Appendix B

Long-term Strategy Analysis Documentation

<u>**Fire Behavior in Conjunction with the Long Term Strategy of the Indian Fire**</u>:

Due to the limited time frame for completion of this plan and the need to give informative direction to an organizational budget, Fire Spread Probability (FSPRO) and a few derivatives of that program were used for the fire behavior analysis.

FSPro – Fire Spread Probability Model.

- WFDSS-FSPro is a spatial model that calculates and maps the probability of fire spread, in the absence of suppression, from a current fire perimeter or ignition point for a specified time period.

- Combining data layers that include, the standard fuel models (13 or 40), current weather projections, historical weather scenarios, fuel moisture classifications, and wind speed and direction, FSPro can project probabilities of fire spread in specified increments, 7, 10, 14, 30, 90 days. **It is not a fire perimeter like a FARSITE map.**

- FSPro helps managers prioritize firefighting resources based on probabilities of fire spread. The model helps to assess a fire's growth potential. Managers can then match up appropriate strategy, tactics and resource allocations. It can also aid in communications with affected partners and the public.

For the Indians Fire this analysis includes a spatial probability profile originating from the fires perimeter of 6/15/08 with forecasted winds and energy release component (fuel dryness index) provided by Fire Behavior Analyst and local meteorologist, for 5 days. The forecast was then built out to a 14 day by the program through a statistical assessment of the historic weather file from Hunter Legett Remote Automated Weather Station. The spatial probability profile derived by the program and used by the team was produced by the models assessment of 100 fires burning across the landscape from the perimeter and the probability was derived by the amount of times a cell in the landscape burned out the 100 scenarios. Several model products that analyzed more fires were completed with a similar probability footprint. The team's confidence level in the spatial product from the model outputs over the time analyzed is high (see FSPro Map attached).

Two subsequent products based on the FSPro model outputs were used to help inform the Accountable Cost Management process and the Long Term Strategy Assessment for the Indians Fire.

RAVAR – Rapid Assessment of Values at Risk

- RAVAR is also a spatial model, showing the primary resource values to be protected and/or at risk by ongoing large fire events.

- The program can be directly integrated with the FSPro model to identify the likelihood of different resources being threatened.

- The most important data layer generated by the RAVAR model is the structure layer using local parcel records, but RAVAR is not limited to the assessment of threatened structures.

- Any resource value that has been spatially mapped may be included within a RAVAR assessment including power lines, road networks, gas pipelines, recreation facilities, sensitive wildlife habitat, cultural heritage sites and municipal water intakes.

- RAVAR assists fire managers in the prioritization of firefighting resources based on values to be protected segmented by the risk categories from FSPro.

Several RAVAR assessments for the Indian Fire have been produced to show increased rate of threatened areas as the fire perimeter and the FSPro probability polygons have grown (see attachments to Accountable Cost Management Appendix).

Average Arrival Time Map (ATT)

The AAT is an experimental spatial product which, like FSPro, computes a probability of a fire's extent, but its basis is on the average time a fire arrives at a cell in a number of days. It relies mainly on the Minimum Travel Time function within FLAMAP and the scenario is run multiple times in order to find the average or best fit in the number of days a cell burns. The caution that needs to be remembered is this analysis is only the average of the scenarios and unlike FSPro does not display the rare events that may occur. Of the whole distribution of possible days that a cell might burn this map just looks at the average not all the possibilities. It has been useful in helping informing the team on the number of days that might be needed to insure that adequate resources are staffed to accomplish specific strategies and/or tactics (see attached map of AAT).

For example the Average Arrival Time for the Active Fire Behavior Scenario to reach the Primary Appropriate Response Area (PARA) boundary to the north (Arroyo Seco road system) is 7-9 days in this modeling effort (based on modeled climatology and forecasted weather). The probability for the Active Fire Scenario to extend to the north and threaten the PARA within the 14 day period is a 40-60% chance.
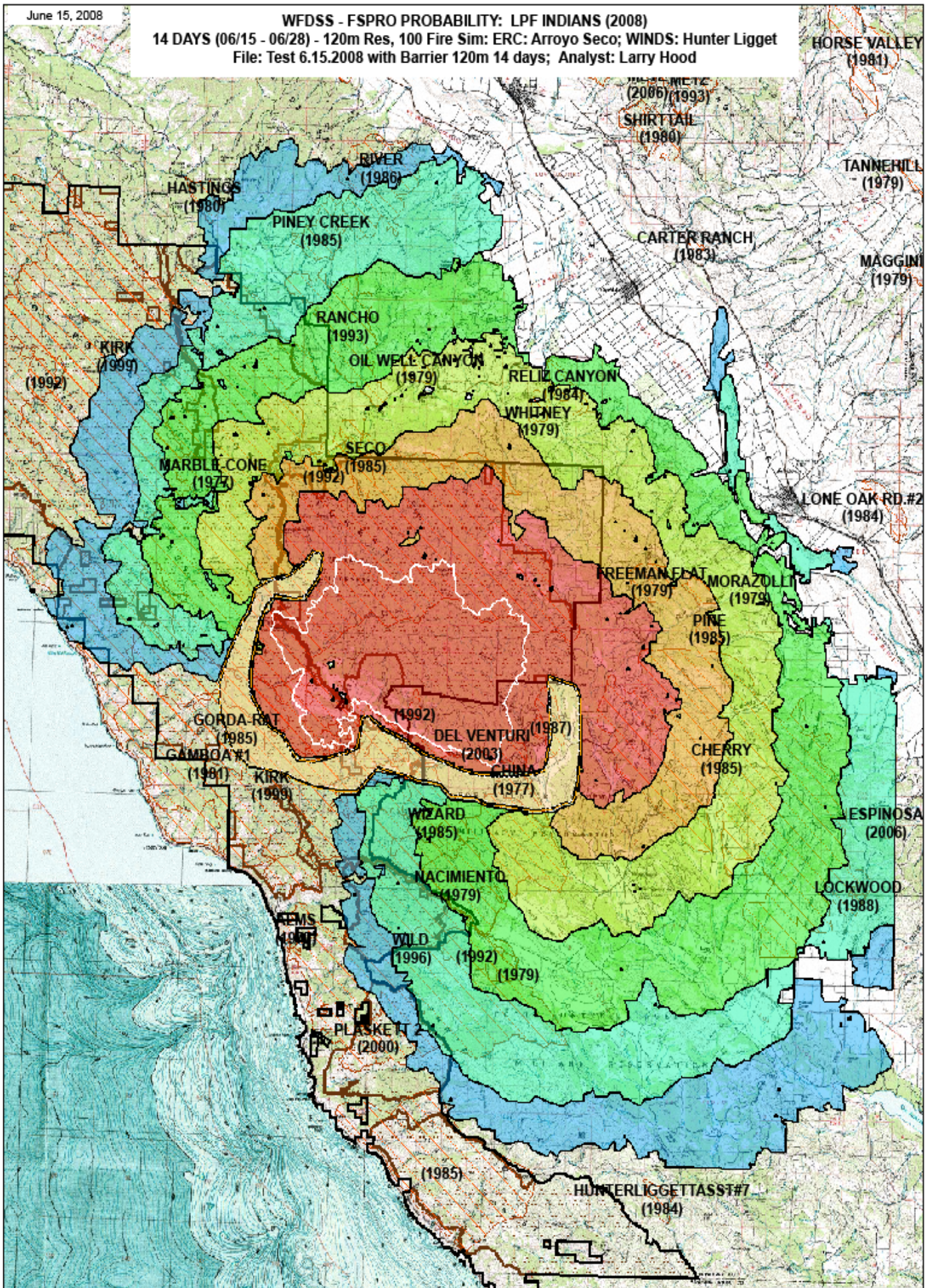
Point of concern	Average days of arrival with active fire in that direction	Probability of Fire Extent Reaching point of concern within 14 days	Appropriate Response Areas that contains point of concern
Arroyo Seco road North Segment	7-9	40-60%	Boundary Primary to Alternate to Contingency
ZigZag Creek West Segment	11-12	40-60%	Alternate
Hunter Liggett South Segment	10	40-60%	Boundary of Contingency
Rio Plaza Subdivision East Segment	11-12	20-40%	Contingency

Generally the East and South Segments where the Alternate and Contingency Lines are described are in the 11-12 average arrival day with a probability of extent in the 20-60% range. The PARA on the South East side is within 1-2 average spread with active fire and a high probability (>80%) of fire extent, this exhibits the most likely area of concern within this analysis.

The probability statements made in terms of this analysis must be reviewed and refreshed upon any changes in fires extent and/or unpredicted weather or fuel loading. These are products that need to be updated frequently.

WFDSS - FSPRO PROBABILITY: LPF INDIANS (2008)
14 DAYS (06/15 - 06/28) - 120m Res, 100 Fire Sim: ERC: Arroyo Seco; WINDS: Hunter Ligget
File: Test 6.15.2008 with Barrier 120m 14 days; Analyst: Larry Hood

HORSE VALLEY
(1981)

METZ
(2006)
(1993)

SHIRTTAIL
(1980)

TANNEHILL
(1979)

RIVER
(1986)

HASTINGS
(1980)

PINEY CREEK
(1985)

CARTER RANCH
(1983)

MAGGINI
(1979)

RANCHO
(1993)

OIL WELL CANYON
(1979)

RELIZ CANYON
(1984)

KIRK
(1999)

(1992)

WHITNEY
(1979)

SECO
(1985)

(1992)

MARBLE CONE
(1977)

LONE OAK RD.#2
(1984)

FREEMAN FLAT
(1979)

MORAZOLLI
(1979)

PINE
(1985)

GORDA-RAT
(1985)

(1992)

DEL VENTURI
(2003)

(1987)

CHERRY
(1985)

GAMBOA #1
(1981)

KIRK
(1999)

CHINA
(1977)

ESPINOSA
(2006)

WIZARD
(1985)

NACIMIENTO
(1979)

LOCKWOOD
(1988)

KEMS
(1987)

WILD
(1996)

(1992)

(1979)

PLASKETT 2
(2000)

(1985)

HUNTERLIGGETTASST#7
(1984)

LPF Indians WFDSS FSPro

Indians LPF, CA
T1_C_080616_jr

Major Values-at-Risk per
FSPro Fire Spread Probabilities:
14 days as of 15 June 2008

Current Fire Perimeter 15 June PM
FSPro Barrier
Past Fires 1994-2006

FSPro Fire Spread 14 Days from 15 June PM
> 80 %
60 - 80 %
40 - 60 %
20 - 40%
5 - 20 %
1 - 5 %

Building Clusters Monterey Co.
RAWS Stations
Water: Dams > 100af
Water Pipeline - Aqueduct - Canal
Powerlines
Communication Towers
Oil & Gas Transmission Lines
Airports
Airport Runways
Schools
HAZMAT: Mines
HAZMAT: Hazardous Waste
Other Landmarks
Interstates
Major Roads
Local Roads (USFS)
County Boundary

Jurisdiction
Private
State
BLM
Other Federal
DOD
USFS
Inventoried Roadless
Designated Wilderness
Primitive RNA
Wild-Scenic-Rec Rivers
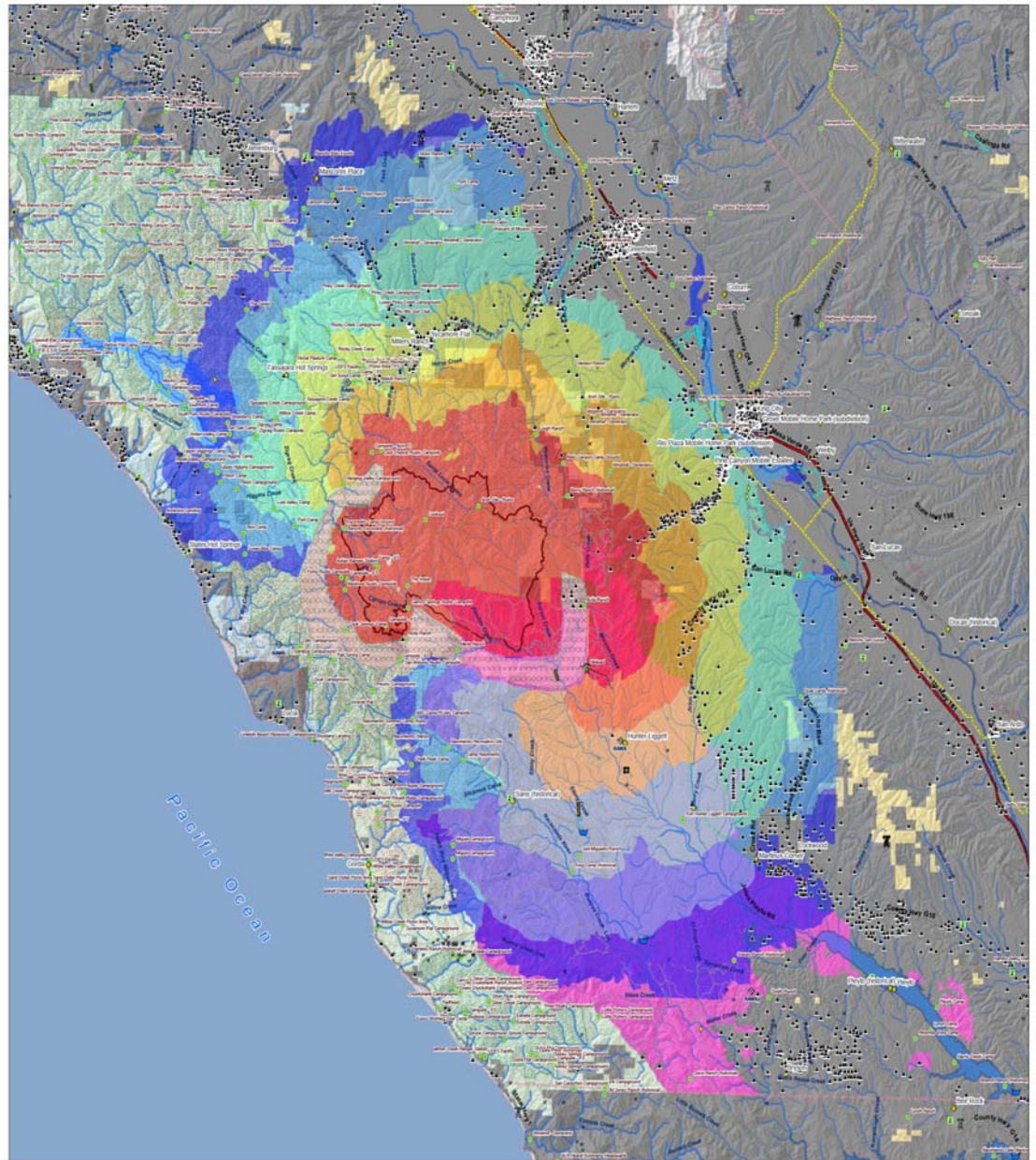
Pacific Ocean

CAUTION:Defer to air photos or local knowledge
for exact structure and other feature locations.

*Building Clusters represent the center of parcels where
county assessor records indicate taxable improvements
are present. One or more structures and other improvements
may exist proximate to these point locations.

Recreation residences and special use area data are not supplied
by USFS, and therefore not identifed or analyzed in this report.

prepared by Jon Rieck for USFS RMRS Forestry Sciences Lab, Missoula - 406.329.2121 - jrieck@fs.fed.us

1:100,000   0   5   10   20 Miles

Indians LPF, CA
T1_C_AAT_080616_jr

Major Values-at-Risk per
FSPro Fire Spread Probabilities:
7 days as of 15 June 2008

Notice: Average Arrival Time Map is an
experimental product. Methods for
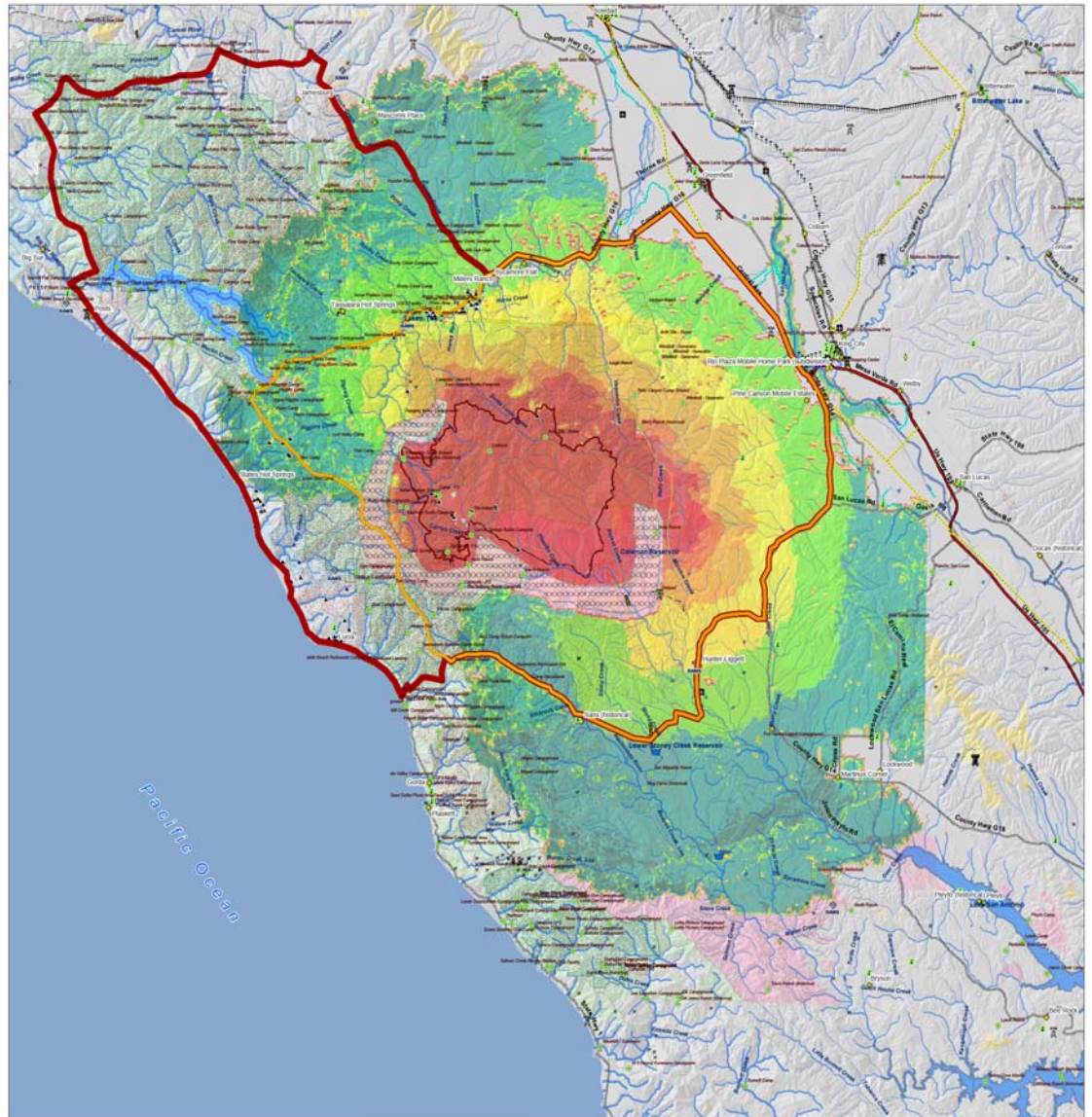interpretation under development.

Average Arrival Time in Days
- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10
- 11 - 12
- 13 - 14

FSPro Barrier
Alternative A
Alternative B
Alternative C
Past Fires 1994-2006
FSPro Perimeter
RAWS Stations
Building Clusters: Monterey Co.
Water: Dams > 100af
Water Supply: Intakes
Water Treatment Plants
Water Pipeline - Aqueduct - Canal
Powerlines
Industrial Plant
Power Pylon
Power or Pumping Substation
Communication Towers
Oil & Gas Transmission Lines
Airports
Airport Runways
Hospitals
Schools
HAZMAT: Mines
HAZMAT: Superfund Sites
HAZMAT: Hazardous Waste
HAZMAT: Landfill
Other Landmarks
Interstates
Major Roads
Local Roads (USFS)
Trails (USFS)
Railways
County Boundary

Jurisdiction
- Private
- State
- BLM
- Other Federal
- DOD
- USFS
- Inventoried Roadless
- Designated Wilderness
- Wild-Scenic-Rec Rivers

CAUTION:Defer to air photos or local knowledge
for exact structure and other feature locations.

** Structure points are derived by the USGS through supervised
analysis of high resolution aerial photography. Structures within
dense canopy may not be mapped.

Recreation residences and special use area data are not supplied
by USFS, and therefore not identifed or analyzed in this report.

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Pacific Ocean

1:100,000   0   5   10   20 Miles