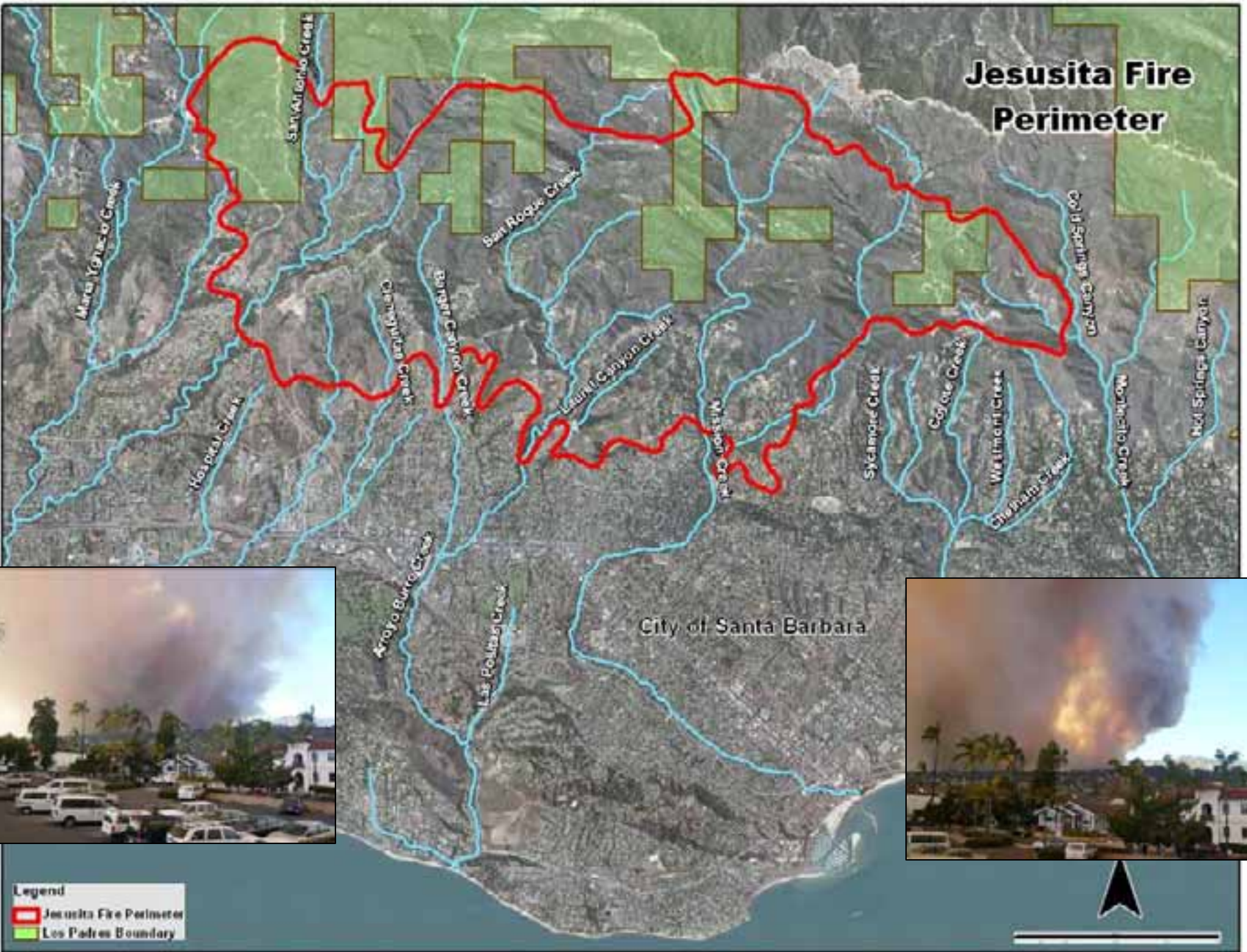


Jesusita Fire Aerial Hydromulch



Joyce Tromp, Andrew Raaf

**Santa Barbara County Flood
Control District**



The Mulch Mix

- Hydromulch protects the ground from rain impacts, reducing surface erosion and runoff.
- Hydromulching (vs hydroseeding) has no seeds. Current practice recognizes there is an existing seed bank in place.
- Mulch helps to protect the hillside and allows native vegetation to regenerate.
- Most of the treated area is chaparral, with fire-tolerant vegetation capable of regrowth.

The Mulch Mix

MULCH MIX PER ACRE



Paper

2,000 lbs. of mulch mix, consisting of:

40% paper, certified 100 % plastic free and contaminant free.

60% wood fiber, certified 100% weed free, plastic free, contaminant free.

80 lbs. of SuperTack®: organic guar-gum based nontoxic tackifier.

Organic green dye, to aid in placement of mulch.

Mixed and delivered with approximately 3,500 gallons of water.



Wood
Fiber

GIS in Watershed Response

- Planning
 - Watershed model for mulch application.
- Implementation
 - Field GPS for safe and accurate delivery by airplanes.
- Monitoring
 - Assessment of mulch effectiveness.

Jesusita Fire Slopes

Slope

Input raster
sb_dtm_jes

Output raster
G:\WaterResources\Flood Control\Emergency Events\Jesusita Fire\GIS\Data\Hydromulch\Slop

Output measurement (optional)
PERCENT_RISE

Z factor (optional)
1

Output measurement (optional)

Determines the measurement units (degrees or percentages) of the output slope data.

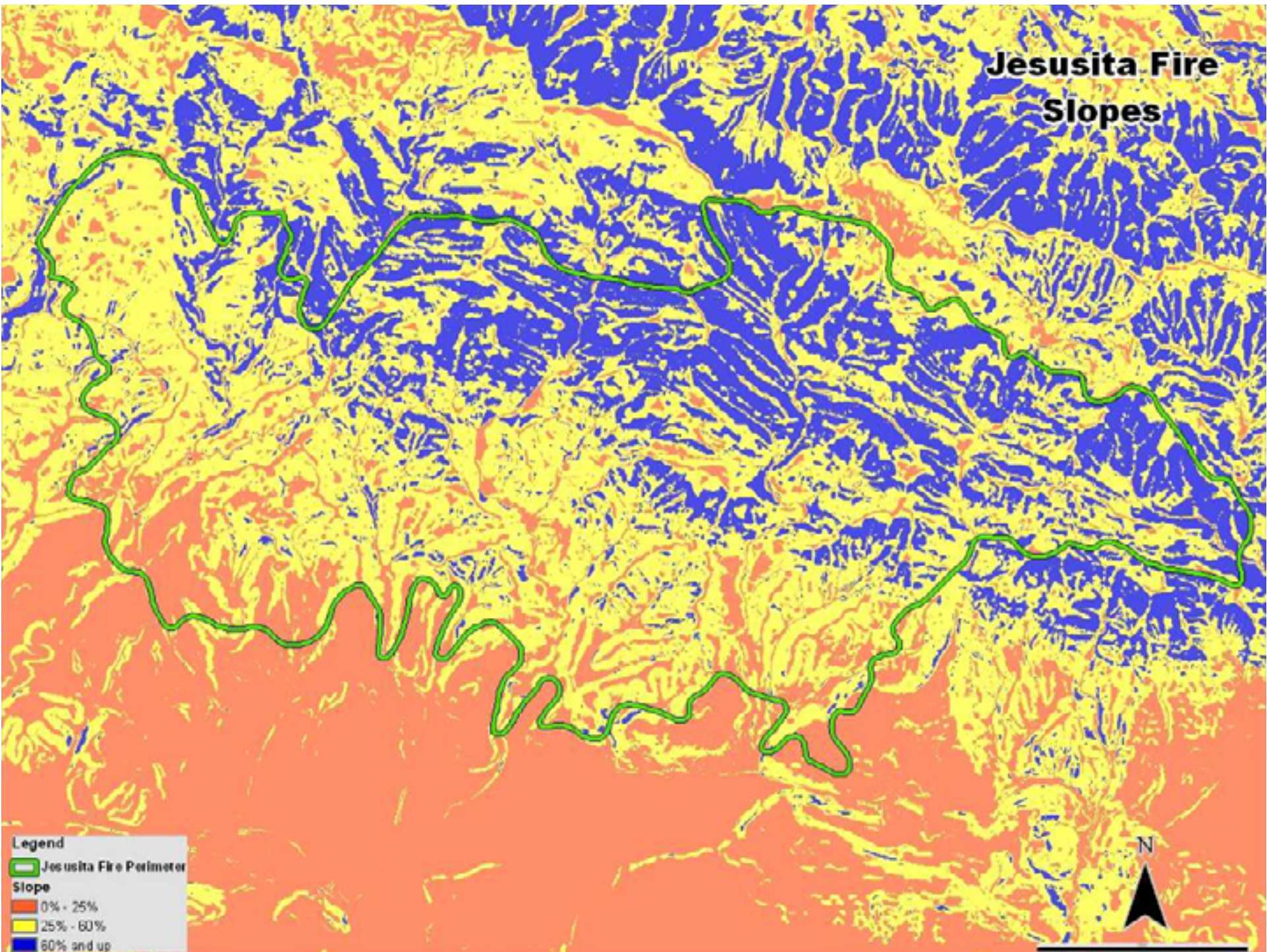
- DEGREE — The inclination of slope will be calculated in degrees.
- PERCENT_RISE — Keyword to output the percent rise, also referred to as the percent slope.

OK Cancel Environments... << Hide Help

Legend
Jesusita Fire Perimeter

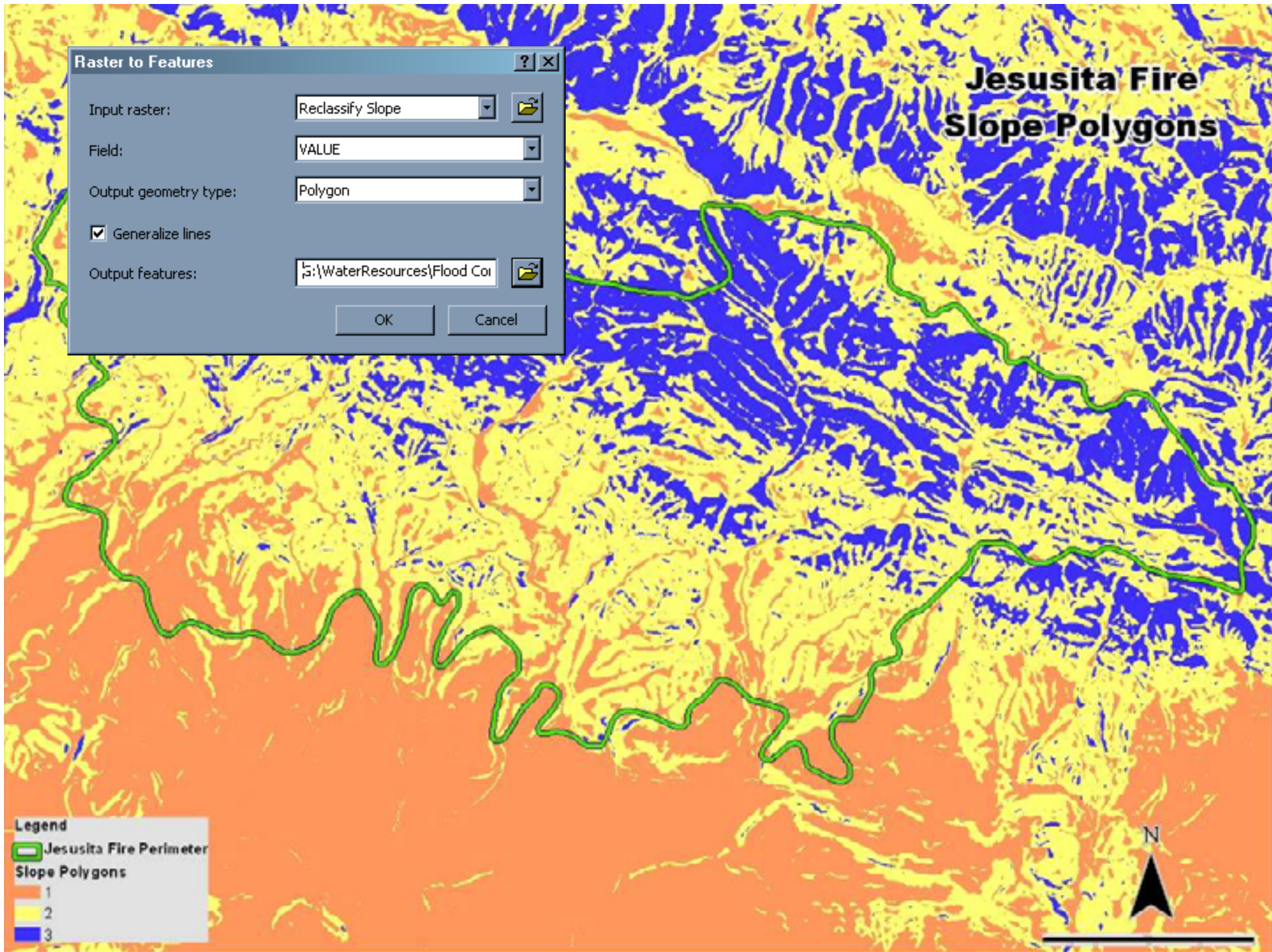


Jesusita Fire Slopes



Legend

- Jesusita Fire Perimeter
- Slope**
- 0% - 25%
- 25% - 60%
- 60% and up



Jesusita Fire Slope-Severity Intersect

Layer Properties [?] [X]

General | Source | Selection | Display | Symbology | Fields | Definition Query | Labels | Joins & Relates

Show:

- Features
- Categories
 - Unique values
 - Unique values, many to one
 - Match to symbols in a layer
- Quantities
- Charts
- Multiple Attributes

Draw categories using unique values combining up to 3 fields. Import...

Value Fields: Slope, Severity, none

Color Ramp: [Color Ramp]

Symbol	Value	Label	Count
[Light Green]	<all other values>	<all other values>	
[Magenta]	2, 3	2, 3	?
[Dark Magenta]	2, 4	2, 4	?

Add All Values | Add Values... | Remove | Remove All | Advanced ▾

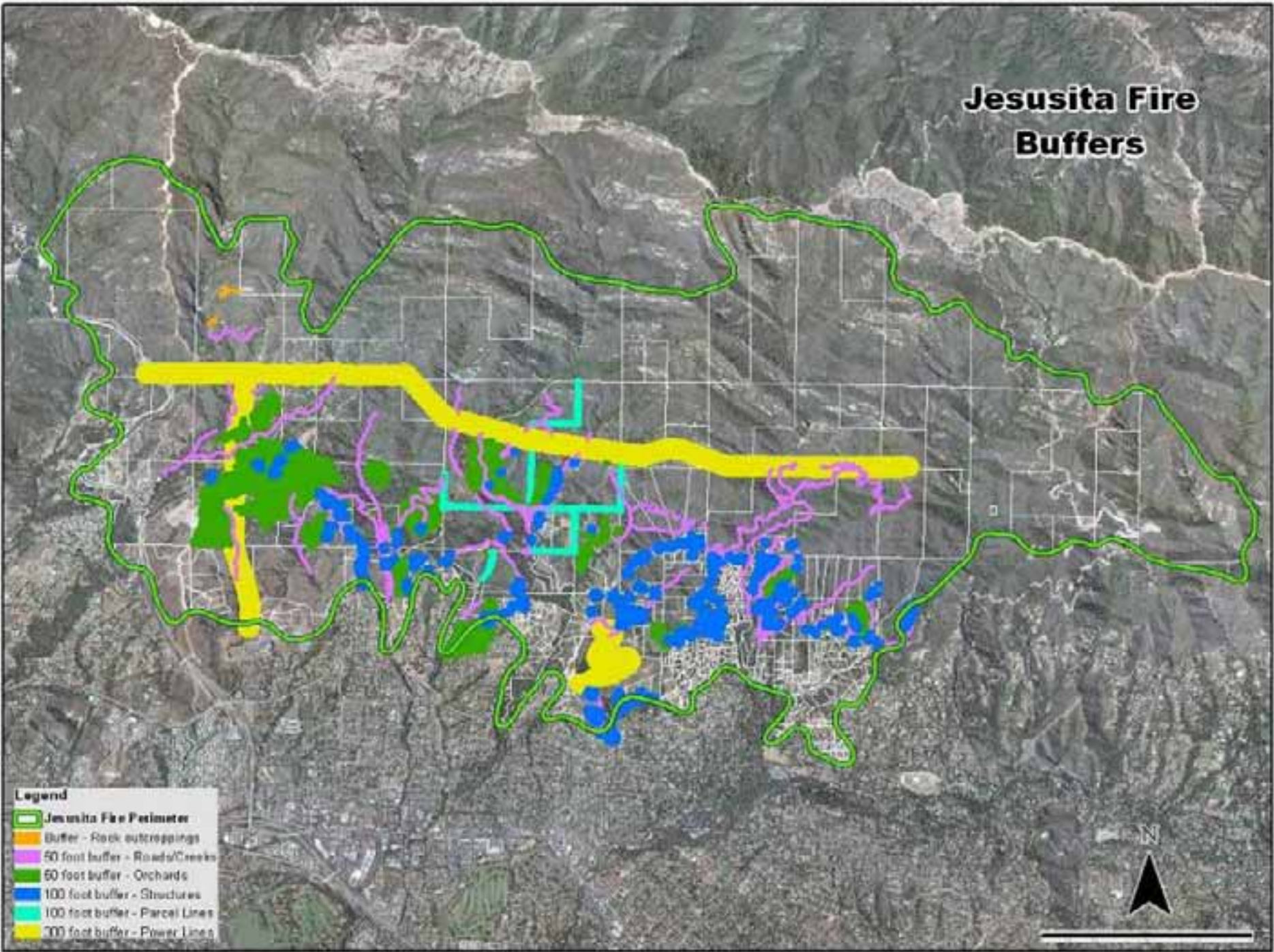
OK | Cancel | Apply

Legend

- Jesusita Fire Perimeter
- Slope-Severity Intersect
 - 2, 3
 - 2, 4



Jesusita Fire Buffers

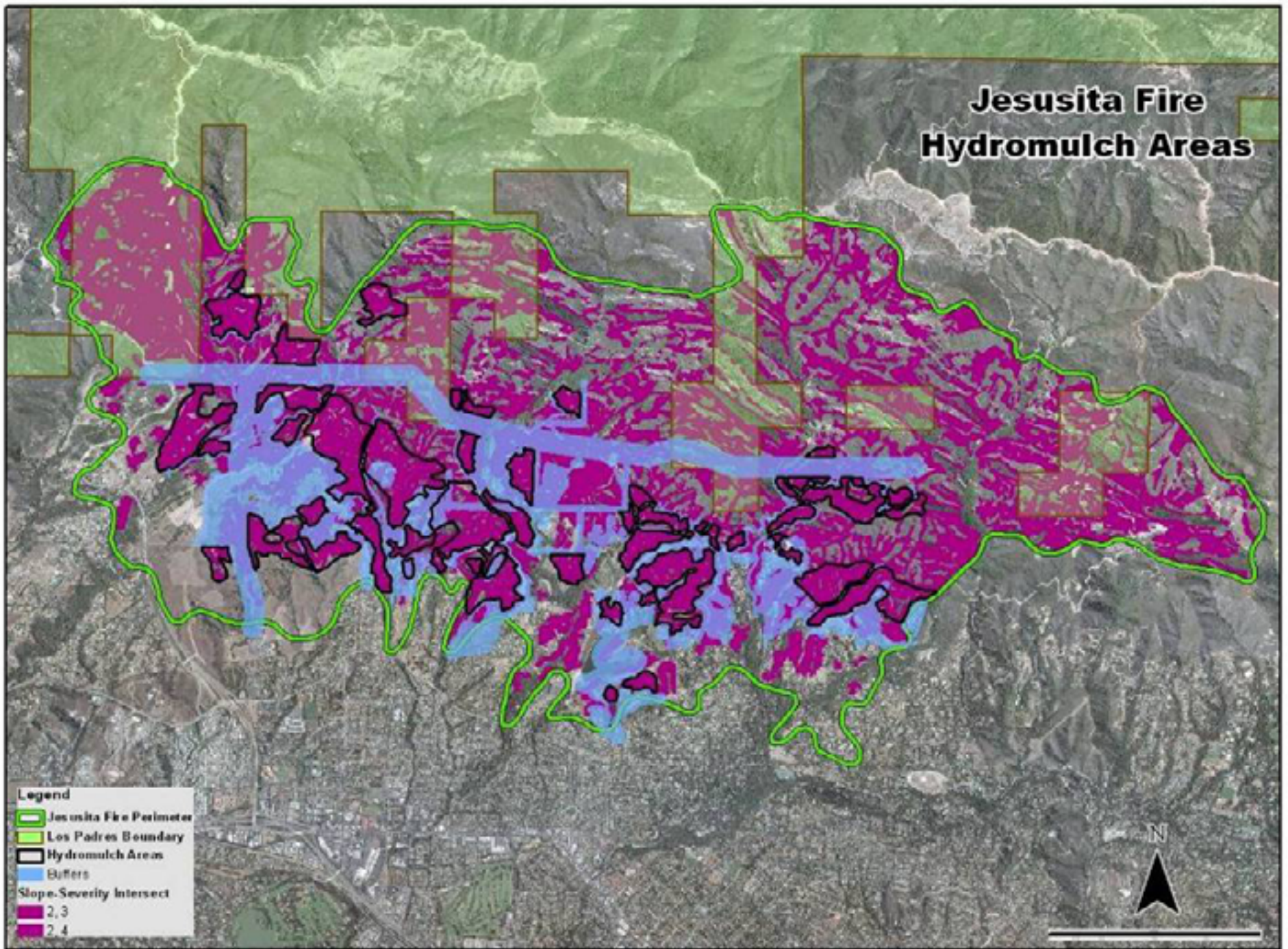


- Legend**
- Jesusita Fire Perimeter
 - Buffer - Rock outcroppings
 - 50 foot buffer - Roads/Creeks
 - 50 foot buffer - Orchards
 - 100 foot buffer - Structures
 - 100 foot buffer - Parcel Lines
 - 300 foot buffer - Power Lines



Jesusita Fire Hydromulch Areas

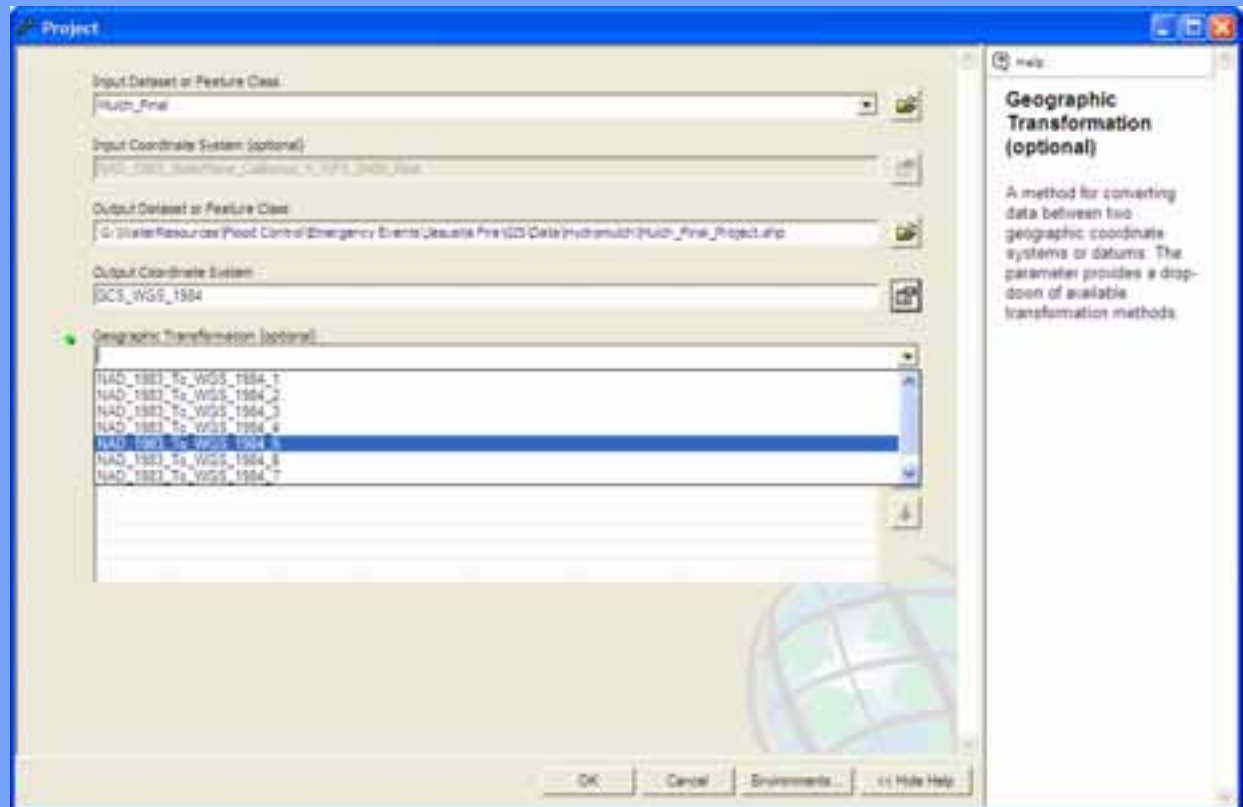
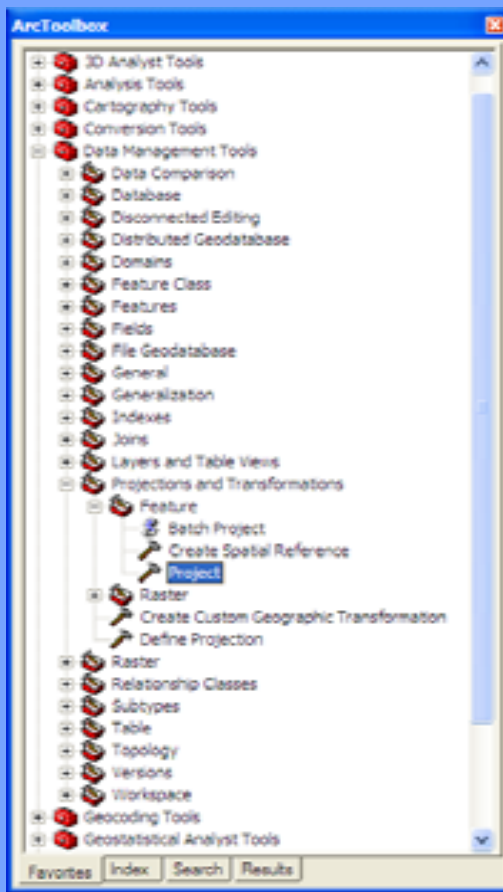
- Legend**
- Jesusita Fire Perimeter
 - Los Padres Boundary
 - Hydromulch Areas
 - Buffers
 - Slope-Severity Intersect
 - 2, 3
 - 2, 4



Data Projection

- **Geographic Transformation not optional.**

http://downloads2.esri.com/support/TechArticles/PEgt_namewhere93_81408.zip



Jesusita Fire Aerial Hydromulch



GPS guided AT-802 turbine powered SEATs
(Single Engine Attack Tanker)





Field Inspection

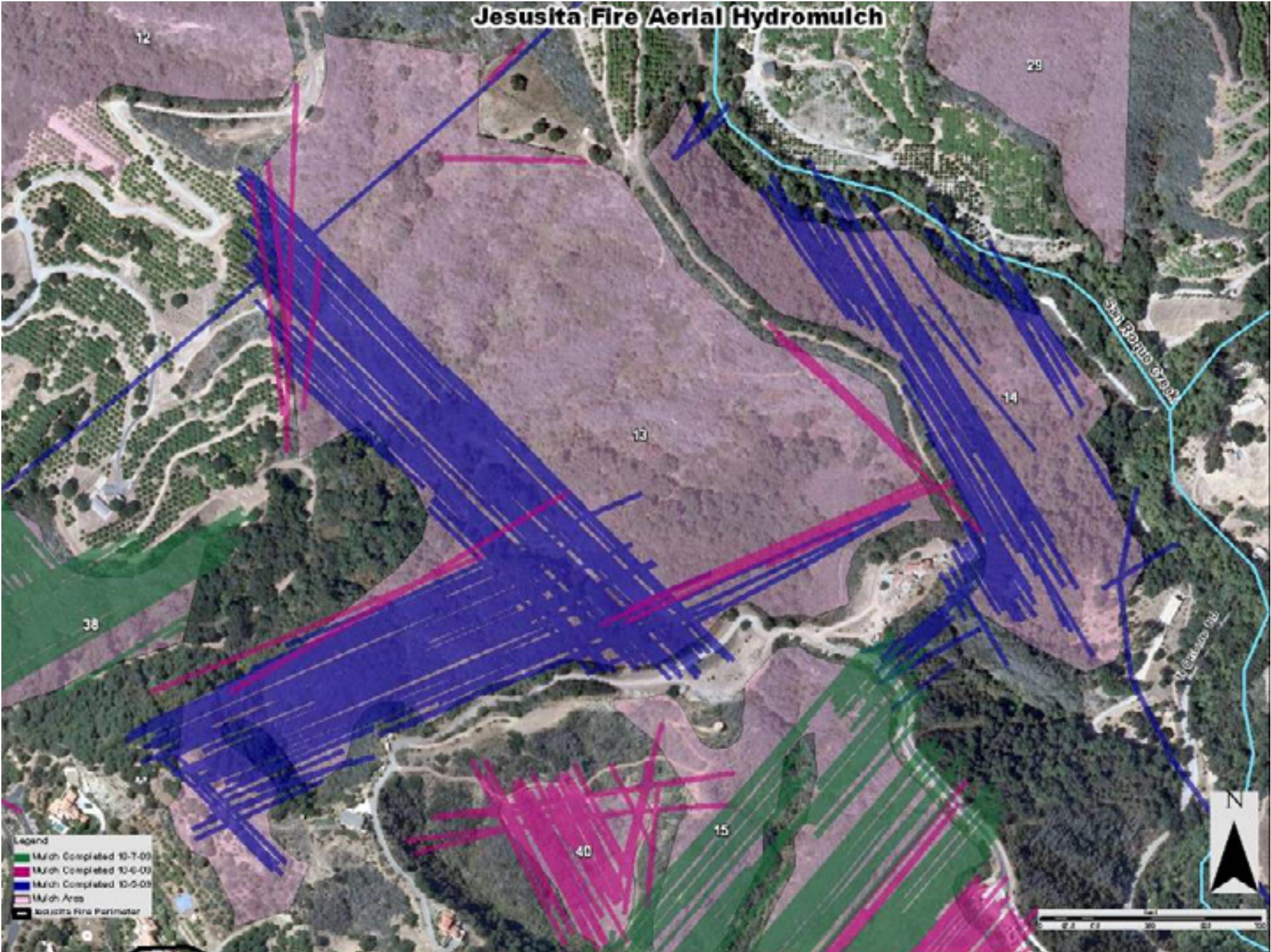
Close proximity to homes





Photo courtesy of Patrick Mullen

Jesuita Fire Aerial Hydromulch

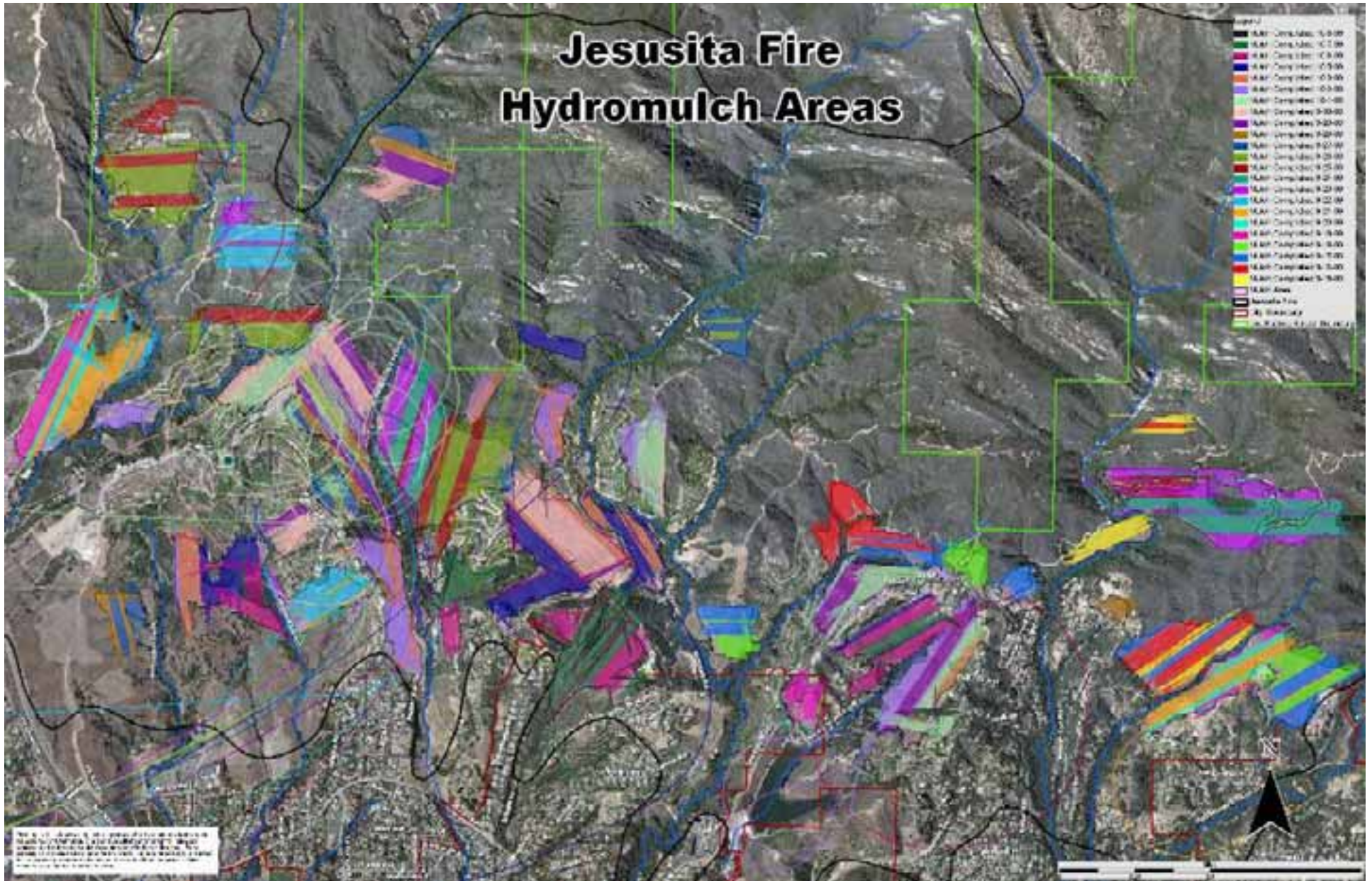


- Legend**
- Mulch Completed 10-7-09
 - Mulch Completed 10-6-09
 - Mulch Completed 10-5-09
 - Mulch Area
 - Jesuita Fire Perimeter





Jesusita Fire Hydromulch Areas



Hydromulch Completed 10-8-09

Mulch Test Plots

- Test plots in 5 regions with different slope, aspect, burn intensity and soils.
- Analyze sediment yield, runoff, and vegetation recovery.

After each significant rainfall, sediment is weighed.

- Visual inspections of runoff vegetation regrowth,
- Compared with rainfall quantity and intensity.
- Monitoring for 2-4 years.



(Modified from Robichaud and Brown 2002)

Mulch Test Plots

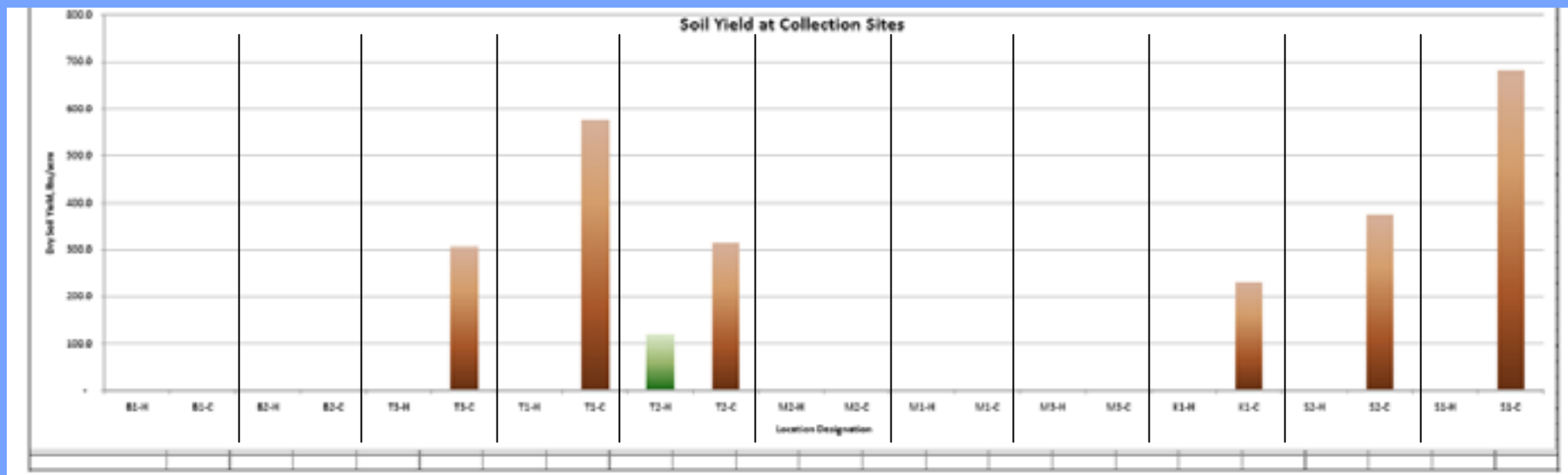


Mulch Test Plots



Preliminary Results

- Mulched plots show noticeably less sediment yield than un-mulched.



- Plant cover equivalent at mulch vs control plots

Preliminary Results

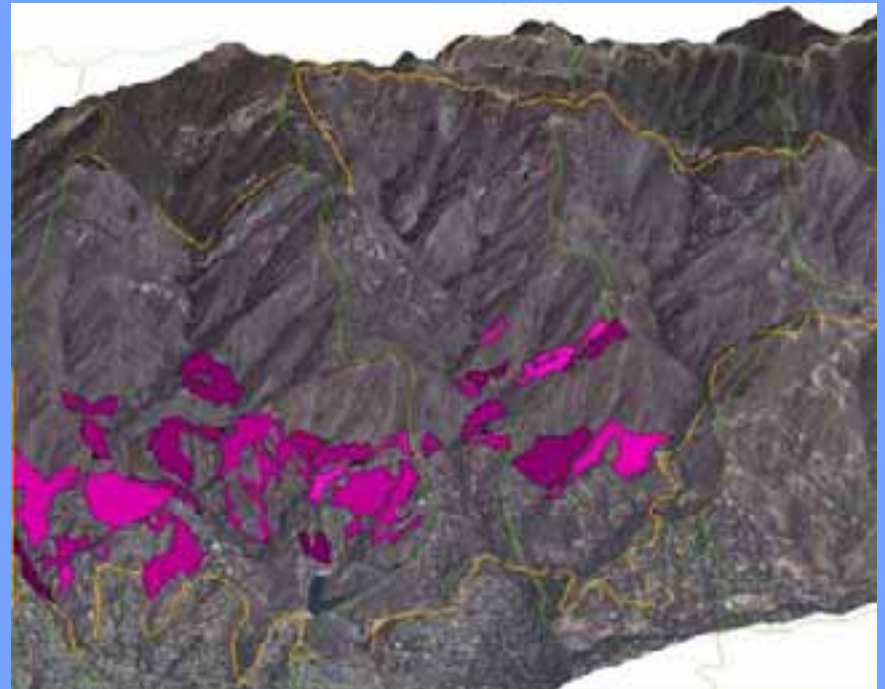
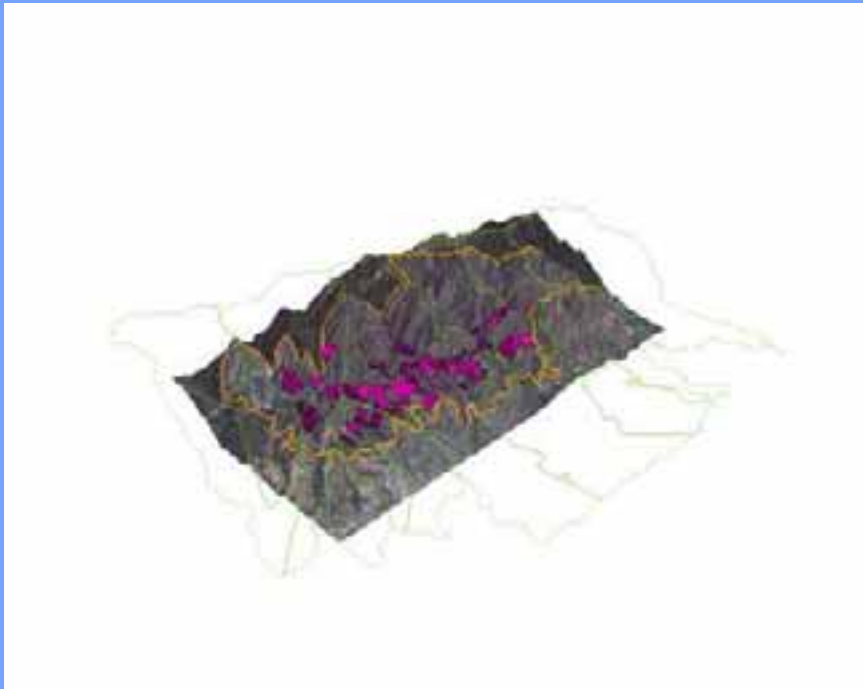


Initial application and 3 months later



Next Steps

- Continue assessment of test-plots.
- Extrapolate test-plot data to watersheds scale.
- Prepare for the next fire.



Lessons Learned

- Buffers, especially powerlines, are critical for a project involving overflights.
- Digital datasets need groundtruthing.
- Data conversions aren't optional.
- Communication management.

Cost Summary

Aerial Hydromulch Costs

Hydromulch (per acre)	\$ 3,261.27
Maximum Contract Amount (1,050 acres)	\$3,424,333.50
Inspection	\$ 317,000.00

Funding

NRCS funding	\$2,568,250.13
State OES	\$ 642,062.53
City of Santa Barbara Cost Share	\$ 50,000.00
County of Santa Barbara Cost Share	\$ 164,020.84

Acknowledgments

- American Public Works Association Chapter: awarded 2010 Project of the Year to Flood Control
- US Forest Service
- Peter Robichaud, Jon Frye, Tom Fayram, Maureen Spencer
- Western States Reclamation, Inc.
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- Enviroscaping Landscapers
- Padre Environmental Consultants