FIRE PROTECTION PLAN
FOR

HAMILTON SUBDIVISION

APN 522-080-49

PREPARED FOR:

Craig Hamilton
15882 Skyline Truck Trail
Jamul, CA 91935
&
County of San Diego
Department of Planning and Land Use
5201 Ruffin Road, Suite B
San Diego, CA 92123

PREPARED BY:

Robin Church
RC Biological Consulting, Inc.
4215 Spring Street, Suite 321
La Mesa, CA 91941
(619) 463-1072

August 2008

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1.0 INTRODUCTION

The proposed project is a minor subdivision and residential development of 24.29 gross acres, APN 522-080-49, into two parcels. There is an existing residence on-site. The proposed project is located on Skyline Truck Trail in the Community of Jamul. The two parcels have gross sizes of 8.57 and 15.72 acres. The proposed project also includes the preservation of 19.28 acres in biological open space easements on-site. Access will be provided by a private road that will extend to a cul-de-sac and individual driveways for the proposed parcels. The project will be supplied water by a well and a 10,000 gallon storage tank. The project is located in the eastern portion of San Diego County east of the Community of Jamul in the County of San Diego (Figure 1). The project is accessed by an existing private road approximately 0.75 miles east from the Lawson Valley Road and Skyline Truck Trail intersection (Figure 2).

The purpose of this Fire Protection Plan (FPP) is to meet the requirements of the Rural Fire Protection District regarding fire safety in the Wildland/Urban Interface for the Hamilton subdivision, APN 522-080-49. Article 86 of the 2001 edition of the California Fire Code indicates that a Fire Protection Plan shall be required for all new development within the Wildland/Urban Interface. Structural and wildland fire protection will be provided to the project area by the Rural Fire Protection District. The Fire Services Availability form and approval letter from Chief Nissen are included as Appendix A.

The following Fire Protection Plan addresses water supply, access, building ignition and fire resistance, fire protection systems and equipment, defensible space and vegetation management in accordance with the requirements of Article 86. When developing mitigation measures the location, topography, geology, flammable vegetation and climate were taken into consideration.

2.0 SETTING AND FIRE HISTORY

Structural and wildland fire protection is provided to the project area by the Rural Fire Protection District. The site is located within a State Responsibility Area (Figure 3). The majority of the project site is located in an area of very high flammable vegetation as depicted by the California Department of Forestry Fuel Threat map (Figure 4). An area of high flammable vegetation is located in the northwestern section of the property. The following sections discuss the surrounding land use, topography, vegetation, climate, and fire history.

2.1 Surrounding Land Use and Topography

The site is located in an area of rural residential development. The site is bordered to the east by a graded access road. The remainder of the site is bordered by rural residential development and undeveloped land. The aerial photograph of the project site and surrounding area illustrates the level of development surrounding the site (Figure 5). The

Figure 1
Regional Location Map

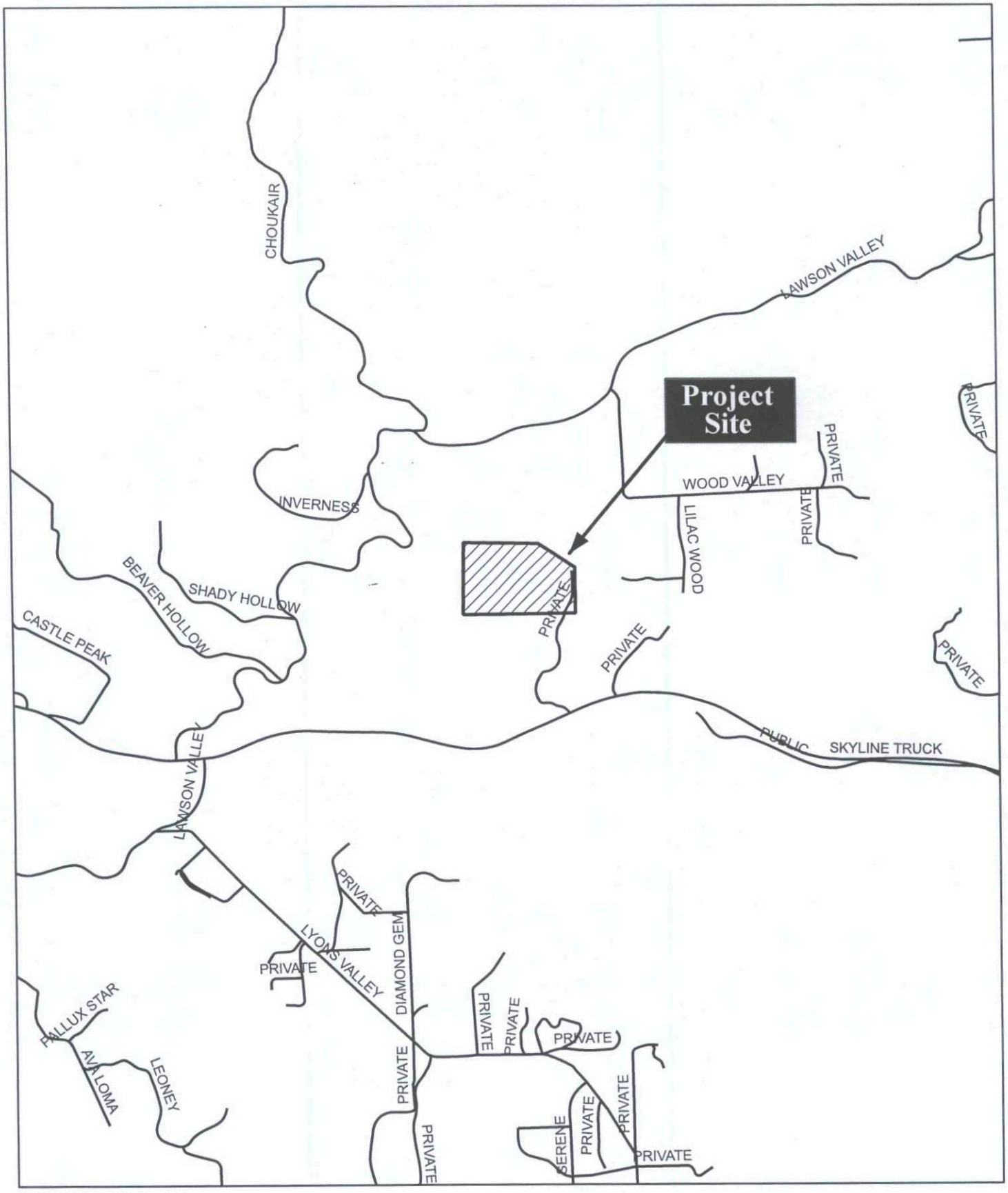
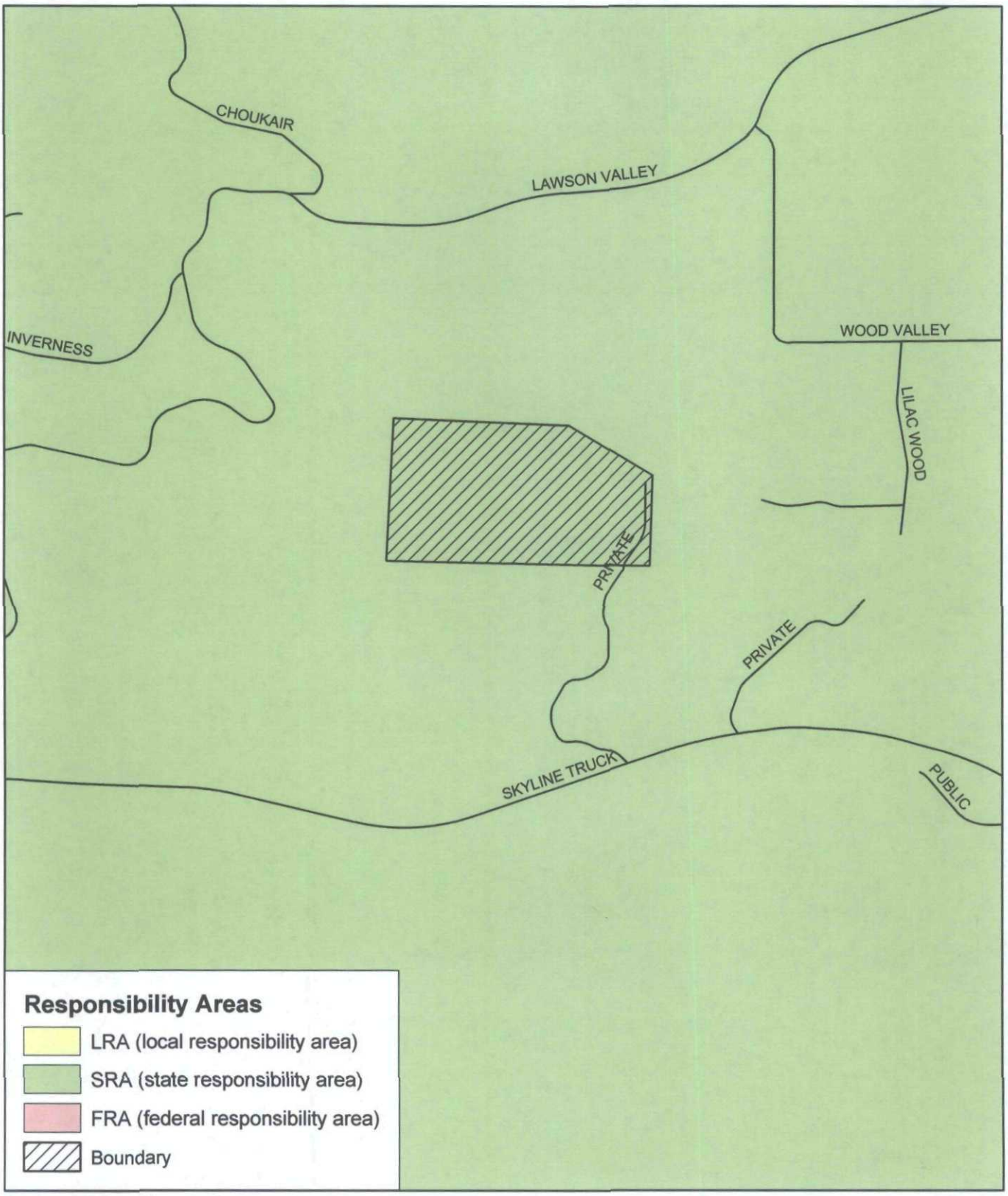


Figure 2
Project Location
Hamilton Property

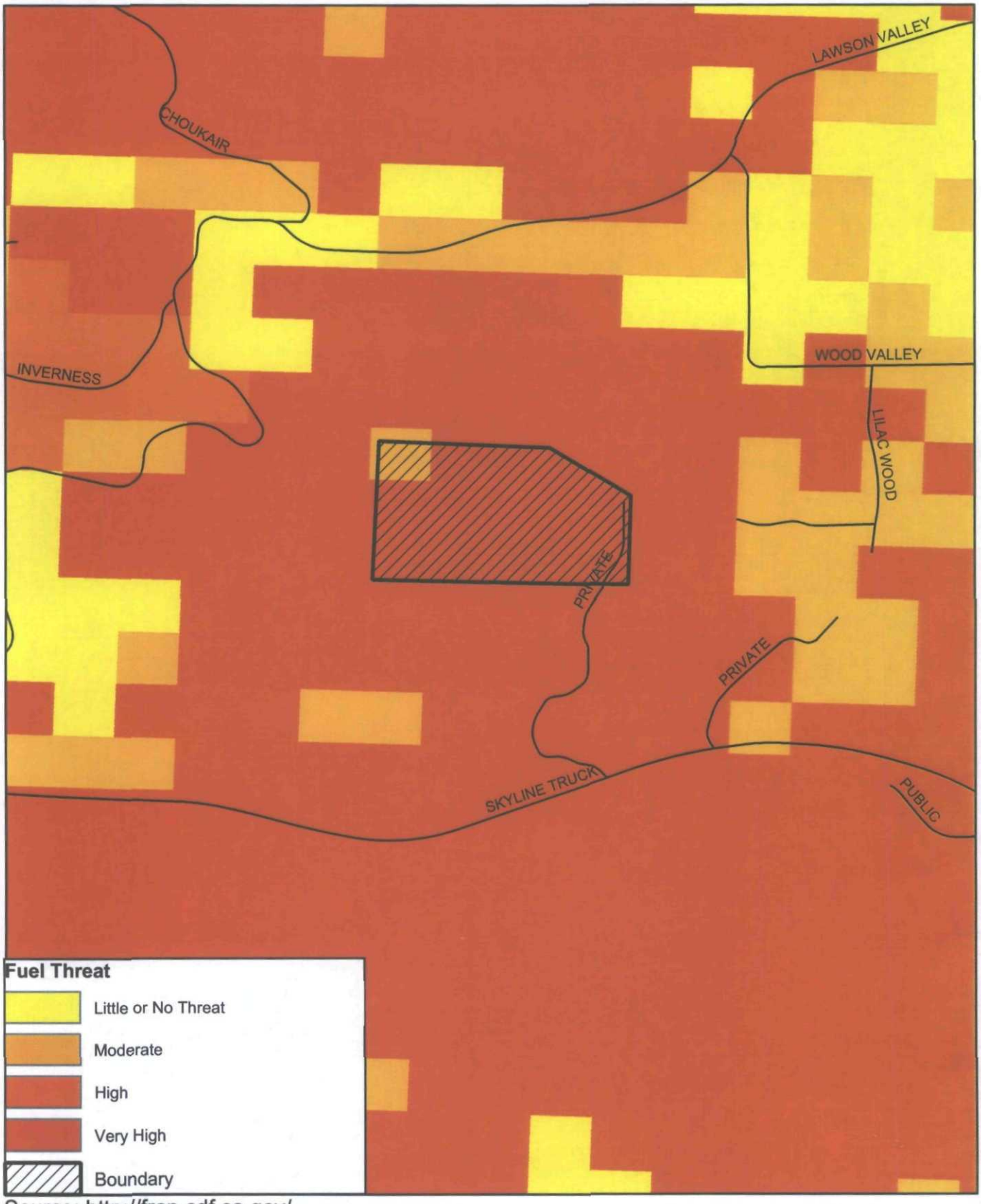


Source: http://frap.cdf.ca.gov/

Figure 3
State Responsibility Area Map
Hamilton Property

N

0 500 1,000 Feet



Source: http://frap.cdf.ca.gov/

Figure 4
Fire Threat Map
Hamilton Property

N

Feet
0 500 1,000

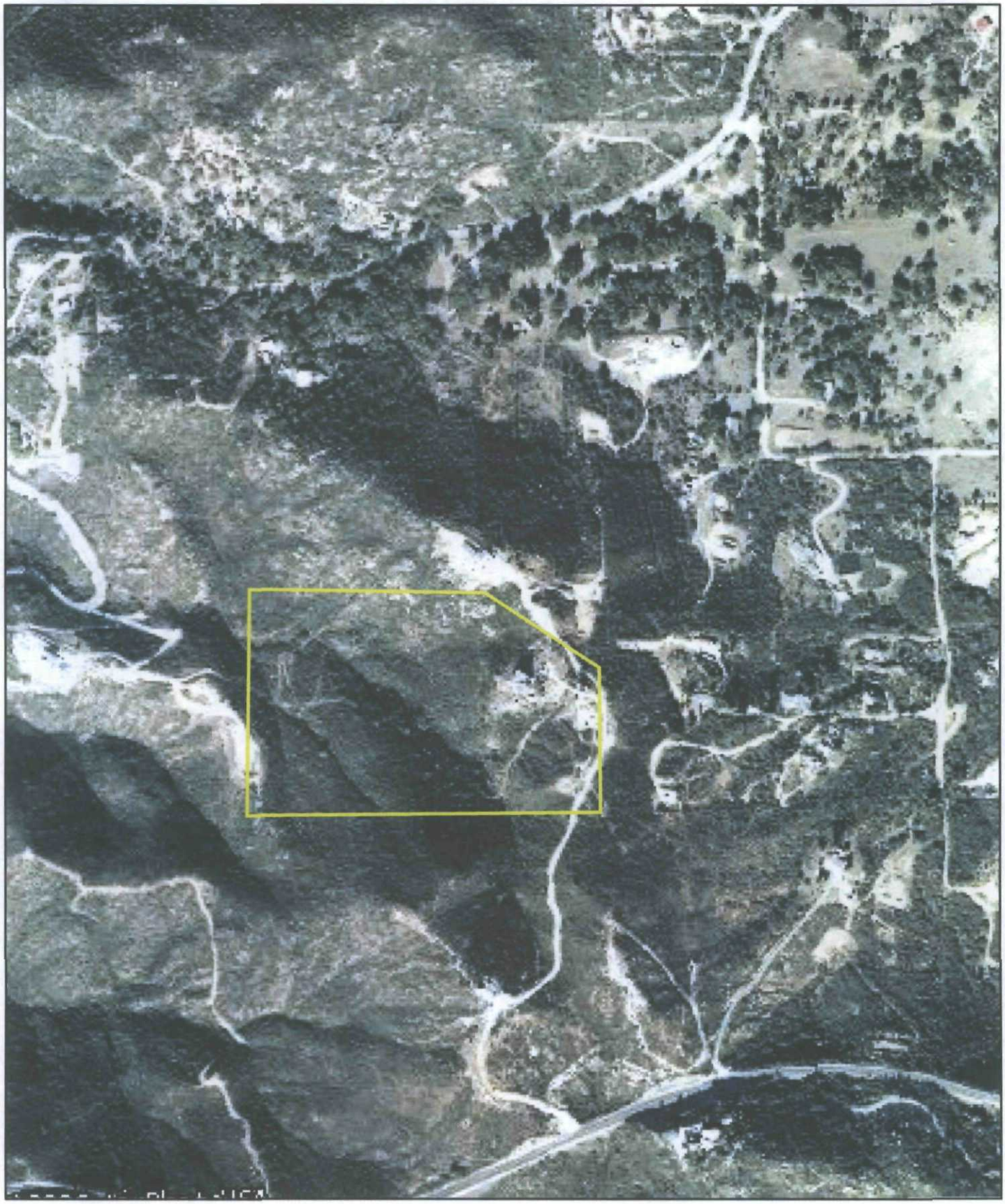


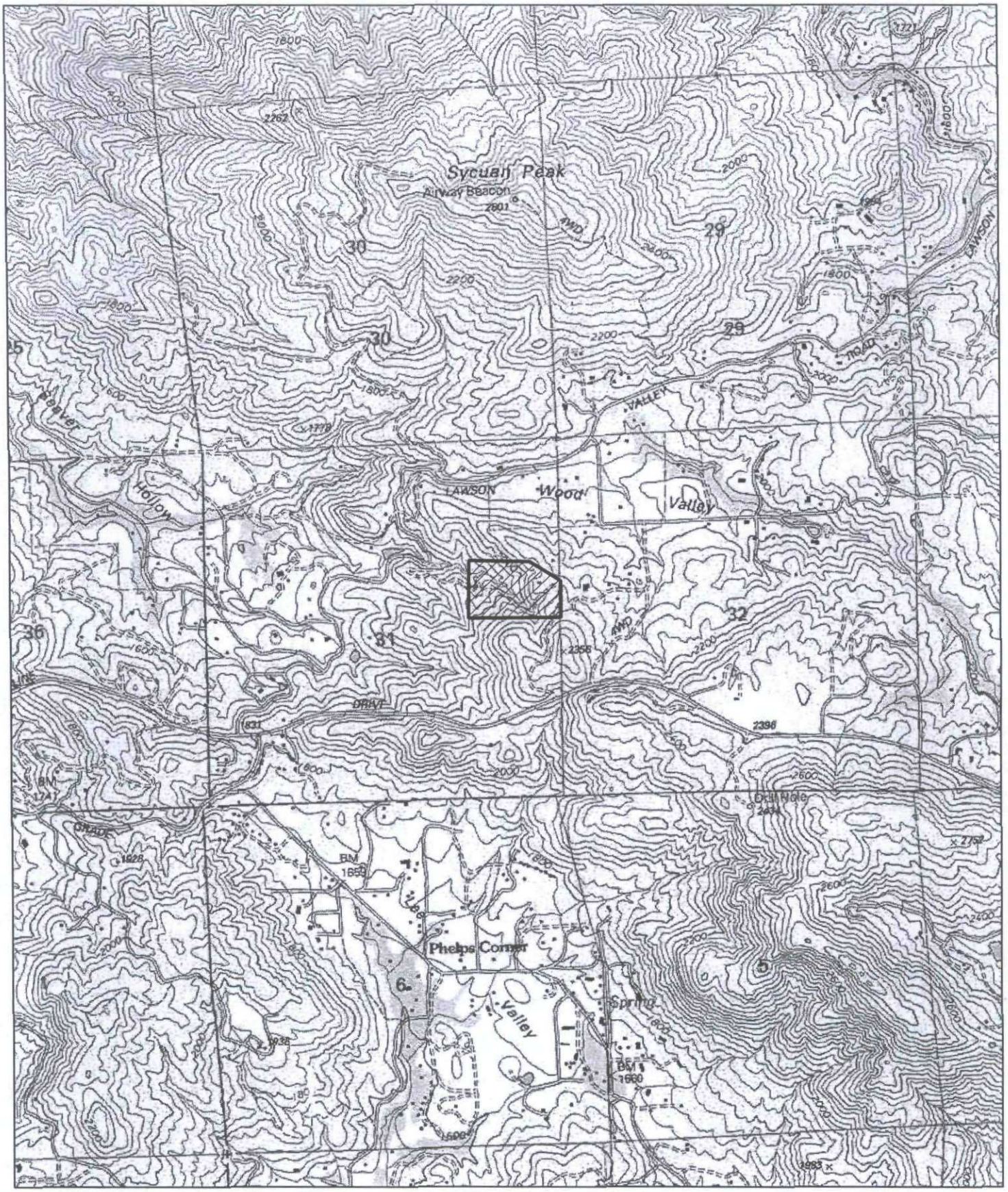
Figure 5
Aerial
Hamilton Property

proposed project is nestled between ridges to the east and south (Figures 5 & 6). The topography of the site is composed of west, south, and north facing slopes. A significant canyon runs southeast/northwest through the site.

2.2 Vegetation

The project site contains two native plant communities, mafic southern mixed chaparral and coastal sage-chaparral scrub. Disturbed and developed habitat also occur on-site (Figure 7). As can be seen in Figure 7, mafic southern mixed chaparral and coastal sage-chaparral scrub habitats are being retained within open space west of the proposed developed portion of the project site. The proposed open space area is shown in Figure 8 below.

Figure 8. *View facing east of mafic southern mixed chaparral preserved in proposed open space*



Source: USGS 7.5' Dulzura Quadrangle

Legend

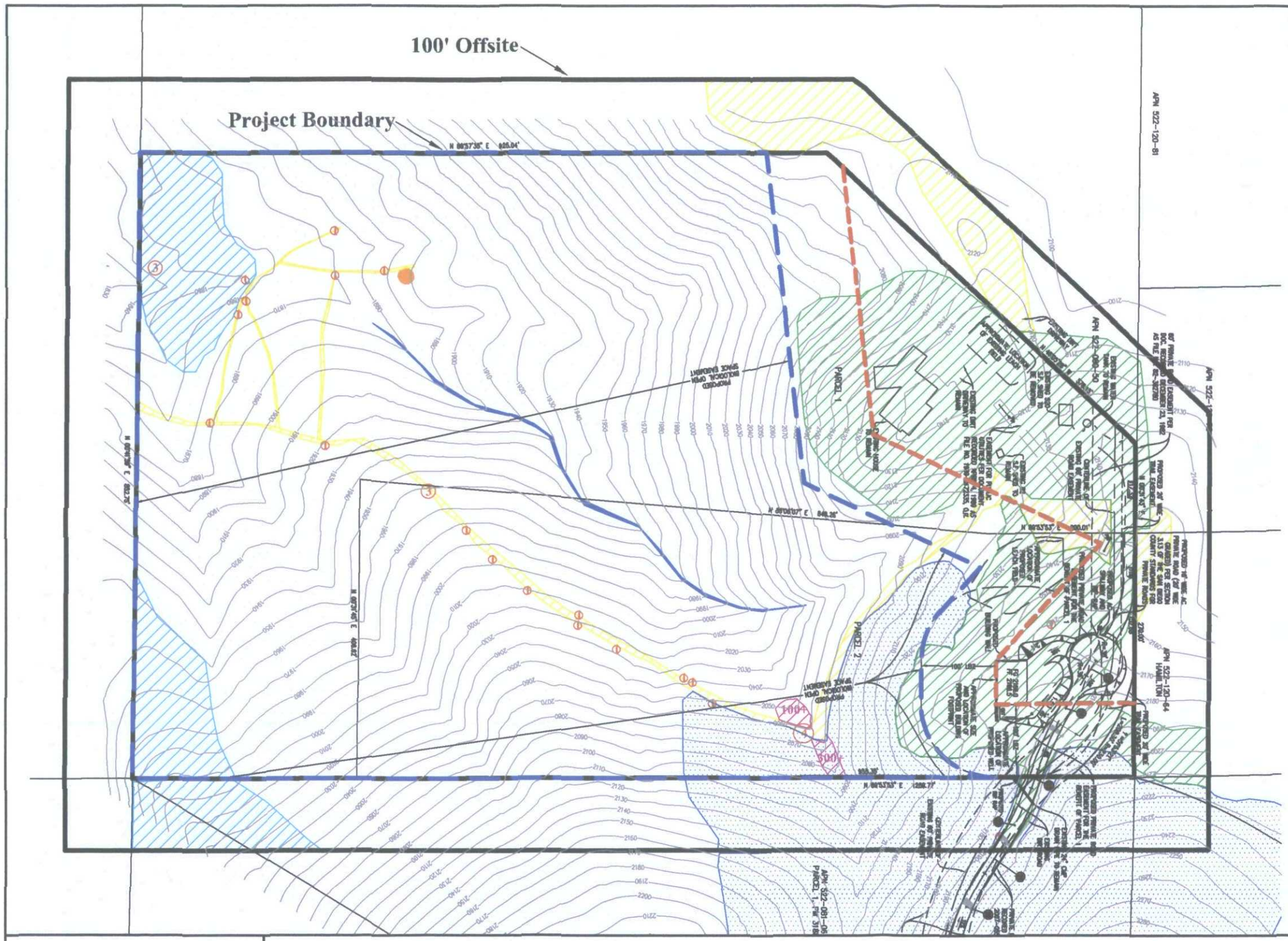
Project Boundary

Figure 6
Surrounding Topography
Hamilton Property

N

Feet

0 1,000 2,000



Legend:

- Coastal Sage-Chaparral Scrub
  Habitat Code: 37G00 (1.27 acres)
- Mafic Southern Mixed Chaparral
  Habitat Code: 37122 (18.41 acres)
- Parry's Tetracoccus (*Tetracoccus dioicus*)
  Dominant Mafic Southern Mixed Chaparral
- Disturbed
  Habitat Code: 11300 (0.54 acres)
- Developed
  Habitat Code: 12000 (4.07 acres)
- Felt-leaved Monardella
  (*Monardella hypoleuca lanata*)
  400+ individuals
- (#) Observed Hermes Copper Butterflies
  (*Lycaena hermes*) 29 total
- Observed San Diego Horned Lizard
  (*Phrynosoma coronatum blainvillei*)
- CDFG & ACOE ephemeral drainage
- Proposed Biological Open Space (18.8 acres):
  Mafic Southern Mixed Chaparral (17.18 acres)
  Coastal Sage-Chaparral Scrub (1.27 acres)
  Disturbed Habitat (0.25 acres)
  Developed Habitat (0.1 acres)

RC
Biological Consulting, Inc.

Biological Open Space Map for the Hamilton Property
TPM 21060

0 75' 150'

Figure 7

2.3 Climate

As defined by the Standard Weather Parameters from the Draft County of San Diego Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection, San Diego has five climate zones: maritime, coastal, transitional, interior and desert. These climate zones are determined by several factors: proximity to the ocean, terrain, elevation and latitude. Using the Koppen system, the metropolitan areas of Southern California have a Mediterranean climate, characterized by mild, sometimes wet winters and warm, very dry summers. The Mediterranean climate includes all coastal areas, valleys and foothills. Annual precipitation amounts increase gradually from the coast to the mountain crests, then drop dramatically into the deserts. Most precipitation comes from winter storms between November and March. The site is located within the transitional climate zone and is located in the southern foothills of the region. Average rainfall is 18 inches per year.

2.4 Fire History

The fire history of the site and surrounding area was reviewed. The source of the fire history information is the California Department of Forestry Fire and Resource Assessment Data from 2005. The data include most large fires since 1910 however smaller fires may not be mapped. The data indicate that the site burned in fire in 1945 and 1970. Approximately 21 other fires occurred in the area between 1912 and 2001 (Figure 9).

3.0 WATER SUPPLY

Water shall be supplied by a 10,000 gallon tank and be in place prior to the initiation of flammable construction. Water storage tanks shall be in conformance with Section 903.3.2 of the Consolidated Fire Code (CFC) (County of San Diego 2001). Tank elevation shall be equal to or higher than the fire department connection on the premises. Regardless of domestic use the tank shall be equipped with a device that will ensure that the tank contains 10,000 gallons of water. The tank shall be capable of supplying a minimum fire flow of 250 gallons per minute for the duration of 40 minutes. The fire department connection on the tank shall be at least one 4-inch National Standard Thread (male), reduced to one 2 ½-inch National Standard (male). Additional outlets maybe required. The outlet shall be located along an access roadway and shall not be closer than 50 feet, nor further than 150 feet from the structure. All exposed tank pipes shall be of an alloy or other material listed for above ground use. Adequate support shall be provided. Water storage tanks shall be constructed from materials approved by the Rural Fire Protection District and installed per manufacturer recommendations.

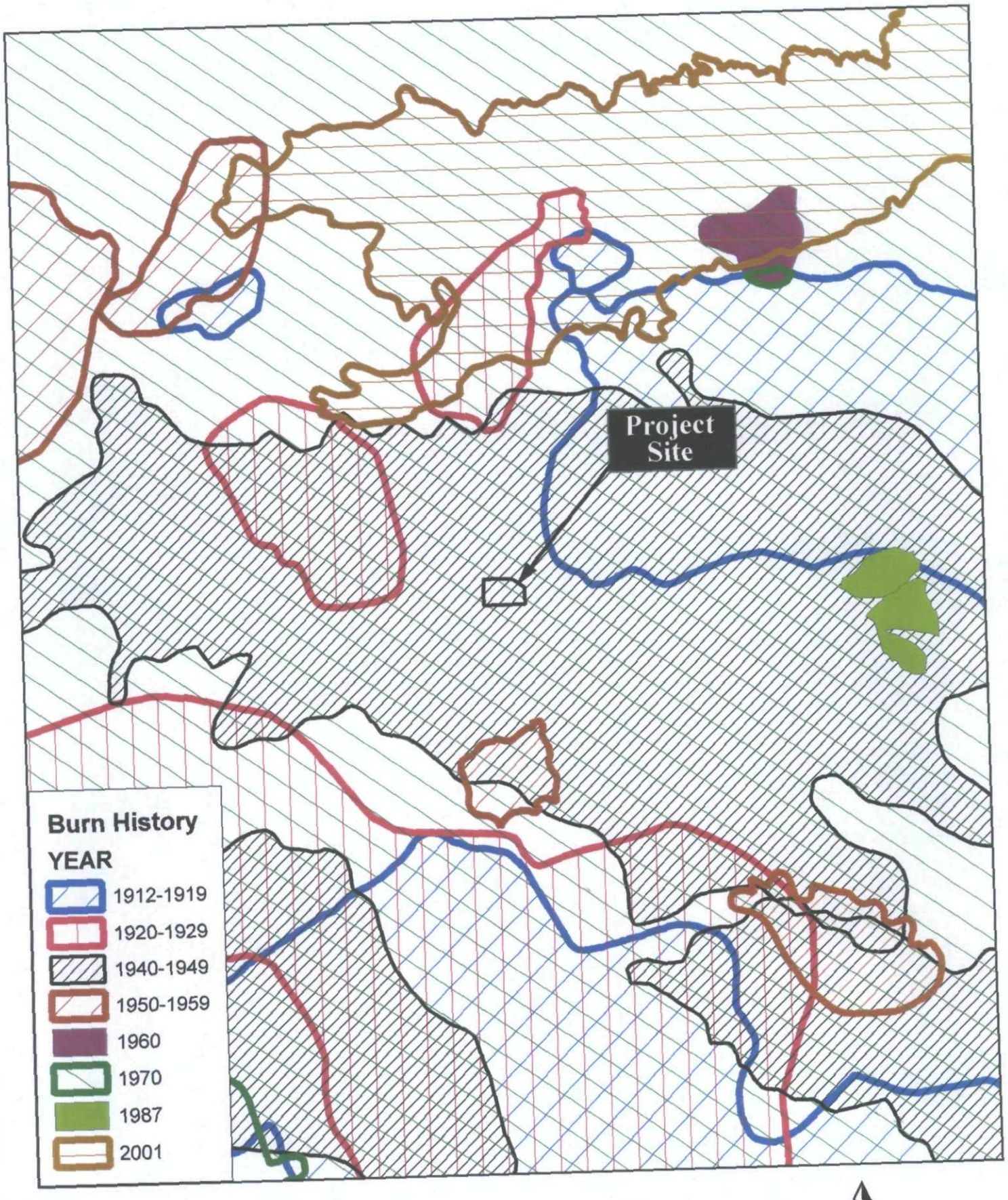


Figure 9
Burn History
Hamilton Property

4.0 ACCESS AND TRAVEL TIME

This section discusses primary access, secondary access and travel time.

4.1 Primary Access

The project is accessed by an existing private dirt road approximately 0.75 miles east from the Lawson Valley Road and Skyline Truck Trail intersection (Figure 2). As indicated on the Tentative Parcel Map (Figure 10), the project proposes to improve the existing private dirt road on-site to 24 feet and improved with Ashpaltic concrete from the intersection of Skyline Truck Trail to the limits of the proposed residence on APN 522-081-55. The road width is reduced to an improved width of 16 feet with Asphaltic concrete from APN 522-081-55 to the proposed cul-de-sac serving the existing single family residence, the proposed residence, and the additional parcel to the north. The proposed cul-de-sac shall have an improved radius of 36 feet. The proposed access road and driveway do not exceed the 20% allowable grade.

4.2 Secondary Access

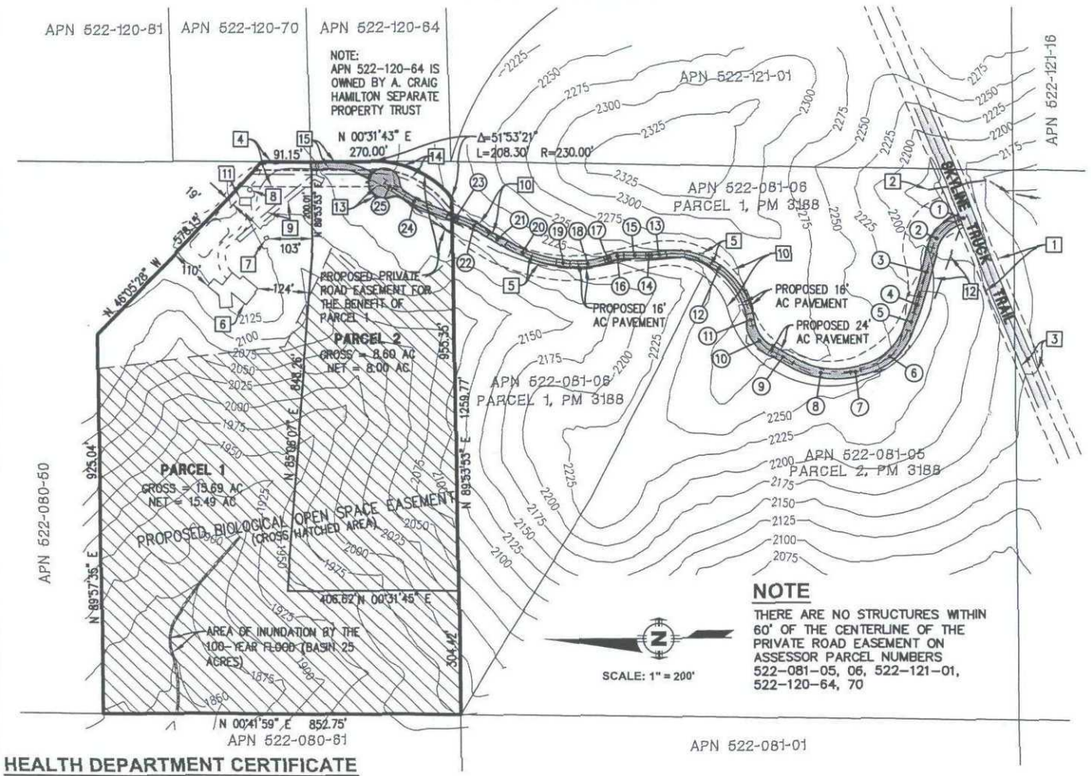
Section 902.2.2.8 of the County Fire Code states that the dead end road length of parcels zoned for 5 to 19.99 acres shall not exceed 2,640 feet. Although the County fire code states that exceeding the dead end length may require secondary access, the California Code of Regulations Title 14 (Fire Safe Regulations) also contains regulations that have been prepared and adopted for the purpose of establishing minimum wildfire protection standards in conjunction with building construction and development in the State Responsibility Area (SRA). The State regulations state that roads in excess of the maximum dead end length shall have secondary access. Title 14 of the California Code of Regulations allows for mitigation measures that provide the "same practical affect" which is defined as follows: 'Same Practical Effect': as used in this chapter, means an exception or alternative with the capability of applying accepted wildland fire suppression strategies and tactics, and provisions for fire fighter safety, including access for emergency wildland fire equipment."

The cul-de-sac measures approximately 2000 feet from the intersection with Skyline Truck Trail. The cumulative dead end length for proposed Parcel 1, which contains an existing residence when including the driveway is approximately 2300 feet. The proposed cumulative length when including the driveway to the fartherest most pad does not exceed the cumulative length of 2,640 feet for parcels zoned for 5 to 19.99 acres, therefore secondary access shall not be necessary.

4.3 Travel Time

The Public Facility Element of the General Plan for the County of San Diego (as amended) , Section 11 – Fire Protection and Emergency Services establishes goals for the delivery of services. The goal to minimize the loss of lives from fires is identified in the

TENTATIVE PARCEL MAP 21060 RPL 2



NOTE

THERE ARE NO STRUCTURES WITHIN 60' OF THE CENTERLINE OF THE PRIVATE ROAD EASEMENT ON ASSESSOR PARCEL NUMBERS 522-081-05, 06, 522-121-01, 522-120-64, 70

NOTES

1. 60' PUBLIC ROAD EASEMENT PER DOC. RECORDED DECEMBER 23, 1965 AS FILE NO. 231062
2. EXISTING 24" CMP STORM DRAIN PIPE
3. EXISTING 32'± AC PAVEMENT
4. 60' PRIVATE ROAD EASEMENT PER DOC. RECORDED DECEMBER 23, 1982 AS FILE NO. 82-392780
5. EXISTING DIRT ROAD
6. EXISTING HOUSE TO REMAIN
7. EXISTING 82 S.F. SHED TO REMAIN
8. EXISTING WATER TANK TO REMAIN
9. EASEMENT FOR PUBLIC UTILITIES PER DOCUMENT RECORDED APRIL 4, 1989 AS FILE NO. 1989-0172335, O.R.
10. 60' PRIVATE ROAD EASEMENT PER DOC. RECORDED OCTOBER 25, 2005 AS FILE NO. 2005-0922135 AND DOC. RECORDED AUGUST 22, 2007 AS FILE NO. 2007-0559404
11. EXISTING 520 S.F SHED TO BE REMOVED
12. PRIVATE ROAD EASEMENT PER DOC. REC. AUGUST 22, 2007 AS FILE NO. 2007-0559405
13. PROPOSED PRIVATE ROAD EASEMENT FOR THE BENEFIT OF PARCEL 1 (R=38')
14. PROPOSED 20' WIDE TRAIL EASEMENT
15. PROPOSED 16' WIDE AC PRIVATE ROAD (20' GRADED) PER SECTION 3.13 OF THE SAN DIEGO COUNTY STANDARDS FOR PRIVATE ROADS

CENTERLINE DATA

①	N 20°34'08" W 23.14'
②	Δ=54°07'11" L=94.46' R=100.00'
③	N 74°41'19" W 122.64'
④	Δ=4°57'55" L=43.33' R=500.00'
⑤	N 69°43'24" W 44.03'
⑥	Δ=59°27'11" L=155.65' R=150.00'
⑦	N 10°16'13" W 25.18'
⑧	Δ=40°36'14" L=141.73' R=200.00'
⑨	N 30°20'01" E 56.97'
⑩	Δ=46°24'17" L=80.99' R=100.00'
⑪	N 76°44'18" E 29.97'
⑫	Δ=80°49'53" L=270.87' R=192.00'
⑬	N 04°05'35" W 35.75'
⑭	Δ=4°20'47" L=15.17' R=200.00'
⑮	N 00°15'13" E 50.70'
⑯	Δ=19°44'45" L=34.46' R=100.00'
⑰	N 19°29'32" W 14.33'
⑱	Δ=27°58'00" L=85.42' R=175.00'
⑲	N 08°28'27" E 33.40'
⑳	Δ=24°01'07" L=125.76' R=300.00'
㉑	N 32°29'34" E 48.06'
㉒	Δ=12°19'14" L=83.86' R=390.00'
㉓	N 20°10'20" E 26.92'
㉔	Δ=13°35'52" L=144.29' R=608.00'
㉕	N 33°46'12" E 23.90'

LAND DIVISION STATEMENT / OWNER'S CERTIFICATE

I HEREBY CERTIFY THAT I AM THE RECORD OWNER, AS SHOWN ON THE LATEST EQUALIZED COUNTY ASSESSMENT, OF THE PROPERTY SHOWN ON THE TENTATIVE PARCEL MAP. ALL OF MY CONTIGUOUS OWNERSHIP WITHIN AND BEYOND THE BOUNDARIES OF THE TENTATIVE PARCEL MAP ARE SHOWN. THE BASIS OF CREATION OF THE LOTS IN MY OWNERSHIP (e.g. PARCEL MAP, FINAL MAP, CERTIFICATE OF COMPLIANCE, RECORDED DEED BEFORE 2/1/72) IS INDICATED ON THE TENTATIVE PARCEL MAP. I UNDERSTAND THAT PROPERTY IS CONSIDERED AS CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS, UTILITY EASEMENTS OR RAILROAD RIGHT-OF-WAY. "FREEWAY" AS DEFINED IN SECTION 23.5 OF THE STREETS AND HIGHWAY CODE, SHALL NOT BE CONSIDERED AS ROADS OR STREETS.

I FURTHER CERTIFY THAT I WILL NOT, BY THIS APPLICATION, CREATE OR CAUSE TO BE CREATED, OR WILL NOT HAVE PARTICIPATED IN THE CREATION OF MORE THAN FOUR PARCELS ON CONTIGUOUS PROPERTY UNLESS SUCH CONTIGUOUS PARCELS WERE CREATED BY MAJOR SUBDIVISION. FOR PURPOSES OF THIS CERTIFICATION, THE TERM "PARTICIPATED" MEANS HAVING COOPERATED WITH OR ACTED IN A PLANNING, COORDINATING OR DECISION-MAKING CAPACITY IN ANY FORMAL OR INFORMAL ASSOCIATION OR PARTNERSHIP FOR THE PURPOSE OF DIVIDING REAL PROPERTY.
I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT.
EXECUTED THIS ____ DAY OF_____, 2008 AT SAN DIEGO, CALIFORNIA.

A. CRAIG HAMILTON SEPARATE PROPERTY TRUST
A. CRAIG HAMILTON, TRUSTEE
15882 SKYLINE TRUCK TRAIL
JAMUL, CA 91935
(619) 666-1998

1. TAX ASSESSOR'S PARCEL NUMBER/TAX RATE AREA: 522-080-49/79011
2. ABBREVIATED LEGAL DESCRIPTION: PARCEL 3 OF PM 3188
3. GENERAL PLAN REGIONAL CATEGORY: RDA
4. GENERAL PLAN LAND USE DESIGNATION: 18
5. COMMUNITY PLAN AREA: JAMUL-DULZURA
6. EXISTING/PROPOSED ZONING:

ZONE	
USE REGULATIONS	A72
ANIMAL REGULATIONS	0
DENSITY	.125
LOT SIZE	8AC
BUILDING TYPE	C
MAXIMUM FLOOR AREA	---
FLOOR AREA RATIO	---
HEIGHT	G
LOT COVERAGE	---
SETBACK	C
OPEN SPACE	---
SPECIAL AREA REGULATIONS	---

7.

GENERAL PLAN SLOPE ANALYSIS TABLE	
AVERAGE SLOPE	MIN. PARCEL SIZE
< 25%	4 AC
> 25% AND < 50%	8 AC
> 50%	20 AC

	PARCEL 1	PARCEL 2
AVERAGE SLOPE	28.6%	37.7%
MIN. PARCEL SIZE	8 AC	8 AC

8. LOCATION AND STATUS OF EXISTING LEGAL ACCESS TO SUBJECT PROPERTY FROM A PUBLICLY MAINTAINED ROAD: 60' PRIVATE ROAD EASEMENT PER PARCEL MAP 3188 CONNECTING TO SKYLINE TRUCK TRAIL (A PUBLICLY MAINTAINED ROAD)
9. ASSOCIATED PERMITS: NONE
10. ALL LOTS WITHIN THIS SUBDIVISION HAVE A MINIMUM 100 SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING UNIT ALLOWED BY THIS SUBDIVISION
11. SEWER: SEPTIC
12. WATER: WELLS
13. FIRE: SAN DIEGO RURAL FIRE PROTECTION DISTRICT
14. SCHOOL DISTRICT(S): GROSSMONT UNION HIGH SCHOOL DISTRICT
    JAMUL DULZURA ELEMENTARY SCHOOL DISTRICT
15. GRADING: CUT =5,400 CY FILL = 2,400 CY
    SHRINKAGE (10% ±) = 500 CY EXPORT = 2,500 CY
16. SOURCE OF TOPOGRAPHY: SAN DIEGO COUNTY 200 SCALE TOPO MAP 206-1827, SUPPLEMENTED WITH FILED SURVEY CONDUCTED BY WALSH ENGINEERING & SURVEYING, INC. DATED APRIL 4, 8, MAY 26 AND SEPTEMBER 26, 2006

PREPARED BY:

LAWRENCE W. WALSH RCE 46316 DATE

Walsh Engineering & Surveying, Inc.
1870 Cordell Court, Suite 102, El Cajon, CA 92020
(619) 588-6747 (619) 448-7132 Fax

REGISTERED PROFESSIONAL ENGINEER LAWRENCE W. WALSH No. C 46316 Exp. 12-31-08 CIVIL STATE OF CALIFORNIA

HEALTH DEPARTMENT CERTIFICATE

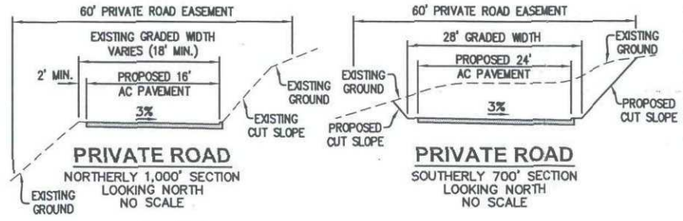
DATA AND RECOMMENDATION IN THE NAME OF A. CRAIG HAMILTON BY LARRY NEWCOMB, REHS

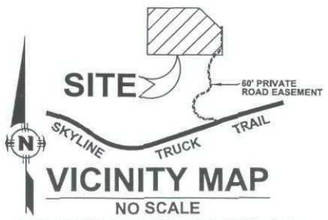
PARCEL NUMBER	LEACH LINE FOOTAGE	TRENCH DEPTH FOOTAGE	ROCK UNDER PIPE FOOTAGE	
1	400 FT	3 FT	1	EXISTING 4 BR
2	420 FT	3 FT	1	4 BR

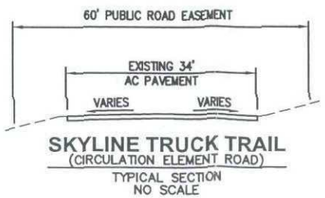
ALL PARCEL TO HAVE 100% RESERVE. WATER FOR ALL PARCELS BY INDIVIDUAL WELLS.

GARY ERBECK, DIRECTOR, DEPARTMENT OF ENVIRONMENTAL HEALTH
BY: LANCE DECLUE DATE: 2-14-07 VPM: 331

THIS CERTIFICATION DOES NOT IMPLY ALL CONDITIONS PURSUANT TO THE RESOURCE PROTECTION ORDINANCE AND THE GROUNDWATER ORDINANCE HAVE BEEN MET. THE DEPARTMENT OF PLANNING AND LAND USE SHOULD BE CONSULTED REGARDING THE APPLICATION OF THESE ORDINANCES RELATIVE TO THIS PROJECT. ANY RESULTANT CHANGES TO THE SEPTIC SYSTEM DESIGN(S) MUST BE RE-EVALUATED BY THE DEPARTMENT OF ENVIRONMENTAL HEALTH.
ALL PARCELS SHALL HAVE A LAYOUT OF THE SEWAGE DISPOSAL SYSTEM PROPOSED STRUCTURES, CUT AND FILLS APPROVED BY THE SAN DIEGO DEPARTMENT OF ENVIRONMENTAL HEALTH PRIOR TO THE APPROVAL OF THE BUILDING PERMIT AND/OR ISSUANCE OF A SEPTIC TANK PERMIT. AN ADDITIONAL EXPANSION AREA OF 100% OF THE INITIAL TILE AREA SHALL BE PROVIDED BY THE GRAVITY FLOW FOR THE POTENTIAL EXPANSION IN THE EVENT OF FAILURE.
EACH PARCEL SHALL HAVE AN INDIVIDUAL WELL APPROVED BY THE DEPARTMENT OF ENVIRONMENTAL HEALTH PRIOR TO APPROVAL OF A BUILDING PERMIT AND/OR ISSUANCE OF A SEPTIC TANK PERMIT. A LAYOUT SHOWING THE LOCATION OF THE SEWAGE SYSTEM AND THE WELL SHALL BE APPROVED PRIOR TO APPROVAL OF PERMITS.







plan as a maximum travel time of 20 minutes for the land use category "Rural" which is defined as large lot single-family residential and agricultural development with lot sizes greater than four acres. The Rural Fire Protection District estimates the travel time to be 6 minutes from Fire Station 66 located at 14145 Highway 94, Jamul (Fire Services Availability Letter – Appendix A). The project meets the goals for travel time set forth in the General Plan.

5.0 ADDRESSES

Addresses shall be placed at appropriate locations and be plainly visible and legible from the street fronting the property from either direction of approach. Said numbers shall contrast with their background and shall meet the following minimum standards as to size: 4" high with a 3/8" stroke.

6.0 FIRE RESISTANCE AND FIRE PROTECTION SYSTEMS

County Fire and Building Codes prescribe fire-resistive construction elements in the Wildland/Urban Interface. The project site is located in an area of very high flammable vegetation as depicted by the California Department of Forestry Fuel Threat map (Figure 4) and therefore has a greater potential for wildfire ignition of the structures based on terrain, vegetation and weather. As a result, the proposed structures shall meet the more restrictive category, enhanced fire resistive construction. In addition, enhanced fire resistive construction shall also apply to decks, carports, patio covers and similar structures.

Residences shall have automatic fire sprinkler systems installed per NFPA 13-D and the County of San Diego Requirements. This condition must be complied with prior to the issuance of the certificate of occupancy for each parcel so designated.

7.0 FIRE BEHAVIOR AND FUEL MODELING

The site is bordered to the east by a graded dirt road and surrounded by rural development and undeveloped lands (Figure 5). The proposed project is situated between ridges to the east and south (Figure 6). The project is located near the top of a significant canyon running northwest/southeast. The topography of the site is composed of north, south, and west facing slopes. There are ridgelines equal or greater in elevation approximately 3600 feet to the north. The land adjacent to the property to the east and south is greater in elevation than the project site.

The project site contains four biological habitat communities, mafic southern mixed chaparral, coastal sage-chaparral scrub, disturbed, and developed (Figure 7–Biological Resources Map).

Several factors were taken into consideration when determining the fuel management zones including topography, degree of exposure, parcel size, and proximity to biological open space. In addition, the plan was developed with watershed protection and suitability of proposed plant species with regard to adjacency to biological open space as a consideration. Fire modeling was performed using Behave Plus 3.0.1 for three types of weather conditions, a Santa Ana weather condition, a peak weather condition and a summer weather condition. Weather data for the Santa Ana, peak and summer conditions were determined by the Standard Weather Parameters for the Transitional Zone from the Draft County of San Diego Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection. The weather data are included in Appendix C.

Modeling was performed for habitat types found adjacent to the proposed structure. Fuel model SH 7 (chamise) was used to represent the mafic southern mixed chaparral adjacent to the structure and to be retained within the open space to the west of the proposed structure.

7.1 Santa Ana Weather Condition

A Santa Ana weather condition is potentially the worst weather for fire. Santa Ana's typically occur from September to May. The fall Santa Ana can create extremely dangerous fire conditions because they are associated with high temperatures, high winds coming from the north/northeast and low humidity. They also occur after long periods of no rain when the vegetation is in a drought stress condition. The soft shrubs that compose habitats such as coastal sage scrub are semi-drought deciduous and have typically lost the majority of their foliage by the end of summer. The hard woody shrubs that compose chaparral are dormant during this period and have little active growth which results in low fuel moisture.

Fire Behavior

Santa Ana winds result in a wind driven fire. These winds typically come from the northeast. Santa Ana winds are Foehn winds which are warm dry winds that result from air spilling over high elevations and moving downhill. These are gravity winds that typically follow the ground. When gravity winds hit an obstacle they can either split around the obstacle and continue or follow the object to the top and then launch over the top resulting in an area behind the obstacle with normal wind conditions.

The site is nestled in a canyon between two ridges to the east and south. Although, the presence of the ridgeline to the east would slow the fire and decrease the run length for fire coming from the east, fire occurring from the northeast would be driven uphill which would increase the rate of spread toward the proposed structure.

Fire Modeling

The weather conditions for fire modeling were determined by the Standard Weather Parameters for the Transitional Zone from the Draft County of San Diego Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection. The weather data are included in Appendix C.

The modeling for the proposed structure used a 28 mile an hour wind, coming from 45 degrees from the north and a temperature range of 90° to 109° Fahrenheit. In addition, the dead fuel moisture used was 3 percent, a very low moisture scenario which would be most applicable to the time of year Santa Ana's typically occur. Modeling was performed using fuel model SH7, which represents the mafic southern mixed chaparral habitat on-site. The resulting flame length for the parcel modeled for Santa Ana conditions averaged 28.6 feet. A copy of the modeling is included as Appendix C.

7.2 Peak Conditions

Peak conditions are the extreme conditions during a Santa Ana event. The peak winds represent the gusts that occur during a Santa Ana.

Fire Behavior

The fire behavior would be essentially the same as during a Santa Ana, however the gusts could significantly increase the rate of spread and the distance that fire bands travel during the time that they are occurring.

Fire Modeling

The weather conditions for fire modeling were determined by the Standard Weather Parameters for the Transitional Zone from the Draft County of San Diego Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection. The weather data are included in Appendix C.

Modeling for the proposed structure used a 41 mile per hour wind, coming from 45 degrees from the north and a temperature range of 90° to 109° Fahrenheit. The dead fuel moisture used was 3 percent, and the live fuel moisture was 50 percent. This represents a moisture scenario which would be most applicable to peak weather conditions. The resulting flame length was 35.3 feet.

7.3 Normal Weather Condition

Normal weather conditions consist of an onshore flow from the southwest. This condition has a lower temperature and higher humidity than does a Santa Ana condition.

Fire Behavior

A fire under normal conditions is typically a fuel driven fire, however wind will also contribute to the rate of spread. The site is nestled at the top of a canyon between two ridges to the east and south. The canyon runs northwest/southeast. The site is completely shielded to the south by a ridge. Although, fire occurring during a normal condition would be slowed down by the southern ridge, the canyon may direct fire towards the site from the west/northwest. Fire directed towards the site by the canyon would be the worst case scenario because the fire would be driven uphill which increases the rate of spread and the open space easement to the west contains undeveloped chaparral habitat.

Fuel Modeling

The weather conditions for fire modeling were determined by the Standard Weather Parameters for the Transitional zone from the Draft County of San Diego Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection. The weather data are included in Appendix C.

Modeling for the proposed structure used a 19 mile per hour wind, coming from 225 degrees from the north and a temperature range of 90° to 109° Fahrenheit. The dead fuel moisture used was 3 percent, and the live fuel moisture was 50 percent. This represents a moisture scenario which would be most applicable to summer weather conditions. The resulting flame lengths averaged 23.7 feet.

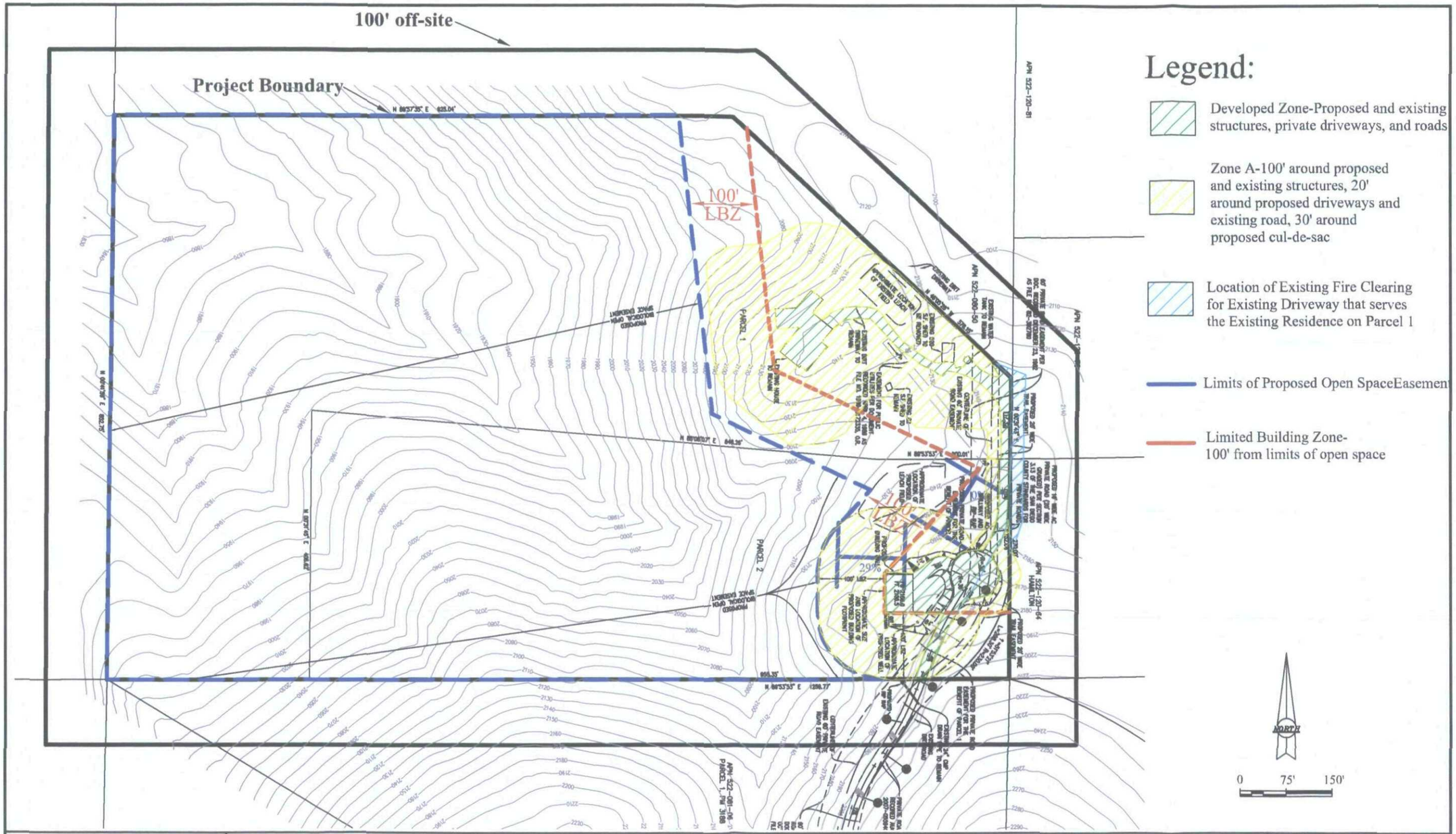
8.0 FUEL MANAGEMENT

The fuel management zones have been developed as a result of the fire risk analysis for the site. The fuel management zones are described below. The fuel management zones are depicted in Figure 11. The fuel management zone shall be 100' around proposed structures, 20' along proposed driveways and existing roads, and 30' along the proposed cul-de-sac. The existing single family residence and associated driveways shall maintain current fire clearing requirements. This level of fire clearing can not assure that structures will not be lost in a catastrophic fire; however it is felt that it is a reasonable zone, that when coupled with fire resistive construction, it increases the probability that the structures will not be lost.

8.1 Developed Areas

The developed zone on the map is the green hatched area. This area includes the roads, driveways, areas where structures greater than 250 square feet may be built, or where existing structures to remain occur. This area shall be maintained as described below.

The Developed Zone will consist of landscape plantings that are maintained and irrigated so that they shall not create fire hazards near structures. The following measures will reduce fire hazards near buildings:



RC
Biological Consulting, Inc.

Fuel Management Zone Map - Hamilton Property
TPM 21060

August 2008

Figure 11

- Highly flammable plants adjacent to structures are prohibited.
- Except for prostrate varieties, acacias, cedars, cypress, eucalyptus, juniper, pines, rosemary and California pepper shall not be planted.
- Plants will only be selected from the County of San Diego "Acceptable Plants for a Defensible Space in Fire Prone Areas" included as Appendix E or other as approved by the Fire Marshal.
- No plants on the undesirable list included in Appendix F shall be planted.
- No Plants on List A and B of the California Exotic Pest Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California as of October 1999" (or more recent version) (Appendix G) shall be planted.
- Trees shall not be planted closer to structures then the distance equal to the tree's mature canopy plus 10 feet. Tree canopies shall be separated by 20 feet.

Irrigation

Permanent irrigation shall be provided to ornamental plantings. Irrigation will conform to any applicable County Landscape Requirements.

Maintenance

Maintenance within this zone shall be performed year-round and include the following tasks:

- Prune and thin trees (Figures 12 through 13) around structures to decrease fuel volume, retain succulent growth and to provide adequate clearance between structures and plants.
- Tree branches overhanging roofs shall be removed.
- Trash and combustible debris shall be cleared from around structures, and removed from roofs and rain gutters.
- Irrigation systems will be maintained to ensure that they function properly and plantings are watered sufficiently to maintain succulent growth.

Thinning and Pruning

Figure 12 below illustrates how native trees retained and planted trees shall have a minimum canopy separation of 20 feet.

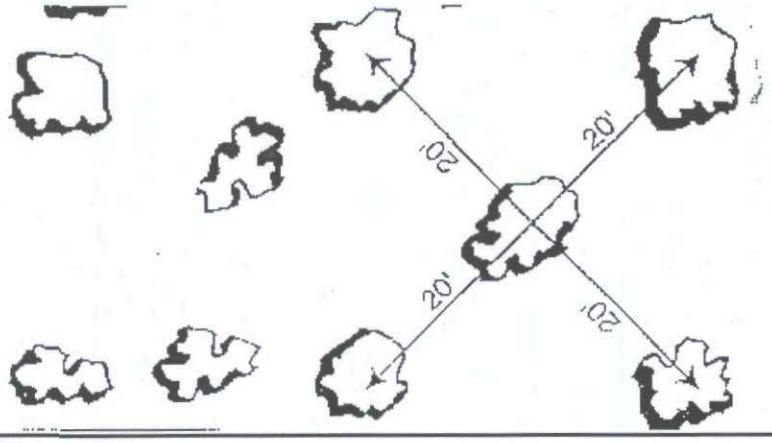


Figure 12. Thinned Trees

Pruning will further reduce the fuel load. Pruning shall be accomplished in the following manner:

- Individual trees and shrubs will be pruned to remove dead, dying and excessively twiggy growth. Figure 13 below illustrates the desired result of pruning.

Unpruned Shrub Pruned Shrub

Figure 13. Pruning of Landscape Shrubs and Retained Trees

- Trees and larger tree form shrubs shall be pruned to provide clearance of three times the height of the understory plant material or six feet whichever is higher. Figure 14 below illustrates this requirement.

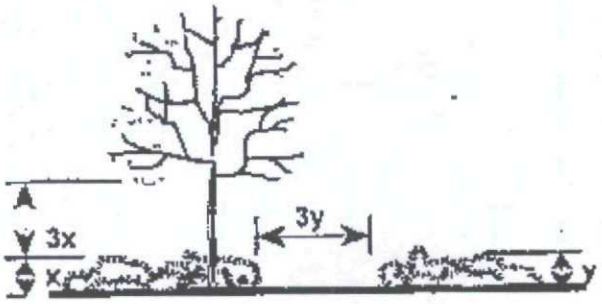


Figure 14. Pruning and Spacing of Trees and Shrubs

8.2 Zone A – Adjacent to Development and Road Clearing

Zone A is represented on Figure 11 in yellow. This zone is the closest zone to the developable area. This zone is a minimum of 100 feet. A fuel management zone of 100 feet provides a fuel management zone approximately 2.8 times the largest calculated flame length of 35.3 feet that resulted from the modeling. This level of fire clearing can not assure that structures will not be lost in a catastrophic fire; however it is felt that it is a reasonable zone, that when coupled with fire resistive construction, increases the probability that the structures will not be lost.

Zone A also applies to the required fuel management along the proposed road and cul-de-sac off-site. This zone is a minimum of 20 feet along the 16' improved road and 10 feet along the proposed cul-de-sac. Fire clearing around the existing single family residence and associated driveway shall be maintained according to existing requirements.

This zone shall be maintained the same as the Developed Zone above. The fire clearing for this zone on each lot shall be implemented prior to bringing combustible building materials onto the site. The fire clearing for the roads shall be implemented prior to issuing certificates of occupancy for any lot.

9.0 RESPONSIBILITIES

This section identifies the responsible parties for conformance and implementation of this plan.

Conformance

The ultimate responsibility for conformance with the fire protection plan lies with the property owner as identified on the County Tax Assessors Maps.

Conformance Approval

Conformance approval is under the jurisdiction of the Rural Fire Protection District.

10.0 REFERENCES

County of San Diego 2001. Consolidated Fire Code, Ordinance No. 9397.

County of San Diego 2004. County Fire Code, Ordinance No. 9669.

County of San Diego 2004. County Building Code, Ordinance No. 9547.

County of San Diego 2007. Draft Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection.

County of San Diego 1979. General Plan – Safety Element.

National Fire Protection Agency 2007. NFPA 13: Standard for the Installation of Sprinkler Systems – 13D.

APPENDIX A

RURAL FIRE PROTECTION DISTRICT AVAILABILITY FORM

COUNTY OF SAN DIEGO
DEPT. OF PLANNING & LAND USE
5201 RUFFIN ROAD, SUITE B
SAN DIEGO, CA 92123-1666
(858) 565-5981 • (858) 267-8770

PROJECT FACILITY AVAILABILITY FORM

FIRE

F

Please type or use pen

Craig Hamilton 666-1998
Owner's Name Phone

15882 Skyline Truck Trail
Owner's Mailing Address Street

Jamul, CA 91935
City State Zip

ORG _____
ACCT _____
ACT _____
TASK _____
DATE _____ AMT $ _____

DISTRICT CASHIER'S USE ONLY

SECTION 1. PROJECT DESCRIPTION — TO BE COMPLETED BY APPLICANT

A. ☐ Major Subdivision (TM) ☐ Specific Plan or Specific Plan Amendment
☒ Minor Subdivision (TPM) ☐ Certificate of Compliance: _____
☐ Boundary Adjustment
☐ Rezone (Reclassification) from _____ to _____ zone.
☐ Major Use Permit (MUP), purpose: _____
☐ Time Extension ... Case No. _____
☐ Expired Map ... Case No. _____
☐ Other _____

B. ☒ Residential ..... Total number of dwelling units 2
☐ Commercial ..... Gross floor area _____
☐ Industrial ..... Gross floor area _____
☐ Other ..... Gross floor area _____

C. Total Project acreage 24.29 Total lots 2 Smallest proposed lot 8

Assessor's Parcel Number(s)
(Add extra if necessary)

522	080	49

Thomas Bros. Page 1273 Grid F5

Project address Skyline Truck Trail
Street

Jamul-Dulzura 91935
Community Planning Area/Subregion Zip

OWNER/APPLICANT AGREES TO COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT.

Applicant's Signature: _____ Date: 11/12/06

Address: 15882 Skyline Truck Trail, Jamul CA 91935 Phone: 619 666-1998

(On completion of above, present to the district that provides fire protection to complete Sections 2 and 3 below.)

SECTION 2. FACILITY AVAILABILITY — TO BE COMPLETED BY DISTRICT

District name: San Diego Rural Fire Protection District

Indicate the location and distance of the primary fire station that will serve the proposed project: Station 16
14145 Highway 94, Jamul, CA 91935 +- 6

A. ☒ Project is in the District and eligible for service.
☐ Project is not in the District but is within its Sphere of Influence boundary, owner must apply for annexation.
☐ Project is not in the District and not within its Sphere of Influence boundary.
☐ Project is not located entirely within the District and a potential boundary issue exists with the _____ District.

B. ☒ Based on the capacity and capability of the District's existing and planned facilities, fire protection facilities are currently adequate or will be adequate to serve the proposed project. The expected emergency travel time to the proposed project is 10 minutes.
☐ Fire protection facilities are not expected to be adequate to serve the proposed development within the next five years.

C. ☐ District conditions are attached. Number of sheets attached: _____
☒ District will submit conditions at a later date.

SECTION 3. FUELBREAK REQUIREMENTS

Note: The fuelbreak requirements prescribed by the fire district for the proposed project do not authorize any clearing prior to project approval by the Department of Planning and Land Use.

☒ Within the proposed project 100 feet of clearing will be required around all structures.
☐ The proposed project is located in a hazardous wildland fire area, and additional fuelbreak requirements may apply. Environmental mitigation requirements should be coordinated with the fire district to ensure that these requirements will not pose fire hazards.

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

Deborah Bowers, Insp (619) 669-1188 2/14/07
Author's Name (Type or Print) Author's Signature Phone Date

On completion of Sections 2 and 3 by the District, applicant is to submit this form with application to:
Zoning Counter, Department of Planning and Land Use, 5201 Ruffin Road, Suite B, San Diego, CA 92123

SAN DIEGO RURAL FIRE PROTECTION DISTRICT

March 19, 2007

County of San Diego
Department of Planning and Land Use
5201 Ruffin Road, Suite B
San Diego, CA 92123-1666

Re: APN#522-080-49 FPP approval

Dear Planner,

The San Diego Rural Fire Protection District has reviewed the fire protection plan submitted by RC Biological Consulting. The plan meets the objectives of the California Fire Code 2000 edition, Article 86 "Fire Protection Plan Urban-Wildland Interface (UWI) Areas" as well as the Fire Districts requirements for discretionary projects. Please call me directly with any questions that you may have.

Sincerely,

David R. Nissen
Battalion Chief

14145 Highway 94 • Jamul, California 91935 • (619) 669-1188 Fax (619) 669-1798

APPENDIX B

WEATHER PARAMETERS

BEHAVE Plus 3.0.1

Worst case sustained winds (10 minute average and peak) Fuel Model 1 at 50% slope

Zone	*Period*	*Temperature*	*Relative Humidity*	*Sustained Wind Speed*
Maritime	Summer	70-89°F	30-34%	17 mph
	Santa Ana	90-109°F	5-9%	18 mph
	~~Peak~~ *Gust	90-109°F	5-9%	22 mph
Coastal	Summer	90-109°F	10-14%	19 mph
	Santa Ana	90-109°F	0-4%	21 mph
	Peak	90-109°F	0-4%	26 mph
Transitional	Summer	90-109°F	10-14%	19 mph
	Santa Ana	90-109°F	5-9%	28 mph
	Peak	90-109°F	5-9%	41 mph
Interior	Summer	90-109°F	5-9%	18 mph
	Santa Ana	90-109°F	5-9%	24 mph
	Peak	90-109°F	5-9%	56 mph
Desert	Summer	90-109°F	5-9%	18 mph
	Santa Ana	90-109°F	5-9%	24 mph
	Peak	90-109°F	5-9%	56 mph

APPENDIX C

FUEL MODELING RESULTS

Fire Modeling For: Hamilton

Behave Version: 3.0

Modeled by: TC

Parcel	Habitat	Fuel Model	Fuel Moisture	20-Ft Wind Speed MI/H	Wind Direction	Slope	Aspect	Flame Length (Ft)	Direction of Max Spread	Towards Structure (y/n)
	SBMC	sh7	Summer			29	270	24.0		
						0	45	23.4		
			Santa Ana			29	270	28.4		
						0	45	28.8		
			Peak			29	270	34.9		
						0	45	35.3		
						0	90	35.3		

Modules: SURFACE, SCORCH

Description		Hamilton-Santa Ana

Fuel/Vegetation, Surface/Understory

Fuel Model		sh7

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	28
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	45
Air Temperature	oF	90, 109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

Direction of Maximum Spread (from north) (deg) [SURFACE]

Midflame Wind Speed (mi/h) [SURFACE]

Wind Adjustment Factor [SURFACE]

Wind/Slope/Spread Direction Diagram [SURFACE]

Fire Characteristics Chart [SURFACE]

Scorch Height (ft) [SCORCH]

(continued on next page)

Input Worksheet (continued)

Notes

The results of this run use the sh7 model which represents the surrounding southern mixed chaparral, a Santa Ana weather condition and a 28 MPH wind according to worst case sustained winds for transitional climate zone.

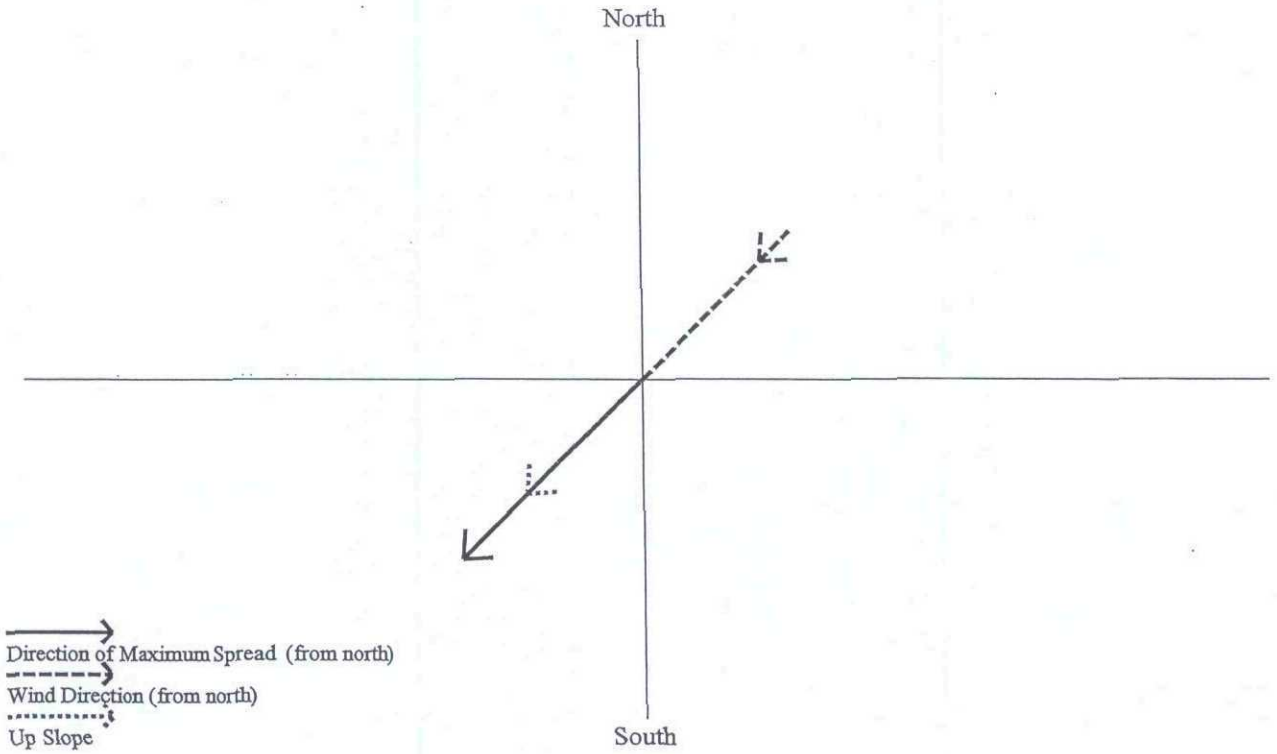
Hamilton-Santa Ana

Air Temp oF	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
90	173.9	28.8	225	11.2	0.4	483
109	173.9	28.8	225	11.2	0.4	779

Hamilton-Santa Ana

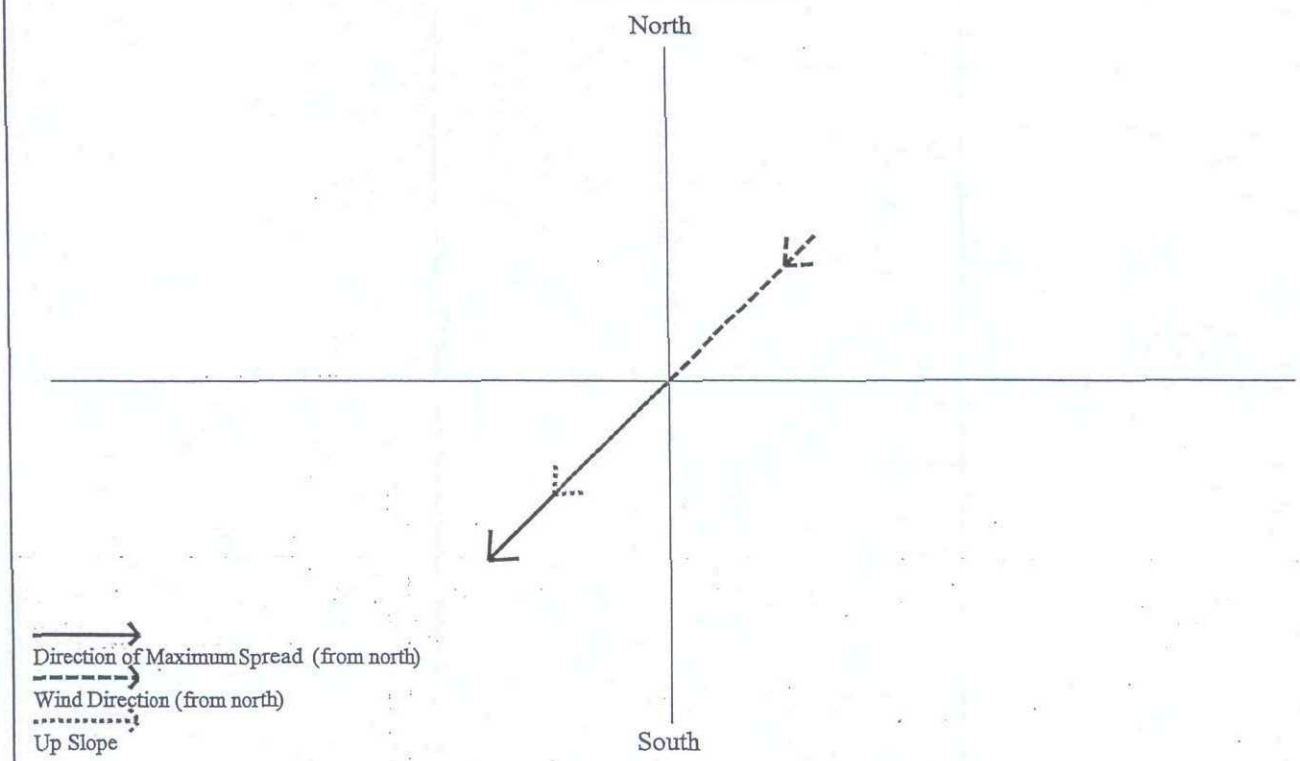
Wind / Slope / Fire Directions

Air Temperature : 90 oF



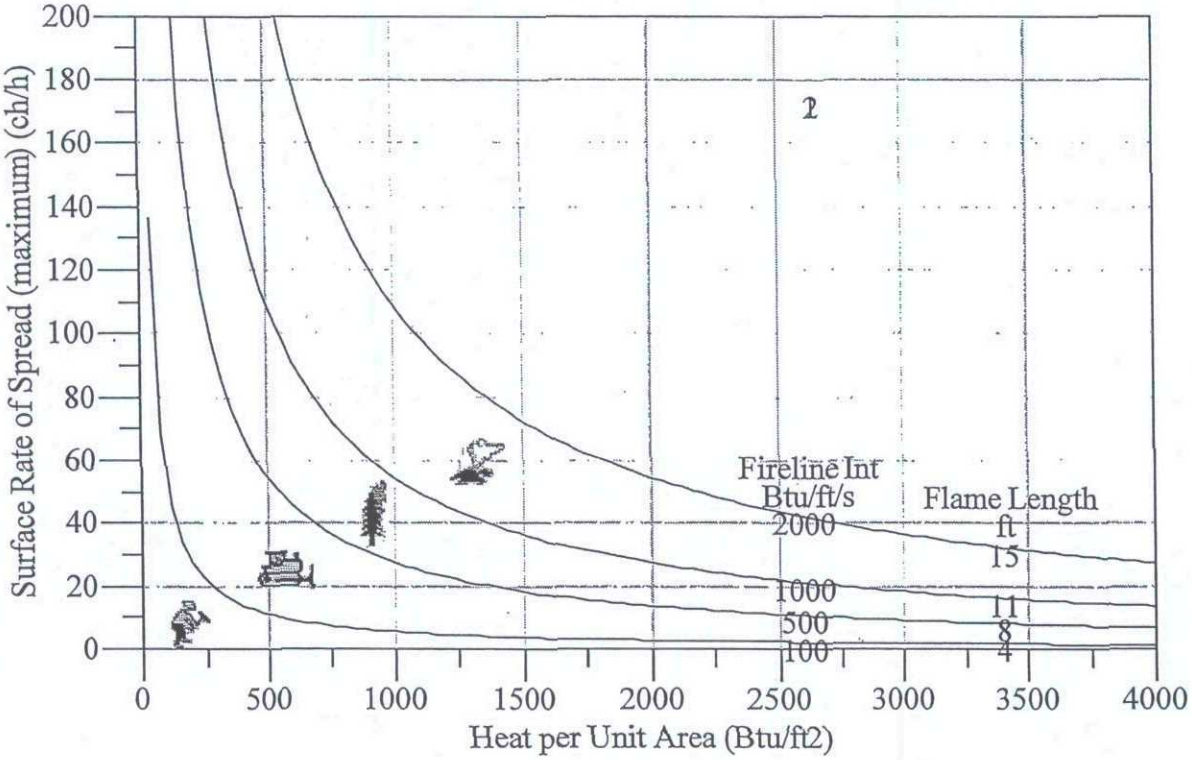
Direction of Maximum Spread (from north) 225 deg

Air Temperature : 109 oF



Direction of Maximum Spread (from north) 225 deg

Hamilton-Santa Ana
Fire Characteristics Chart



Discrete Variable Codes Used
Hamilton-Santa Ana

Fuel Model

sh7 Very high load, dry climate shrub (S) (147)

Modules: SURFACE, SCORCH

Description		Hamilton-Santa Ana

Fuel/Vegetation, Surface/Understory

Fuel Model		sh7

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	28
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	45
Air Temperature	oF	90, 109

Terrain

Slope Steepness	%	29
Aspect (from north)	deg	270

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

Direction of Maximum Spread (from north) (deg) [SURFACE]

Midflame Wind Speed (mi/h) [SURFACE]

Wind Adjustment Factor [SURFACE]

Wind/Slope/Spread Direction Diagram [SURFACE]

Fire Characteristics Chart [SURFACE]

Scorch Height (ft) [SCORCH]

(continued on next page)

Input Worksheet (continued)

Notes

The results of this run use the sh7 model which represents the surrounding southern mixed chaparral, a Santa Ana weather condition and a 28 MPH wind according to worst case sustained winds for transitional climate zone.

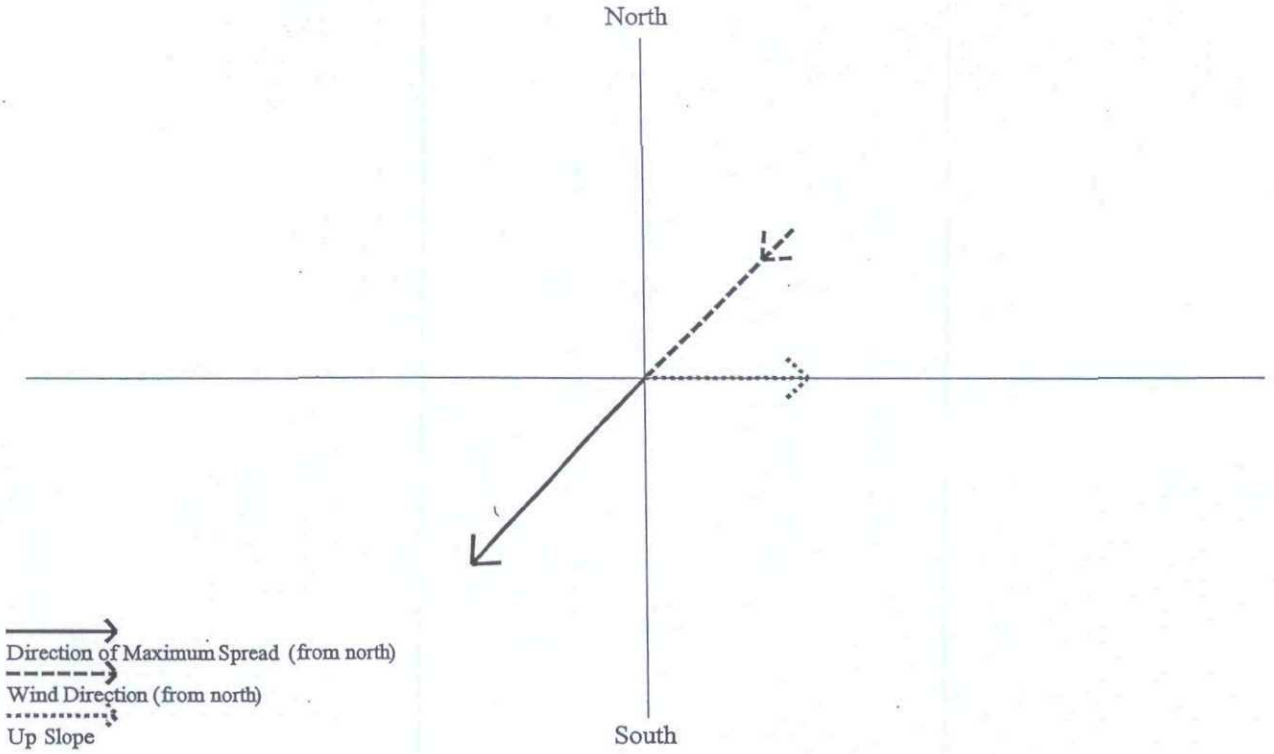
Hamilton-Santa Ana

Air Temp oF	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
90	168.3	28.4	223	11.2	0.4	472
109	168.3	28.4	223	11.2	0.4	761

Hamilton-Santa Ana

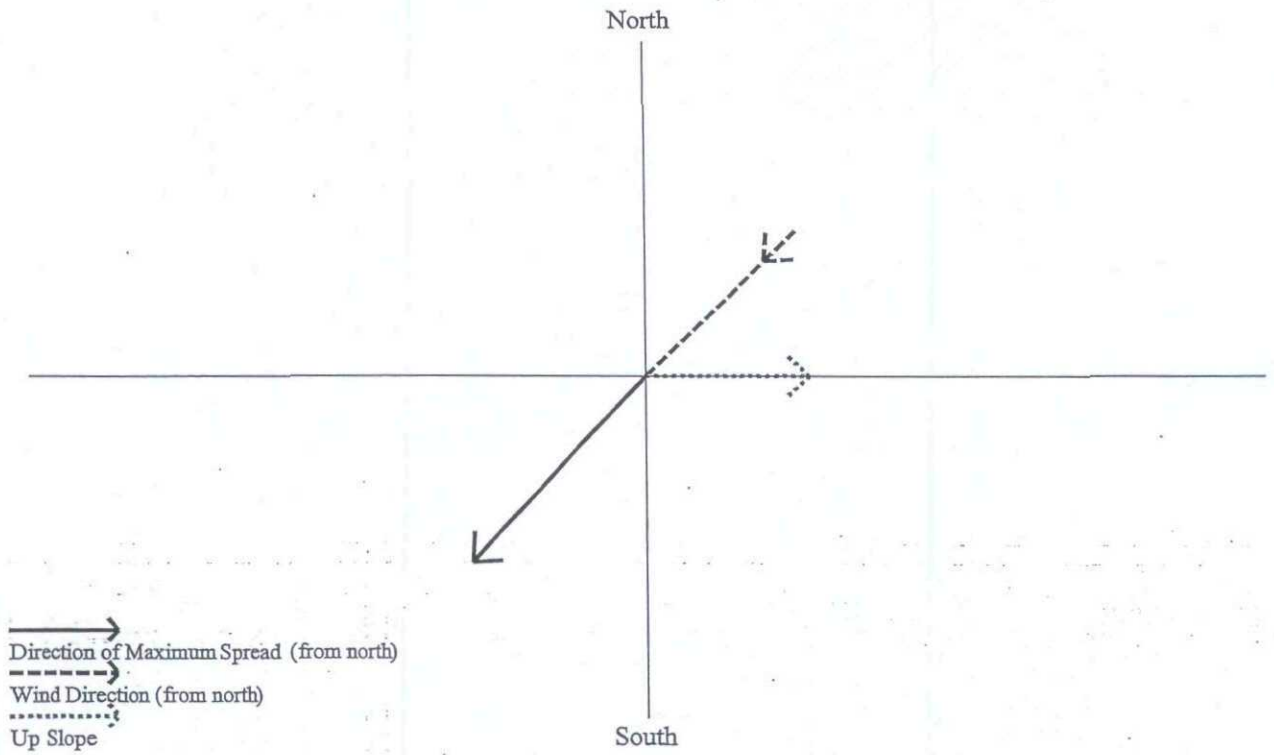
Wind / Slope / Fire Directions

Air Temperature : 90 oF



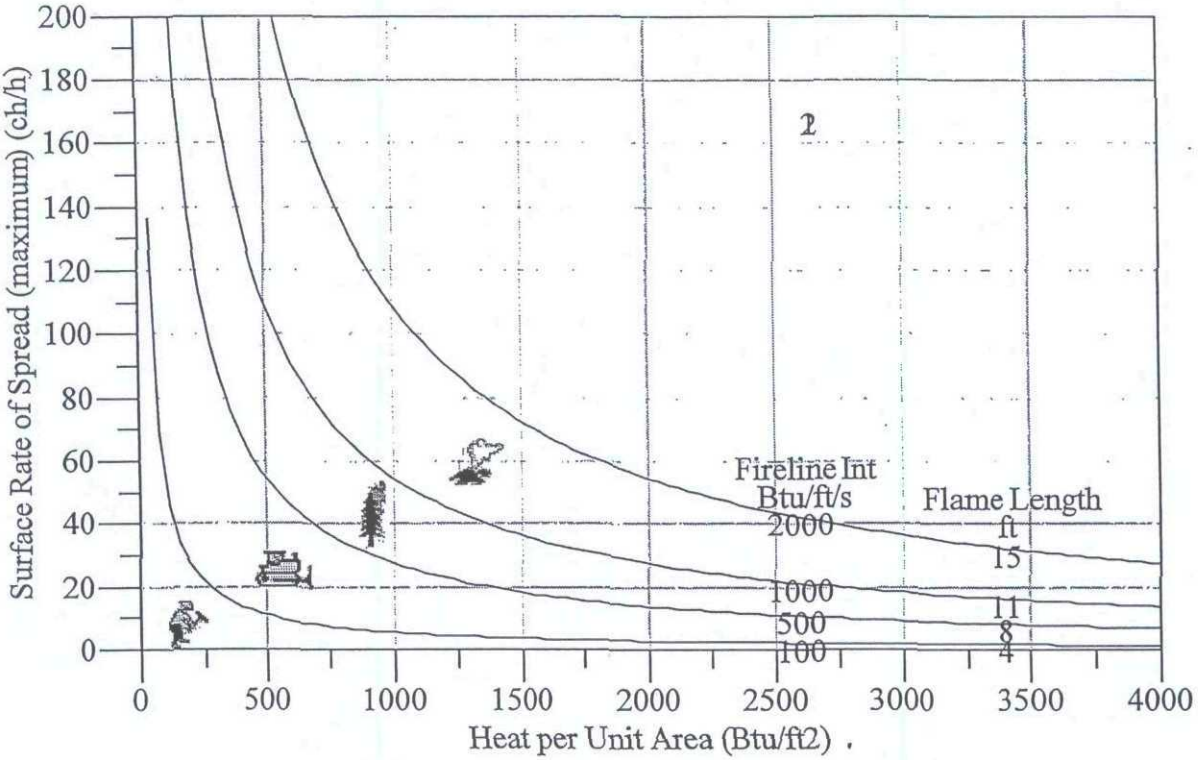
Direction of Maximum Spread (from north) 223 deg

Air Temperature : 109 oF



Direction of Maximum Spread (from north) 223 deg

Hamilton-Santa Ana
Fire Characteristics Chart



Discrete Variable Codes Used
Hamilton-Santa Ana

Fuel Model

sh7 Very high load, dry climate shrub (S) (147)

Modules: SURFACE, SCORCH

Description		Hamilton-Peak

Fuel/Vegetation, Surface/Understory

Fuel Model		sh7

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	41
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	45
Air Temperature	oF	90, 109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	90

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

Direction of Maximum Spread (from north) (deg) [SURFACE]

Midflame Wind Speed (mi/h) [SURFACE]

Wind Adjustment Factor [SURFACE]

Wind/Slope/Spread Direction Diagram [SURFACE]

Fire Characteristics Chart [SURFACE]

Scorch Height (ft) [SCORCH]

(continued on next page)

Input Worksheet (continued)

Notes

The results of this run use the sh7 model which represents the surrounding southern mixed chaparral, a peak Santa Ana weather condition and a 41 MPH wind according to worst case sustained winds for transitional climate zone.

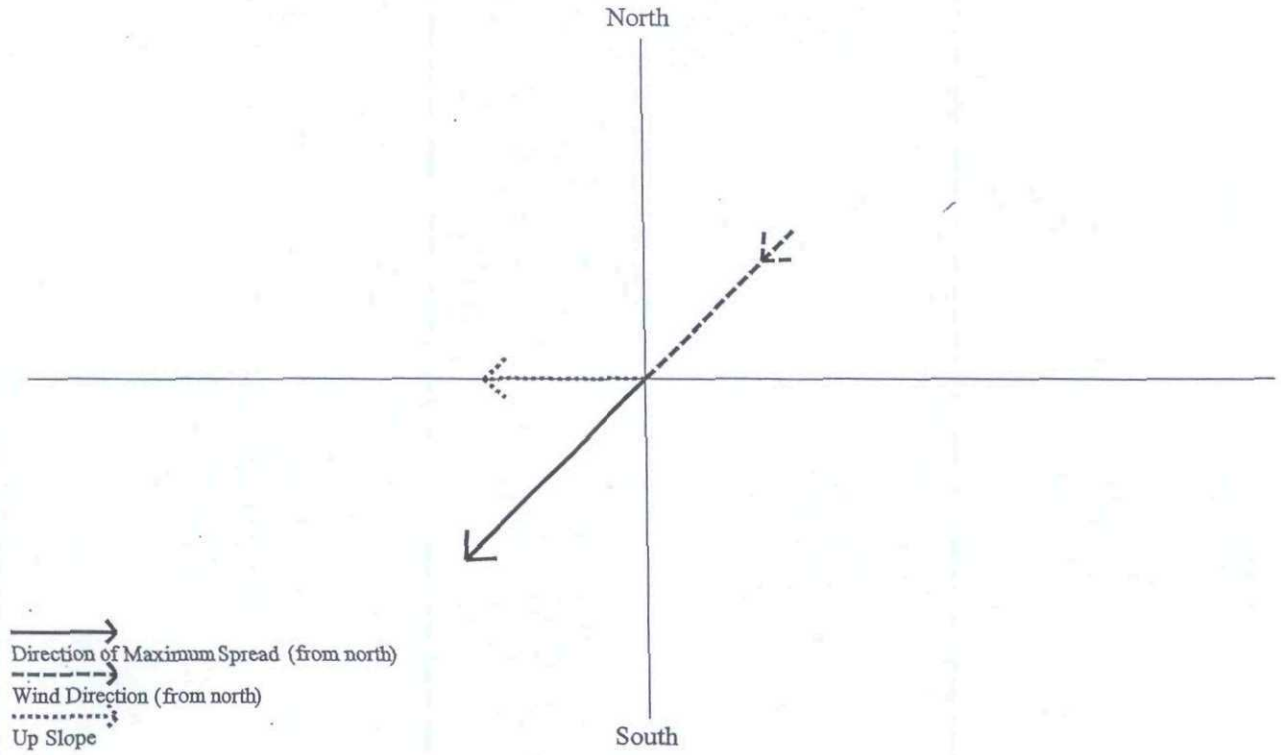
Hamilton-Peak

Air Temp oF	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
90	270.7	35.3	225	16.4	0.4	607
109	270.7	35.3	225	16.4	0.4	978

Hamilton-Peak

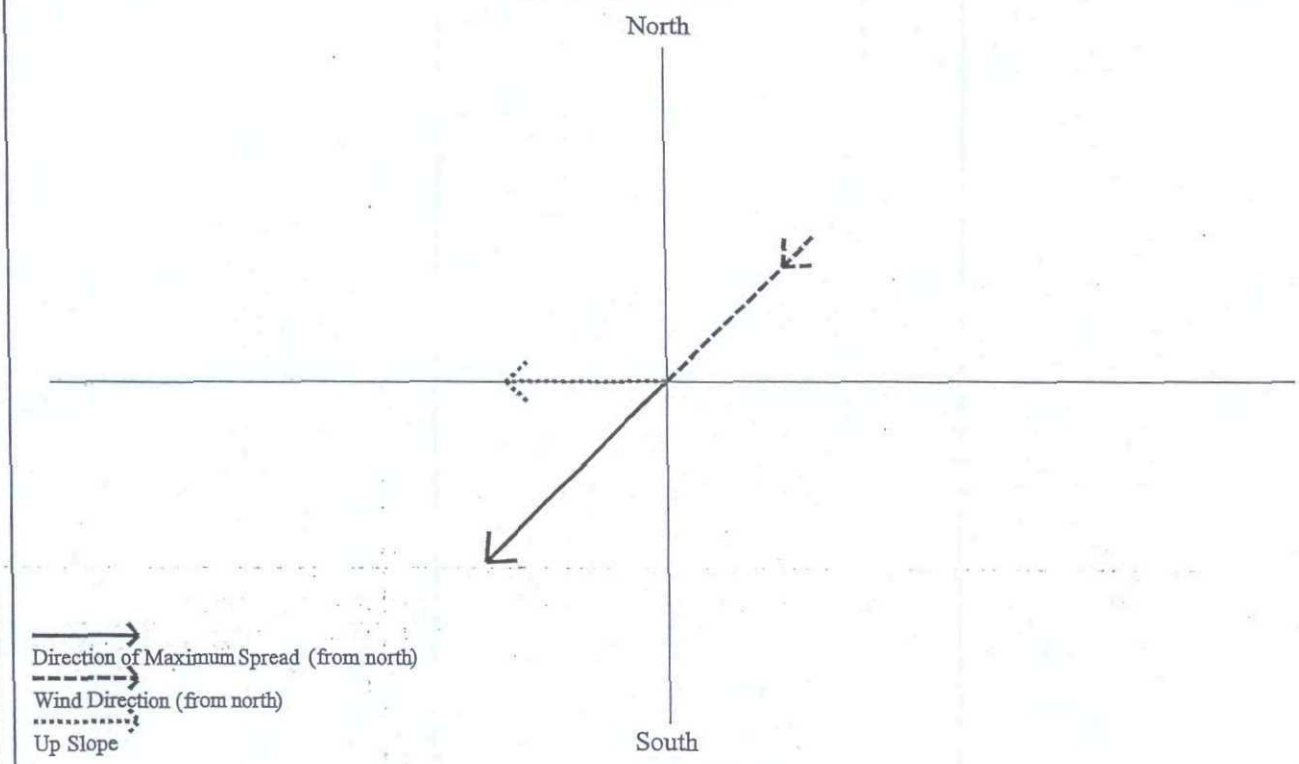
Wind / Slope / Fire Directions

Air Temperature : 90 oF



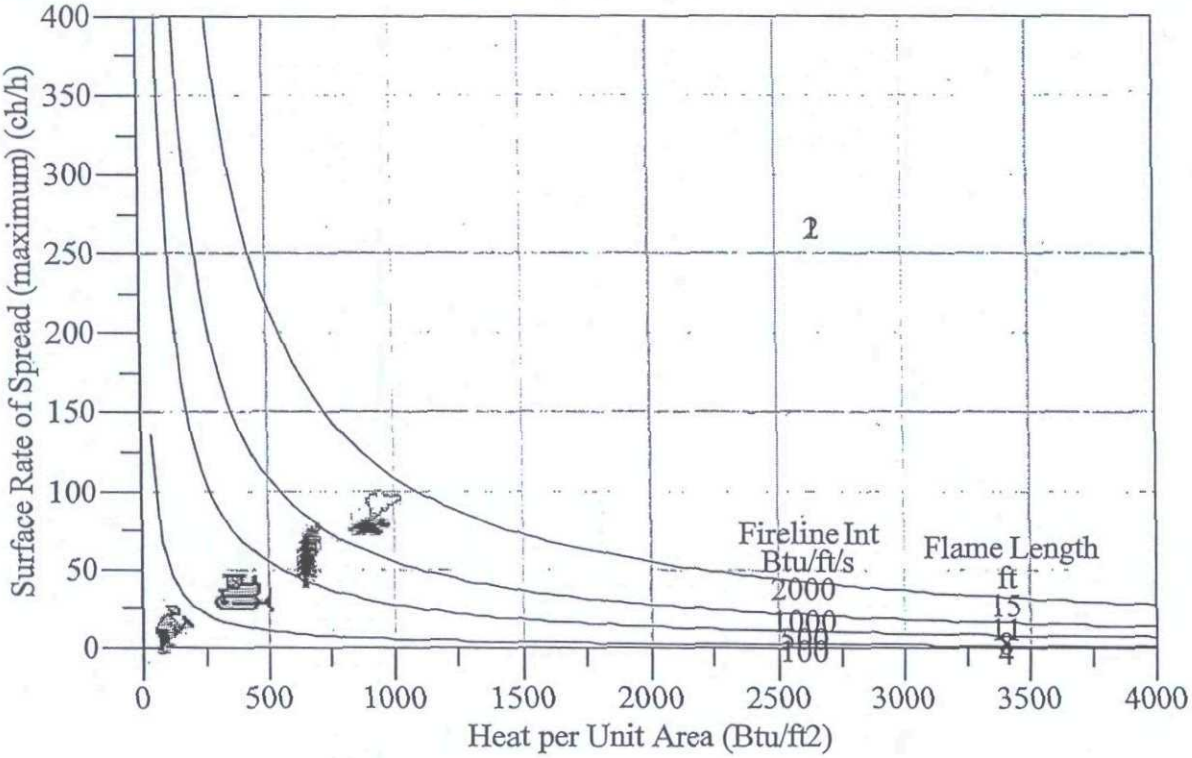
Direction of Maximum Spread (from north) 225 deg

Air Temperature : 109 oF



Direction of Maximum Spread (from north) 225 deg

Hamilton-Peak
Fire Characteristics Chart



Discrete Variable Codes Used
Hamilton-Peak

Fuel Model

sh7 Very high load, dry climate shrub (S) (147)

Modules: SURFACE, SCORCH

Description		Hamilton-Peak

Fuel/Vegetation, Surface/Understory

Fuel Model		sh7

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	41
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	45
Air Temperature	oF	90, 109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

Direction of Maximum Spread (from north) (deg) [SURFACE]

Midflame Wind Speed (mi/h) [SURFACE]

Wind Adjustment Factor [SURFACE]

Wind/Slope/Spread Direction Diagram [SURFACE]

Fire Characteristics Chart [SURFACE]

Scorch Height (ft) [SCORCH]

(continued on next page)

Input Worksheet (continued)

Notes

The results of this run use the sh7 model which represents the surrounding southern mixed chaparral, a peak Santa Ana weather condition and a 41 MPH wind according to worst case sustained winds for transitional climate zone.

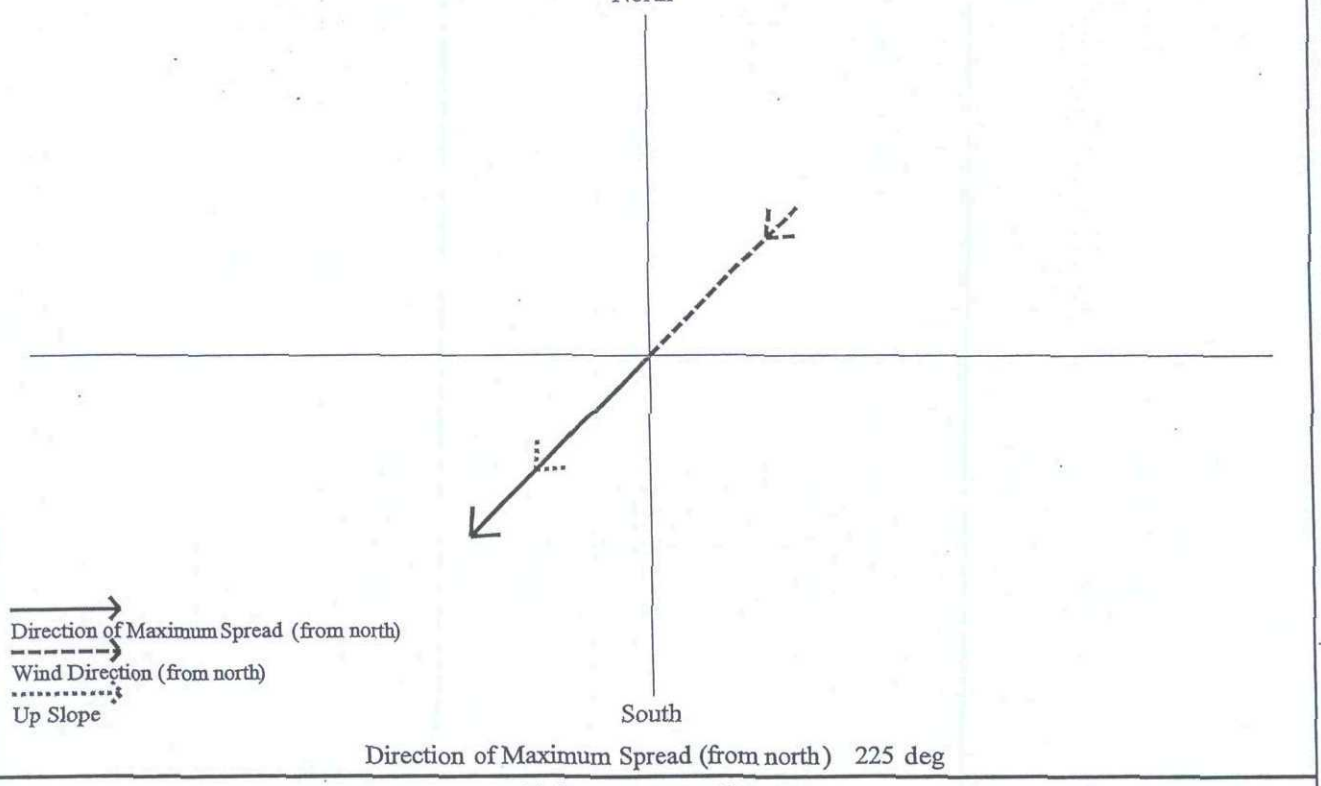
Hamilton-Peak

Air Temp oF	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
90	270.7	35.3	225	16.4	0.4	607
109	270.7	35.3	225	16.4	0.4	978

Hamilton-Peak

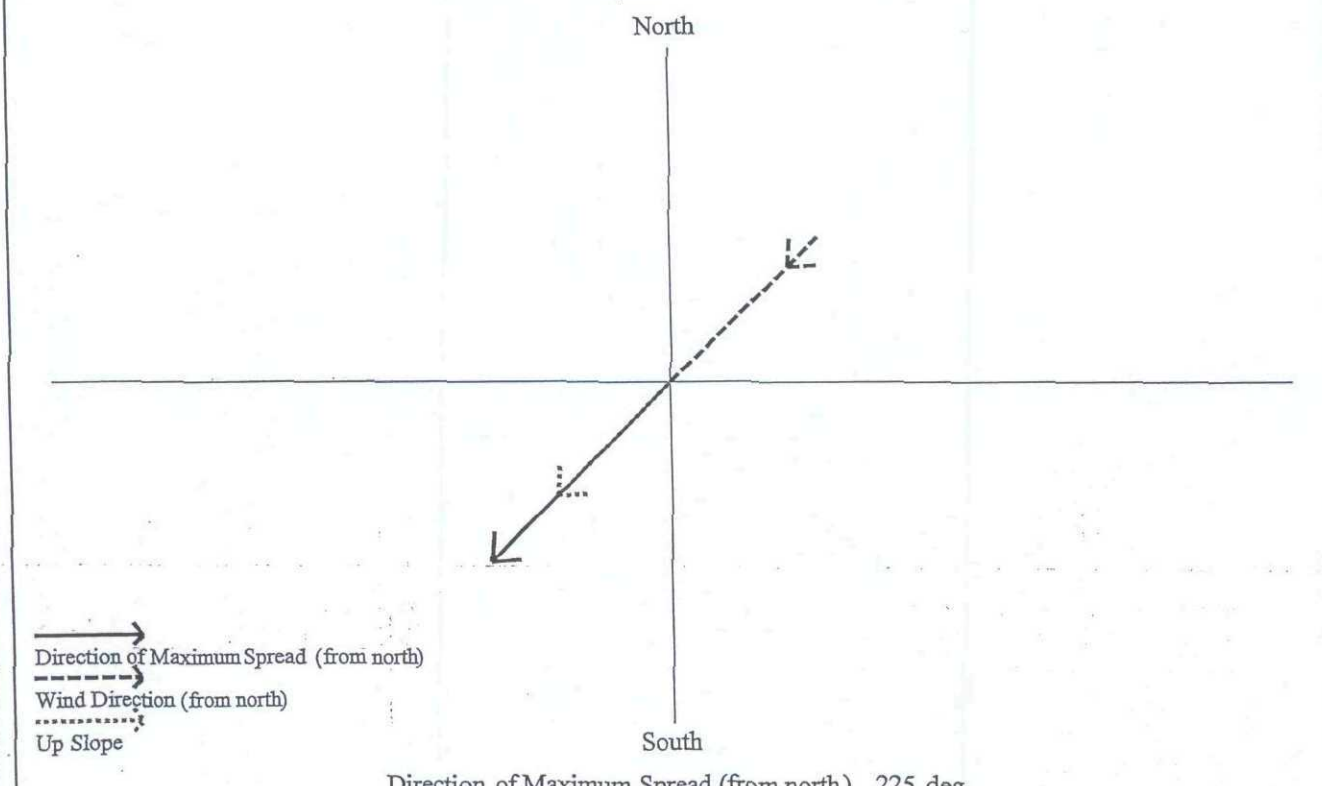
Wind / Slope / Fire Directions

Air Temperature : 90 oF



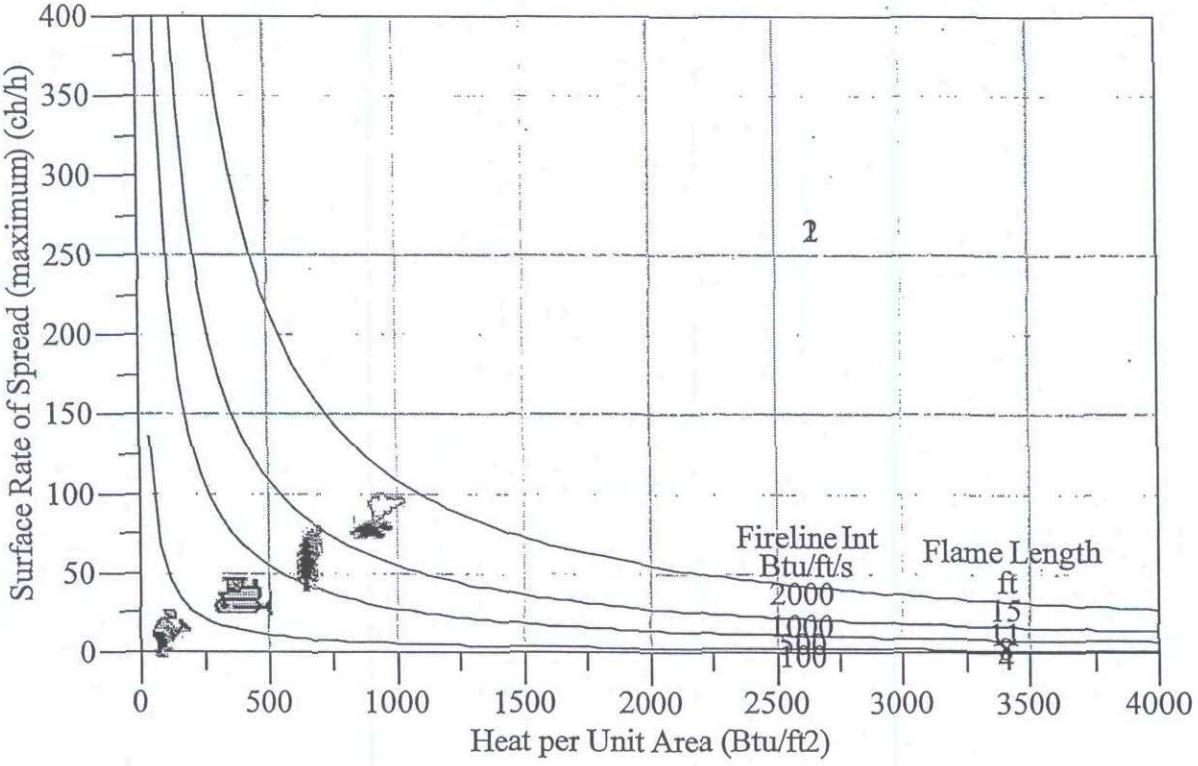
Direction of Maximum Spread (from north) 225 deg

Air Temperature : 109 oF



Direction of Maximum Spread (from north) 225 deg

Hamilton-Peak
Fire Characteristics Chart



Discrete Variable Codes Used
Hamilton-Santa Ana

Fuel Model

sh7 Very high load, dry climate shrub (S) (147)

Modules: SURFACE, SCORCH

Description		Hamilton-Peak
Fuel/Vegetation, Surface/Understory		
Fuel Model		sh7
Fuel Moisture		
Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50
Weather		
20-ft Wind Speed	mi/h	41
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	45
Air Temperature	oF	90, 109
Terrain		
Slope Steepness	%	29
Aspect (from north)	deg	270

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

Direction of Maximum Spread (from north) (deg) [SURFACE]

Midflame Wind Speed (mi/h) [SURFACE]

Wind Adjustment Factor [SURFACE]

Wind/Slope/Spread Direction Diagram [SURFACE]

Fire Characteristics Chart [SURFACE]

Scorch Height (ft) [SCORCH]

(continued on next page)

Input Worksheet (continued)

Notes

The results of this run use the sh7 model which represents the surrounding southern mixed chaparral, a peak Santa Ana weather condition and a 41 MPH wind according to worst case sustained winds for transitional climate zone.

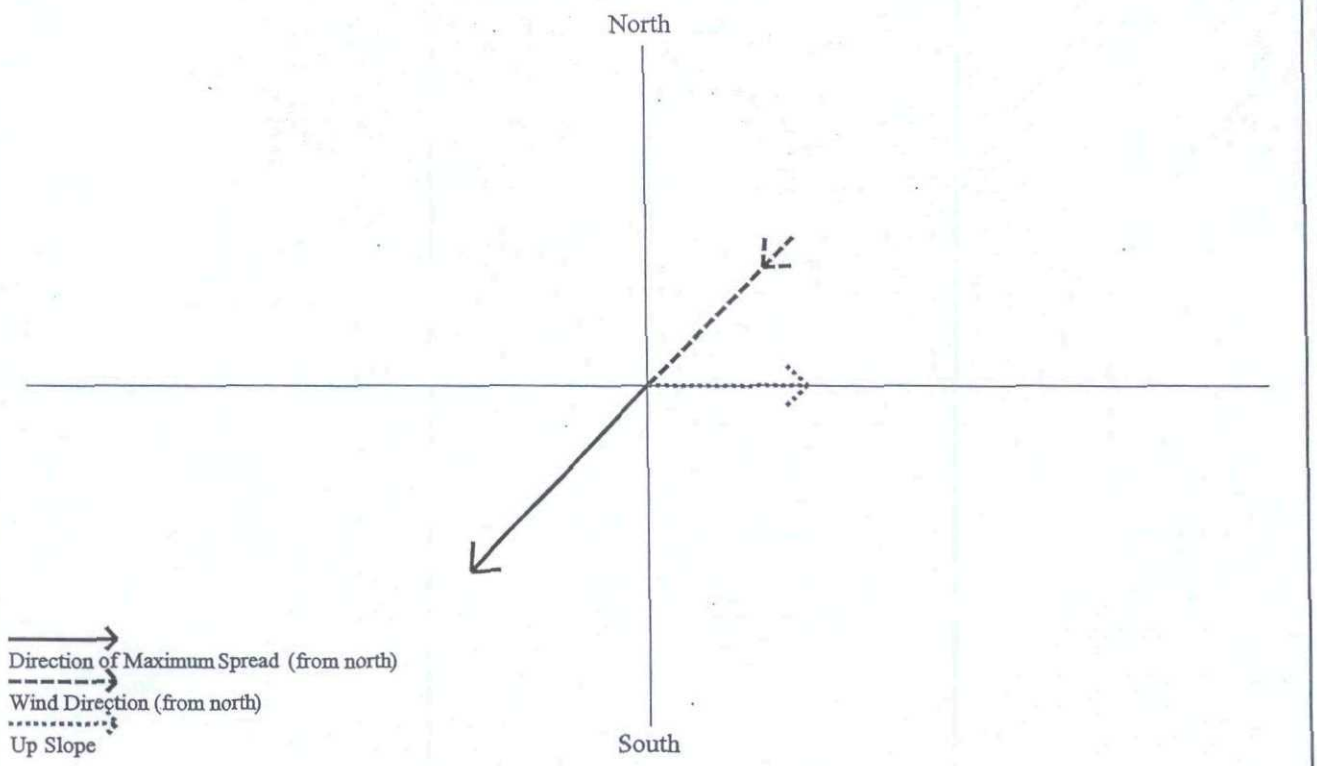
Hamilton-Peak

Air Temp oF	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
90	265.2	34.9	224	16.4	0.4	597
109	265.2	34.9	224	16.4	0.4	962

Hamilton-Peak

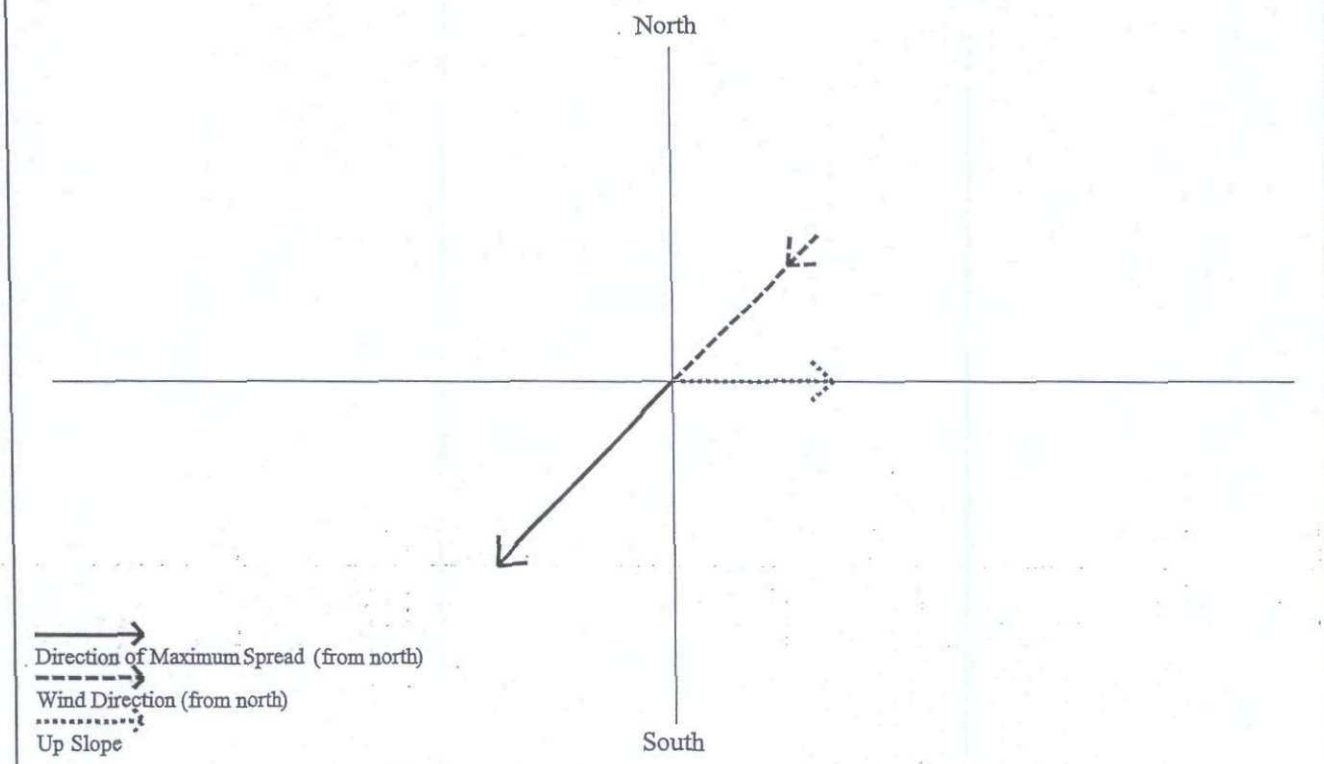
Wind / Slope / Fire Directions

Air Temperature : 90 oF



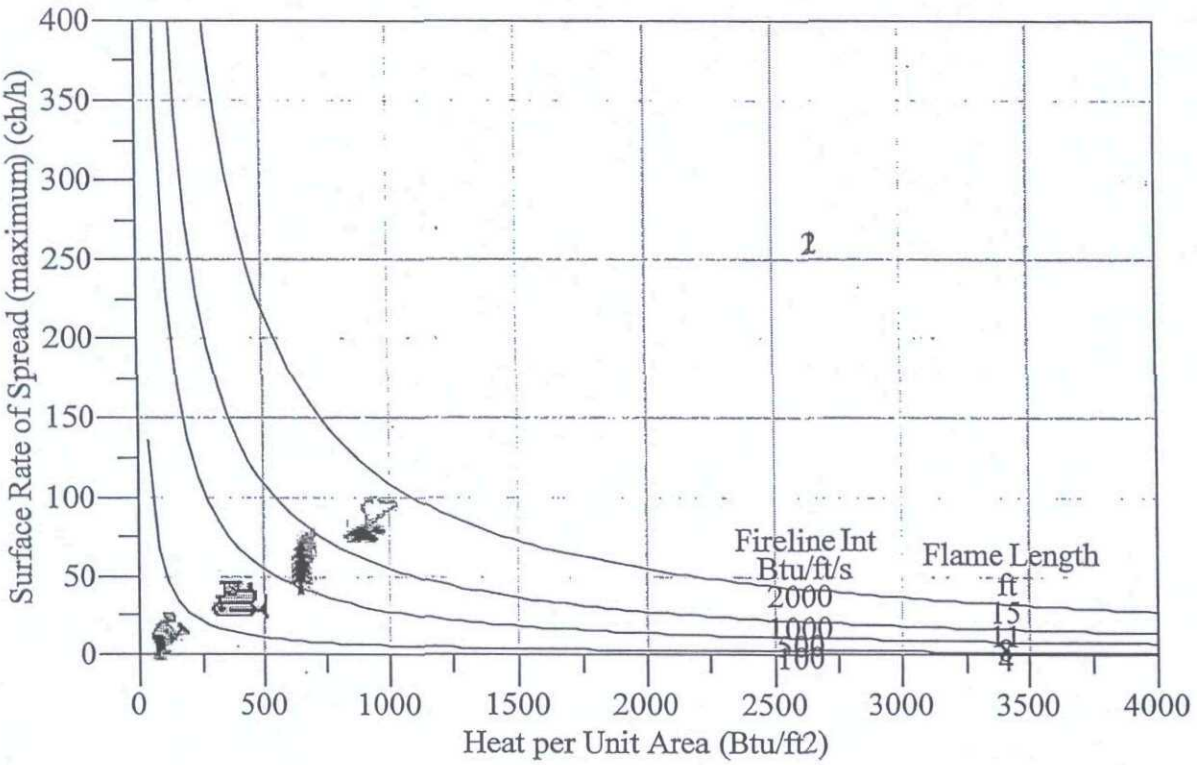
Direction of Maximum Spread (from north) 224 deg

Air Temperature : 109 oF



Direction of Maximum Spread (from north) 224 deg

Hamilton-Peak
Fire Characteristics Chart



Discrete Variable Codes Used
Hamilton-Peak

Fuel Model

sh7 Very high load, dry climate shrub (S) (147)

Modules: SURFACE, SCORCH

Description		Hamilton-Summer

Fuel/Vegetation, Surface/Understory

Fuel Model		sh7

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	19
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	225
Air Temperature	oF	90, 109

Terrain

Slope Steepness	%	29
Aspect (from north)	deg	270

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

Direction of Maximum Spread (from north) (deg) [SURFACE]

Midflame Wind Speed (mi/h) [SURFACE]

Wind Adjustment Factor [SURFACE]

Wind/Slope/Spread Direction Diagram [SURFACE]

Fire Characteristics Chart [SURFACE]

Scorch Height (ft) [SCORCH]

(continued on next page)

Input Worksheet (continued)

Notes

The results of this run use the sh7 model which represents the surrounding southern mixed chaparral, a summer weather condition and a 19 MPH wind according to worst case sustained winds for transitional climate zone.

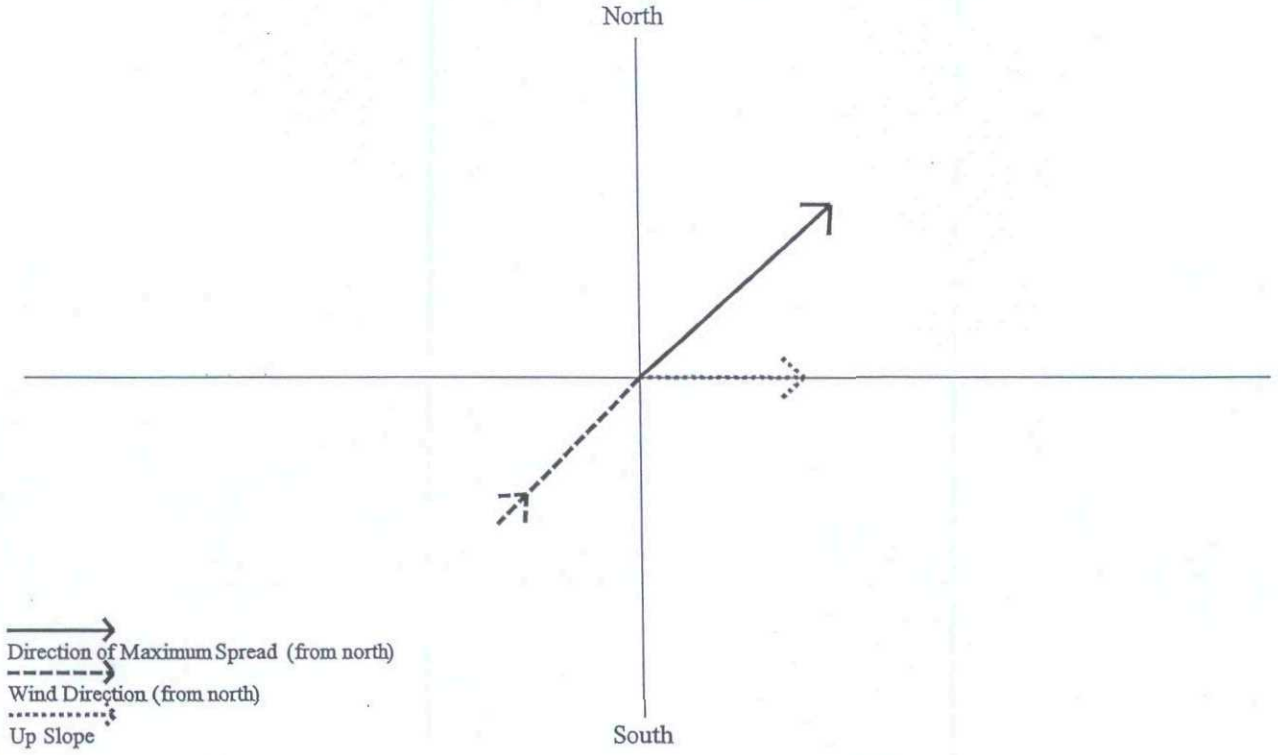
Hamilton-Summer

Air Temp oF	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
90	117.0	24.0	48	7.6	0.4	386
109	117.0	24.0	48	7.6	0.4	623

Hamilton-Summer

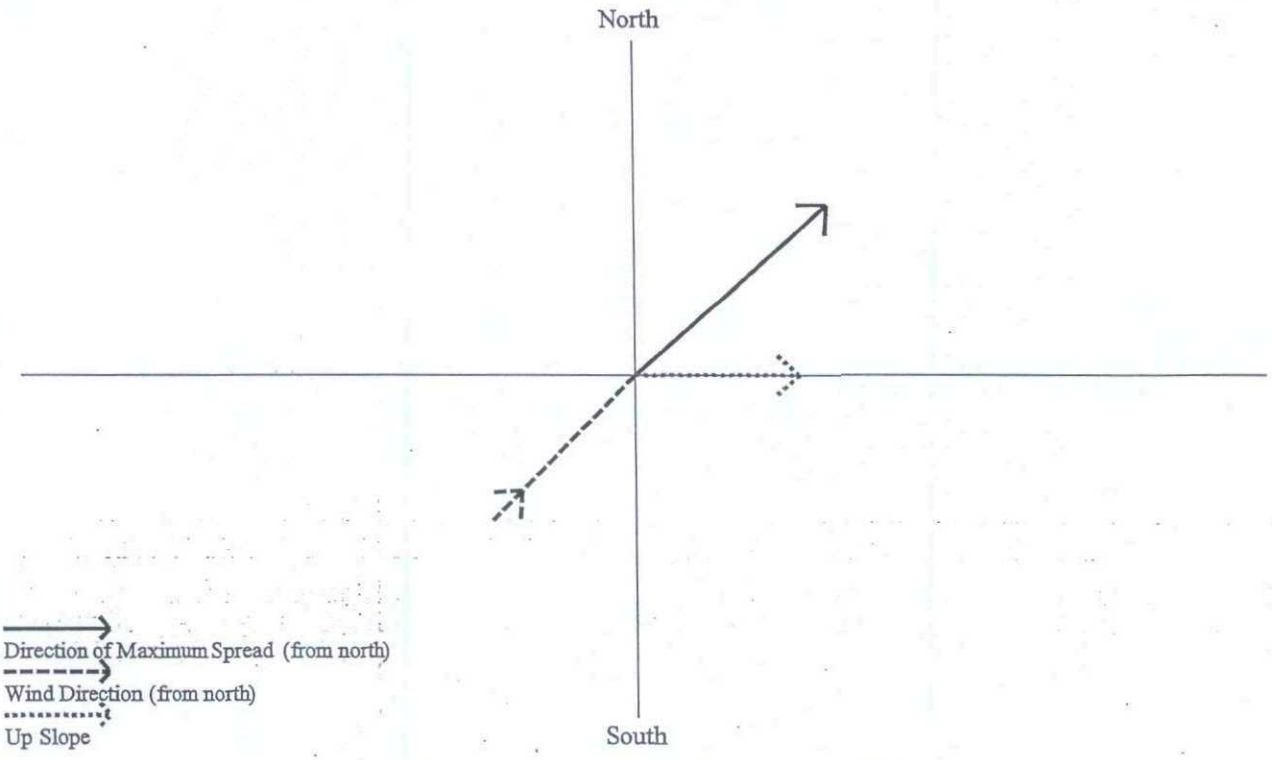
Wind / Slope / Fire Directions

Air Temperature : 90 oF



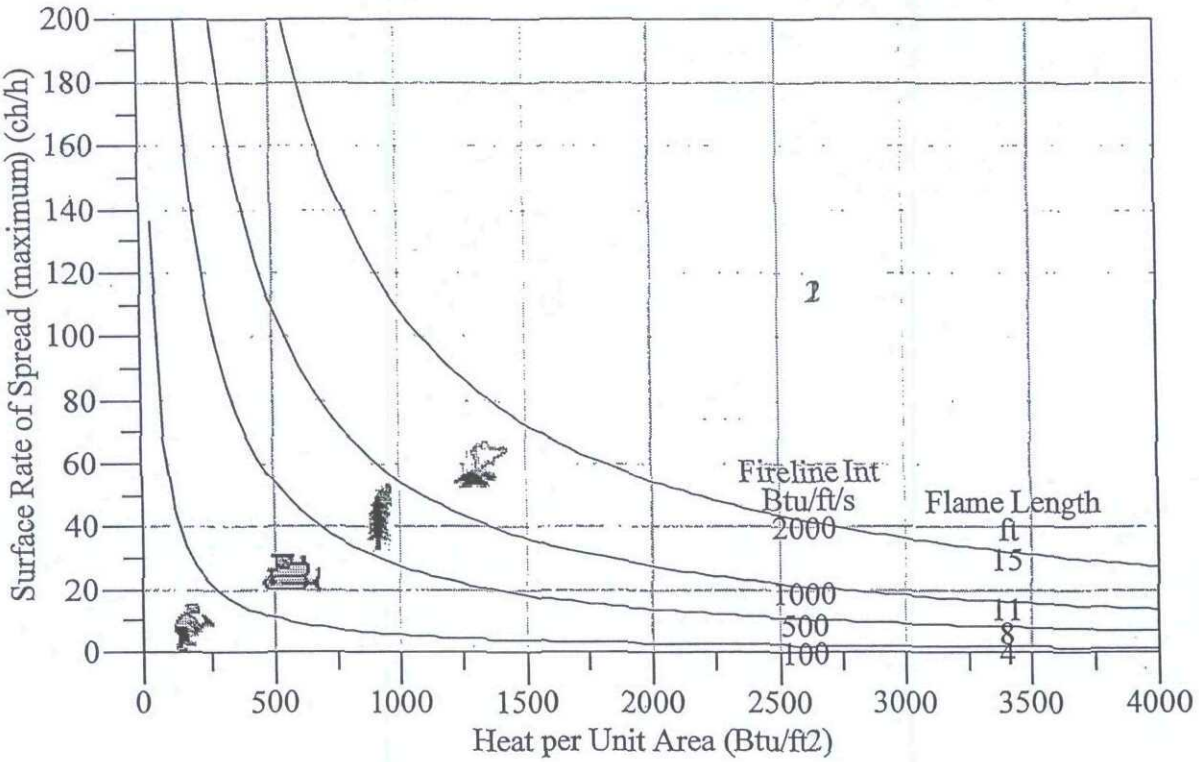
Direction of Maximum Spread (from north) 48 deg

Air Temperature : 109 oF



Direction of Maximum Spread (from north) 48 deg

Hamilton-Summer
Fire Characteristics Chart



Discrete Variable Codes Used
Hamilton-Summer

Fuel Model

sh7 Very high load, dry climate shrub (S) (147)

Modules: SURFACE, SCORCH

Description		Hamilton-Summer

Fuel/Vegetation, Surface/Understory

Fuel Model		sh7

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	19
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	225
Air Temperature	oF	90, 109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Flame Length (ft) [SURFACE]

Direction of Maximum Spread (from north) (deg) [SURFACE]

Midflame Wind Speed (mi/h) [SURFACE]

Wind Adjustment Factor [SURFACE]

Wind/Slope/Spread Direction Diagram [SURFACE]

Fire Characteristics Chart [SURFACE]

Scorch Height (ft) [SCORCH]

(continued on next page)

Input Worksheet (continued)

Notes

The results of this run use the sh7 model which represents the surrounding southern mixed chaparral, a summer weather condition and a 19 MPH wind according to worst case sustained winds for transitional climate zone.

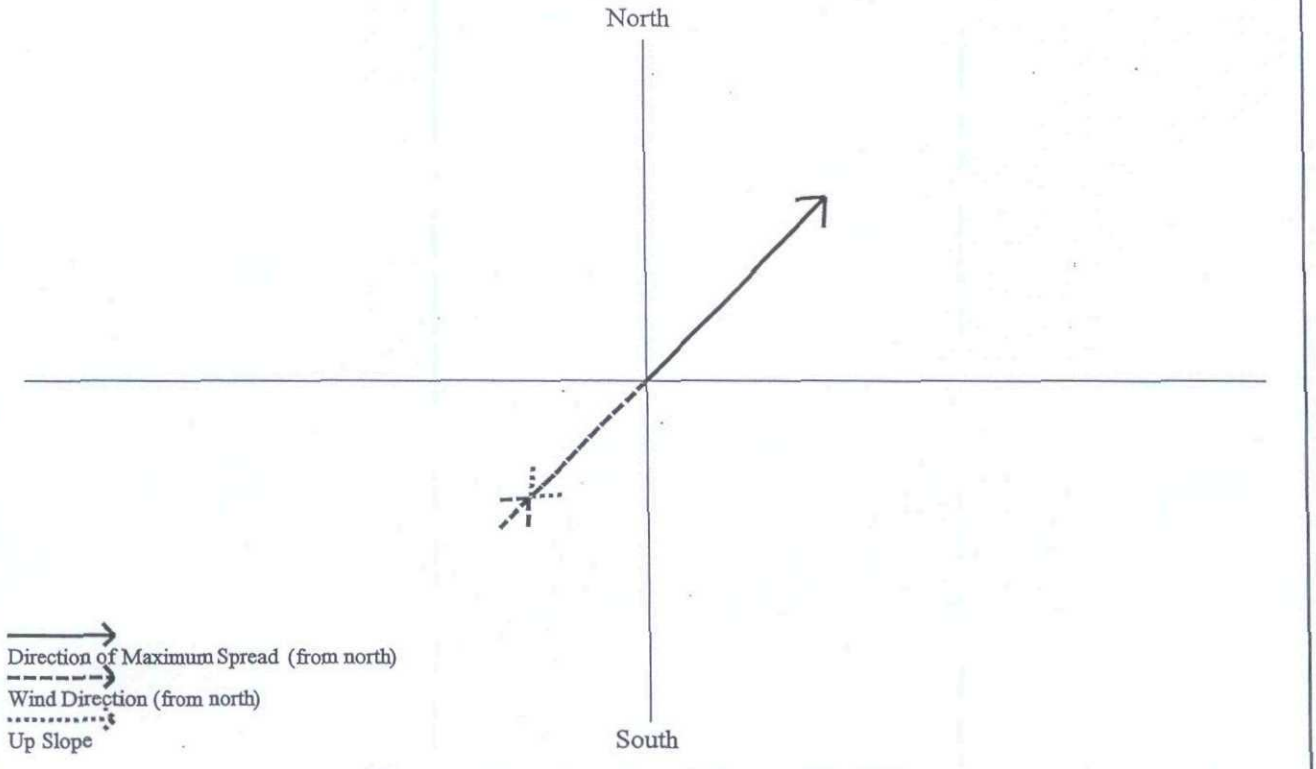
Hamilton-Summer

Air Temp oF	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
90	111.3	23.4	45	7.6	0.4	373
109	111.3	23.4	45	7.6	0.4	601

Hamilton-Summer

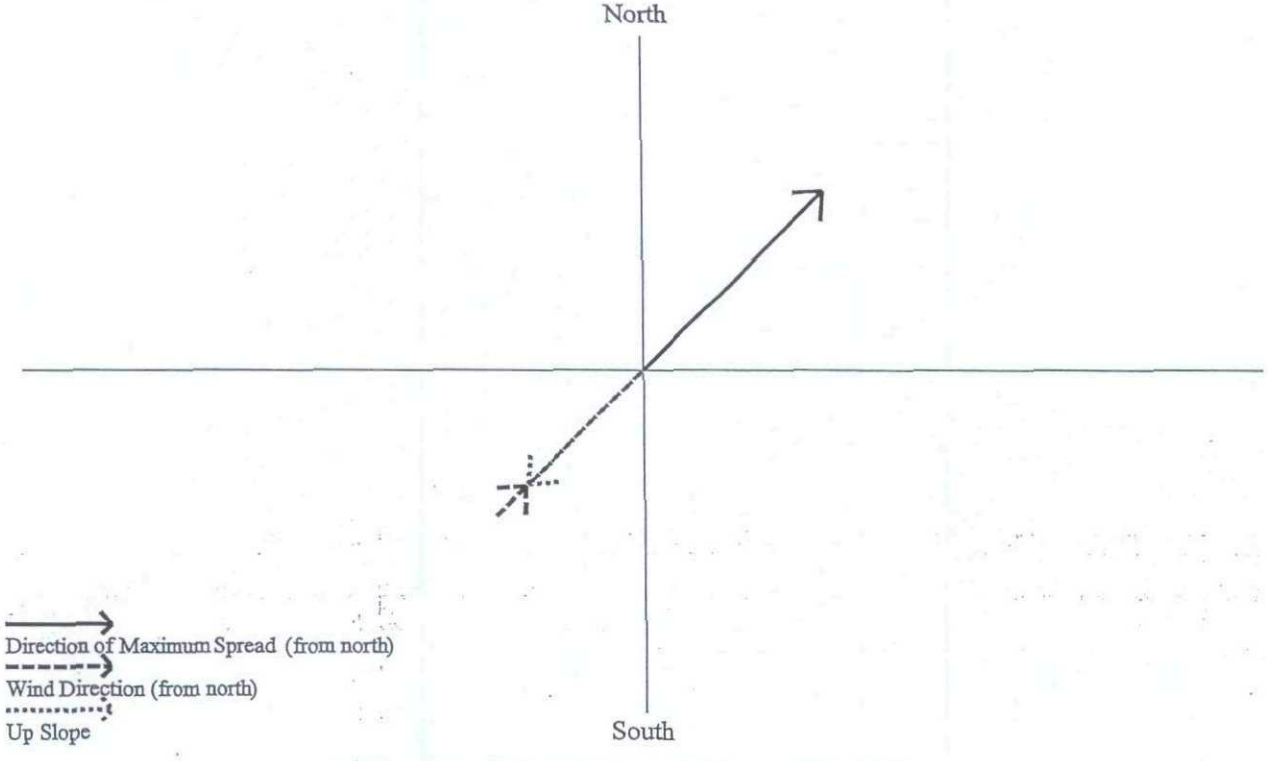
Wind / Slope / Fire Directions

Air Temperature : 90 oF



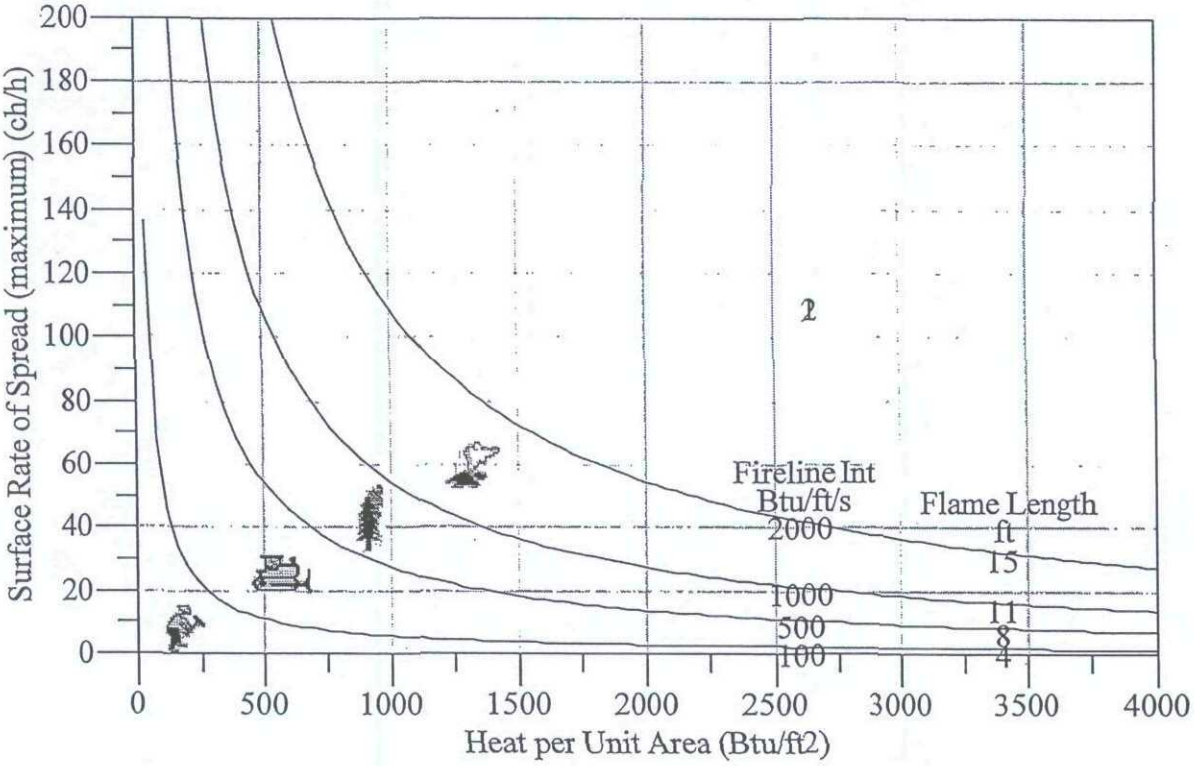
Direction of Maximum Spread (from north) 45 deg

Air Temperature : 109 oF



Direction of Maximum Spread (from north) 45 deg

Hamilton-Summer
Fire Characteristics Chart



Discrete Variable Codes Used
Hamilton-Summer

Fuel Model

sh7 Very high load, dry climate shrub (S) (147)

APPENDIX D

SUGGESTED PLANT LIST FOR A DEFENSIBLE SPACE

SUGGESTED PLANT LIST FOR A DEFENSIBLE SPACE

BOTANICAL NAME	COMMON NAME	Climate Zone
TREES		
Acer		
platanoides	Norway Maple	M
rubrum	Red Maple	M
saccharinum	Silver Maple	M
saccarum	Sugar Maple	M
macrophyllum	Big Leaf Maple	C/ (R)
Alnus rhombifolia	White Alder	C/I/M (R)
Arbutus		
unedo	Strawberry Tree	All zones
Archontophoenix		
cunninghamiana	King Palm	C
Arctostaphylos spp.**	Manzanita	C/I/D
Brahea		
armata	Blue Hesper Palm	C/D
edulis	Guadalupe Palm	C/D
Ceratonia siliqua	Carob	C/I/D
Cerdidium floridum	Blue Palo Verde	D
Cercis occidentalis**	Western Redbud	C/I/M
Cornus		
nuttallii	Mountain Dogwood	I/M
stolonifera	Redtwig Dogwood	I/M
Eriobotrya		C/I/D
japonica	Loquat	C
Erythrina caffra	Kaffirboom Coral Tree	I/M
Gingko biloba "Fairmount"	Fairmount Maidenhair Tree	I/D/M
Gleditisia triacanthos	Honey Locust	
Juglans		I
californica	California Walnut	C/I
hindsii	California Black Walnut	I/D/M
Lagerstroemia indica	Crape Myrtle	I
Ligustrum lucidum	Glossy Privet	C/I/M
Liquidambar styraciflua	Sweet Gum	I
Liriodendron tulipifera	Tulip Tree	
Lyonothamnus floribundus		C
ssp. Asplenifolius	Fernleaf Catalina Ironwood	C/I/D
Melaleuca spp.	Melaleuca	C/I
Parkinsonia aculeate	Mexican Palo Verde	
Pistacia	Chinese Pistache	
chinensis	Pistachio Nut	C/I/D

vera	Pistachio Nut	I
Pittosporum		
phillyraeoides	Willow Pittosporum	C/I/D
viridiflorum	Cape Pittosporum	C/I
Platanus		
acerifolia	London Plane Tree	All zones
racemosa**	California Sycamore	C/I/M
Populus		
alba	White Poplar	D/M
fremontii**	Western Cottonwood	I
trichocarpa	Black Cottonwood	I/M
Prunus		
xblireiana	Flowering Plum	M
caroliniana	Carolina Laurel Cherry	C
ilicifolia**	Hollyleaf Cherry	C
lyonii**	Catalina Cherry	C
serrulata 'Kwanzan'	Flowering Cherry	M
yedoensis 'Akebono'	Akebono Flowering Cherry	M
Quercus		
agrifolia**	Coast Live Oak	C/I
engelmannii	Engelmann Oak	I
** suber	Cork Oak	C/I/D
Rhus		
lancea**	African Sumac	C/I/D
Salix spp.**	Willow	All zones (R)
Tristania conferta	Brisbane Box	C/I
Ulmus		
parvifolia	Chinese Elm	I/D
pumila	Siberian Elm	C/M
Umbellularia californica**	California Bay Laurel	C/I

SHRUBS		
Agave	Century Plant	D
americana	Century Plant	D
deserti	Shawis Century Plant	D
shawi**		
Amorpha fruticosa**	False Indigobush	I
Arbutus		
menziesii**	Madrone	C/I
Arctostaphylos spp.**	Manzanita	C/I/D
Atriplex**		
canescens	Hoary Saltbush	I
lentiformis	Quail Saltbush	D
Baccharis**		
glutinosa	Mule Fat	C/I
pilularis	Coyote Bush	C/I/D
Carissa grandiflora	Natal Plum	C/I
Ceanothus spp.**	California Lilac	C/I/M
Cistus spp.	Rockrose	C/I/D
Cneoridium dumosum**	Bushrue	C
Comarostaphylis**		
diversifolia	Summer Holly	C
Convolvulus cneorum	Bush Morning Glory	C/I/M
Dalea		
orcuttii	Orcutt's Delea	D
spinosa**	Smoke Tree	I/D
Elaeagnus		
pungens	Silverberry	C/I/M
Encelia**		
californica	Coast Sunflower	C/I
farinose	White Brittlebush	D/I
Eriobotrya		
deflexa	Bronze Loquat	C/I
Eriophyllum		
confertiflorum**	Golden Yarrow	C/I
staechadifolium	Lizard Tail	C
Escallonia spp.	Escallonia	C/I
Feijoa sellowiana	Pineapple Guava	C/I/D
Fouqueria splendens	Ocotillo	D
Fremontodendron**		
californicum	Flannelbush	I/M
mexicanum	Southern Flannelbush	I
Galvezia		
juncea	Baja Bush-Snapdragon	C
speciosa	Island Bush-Snapdragon	C
Garrya		
elliptica	Coast Silktassel	C/I
flavescens**	Ashy Silktassel	I/M

Heteromeles arbutifolia**	Ashy Silktassel	I/M
Lantana spp.	Toyon	C/I/M
Lotus scoparius	Lantana	C/I/D
Mahonia spp.	Deerweed	C/I
	Barberry	C/I/M
Malacothamnus		
clementinus		
	San Clemente Island Bush Mallow	C
fasciculatus**		
	Mesa Bushmallow	C/I
Melaleuca spp.		
Mimulus spp.**	Melaleuca	C/I/D
Nolina	Monkeyflower	C/I (R)
parryi		
parryi ssp. wolfii	Parry's Nolina	I
Photinia spp.	Wolf's Bear Grass	D
Pittosporum	Photinia	All Zones
crassifolium		
rhombifolium		CI/I
tobira 'Wheeleri'	Queensland Pittosporum	C/I
undulatum	Wheeler's Dwarf	C/I/D
viridiflorum	Victorian Box	C/I
Plumbago auriculata	Cape Pittosporum	C/I
Prunus	Cape Plumbago	C/I/D
caroliniana		
ilicifolia**	Carolina Laurel Cherry	C
lyonii**	Hollyleaf Cherry	C
Puncia granatum	Catalina Cherry	C
Pyracantha spp.	Pomegranate	C/I/D
Quercus	Firethorn	All Zones
dumosa**		
Rhamus	Scrub Oak	C/I
alaternus		
californica**	Italian Blackthorn	C/I
Rhaphiolepis spp.	Coffeeberry	C/I/M
Rhus	Rhaphiolepis	C/I/D
integrifolia**		
laurina	Lemonade Berry	C/I
lentii	Laurel Sumac	C/I
ovata**	Pink-Flowering Sumac	C/D
trilobata**	Sugarbush	I/M
Ribes	squawbush	I
viburnifolium		
speciosum**	Evergreen Currant	C/I
Romneya coulteri	Fuschia-Flowering Gooseberry	C/I/D
Rosa	Matilija Poppy	I
californica**		
minutifolia		

Salvia spp.**	California Wild Rose	C/I
Sambucus spp.**	Baja California Wild Rose	C/I
Symphoricarpos mollis**	Sage	All Zones
Syringa vulgaris	Elderberry	C/I/M
Tecomaria capensis	Creeping Snowberry	C/I
Teucrium fruticans	Lilac	M
Toxicodendron**	Cape Honeysuckle	C/I/D
diversilobum	Bush Germander	C/I
Verbena		
lilacina	Poison Oak	I/M
Xylosma congestum		
Yucca**	Lilac Verbena	C
schidigera	Shiny Xylosma	C/I
whipplei		
	Mojave Yucca	D
	Foothill Yucca	I

GROUNDCOVERS		
Achillea**	Yarrow	All Zones
Aptenia cordifolia	Apteria	C
Arctostaphylos spp.**	Manzanita	C/I/D
Baccharis**		
pilularis	Coyote Bush	C/I/D
Ceanothus spp.**	California Lilac	C/I/M
Cerastium tomentosum	Snow-in-Summer	All Zones
Coprosma kirkii	Creeping Coprosma	C/I/D
Cotoneaster spp.	Redberry	All Zones
Drosanthemum hispidum	Rosea Ice Plant	C/I
Dudleya		
brittonii	Brittonis Chalk Dudleya	C
pulverulenta**	Chalk Dudleya	C/I
virens	Island Live Fore-ever	C
Eschscholzia californica**	California Poppy	All Zones
Euonymus fortunei		
'Carrierei'	Glossy Winter Creeper	M
'Coloratus'	Purple-Leaf Winter Creeper	M
Ferocactus viridescens**	Coast Barrel Cactus	C
Gaillardia grandiflora	Blanket Flower	All Zones
Gazania spp.	Gazania	C/I
Helianthemum spp.**	Sunrose	All Zones
Lantana spp.	Lantana	C/I/D
Lasthenia		
californica**	Common Goldfields	I
glabrata	Coastal Goldfields	C
Lupinus spp.**	Lupine	C/I/M
Myoporum spp.	Myoporum	C/I
Pyracantha spp.	Firethorn	All zones
Rosmarinus officinalis	Rosemary	C/I/D
Santolina		
chamaecyparissus	Lavender Cotton	All Zones
virens	Santolina	All Zones
Trifolium frageriferum	O'Connor's Legume	C/I
Verbena		
rigida	Verbena	All Zones
Viguiera laciniata**	San Diego Sunflower	C/I
Vinca		
minor	Dwarf Periwinkle	M

VINES		
Antigonon leptopus	San Miguel Coral Vine	C/I
Distictis buccinatoria	Blood-Red Trumpet Vine	C/I/D
Keckiella cordifolia**	Heart-Leaved Penstemon	C/I
Lonicera		
japonica 'Halliana'	Hall's Honeysuckle	All Zones
subspicata**	Chaparral Honeysuckle	C/I
Solanum		
jasminoides	Potato Vine	C/I/D

PERENNIALS		
Coreopsis		
gigantean	Giant Coreopsis	C
grandiflora	Coreopsis	All Zones
maritime	Sea Dahlia	C
verticillata	Coreopsis	C/I
Heuchera maxima	Island Coral Bells	C/I
Iris douglasiana**	Douglas Iris	C/M
Iva hayesiana**	Poverty Weed	C/I
Kniphofia uvaria	Red-Hot Poker	C/M
Lavandula spp.	Lavender	All Zones
Limonium californicum		
var. mexicanum	Coastal Statice	C
perezii	Sea Lavender	C/I
Oenothera spp.	Primrose	C/I/M
Penstemon spp.**	Penstemon	C/I/D
Satureja douglasii	Yerba Buena	C/I
Sisyrinchium		
bellum	Blue-Eyed Grass	C/I
californicum	Golden-Eyed Grass	C
Solanum		
xantii	Purple Nightshade	C/I
Zauschneria**		
californica	California Fuschia	C/I
cana	Hoary California Fuschia	C/I
'Catalina'	Catalina Fuschia	C/I

ANNUALS		
Lupinus spp.**	Lupine	C/I/M

APPENDIX E

UNDESIRABLE PLANT LIST

UNDESIRABLE PLANT LIST

The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio. Many of these species, if existing on the property and adequately maintained (pruning, thinning, irrigation, litter removal, and weeding), may remain as long as the potential for spreading a fire has been reduced or eliminated.

BOTANICAL NAME	COMMON NAME
Abies species	Fir Trees
Acacia species	Acacia (trees, shrubs, groundcovers)
*Adenostoma sparsifolium***	Red Shanks
*Adenostoma fasciculatum***	Chamise
Agonis juniperina	Juniper Myrtle
Araucaria species	Monkey Puzzle, Norfolk Island Pine
*Artemesia californica***	California Sagebrush
Bambusa species	Bamboo
Cedrus species	Cedar
Chamaecyparis species	False Cypress
Coprosma pumila	Prostrate Coprosma
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leylandii Cypress
*Cupressus forbesii***	Tecate Cypress
Cupressus glabra	Arizona Cypress
Cupressus sempervirens	Italian Cypress
Dodonea viscosa	Hopseed Bush
*Eriogonum fasciculatum***	Common Buckwheat
Eucalyptus species	Eucalyptus
*Heterotheca grandiflora***	Telegraph Plant
Juniperus species	Junipers
Larix species	Larch
Lonicera japonica	Japanese Honeysuckle
Miscanthus species	Eulalia Grass
*Muehlenbergia species***	Deer Grass
Palmae species	Palms
Picea species	Spruce Trees
*Pickeringia Montana***	Chaparral Pea
Pinus species	Pines
Podocarpus species	Fern Pine
Pseudotsuga menziesii	Douglas Fir
Rosmarinus species	Rosemary
*Salvia mellifera***	Black Sage
Taxodium species	Cypress
Taxus species	Yew
Thuja species	Arborvitae
Tsuga species	Hemlock
*Urtica urens***	Burning Nettle

** San Diego County native species

References: Gordon, H. White, T.C. 1994. Ecological Guide to Southern California Chaparral Plant Series. Cleveland National Forest.

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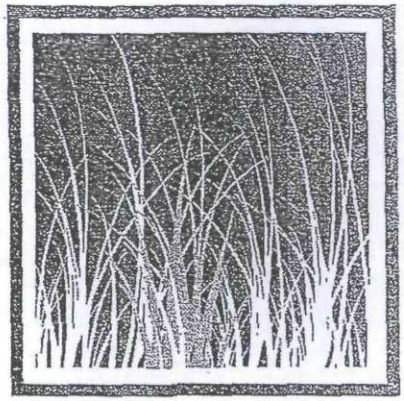
www.ucfpl.ucop.edu. 2004. University of California, Berkeley, Forest Products Laboratory, College of Natural Resources. Defensible Space Landscaping in the Urban/Wildland Interface. A Compilation of Fire Performance Ratings of Residential Landscape Plants.

County of Los Angeles Fire Department. 1998. Fuel Modification Plan Guidelines. Appendix I, Undesirable Plant List, and Appendix II, Undesirable Plant List.

APPENDIX F

CALIFORNIA EXOTIC PEST PLANTS OF GREATEST ECOLOGICAL CONCERN IN CALIFORNIA

The CalEPPC List:
Exotic Pest Plants of Greatest Ecological Concern in California
October, 1999



The CalEPPC list is based on information submitted by our members and by land managers, botanists and researchers throughout the state, and on published sources. The list highlights non-native plants that are serious problems **in wildlands** (natural areas that support native ecosystems, including national, state and local parks, ecological reserves, wildlife areas, national forests, BLM lands, etc.).

List categories include:

List A: Most Invasive Wildland Pest Plants; documented as aggressive invaders that displace natives and disrupt natural habitats. Includes two sub-lists; List A-1: Widespread pests that are invasive in more than 3 Jepson regions (see page 3), and List A-2: Regional pests invasive in 3 or fewer Jepson regions.

List B: Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be widespread or regional.

Red Alert: Pest plants with potential to spread explosively; infestations currently small or localized. If found, alert CalEPPC, County Agricultural Commissioner or California Department of Food and Agriculture.

Need More Information: Plants for which current information does not adequately describe nature of threat to wildlands, distribution or invasiveness. Further information is requested from knowledgeable observers.

Annual Grasses: New in this edition; a preliminary list of annual grasses, abundant and widespread in California, that pose significant threats to wildlands. Information is requested to support further definition of this category in next List edition.

Considered But Not Listed: Plants that, after review of status, do not appear to pose a significant threat to wildlands.

Plants that fall into the following categories are not included in the List:

- Plants found mainly or solely in disturbed areas, such as roadsides and agricultural fields.
- Plants that are established only sparingly, with minimal impact on natural habitats.

1999 List Review Committee:

Dr. Lars W.J. Anderson, Research Leader
U.S. Dept. of Agriculture-ARS
Aquatic Weed Research Lab.

Dr. Joe DiTomaso, Extension Weed Ecologist
Weed Science Program
Department of Vegetable Crops
University of California, Davis

Dr. G. Fred Hrusa, Senior Plant Systematist
Plant Pest Diagnostics Center
California Department of Food & Agriculture

Dr. Marcel Rejmánek, Professor of Plant Ecology
Section of Evolution and Ecology
University of California, Davis

CalEPPC List Committee:

Ann Howald, Instructor
Santa Rosa Junior College

Dr. John Randall, Invasive Weed Specialist
The Nature Conservancy

Jake Sigg, President
California Native Plant Society

Ellie Wagner, Botanist
California Dept. of Transportation

Peter Warner, Restoration Coordinator
Golden Gate National Parks Association

The CalEPPC list is updated regularly. Please use the form provided to send comments, suggestions or new information to: **Peter Warner, 555 Magnolia Avenue, Petaluma, CA, 94952-2080** or via email at **peterjwarner@earthlink.net**

Thanks to all those who submitted comments for the 1999 list.

List A-1: Most Invasive Wildland Pest Plants; Widespread

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Ammophila arenaria	European beach grass	Coastal dunes	SCo,CCo,NCo
Arundo donax	giant reed, arundo	Riparian areas	cSNF,CCo,SCo,SnGb,D,GV
Bromus tectorum	cheat grass, downy brome	Sagebrush, pinyon-juniper, other desert communities; increases fire frequency	GB,D
Carpobrotus edulis	iceplant, sea fig	Many coastal communities, esp. dunes	SCo,CCo,NCo,SnFrB
Centaurea solstitialis[C]	yellow starthistle	Grasslands	CA-FP (uncommon in SoCal)
Cortaderia jubata	Andean pampas grass, jubatagrass	Horticultural; many coastal habitats; esp. disturbed or exposed sites incl. logged areas	NCo,NCoRO,SnFrB, CCo,WTR,SCo
Cortaderia selloana	pampas grass	Horticultural; coastal dunes, coastal scrub, Monterey pine forest, riparian, grasslands; wetlands in ScV; also on serpentine	SnFrB,SCo,CCo,ScV
Cynara cardunculus[B]	artichoke thistle	Coastal grasslands	CA-FP, esp. CCo,SCo
Cytisus scoparius[C]	Scotch broom	Horticultural; coastal scrub, oak woodlands, Sierra foothills	NW,CaRF,SNF,GV, SCo,CW
Eucalyptus globulus	Tasmanian blue gum	Riparian areas, grasslands; moist slopes	NCoRO,GV,SnFrB, CCo,SCoRO,SCo,nChI
Foeniculum vulgare	wild fennel	Grasslands; esp. SoCal, Channel Is.; the cultivated garden herb is not invasive	CA-FP
Genista monspessulana[C]	French broom	Horticultural; coastal scrub, oak woodlands, grasslands	NCoRO,NCoRI,SnFrB, CCo,SCoRO,sChI,WTR,PR
Lepidium latifolium[B]	perennial pepperweed, tall whitetop	Coastal, inland marshes, riparian areas, wetlands, grasslands; potential to invade montane wetlands	CA (except KR,D)
Myriophyllum spicatum	Eurasian watermilfoil	Horticultural; lakes, ponds, streams, aquaculture	SnFrB,SnJV,SNH(?); prob. CA
Pennisetum setaceum	fountain grass	Horticultural; grasslands, dunes, desert canyons; roadsides	Deltaic GV,CCo,SCo, SnFrB
Rubus discolor	Himalayan blackberry	Riparian areas, marshes, oak woodlands	CA-FP
Senecio mikanioides (=*Delairea odorata*)	Cape ivy, German ivy	Coastal, riparian areas, also SoCal (south side San Gabriel Mtns.)	SCo,CCo,NCo,SnFrB,SW
Taeniatherum caput-medusae[C]	medusa-head	Grasslands, particularly alkaline and poorly drained areas	NCoR,CaR,SNF,GV,SCo
Tamarix chinensis, T. gallica, T. parviflora & T. ramosissima	tamarisk, salt cedar	Desert washes, riparian areas, seeps and springs	SCo,D,SnFrB,GV,sNCoR, sSNF,Teh,SCoRI,SNE, WTR
Ulex europaeus[B]	gorse	North, central coastal scrub, grasslands	NCo,NCoRO,CaRF, n&cSNF,SnFrB,CCo

[1]Noxious Weed Ratings

F: Federal Noxious Weed, as designated by the USDA; targeted for federally-funded prevention, eradication or containment efforts.

A: CA Dept. of Food & Agriculture, on "A" list of Noxious Weeds; agency policies call for eradication, containment or entry refusal.

B: CA Dept. of Food & Agriculture, on "B" list of Noxious Weeds; includes species that are more widespread, and therefore more difficult to contain; agency allows county Agricultural Commissioners to decide if local eradication or containment is warranted.

C: CA Dept. of Food & Agriculture, on "C" list of Noxious Weeds; includes weeds that are so widespread that the agency does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.

Q: CA Dept. of Food & Agriculture's designation for temporary "A" rating pending determination of a permanent rating.

For most species nomenclature follows *The Jepson Manual: Higher Plants of California* (Hickman, J., Ed., 1993).

List B: Wildland Pest Plants of Lesser Invasiveness

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Ageratina adenophora[F]	eupatory	Horticultural; coastal canyons, coastal scrub, slopes, Marin to San Diego Co; San Gabriel Mtns.	CCo,SnFrB,SCo,SCoRO
Bassia hyssopifolia	bassia	Alkaline habitats	CA (except NW,SNH)
Bellardia trixago	bellardia	Grasslands, on serpentine, where a threat to rare natives	NCoRO,CCo,SnFrB
Brassica nigra	black mustard	Coastal communities, esp. fog-belt grasslands; disturbed areas	CA-FP
Cardaria chalepensis[B]	lens-podded white-top	Wetlands of Central Valley	CA
Carduus pycnocephalus[C]	Italian thistle	Grasslands, shrublands, oak woodlands	sNCo,sNCoR,SNF,CW, SCo,ScV
Centaurea calcitrapa[B]	purple starthistle	Grasslands	NW,sCaRF,SNF,GV,CW,SW
Centaurea melitensis	tocalote, Malta starthistle	Widespread; sometimes misidentified as C. solstitialis; perhaps a more serious invader than currently recognized	CA-FP,D
Cirsium arvense[B]	Canada thistle	Especially troublesome in riparian areas	CA-FP
Cirsium vulgare	bull thistle	Riparian areas, marshes, meadows	CA-FP,GB
Conium maculatum	poison hemlock	Mainly disturbed areas but may invade wildlands; known to poison wildlife; early expanding stage in many areas, esp. San Diego Co. riparian, oak understory	CA-FP
Crataegus monogyna	hawthorn	Horticultural; recent invader, colonizing healthy native forest around Crystal Springs reservoir on S.F. peninsula	SnFrB,CCo,NCo,NCoR
Ehrharta erecta	veldt grass	Wetlands, moist wildlands; common in urban areas; potential to spread rapidly in coastal, riparian, grassland habitats	SnFrB,CCo,SCo
Erechtites glomerata, E. minima	Australian fireweed	Coastal woodlands, scrub, NW forests, esp. redwoods	NCo,NCoRO,CCo,SnFrB, SCoRO
Festuca arundinacea	tall fescue	Horticultural (turf grass); coastal scrub, grasslands in NCo, CCo	CA-FP
Hedera helix	English ivy	Horticultural; invasive in coastal forests, riparian areas	CA-FP
Holcus lanatus	velvet grass	Coastal grasslands, wetlands in No. CA	CA exc. DSon
Hypericum perforatum[C]	Klamathweed, St. John's wort	Redwood forests, meadows, woodlands; invasion may occur due to lag in control by established biocontrol agents	NW,CaRH,n&cSN,ScV, CCo,SnFrB,PR
Ilex aquifolium	English holly	Horticultural; coastal forests, riparian areas	NCoRO,SnFrB,CCo
Iris pseudacorus	yellow water iris, yellow flag	Horticultural; riparian, wetland areas, esp. San Diego, Los Angeles cos.	SnFrB,CCo,sSnJV,SCo
Leucanthemum vulgare	ox-eye daisy	Horticultural; invades grassland, coastal scrub	KR,NCoRO,n&cSNH, SnFrB,WTR,PR
Mesembryanthemum crystallinum	crystalline iceplant	Coastal bluffs, dunes, scrub, grasslands; concentrates salt in soil	NCo,CCo,SCo,ChI
Myriophyllum aquaticum	parrot's feather	Horticultural; streams, lakes, ponds	NCo,CaRF,CW,SCo
Olea europaea	olive	Horticultural and agricultural; reported as invasive in riparian habitats in Santa Barbara, San Diego	NCoR,NCoRO,CCo, SnFrB,SCoRO,SCo
Phalaris aquatica	Harding grass	Coastal sites, esp. moist soils	NW,cSNF,CCo,SCo
Potamogeton crispus	curlyleaf pondweed	Scattered distribution in ponds, lakes, streams	NCoR,GV,CCo,SnFrB, SCo,ChI,SnGb,SnBr,DMoj
Ricinus communis	castor bean	SoCal coastal riparian habitats	GV,SCo,CCo
Robinia pseudoacacia	black locust	Horticultural; riparian areas, canyons; native to eastern U.S.	CA-FP,GB
Schinus molle	Peruvian pepper tree	Horticultural; invasive in riparian habitats in San Diego, Santa Cruz Is.	SNF,GV,CW,SW,Teh

Exotic Pest Plants of Greatest Ecological Concern in California

List A-2: Most Invasive Wildland Pest Plants; Regional

Latin Name	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Ailanthus altissima	tree of heaven	Riparian areas, grasslands, oak woodlands, esp. GV, SCo	CA-FP
Atriplex semibaccata	Australian saltbush	SoCal; coastal grasslands, scrub; "high marsh" of coastal salt marshes	CA (except CaR,c&sSN)
Brassica tournefortii	Moroccan or African mustard	Washes, alkaline flats, disturbed areas in Sonoran Desert	SW,D
Bromus madritensis ssp. *rubens*	red brome	Widespread; contributing to SoCal scrub, desert scrub type conversions; increases fire frequency	CA
Cardaria draba[B]	white-top, hoary cress	Riparian areas, marshes of central coast; also ag. lands, disturbed areas	Problem only in CCo
Conicosia pugioniformis	narrow-leaved iceplant, roundleaf iceplant	Coastal dunes; sandy soils near coast; best documented in San Luis Obispo and Santa Barbara cos.	CCo
Cotoneaster pannosus, C. lacteus	cotoneaster	Horticultural; many coastal communities; esp. North Coast, Big Sur; related species also invasive	CCo,SnFrB,NW
Cytisus striatus	striated broom	Often confused with C. scoparius; coastal scrub, grassland	SnFrB,CCo,SCo,PR
Egeria densa	Brazilian waterweed	Streams, ponds, sloughs, lakes; Sacramento-San Joaquin Delta	n&sSNF,SnJV,SnFrB, SnJt,SNE
Ehrharta calycina	veldt grass	Sandy soils, esp. dunes; rapidly spreading on central coast	CCo,SCoRO,WTR
Eichhornia crassipes	water hyacinth	Horticultural; established in natural waterways, esp. troublesome in Sacramento-San Joaquin Delta	GV,SnFrB,SCo,PR
Elaeagnus angustifolia	Russian olive	Horticultural; interior riparian areas	SnJV,SnFrB,SNE,DMoj
Euphorbia esula[A]	leafy spurge	Rangelands in far no. CA, also reported from Los Angeles Co.	eKR,NCo,CaR,MP,SCo
Ficus carica	edible fig	Horticultural; Central Valley, foothill, South Coast and Channel Is. riparian woodlands	nSNF,GV,SnFrB,SCo
Lupinus arboreus	bush lupine	Native to SCo, CCo; invasive only in North Coast dunes	SCo,CCo,NCo
Mentha pulegium	pennyroyal	Santa Rosa Plain (Sonoma Co.) and Central Valley vernal pools; wetlands elsewhere	NW,GV,CW,SCo
Myoporum laetum	myoporum	Horticultural; coastal riparian areas in SCo	SCo,CCo
Saponaria officinalis	bouncing bet	Horticultural; meadows, riparian habitat in SNE, esp. Mono Basin	NW,CaRH,nSNF,SnFrB, SCoRO,SCo,PR,MP,SNE, GV
Spartina alterniflora	Atlantic or smooth cordgrass	S.F. Bay salt marshes; populations in Humboldt Bay believed extirpated	CCo(shores of S.F. Bay)

[2]Distribution by geographic subdivisions per the Jepson Manual

CA=California
CA-FP=California Floristic Province
CaR=Cascade Ranges
CaRF=Cascade Range Foothills
CCo=Central Coast
ChI=Channel Islands
CW=Central Western CA
D=Deserts
DMoj=Mojave Desert
DSon=Sonoran Desert
GB=Great Basin
GV=Great Valley
KR=Klamath Ranges
MP=Modoc Plateau
NCo=North Coast
NCoRI=Inner NCo Ranges
NCoRO=Outer NCo Ranges
NW=Northwestern CA
PR=Peninsular Ranges
SCo=South Coast
SCoRI=Inner SCo Ranges
SCoRO=Outer SCo Ranges
ScV=Sacramento Valley
SnJV=San Joaquin Valley
SN=Sierra Nevada
SNE=East of SN
SNF=SN Foothills
SNH=High SN
SnFrB=San Francisco Bay Area
SnGb=San Gabriel Mtns
SW=Southwestern CA
Teh=Tehachapi Mtns
WTR=Western Transverse Ranges

List B: Continued

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Schinus terebinthifolius	Brazilian pepper	Horticultural; riparian areas	sSCo
Senecio jacobaea[B]	tansy ragwort	Grasslands; biocontrol agents established	NCo,wKR,s&wCaR, nSNF, nScV,SW
Spartium junceum	Spanish broom	Coastal scrub, grassland, wetlands, oak woodland, NW forests, esp. redwoods; also roadcuts	NCoRO,ScV,SnFrB, SCoRO,SCo,sChI,WTR
Verbascum thapsus	woolly or common mullein	SNE meadows, sagebrush, pinyon-juniper woodlands; shores of Boggs Lake (Lake Co.)	CA
Vinca major	periwinkle	Horticultural; riparian, oak woodland, other coastal habitats	NCoRO,SnFrB, CCo, sSCoRO,SCo

Red Alert: Species with potential to spread explosively; infestations currently restricted

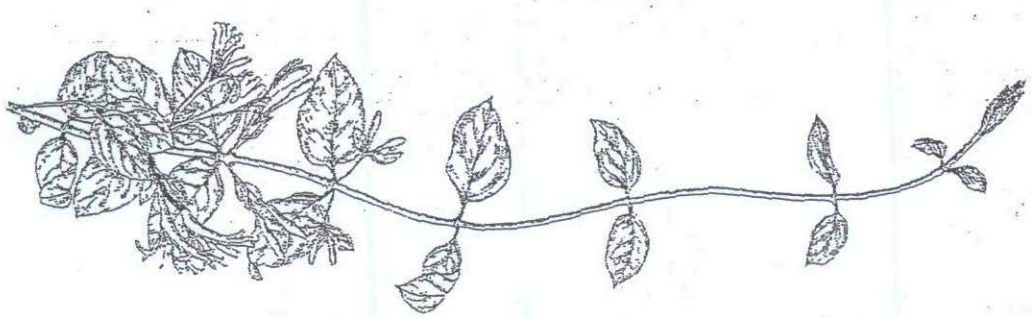
Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Alhagi pseudalhagi[A]	camel thorn	Noxious weed of arid areas; most infestations in California have been eradicated	GV,sSNE,D
Arctotheca calendula[A]	Capeweed	Seed-producing types are the problem; most are vegetative only	NCo,SnFrB,CCo
Centaurea maculosa[A]	spotted knapweed	Riparian, grassland, wet meadows, forest habitats; contact CA Food & Ag if new occurrences found	CaR,SN,nScV,nCW,MP, nSNE,sPR,NW
Crupina vulgaris[F,A]	bearded creeper, common crupina	Aggressively moving into wildlands, esp. grassland habitats	NCoR (Sonoma Co.),MP
Halogeton glomeratus[A]	halogeton	Noxious weed of Great Basin rangelands; report locations to CA Food & Ag; goal is exclusion from CA	GB
Helichrysum petiolare	licorice plant	North coastal scrub; one population on Mt. Tamalpais, w. Marin Co.	Not in Jepson
Hydrilla verticillata[F,A]	hydrilla	Noxious water weed; report locations to CA Food & Ag; eradication program in place; found in Clear Lake (Lake Co.) in 1994	NCoRI,n&cSNF,ScV,SCo,D
Lythrum salicaria[B]	purple loosestrife	Horticultural; noxious weed of wetlands, riparian areas	sNCo,NCoRO,nSNF,ScV, SnFrB,nwMP
Ononis alopecuroides[Q]	foxtail restharrow	Eradication efforts underway in San Luis Obispo Co.; to be looked for elsewhere in CA	CCo; not in Jepson
Retama monosperma	bridal broom	First noted at Fallbrook Naval Weapons Station, San Diego Co; could rival other invasive brooms	San Diego Co.; not in Jepson
Salvinia molesta[F]	giant waterfern	Ponds, lakes, reservoirs, canals	Napa, Sonoma cos., lower Colorado River; not in Jepson
Sapium sebiferum	Chinese tallow tree	Horticultural; riparian, wetland habitats, open areas and understory	ScV,SnFrB; not in Jepson
Sesbania punicea	scarlet wisteria tree	Horticultural; riparian areas; American River Parkway, Sacramento Co., Suisun Marsh, San Joaquin River Parkway	ScV,SnJV; not in Jepson
Spartina anglica	cord grass	Scattered in S.F. Bay	Not in Jepson
Spartina densiflora	dense-flowered cord grass	Scattered in S.F. Bay, Humboldt Bay salt marshes	CCo,NCo
Spartina patens	salt-meadow cord grass	One site in S.F. Bay, also Siuslaw Estuary, OR and Puget Sound, WA	CCo

Need More Information

Latin Name	Common Name	Habitats of Concern and Other Comments	Distribution
Acacia dealbata	silver wattle	Aggressive in natural areas?	SnFRB,SCoRO,SCoRI,CCo
Acacia decurrens	green wattle	Sometimes confused with A. dealbata; aggressive in natural areas?	Unknown
Acacia melanoxylon	blackwood acacia	Reported from S.F. Bay area, central coast, Santa Cruz Is.; spreads slowly; other areas?	SnFrB,SCoRO,SCo,CCo
Aeschynomene rudis[B]	rough jointvetch	Princeton area, Colusa Co.; pest of rice crops; potential threat to riparian, wetland habitats?	ScV
Agrostis avenacea	Pacific bentgrass	Invading vernal pools in San Diego area; attempts at manual eradication unsuccessful so far; problem in other areas?	sNCo,sNCoR,SNF, GV,CW,nSCo
Aptenia cordifolia	red apple	Habitats where invasive?	CCo,SCo,sChI
Asphodelus fistulosus	asphodel	Common in SCo highway rights-of-way, other disturbed sites; threats to wildlands?	sSnJV,SCo
Carduus acanthoides[A]	giant plumeless thistle	Threatens wildlands?	NCoRI,nSN,SnFrB, nSCoRO,MP
Cistus ladanifer	gum cistus	Horticultural; invades coastal sage scrub, chaparral; areas where problematic?	sCCo,SnGb
Cordyline australis	New Zealand cabbage	Infestation at Salt Point State Park; bird-dispersed; other problem areas?	Not in Jepson
Cotoneaster spp. (exc. C. pannosus, C. lacteus)	cotoneaster	Horticultural; bird-distributed; which species are problems in wildlands?	Unknown
Cupressus macrocarpa	Monterey cypress	Native only to Monterey Peninsula; planted and naturalized CCo, NCo; threat to wildlands?	CCo
Descurainia sophia	flixweed, tansy mustard	Entering Mojave wildlands through washes; threat to wildlands?	CA
Dimorphotheca sinuata	African daisy, Cape marigold	Horticultural; reported as invasive in w. Riverside Co., Ventura Co.; problem elsewhere?	SnJV,SCoRO,SCo,PR
Echium candicans, E. pininana	pride of Madeira, pride of Teneriffe	Horticultural; riparian, grassland, coastal scrub communities; spreads by seed	CCo,SnFrB,SCo,sNCo
Ehrharta longiflora	veldt grass	Reported from San Diego	Not in Jepson
Erica lusitanica	heath	Threat to wildlands?	NCo (Humboldt Co.)
Euphorbia lathyris	caper spurge, gopher plant	Invades coastal scrub, marshes, dunes; Sonoma, Marin cos.; threat to wildlands?	NCo,CCo,GV,SCo
Gazania linearis	gazania	Horticultural; invades grassland in S.F., coastal scrub?	CCo,SCo
Glyceria declinata		Although reported from Central Valley vernal pools, genetic research is needed to confirm identity; plants that have been called G. declinata key in Jepson to native G. occidentalis	Uncertain; not in Jepson
Hedera canariensis	Algerian ivy	Horticultural; invasive in riparian areas in SoCal?	Not in Jepson
Hirschfeldia incana	Mediterranean or short-pod mustard	Increasing in western, southern Mojave; threat to wildlands?	NCo,SNF,GV,CW,SCo, DMoj
Hypericum canariense	Canary Island hypericum	Reported in San Diego area, coastal sage scrub, grassland; threat to wildlands?	SCo
Hypochaeris radicata	rough cat's-ear	Widespread in coastal grasslands, wetlands; threat to wildlands?	NW,CaRF,nSNF,ScV, CW,SCo
Isatis tinctoria[B]	dyers' woad	Well-known invader in Utah; threat to wildlands?	KR,CaR,nSNH,MP
Ligustrum lucidum	glossy privet	Horticultural; spreading rapidly on Mendocino coast; problem in other areas?	NCo; not in Jepson
Limonium ramosissimum ssp. *provinciale*	sea lavender	Reported spreading in Carpinteria Salt Marsh; problem in other areas?	Not in Jepson

Need More Information: Continued

Latin Name	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Ludwigia uruguayensis (= *L. hexapetala*)	water primrose	Invasive in aquatic habitats; non-native status questioned?	NCo,sNCoRO,CCo, SnFrB,SCo
Malephora crocea	ice plant	Invades margins of wetlands, bluffs along SCo	CCo,SCo,sChI
Maytenus boaria	mayten	Horticultural; scattered in riparian forests, ScV; east SnFrB	ScV,SnFrB
Mesembryanthemum nodiflorum	slender-leaved iceplant	Abundant on Channel Islands; invades wetlands; habitats where problematic?	SnFrB,SCo,ChI
Nicotiana glauca	tree tobacco	Disturbed places; not very competitive with natives in coastal scrub, chaparral; spreading along Putah Creek (Yolo Co.); problems elsewhere?	NCoRI,c&sSNF, GV,CW,SW,D
Oxalis pes-caprae	Bermuda buttercup	Invades disturbed sites; invasive in undisturbed habitats?	NCo,NCoRO,CCo, SnFrB,SCoRO,SCo
Parentucellia viscosa		Threat to NCo (Humboldt Co.) dune swales?	NCo,NCoRO,CCo,SCo
Passiflora caerulea		Horticultural; reported from SoCal; threat to wildlands?	SCo; not in Jepson
Pennisetum clandestinum[F,C]	Kikuyu grass	Disturbed sites, roadsides; threat to wildlands?	NCo,CCo,SnFrB,SCo, Santa Cruz Is.
Phyla nodiflora	mat lippia	Most varieties in CA are native; taxonomy unclear; status of plants in vernal pools, wetlands?	NW(except KR,NCoRH), GV,CCo,SnFrB,SCo, PR,DSon
Pinus radiata cultivars	Monterey pine	Cultivars invading native Monterey, Cambria forests, where spread of pine pitch canker is a concern	CCo
Piptatherum miliaceum	smilo grass	Aggressive in SoCal creeks, canyons; threats to wildlands?	NCo,GV,CW,SCo
Pistacia chinensis	Chinese pistache	Horticultural; invades riparian areas and woodlands in ScV	ScV
Prunus cerasifera	cherry plum	Oak woodland, riparian areas; esp. Marin, Sonoma cos.; bird-distributed; problems elsewhere?	SnFrB,CCo
Pyracantha angustifolia	pyracantha	Horticultural; spreads from seed in S.F. Bay area; bird-distributed; problem elsewhere?	sNCoRO,CCo,SnFrB, SCo
Salsola soda	glasswort	Threat to salt marshes?	nCCo,SnFrB
Salsola tragus[C]	Russian thistle, tumbleweed	Abundant in dry open areas in w. Mojave Desert, Great Basin; not limited to disturbed sites; threats?	CA
Salvia aethiopis[B]	Mediterranean sage	Creates monocultures in E. Oregon grasslands; threat to CA wildlands?	MP
Stipa capensis		Distribution and threats?	Not in Jepson
Tamarix aphylla	athel	Spreading in Salton Sea area; threats to wildlands?	nSnJV,nSCo,D
Tanacetum vulgare	common tansy	Jepson reports as uncommon, escape from cultivation in urban areas; problem in wildlands?	NCo,NCoRO,CaRH, SCoRO
Verbena bonariensis, *V. litoralis*	tall vervain	Horticultural; invades riparian forests, wetlands; extensive along ScV riparian corridors; roadsides (Yuba Co.); elsewhere?	ScV,nSnJV,nSnFrB,CCo



Annual Grasses

Latin Name	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Aegilops triuncialis[B]	barbed goatgrass	Serpentine soils, grasslands	sNCoR,CaRF, n&cSNF, ScV,nCW
Avena barbata	slender wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub, disturbed sites	CA-FP,MP,DMoj
Avena fatua	wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub on deeper soil, disturbed sites	CA-FP,MP,DMoj
Brachypodium distachyon	false brome	Expanding in SoCal; common in Orange Co.	sNCoR,sCaRF, SNF,GV,CW,SCo,sChI
Bromus diandrus	ripgut brome	Coastal dunes, coastal sage scrub, grasslands	CA
Lolium multiflorum	Italian ryegrass	Wetland areas, esp. vernal pools in San Diego Co.; common in disturbed sites	CA-FP
Schismus arabicus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,CW,sChI,D
Schismus barbatus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,SW,D

Considered, but not listed

Latin Name	Common Name	Habitats of Concern and Other Comments
Albizia lophantha	plume acacia	Not invasive
Anthoxanthum odoratum	sweet vernal grass	Disturbed sites on coast; Marin, Sonoma, Mendocino cos.
Carpobrotus chilensis	sea fig	Native status in question; not a threat to wildlands
Centranthus ruber	red valerian	Horticultural; roadcuts in Marin Co.; not a threat to wildlands
Convolvulus arvensis[C]	field bindweed	Disturbed sites; ag lands
Coprosma repens	mirror plant	No evidence of wildland threat
Crocosmia x crocosmiiflora		Generally in disturbed coastal, urban areas, roadsides
Digitalis purpurea	foxglove	Horticultural; scattered in prairies, meadows, disturbed sites; not a major wildland threat
Dipsacus sativus, D. fullonum	wild teasel, Fuller's teasel	Roadsides, disturbed sites
Fumaria officinalis, F. parviflora	fumitory	S.F. Bay area, Monterey Bay salt marshes, sandy disturbed sites
Medicago polymorpha	California bur clover	Grasslands, moist sites; mainly restricted to disturbed sites
Melilotus officinalis	yellow sweet clover	Restricted to disturbed sites in CA
Nerium oleander	oleander	Horticultural; not invasive, although reported from riparian areas in Central Valley, San Bernardino Mtns.
Picris echioides	bristly ox-tongue	Disturbed areas
Silybum marianum	milk thistle	Disturbed areas, especially overgrazed moist pasturelands; may interfere with restoration
Xanthium spinosum	spiny cocklebur	Identified as native in *The Jepson Manual* (Hickman, 1993) and *A California Flora* (Munz and Keck, 1968); restricted to disturbed areas
Zantedeschia aethiopica	calla lily	Horticultural; mainly a garden escape in wet coastal areas
Zoysia cultivars	Amazoy and others	Horticultural; no evidence of wildland threat