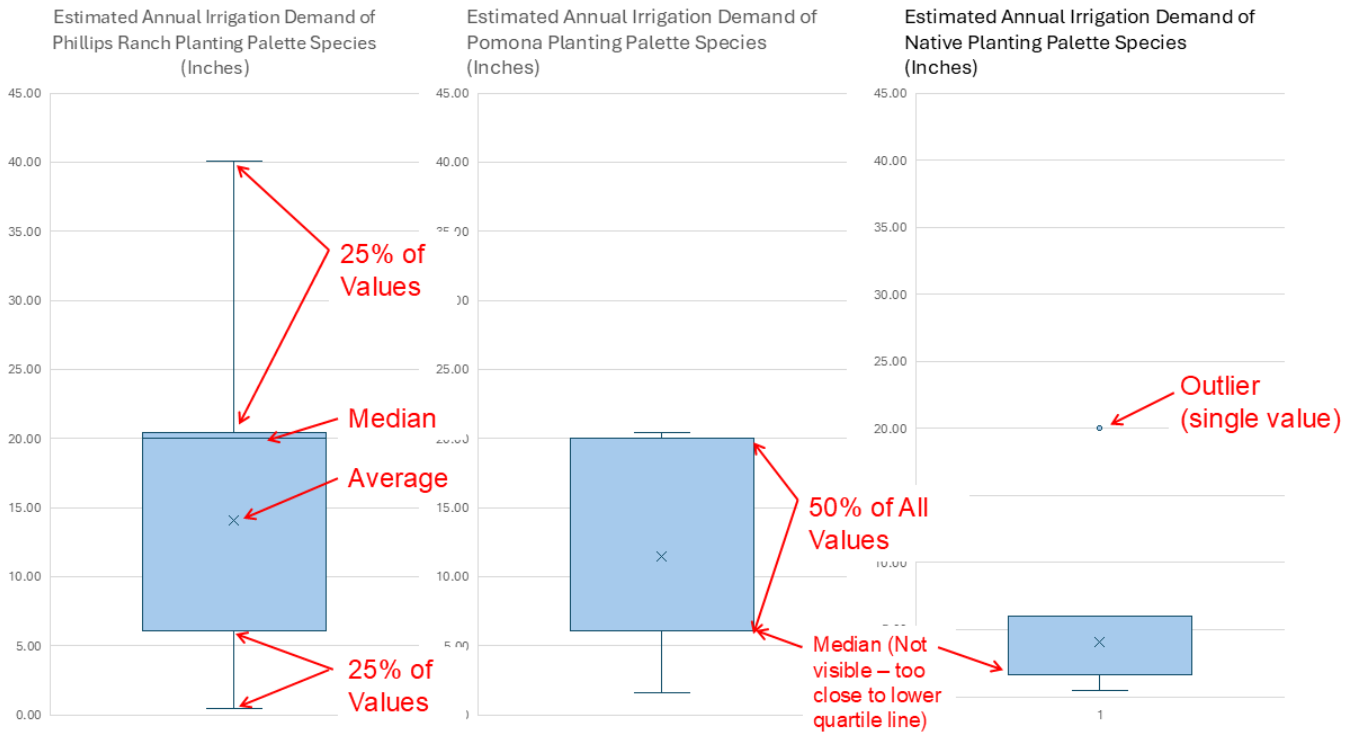
The city of Pomona's Street Tree Master Plan includes about 3 dozen tree species that were not included in either the native plant assemblages or the Phillips Ranch planting palette. These species were selected with consideration of the State water efficient landscape requirements and are presumed to be more water efficient than the Phillips Ranch planting palette, but less efficient than native assemblages.

Comparison of Water Needs

Comparison of the water needs of each planting palette reveals the impact of select species on overall efficiencies. Not surprisingly, the native palette demands far less irrigation than the other palettes, with an average of less than 5 inches of irrigation water per species needed annually, mostly during late spring or early summer months prior to dormancy. The outlier in this group is the Western Sycamore, a winter-dormant riparian species requiring 20 inches of irrigation water annually, particularly in areas outside of natural drainage regimes.

The City of Pomona Planting Palette requires an average 12 inches of irrigation water annually, with all species requiring less than 20 inches of irrigation water annually. This is primarily due to the exclusion of species with "High" plant factors.

By far the greatest variability is in the Phillips Ranch Planting Palette. This palette has the highest average annual irrigation demand per species, nearly 15 inches per year. While nearly 25% of its species require less than 6 inches of irrigation water annually, over 25% require more than 20 inches annually. These high water need species represent the most expensive components of the Phillips Ranch landscape when irrigated, and pose a significant fire hazard when not irrigated, due to a presumed lack of moisture within the plants. As such, any management strategy should look at long-term removal of these species, and prioritizing replacement with lower water-need plants, either from the Native or City of Pomona planting palette. Unfortunately we do not have any information about the extent of these species in the present-day landscape.

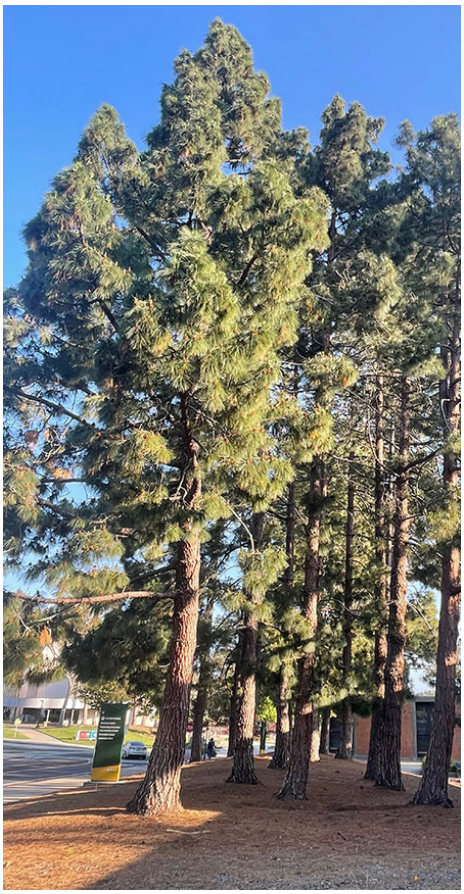


Phillips Ranch Planting Palette: Highest Water Need plants.

Species (Common Name)	Species (Scientific Name)	Type	Annual Estimated Irrigation Demand, Inches
White clover	*Trifolium repens*	Groundcover	40.11
White Alder	*Alnus rhombifolia*	Tree	35.35
Tulip Tree	*liriodendron tulipifera*	Tree	35.35
Weeping Willow	*Salix babylonica*	Tree	35.35
English Ivy	*Hedera helix*	Groundcover	22.59
Algerian Ivy	*Hedera canariensis*	Groundcover	22.06
Bird's-Foot Trefoil	*Lotus corniculatus*	Groundcover	22.06
Golden Wattle	*Acacia latifolia*	Shrub	20.43
Shiny Xylosma	*Xylosma congesta*	Shrub	20.43
Coast myoporum	*Myoporum laetum*	Shrub	20.43
Camphor Tree	*Cinnamomum camphora*	Tree	20.43
Bronze loquat	*Eriobotrya deflexa*	Tree	20.43
Hopseed bush	*Dodonea viscosa*	Shrub	20.43
Grand Magnolia	*Magnolia grandiflora*	Tree	20.43
Manna Gum	*Eucalyptus viminalis*	Tree	20.43
Italian Buckthorn	*Rhamnus alaternus*	Shrub	20.43
Rusty Leaf Fig	*Ficus rubiginosa*	Tree	20.43
Queen Palm	*Syagrus romanzoffiana*	Tree	20.43
Cape honeysuckle	*Tecoma capensis*	Shrub	20.43
Fraser's photinia	*Photinia fraseri*	Shrub	20.43
Cajeput Tree	*Melaleuca quinquenervia*	Tree	20.43
Mayten Tree	*Maytenus boaria*	Tree	20.43
California Laurel	*Umbellularia californica*	Tree	20.43
Canary Island Pine	*Pinus canariensis*	Tree	20.43

White Clover (*Trifolium repens*).

Weeping Willow (*Salix babylonica*).



Canary Island Pine (*Pinus Canariensis*).

Tulip Tree (*Liriodendron tulipifera*).

White Alder (*Alnus rhombifolia*).

Phillips Ranch Planting Palette: Lowest Water Need plants.

Species (Common Name)	Species (Scientific Name)	Type	Annual Estimated Irrigation Demand, Inches
Bushy Yate	*Eucalyptus lehmanni*	Tree	6.05
Rockrose	*Cistus corbariensis*	Shrub	6.05
Sonoma Sage	*Salvia sonomensis*	Shrub	6.05
White ironbark	*Eucalyptus leucoxylon*	Tree	6.05
Bearberry	*Arctostaphylos uva-ursi*	Tree	6.05
Chinese Elm	*Ulmus parvifolia*	Tree	6.05
Coffeeberry	*Rhamnus californica*	Shrub	6.05
Red Gum	*Eucalyptus camaldulensis*	Tree	6.05
Pink Melaleuca	*Melaleuca nesophila*	Shrub	6.05
Silk Oak	*Grevillea robusta*	Tree	6.05
Sugar Bush	*Rhus ovata*	Shrub	6.05
Oleander	*Nerium oleander*	Shrub	6.05
Flooded Gum	*Eucalyptus rudis*	Tree	6.05
Pepper Tree	*Schinus molle*	Tree	6.05
Lemonade berry	*Rhus integrifolia*	Shrub	6.05
Red Ironbark	*Eucalyptus sideroxylon*	Tree	6.05
Carmel Creeper Ceanothus	*Ceanothus griseus*	Shrub	6.05
Ice Plant	*Lampranthus spectabilis*	Groundcover	1.92
Common Sunrose	*Helianthemum nummularium*	Shrub	1.60
Carob	*Ceratonia siliqua*	Tree	1.60
Aleppo Pine	*Pinus halepensis*	Tree	1.60
California poppy	*Eschscholzia californica*	Groundcover	0.51
Saltbush	*Atriplex spp.*	Shrub	0.43

Red Ironbark (*Eucalyptus sideroxylon*).

White Ironbark (*Eucalyptus leucoxylon*).

California Poppy (*Eschscholzia californica*).

Pepper Tree (*Schinus molle*).

Aleppo Pine (*Pinus halepensis*).

Ice Plant (*Lampranthus spectabilis*).

Sonoma Sage (*Salvia sonomensis*).

ECOSYSTEM MANAGEMENT RECOMMENDATIONS

In response to our analysis of wildfire hazards and water use associated with the landscape, we have developed a series of ecosystem management recommendations. Some of these recommendations require the collection and analysis of additional data in order to take steps to improve ecosystem management. These steps are delineated to the greatest extent possible, based on information available at the time of writing this report.

1. Continue annual management of all fire hazard areas to comply with Los Angeles County Fire directives.

Our analysis confirms that the 31 open space sites being actively managed by the Assessment District are high priority areas, meaning annual fuel modifications practices should continue. As we mentioned, their is uncertainty about the potential expansion of required fuel modification zones to 200 feet from structures, which may increase maintenance costs. While this may be the case, in many areas we noted evidence of mowing/discing that already extended beyond the current 100-foot distance from structures. In some situations, this modification zone appeared to be approximately 100 feet from property boundaries, and nearly 200 feet from structures. ***The Assessment District should examine current practices to determine actual distances from structures currently being managed***. This may reveal that the District may be in compliance with County Fire directives, even if they are modified in 2026.

2. Target fire-prone plant species for removal.

Four plant species identified as fire-prone by L.A. County Fire were included in the original Phillips Ranch Planting Palette. The extent of Pampas Grass, Cypress and Cape Honeysuckle present, particularly in fire hazard sites, is unknown. However, multiple Eucalyptus species were widely planted throughout the Assessment

Ecosystem Management recommendations

Wildfire Hazard Management

1. Continue annual management of all fire hazard areas to comply with Los Angeles County Fire directives.
2. Target fire-prone plant species for removal.
3. Transform very high fire hazard areas toward fire-resistant planting palettes.

Water Use Efficiency

4. Target high-water need plants for removal and replacement.
5. Develop a revised planting palette that reduces watering requirement.
6. Inventory and assess the District's irrigation system to determine its extent and condition.
7. Explore strategies for retaining soil water to reduce irrigation requirements and strengthen fire resiliency.

Eucalyptus trees are prevalent throughout the Phillips Ranch Assessment District, but they are a fire concern as they contain oils which increase flammability. L.A. County Fire Department classifies them as undesirable.

District, and are apparent in fire hazard areas adjacent to residential lots, as well as throughout roadside planting areas. Many of these trees are majestic in stature, and emblematic of the Phillips Ranch landscape as it has come to be known by locals. These cultural benefits must be weighed in comparison to the fire hazard they represent. They may be suitable if well-managed in lower risk locations. The Assessment District should:

A. ***Map the presence and location of all fire-prone species listed on page 13.***
B. ***Classify each fire-prone plant based on its fire hazard risk, as denoted on the map on page 13. It is expected that highest risk locations will be sites adjacent to residential lots.***
C. ***Prioritize the removal of high-risk specimens. Identify suitable alternatives for replacement, such as Coast Live Oak (Quercus agrifolia).***
D. ***In lower-risk areas, such as roadside plantings, initiate community discussion about the desirability of preserving these species, or developing a transition plan to less fire-prone species.***

Open space sites at the rear of residential lots often include Eucalyptus species in varied condition. These high risk areas should be prioritized for removal of fire-prone species and other dead or dying plants.

3. Transform very high fire hazard areas toward fire-resistant planting palettes.

Our analysis identified four Assessment District open space sites that contain substantial areas of very high fire hazard (Sites 21, 19, 15, 14). While other sites may be high risk, these four sites may be of higher priority, due to their characteristics. The Assessment District should transform these sites toward fire-resistance by:

A. ***Remove dead/dying trees and shrubs.***
B. ***Remove fire-prone species.***
C. ***Map remaining vegetation.***
D. ***Develop a planting plan to re-establish original landscape character with species that are less fire-prone. Particular consideration should be given to Coast Live Oak as a dominant canopy species, due to its fire resistance and ecological benefits.***

It is believed that grants may be available from CalFire or private urban forestry foundations for the revegetation of these sites. The Assessment District is encouraged to work with the City in pursuing such grant opportunities.

Coast Live Oak (Quercus Agrifolia) are native plants which dot the hillsides of Phillips Ranch. Their fire resistance and ecological benefits of wildlife habitat, carbon sequestration, and stormwater retention make them an excellent choice for revegetation of high fire hazard areas.

Canary Island Pine (Pinus Canariensis) are widely planted throughout Phillips Ranch, but they also require relatively high amounts of water to maintain health and fire resiliency.

Heavily used and highly visible landscapes present an opportunity for enhancing the beauty of Phillips Ranch. Prior to the re-design of these areas, a comprehensive revision to the Assessment District's planting palette should be prioritized, to ensure consistency.

4. Target high-water need plants for removal and replacement.

While the original Phillips Ranch plant palette included 23 low-water need species, it also include 24 high-water need species. It is unknown how many of these plants persist in today's landscape. Similar to the prioritization of fire-prone plant removal, the Assessment District should:

A. ***Map the presence and location of all high-water need species listed on page 18.***
B. ***Prioritize the removal of high-water need specimens. Metrics that may considered in determining prioritization include ease/cost of irrigation, and community benefit (the extent to which the site is visible from public roadways, trails, etc.).***
D. ***Identify suitable alternatives for replacement.***

5. Develop a revised planting palette that reduces watering requirement.

The original Phillips Ranch Plant Palette is a robust list of nearly 120 species of groundcovers, shrubs and trees. Many of these species are high-water need plants no longer considered appropriate for Southern California, nor are they likely compliant with state and city regulations on water efficient landscapes.

At the same time, the palette also includes nearly two dozen low-water need plants. However, many of these species are now understood to be fire-prone, most notably four species of Eucalyptus trees. There are also concerns of invasiveness and other ecologically detrimental characteristics with other species, such as Ice Plant and Pepper Tree.

It is recommended that the Assessment District work to revise the planting palette to achieve compliance with water efficient landscape requirements, include ecologically beneficial plants, and also maintain the desirable landscape character of Phillips Ranch. The development of a revised planting palette is an important first step in re-designing key landscapes to enhance the beauty of Phillips Ranch.

6. Inventory and assess the District's irrigation system to determine its extent and condition.

While some information regarding water usage was available for analysis in compiling this report, there is a lack of information about the location, extent and functioning of the District's irrigation system. This prevented more detailed analysis about water use within particular zones and landscape types, as well as more detailed understanding about fuel load in open space areas. It was reported that much of the irrigation has been turned off to reduce costs, but it is unclear what may still be operational and capable of retrofitting for more efficient technology, such as drip irrigation. This is important, because all plants, even low-water need plants, need supplemental irrigation when planted, in order to establish.

It is recommended that the District map the location and extent of its irrigation system to support further enhancement of the Phillips Ranch landscape. Systems should be denoted as operational, inoperable, or currently deactivated.

Many sites throughout the Assessment District were developed with sub-surface irrigation. But there is a lack of reliable information about the location, extent, and functioning of these systems.

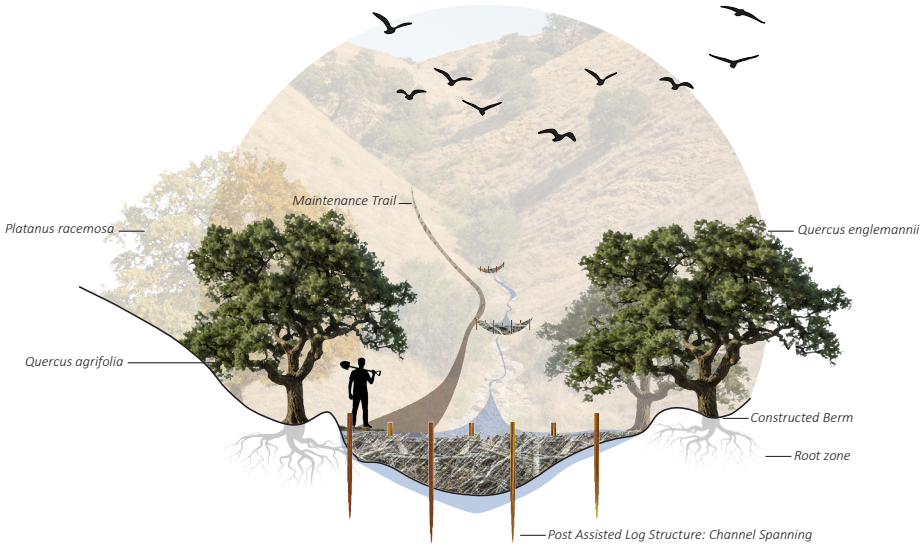
7. Explore strategies for retaining soil water to reduce irrigation requirements and strengthen fire resiliency.

The water contained within soil is an important resource for plants. It may allow vegetation to persist through dry seasons, reduce irrigation demand, and can even strengthen fire resiliency. Studies on the effect of beavers, and their ability to retain water in landscapes through dam construction, have shown that these landscapes are more fire-resistant than surrounding landscapes, due to greater moisture levels in soils and plants. This understanding has led to the development of "Beaver dam analogues" that mimic beaver practices through human-constructed devices that retain water.

Application of this technology is limited in arid climates, like Phillips Ranch. Our student team explored some possible approaches. ***It is recommended that the Assessment District continue to explore the potential of beaver dam analogues and similar devices, to reduce irrigation demand and strengthen fire resiliency***.

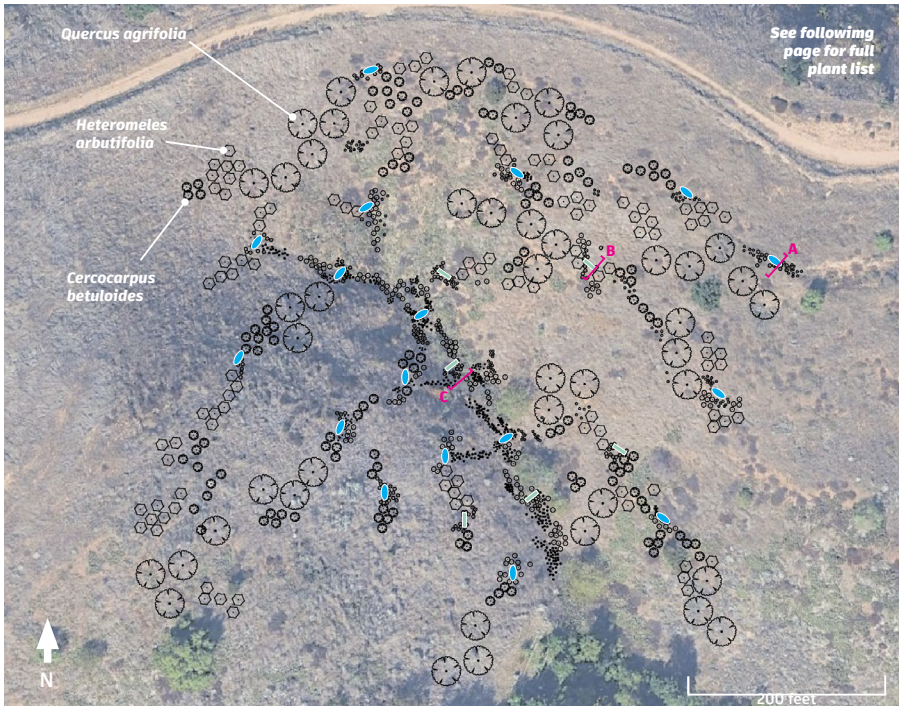
Beaver Dam Analogs

Post Assisted Log Structure: Channel Spanning



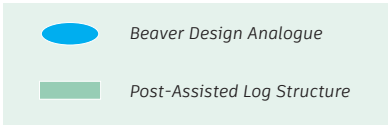
Beaver dam analogues are human-constructed devices that slow down the flow of stormwater and increase infiltration into soil, storing water for use by plants. It has been shown that soil water retention increases fire-resistance in landscapes. Design by Lucas Murillo.

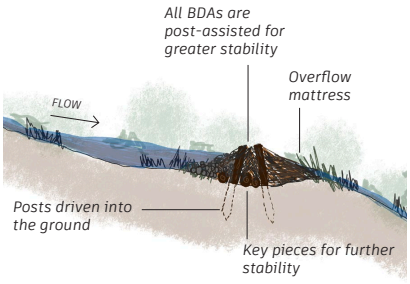
SITE PLAN



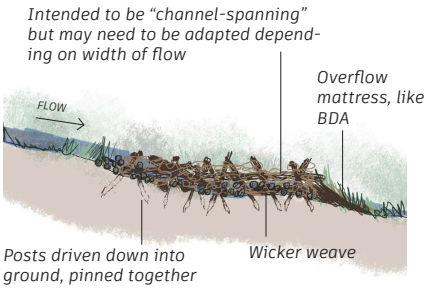
This site plan identifies 23 locations for BDAs or PALS. The planting used to supplement the structures could be further filled in, but this initial plan gives a sense of the staggered placement of structures alongside planting that would allow the site to retain more moisture. The structures are positioned to receive water from the various directions of flow, all towards a central area of the site that would be planted like a swale, with a higher density of grasses and groundcover plants that would slow water down further. It's clear from the scholarship surrounding BDAs that quantity is often the most important factor with regards to effectiveness across a large site, so I chose to use a high number of structures and layer them across the landscape, creating stepping stones that would widen the floodplain during a storm event and create a diverse network of flows.

KEY





Beaver Design Analogues (BDAs) - Section A
Standard for all BDAs on site



Post-Assisted Log Structures (PALS) - Section B
Standard for all PALS on site

Given that the site receives significant sun throughout the year, consists of clay soil, and has a substantial slope, plants were selected according to these qualities. Certain plants were also selected because of their particular functionality with swales or dry streambeds.

KEY PLANT CHARACTERISTICS:

LOW WATER
FULL SUN
TOLERANT OF SLOW DRAINING SOILS
*NATIVE TO SOUTHERN CALIFORNIA**

GRASSES / GROUNDCOVERS

Carex tumulicola
Foothill Sedge

Elymus condensatus
Giant Wildrye

Muhlenbergia rigens
Deergrass

Achillea millefolium
Common Yarrow

SHRUBS

Cercocarpus betuloides
Mountain Mahogany

Eriogonum fasciculatum
Califronia Buckwheat

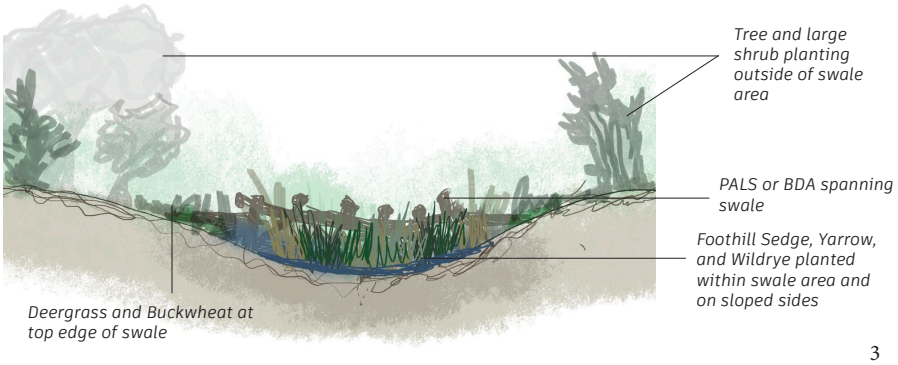
Heteromeles arbutifolia
Toyon

TREES

Quercus agrifolia
Coast Live Oak

*Cultivars were not selected for this project. I aimed to create a landscape that might mimic a naturally-occuring plant community, blending a swale or dry stream bed palette with a hillside, full sun/low water palette.

EXAMPLE OF PLANTING WITH BDA IN SWALE AREA - Section C



Beaver Dam analogue concept for Westmont Hill. Design by Kat Chavez.

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