

**2002 Air Quality
Lessons Learned
Yosemite National Park**



A Brief Policy Review

- December 1995 - *Federal Wildland Fire Management Policy & Program Review* released, calling for human safety to be reaffirmed as 1st priority over property & natural/cultural resource protection (the latter equally share second priority).
- Endorses fire as a vital natural process, and allows for fire management & suppression decisions based on ecological benefit.



A Brief Policy Review

- May 1996 - *Policy Review Action Plan* identifies action items under new guidelines including:
- “..jointly develop programs to plan, fund, an implement an expanded program of prescribed fire in fire-dependent ecosystems.”
- “..facilitate the planning and implementation of landscape-scale prescribed burns across agency boundaries.”



Director's Order #18

"Fire is Fire"

- Replaces the distinction between wildfires and prescribed fires with the philosophy of **appropriate management action**.
- "All ignitions are classified as wildland fires and permit management to meet a continuum of land and resource management objectives."



Director's Order #18

- "Individual and multiple management strategies will be employed on unplanned ignitions as necessary to accomplish objectives...managers will now use fire suppression or fire use strategies as appropriate, or a mixture of both strategies on the same incident"
- Emergency firefighting funds will be expanded to include the management of fires that achieve resource management objectives.



2002 Fuel Treatment Target Areas

- Yosemite NP Boundary
- WUI Zones
- Roads
- Rock
- >4 Missed Fire Return Intervals
- Largest Fires 1990-2001



Hodgdon Meadows

Crane Flat, Tuloumne & Merced Groves

Foresta

El Portal

Yosemite West

Wawona

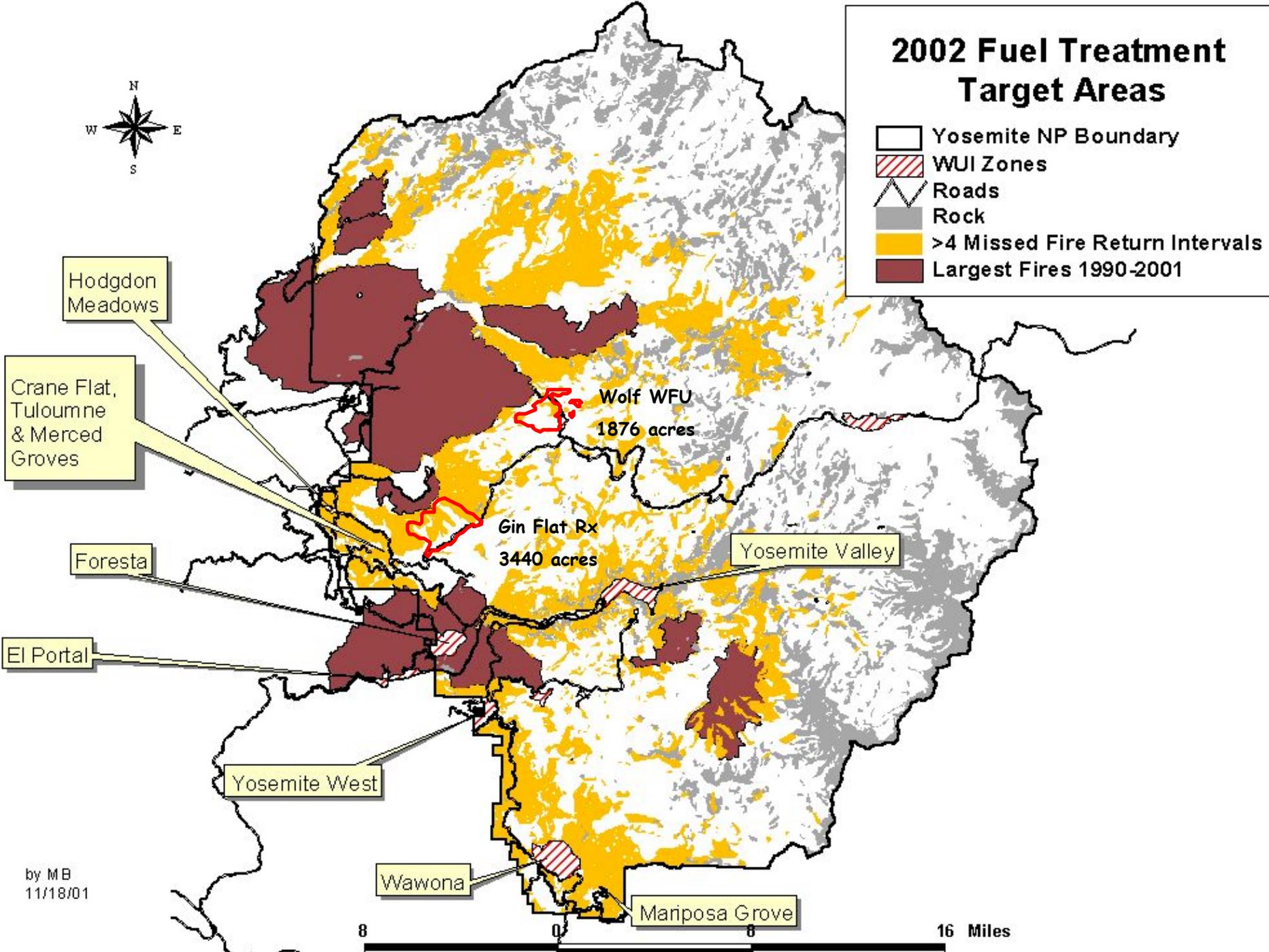
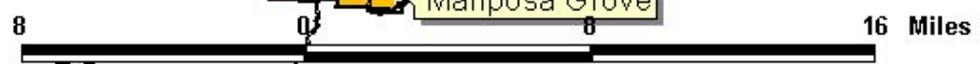
Mariposa Grove

Wolf WFU
1876 acres

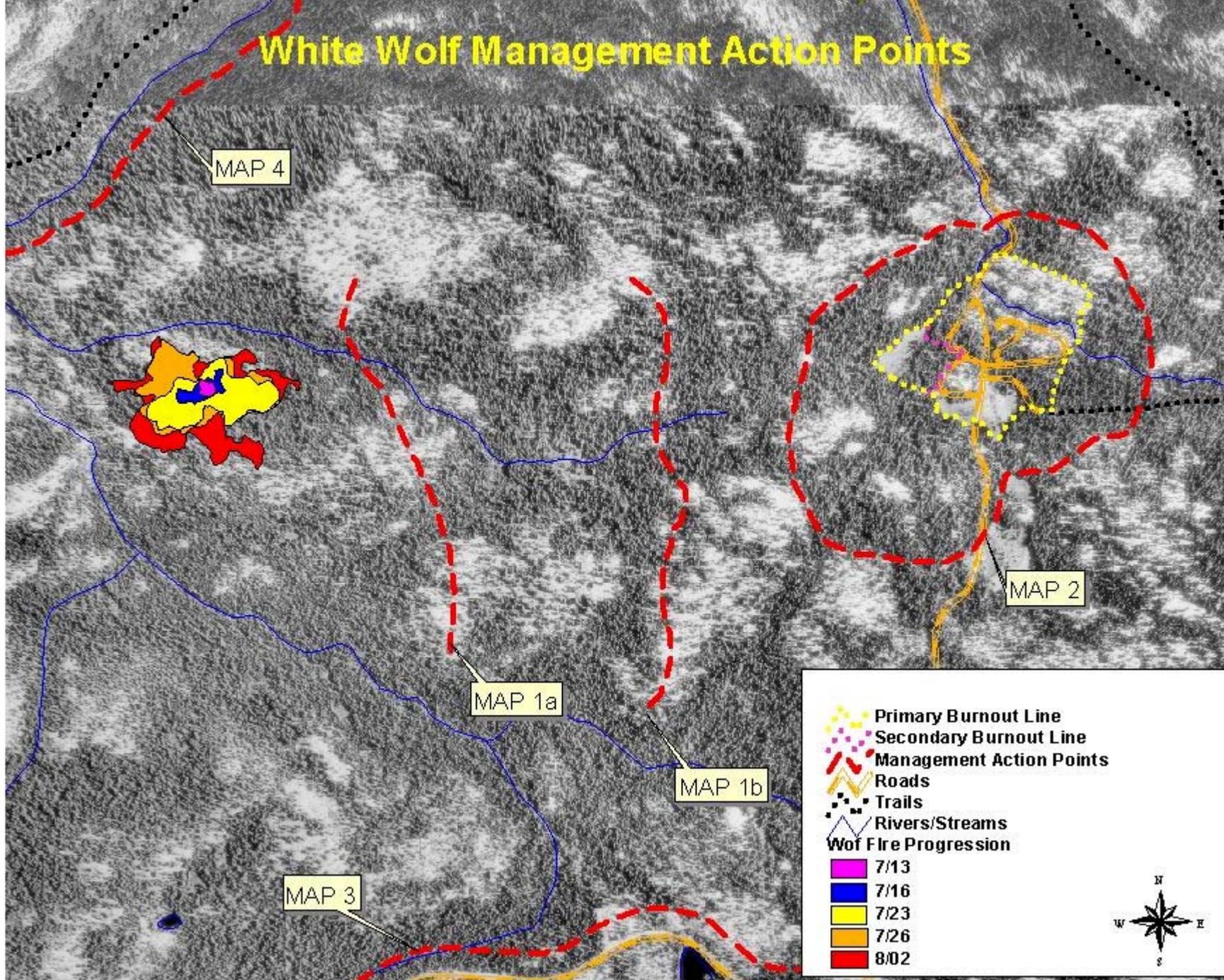
Gin Flat Rx
3440 acres

Yosemite Valley

by MB
11/18/01



White Wolf Management Action Points



MAP 4

MAP 2

MAP 1a

MAP 1b

MAP 3

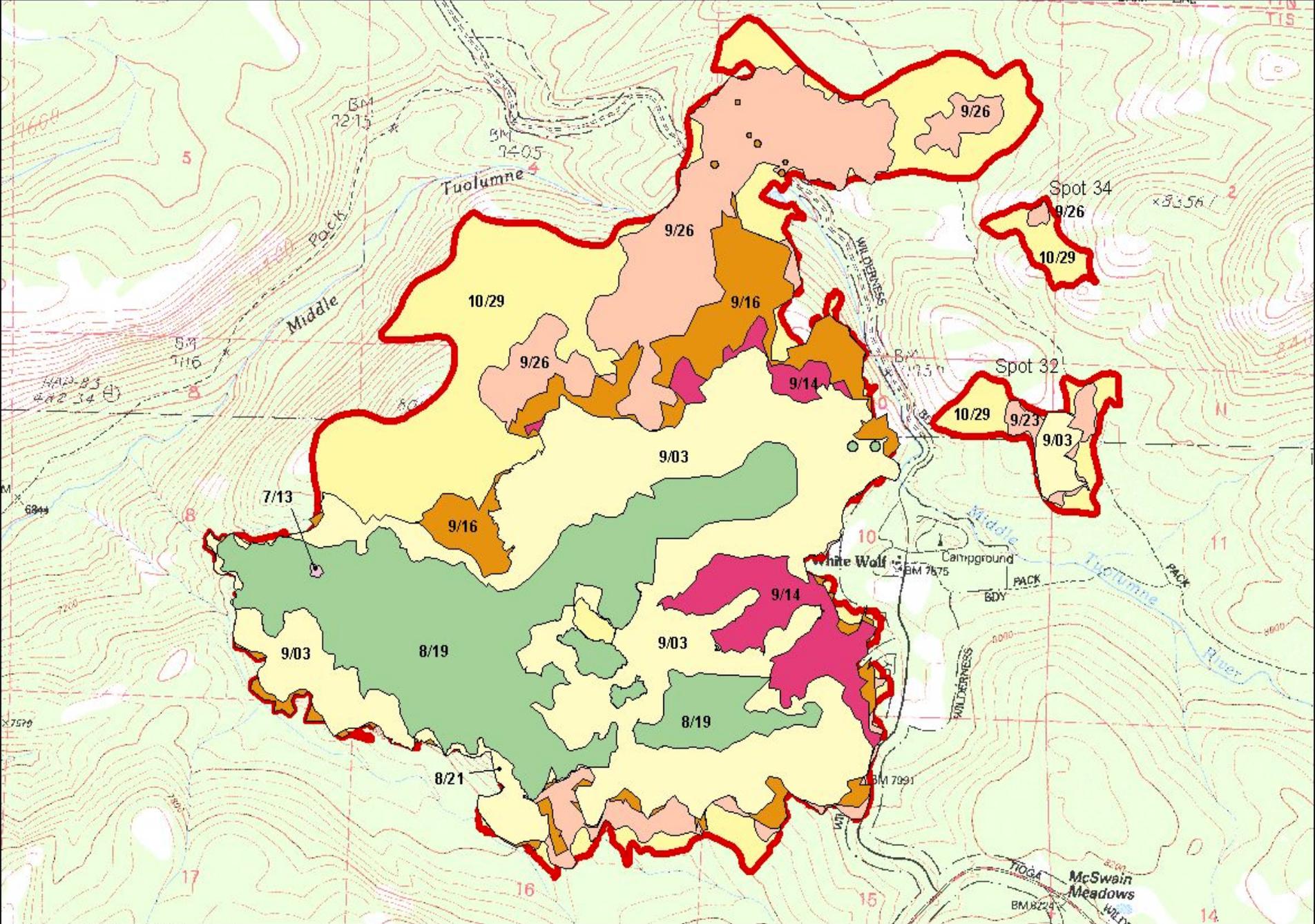
- Primary Burnout Line
- Secondary Burnout Line
- Management Action Points
- Roads
- Trails
- Rivers/Streams
- Wolf Fire Progression
- 7/13
- 7/16
- 7/23
- 7/26
- 8/02



1

0

1 Miles



0 1000 2000 Feet

Wolf Fire Progression 7/13 - 10/29 1876 acres

Yosemite National Park
10/30/Wolf.lyt Wolf_02.apr



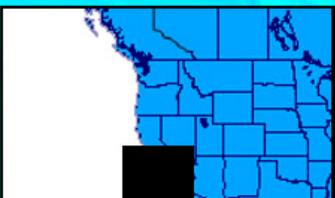
California

Nevada

SEQUOIA
NATIONAL
FOREST

Pacific
Ocean

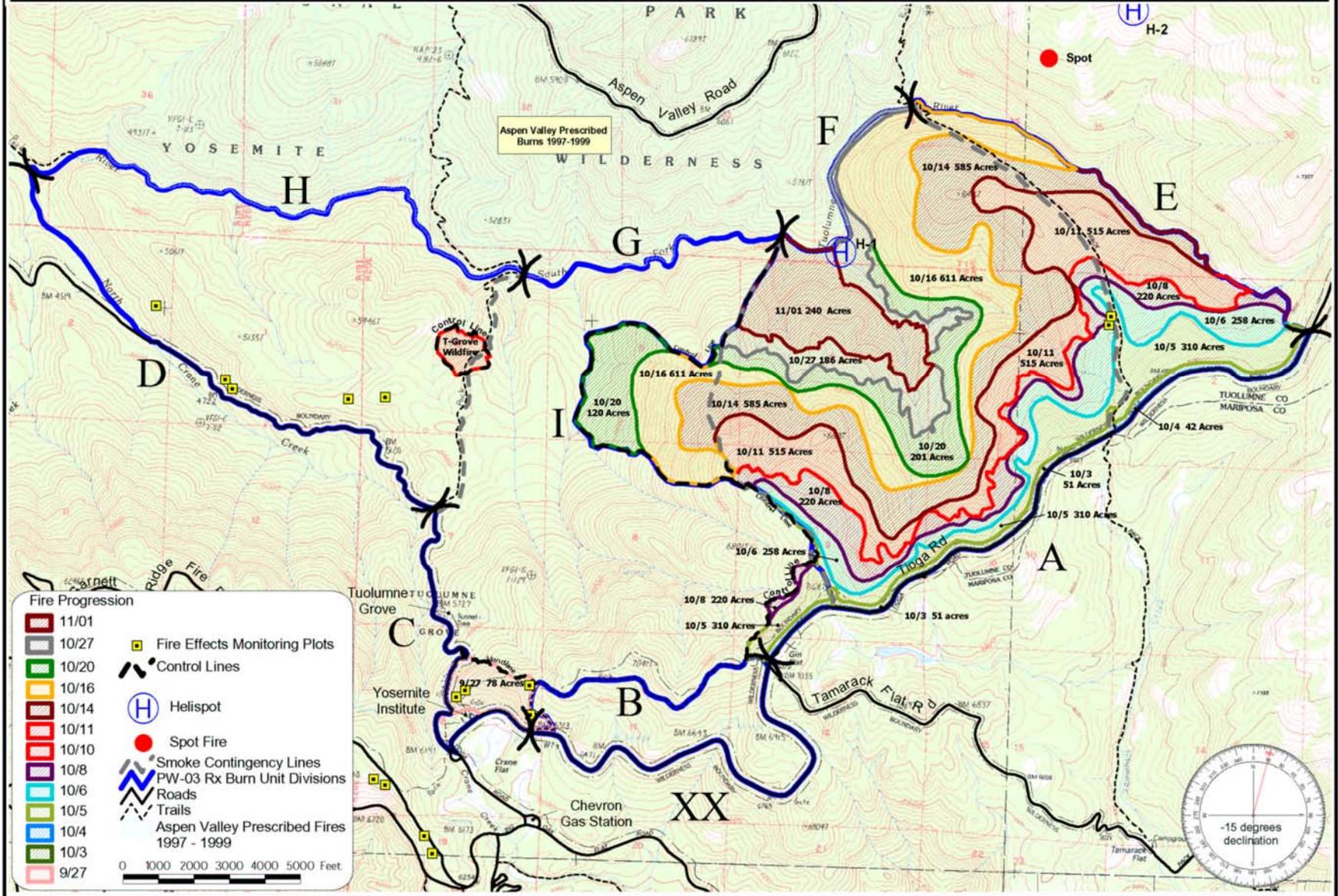
**Mid-Summer 2002:
McNalley Fire in
California and Biscuit
Fire in Oregon
Contribute to Regional
Smoke Impacts**



PW-3 Gin Flat Prescribed Burn

September 27 - November 1, 2002 3440 Acres

Yosemite National Park

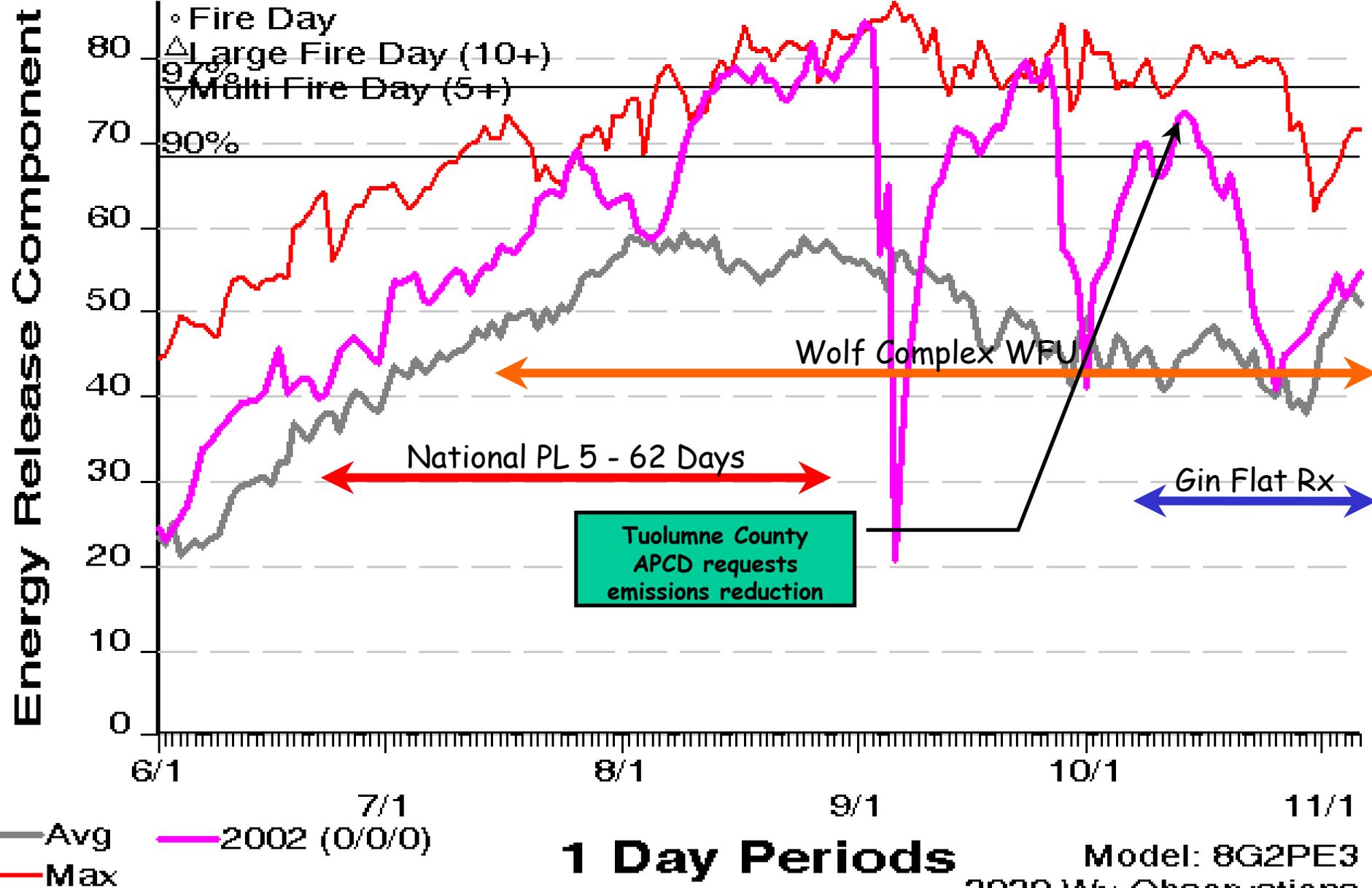


Energy Release Component- Defined

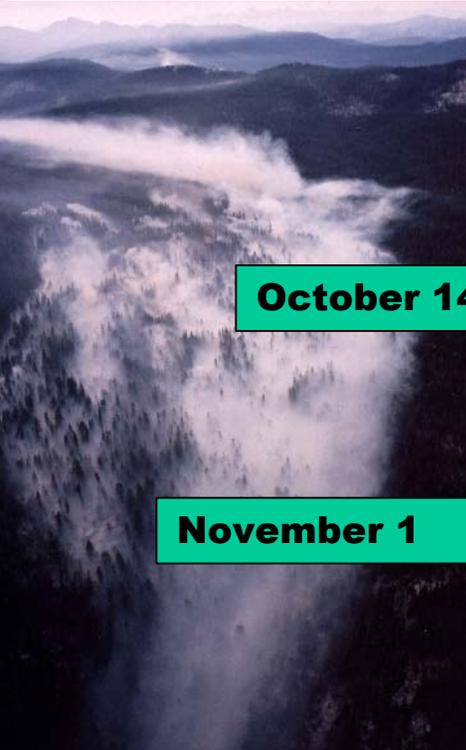
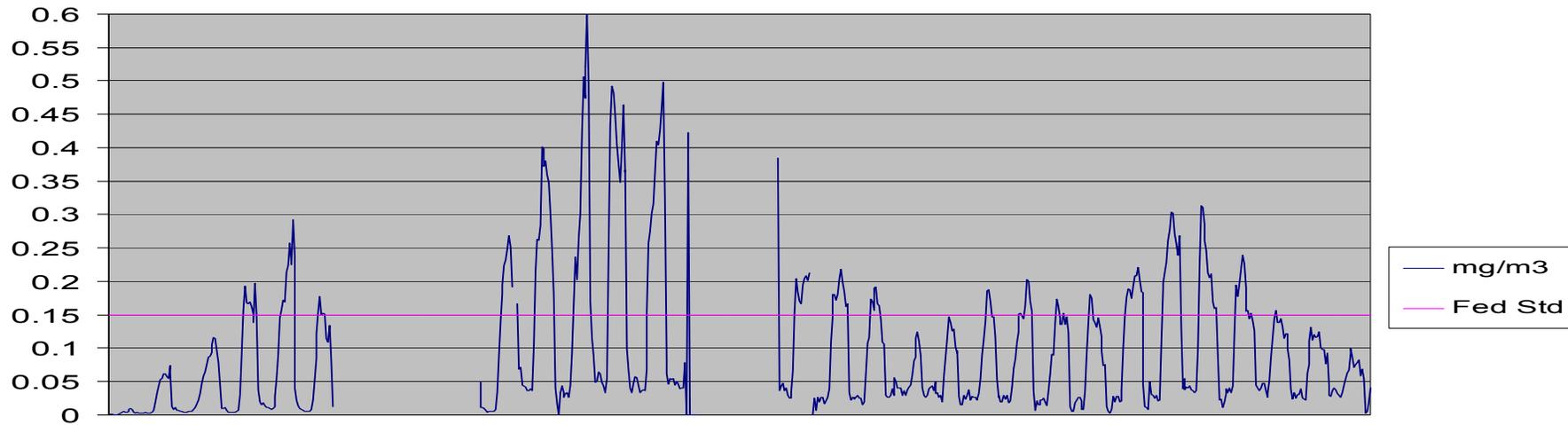
- The Energy Release Component is a number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire.
- Daily variations in ERC are due to changes in moisture content of the various fuels present, both live and dead.
- Since this number represents the potential "heat release" per unit area in the flaming zone, it can provide guidance to several important fire activities.
- It may also be considered a composite fuel moisture value as it reflects the contribution that all live and dead fuels have to potential fire intensity.
- The ERC is a cumulative or "build-up" type of index. As live fuels cure and dead fuels dry, the ERC values get higher thus providing a good reflection of drought conditions.



044102-CRANE 1973 - 2001



Hardin Flat PM-10 Concentrations 10/4-11/6

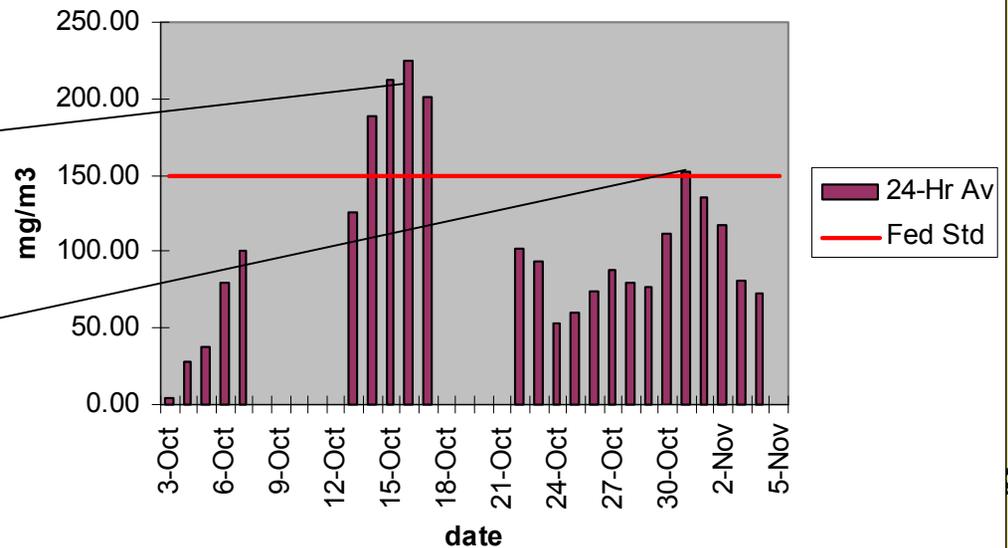


**EXCEEDENCE
OF FEDERAL
24-HOUR PM10
STANDARD**

October 14-17

November 1

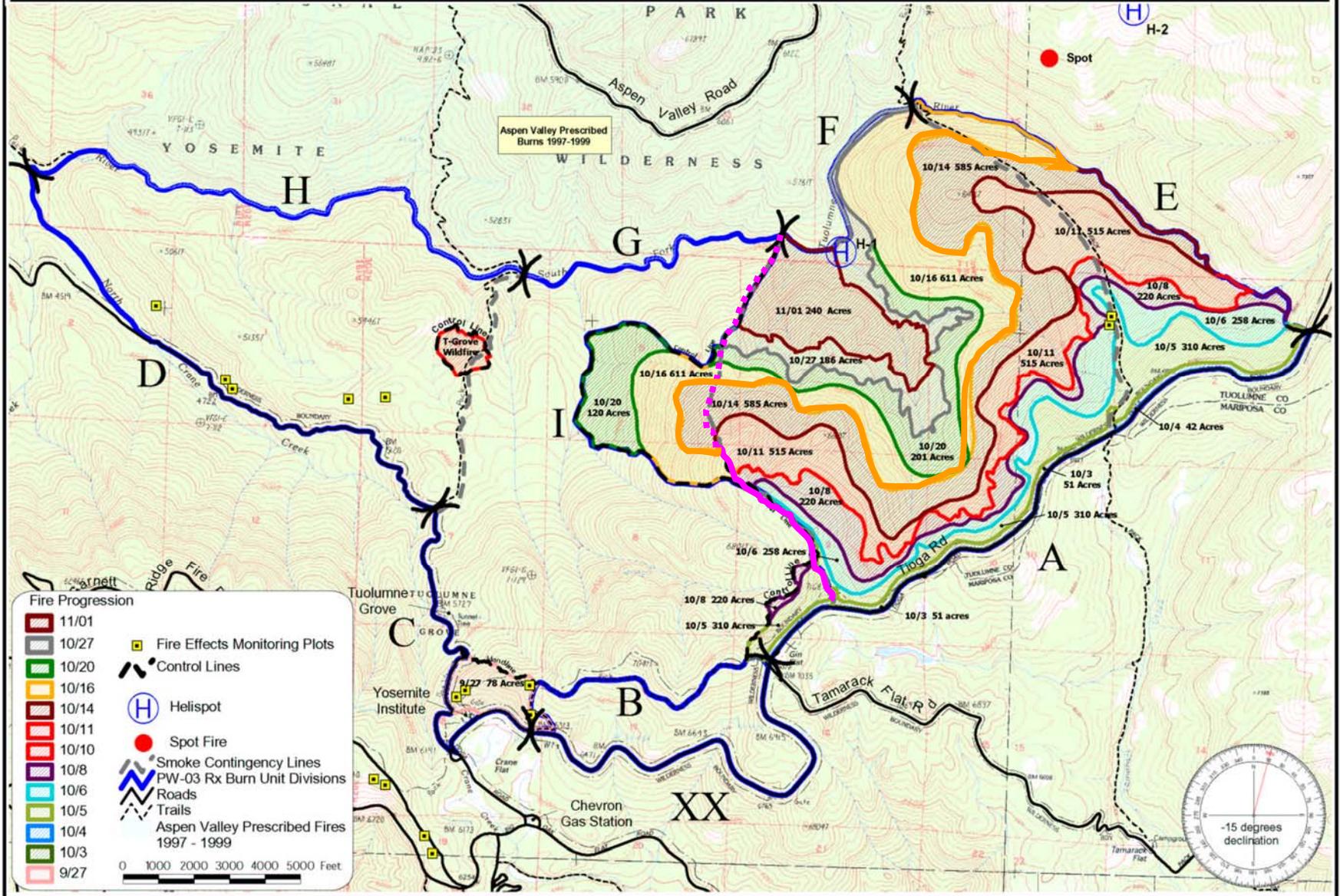
Hardin Flat PM-10 24-Hr. Average



PW-3 Gin Flat Prescribed Burn

September 27 - November 1, 2002 3440 Acres

Yosemite National Park



Lessons Learned

- Public can only tolerate a week or less of significant smoke.
- Depending on topography, fuels, and proximity to populations, around 100 acres/day seems to be a significant threshold.
- Large landscape units should be broken into smaller units that can be completed in 3-4 days time.
- Identify strategic sites for placement of air quality monitoring equipment and keep sites consistent throughout project. Share this data with interested parties.
- Ensure web site information is updated and easy to find.
- Ensure all preparation work is complete according to the burn plan (e.g. smoke contingency line).
- Smoke contingency holding line was identified in the planning process and was utilized.
- Ensure all overhead positions are in agreement concerning long-term strategy.



Lessons Learned

- Need to have a dedicated phone line for smoke complaints.
- Consider impacts to public tolerance for smoke from multiple projects within a single airshed and cumulative effects from the season's wildfires.
- Tuolumne County's request to stop or reduce emissions resulted in much higher aviation and personnel costs on the Gin Flat burn.



Incident Reviews/Additional Items

- January 14, 2002 - Sequoia & Yosemite NP staff review Tar Gap and Gin Flat Prescribed Burns
- January 17, 2002 - Yosemite Fire Management Staff met with Tuolumne County APCD Staff to develop action items.
- Include air district staff in burn plan review process, particularly for larger, more complex burns.
- Arrange pre-burn site visits, particularly with Resource Management and operational staff, but air district staff should be invited.
- Develop better guidelines for particulate monitoring sites.
- Resolve state 50 ug/m³ vs. federal 150 ug/m³ thresholds, as applies to violation. Is this reasonable with a background of 20-30 ug/m³?
- Show spatial sequencing from park's 5-yr. project plan to district, for long-range planning.
- Improve public outreach, especially in nearby communities.
 - District & NPS will collaborate to develop a list of groups that would be interested in a briefing on Gin Flat and future fuels management projects at the park (e.g. ne Fire Safe Council, Bard of Supervisors, etc.)
 - Address perception that park doesn't consider local citizens concerns.
 - Better advance community notification.



Incident Reviews/Additional Items

- Parse larger units into units as small as practicable with smoke contingency holding lines - 1 week/500-700 acres seemed to be a point of agreement on total duration, followed by a tangible break in the smoke impact, before another block is ignited nearby.
- Make sincere efforts at implementing mechanical treatments, *where possible*, that lower emissions (chip/haul/biomass, firewood cutting, etc.)
- Emphasize increased use of contract labor to support local economies.
- Ensure anticipated *total daily* acres burned, rather than just acres ignited is reported on the daily validation form.

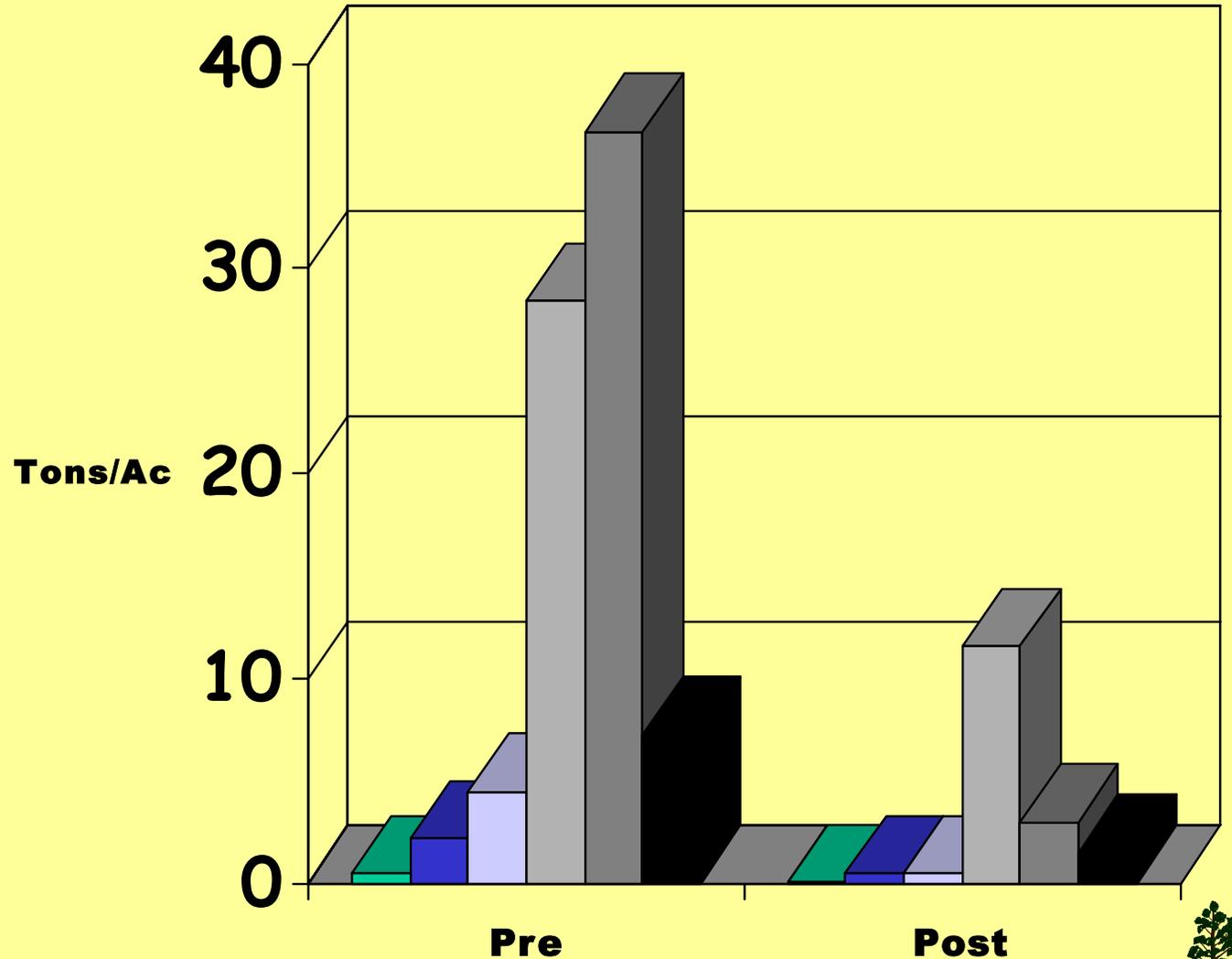




Fire Effects

Based on 9 FMH Plots
(7 ABCO/2 ABMA)

- 1-Hour TLF
- 10-Hour TLF
- 100-Hour TLF
- 1000-Hour TLF
- Duff
- Litter



Yosemite West WUI Fuel Reduction Contract

ATV "Forwarding Arch"



Before

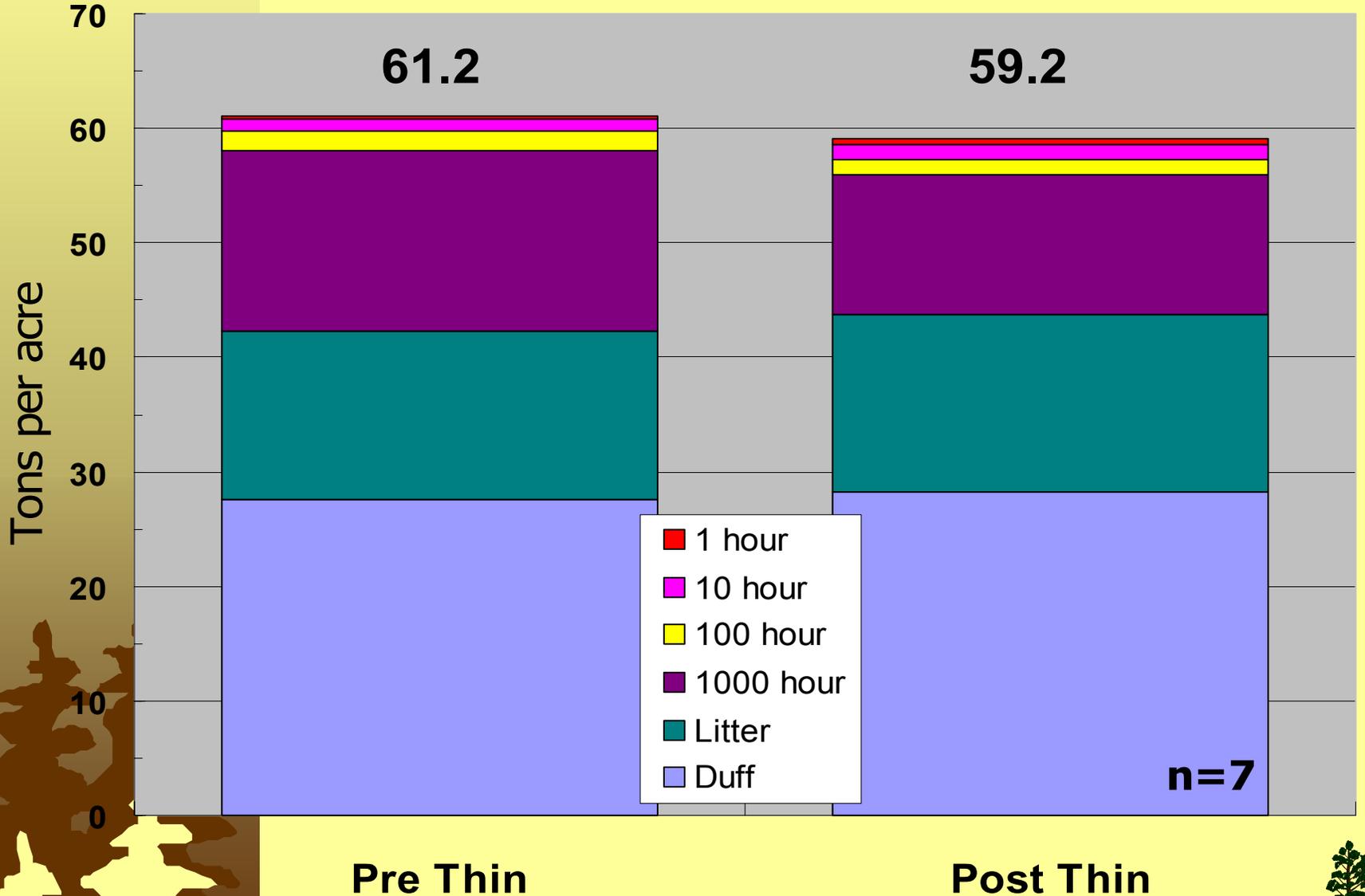
Log Deck for Firewood Cutting



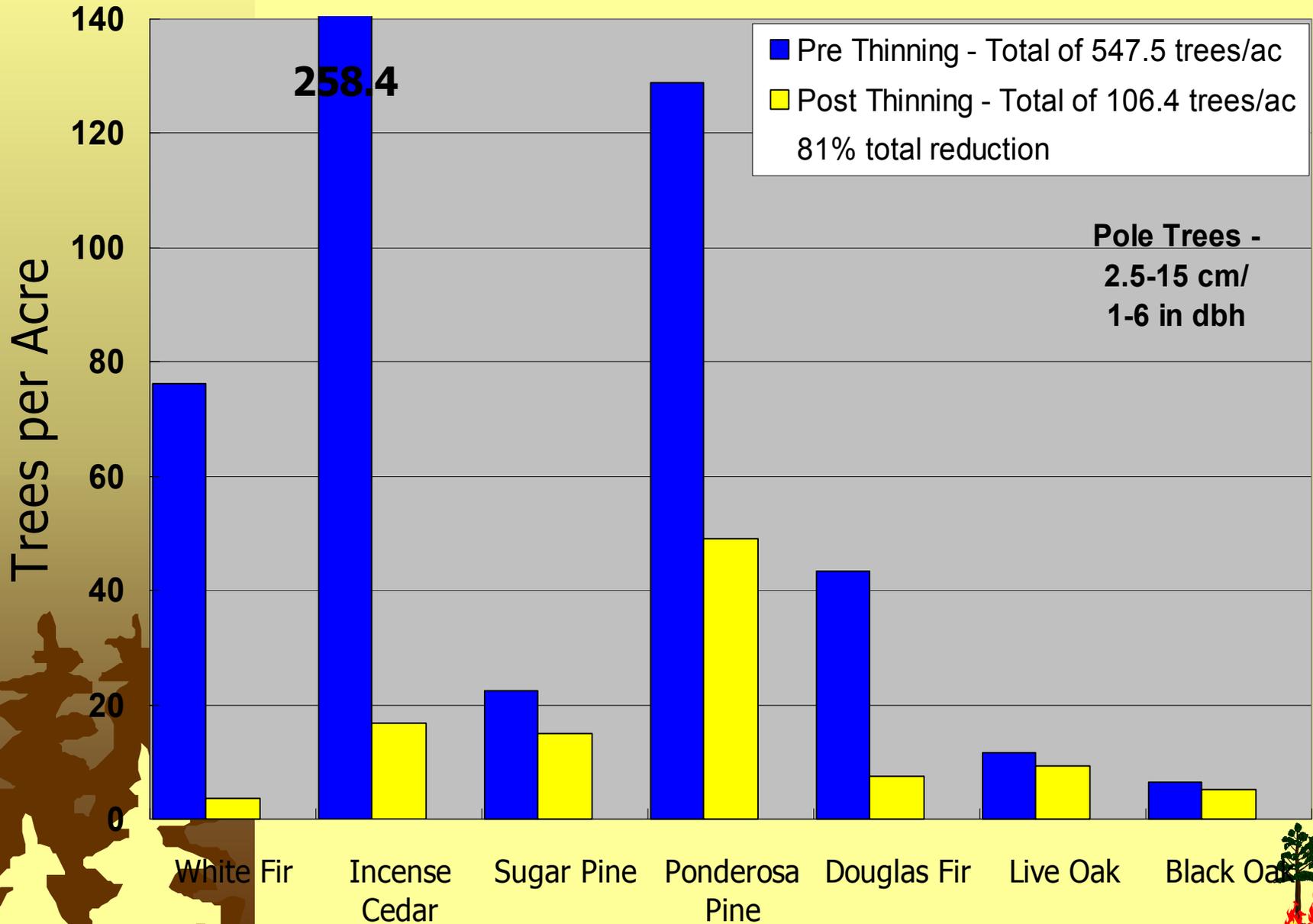
After



Total Dead Fuel Reduction After Thinning



Pole Density After Thinning (n=7)





Thinning has...

- Increased flashier fuels (1,10 hr) that contribute to rapid fire spread
- Slightly decreased large woody fuel load
- NOT significantly decreased total fuel load
- Significantly reduced pole sized trees (81% reduction)
- Decreased chance of torching and crown fire
- Per acre costs of PW-3, Tuolumne and Kibbie Fires are *lower* than contact thinning costs with superior fuel reduction results!





Thanks!

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209-375-9574

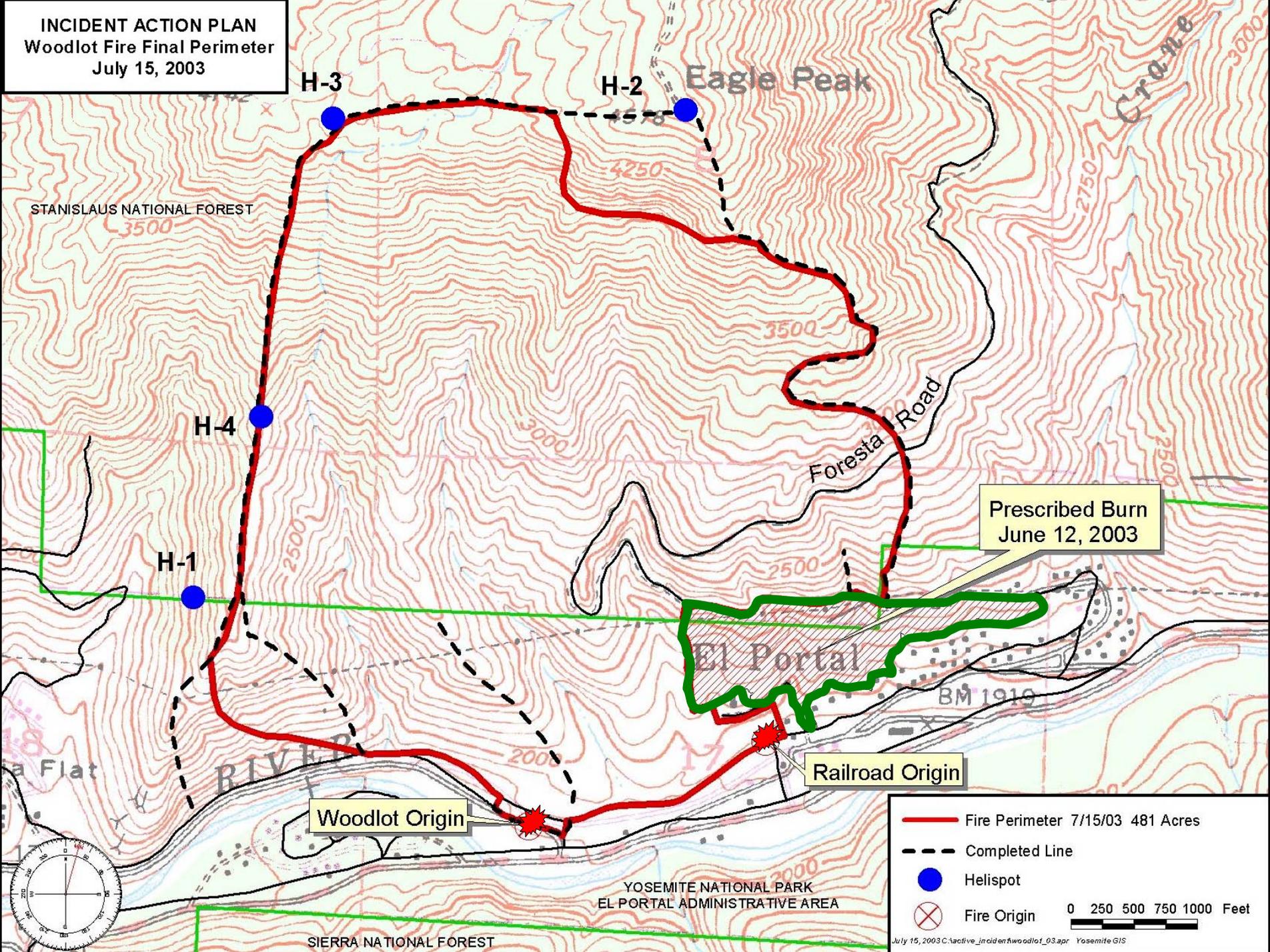
Woodlot Fire July 8, 2003



**Success
Story:
Homes
protected
from
two arson
starts by Rx
fire.**



INCIDENT ACTION PLAN
Woodlot Fire Final Perimeter
July 15, 2003



Prescribed Burn
 June 12, 2003

Railroad Origin

Woodlot Origin

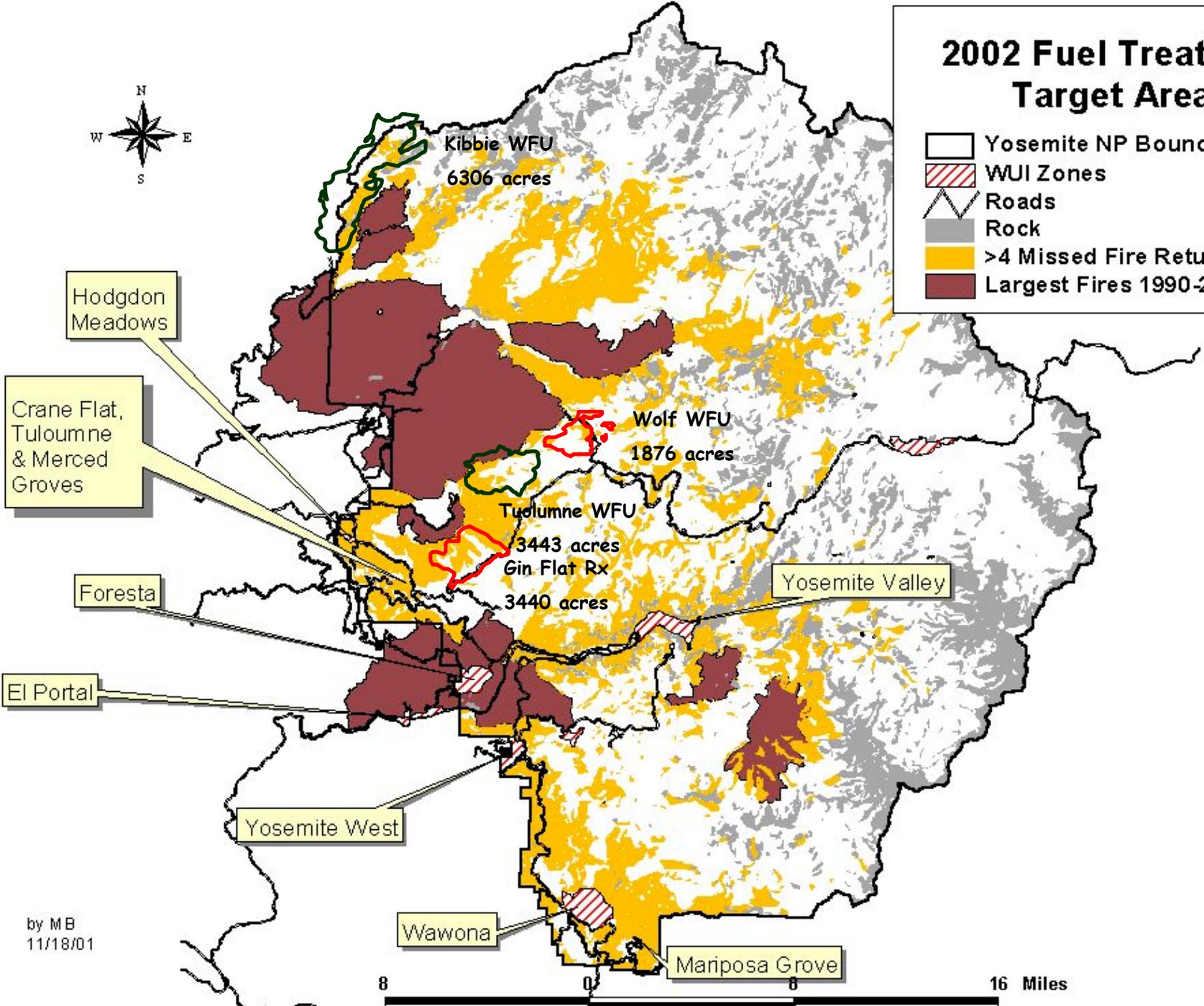
- Fire Perimeter 7/15/03 481 Acres
 - Completed Line
 - Helispot
 - ✱ Fire Origin
- 0 250 500 750 1000 Feet

YOSEMITE NATIONAL PARK
 EL PORTAL ADMINISTRATIVE AREA

SIERRA NATIONAL FOREST

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- Yosemite NP Boundary
- WUI Zones
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Hodgdon Meadows

Crane Flat, Tuloumne & Merced Groves

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El Portal

Yosemite West

Wawona

Mariposa Grove

Yosemite Valley

Kibbie WFU
6306 acres

Wolf WFU
1876 acres

Tuolumne WFU
3443 acres
Gin Flat Rx
3440 acres

by MB
11/18/01

8 0 8 16 Miles

2003 Season At-A-Glance

- Near record-breaking April precipitation.
- 2 Fires ignited near Kibbie Lake in late July, followed by over 2" of rain parkwide on August 1st and 2nd.
- Kibbie Fire extinguished at 32 acres, SOK Fire relatively inactive for some time.
- At least two significant monsoonal rain events occur later in the season, bringing additional fire starts, including the Tuolumne Fire and four additional fires in the Kibbie Lake basin.
- Around Sept. 19-20th regional high pressure subsidence begins to warm and dry upper level atmosphere, decreasing fuel moistures.



2003 Season At-A-Glance

- 1st bucket drops utilized on SW flank on Sept. 21st and 22nd.
- Single-digit day and night humidities extend burning period to 24 hours and bring fine fuel moistures to 2-3%.
- On Monday, Sept. 22nd, Ground resources scout line and begin line construction. Tuolumne Co. APCD begins to receive calls and is assured suppression actions are underway.
- Between Sept 23rd and 25th Type III organization would peak at 3 handcrews, 2 engines, 2 water tenders and H551.
- Control lines would be overrun three times prior to the Type II IMT transition on the morning of Sept. 26th.



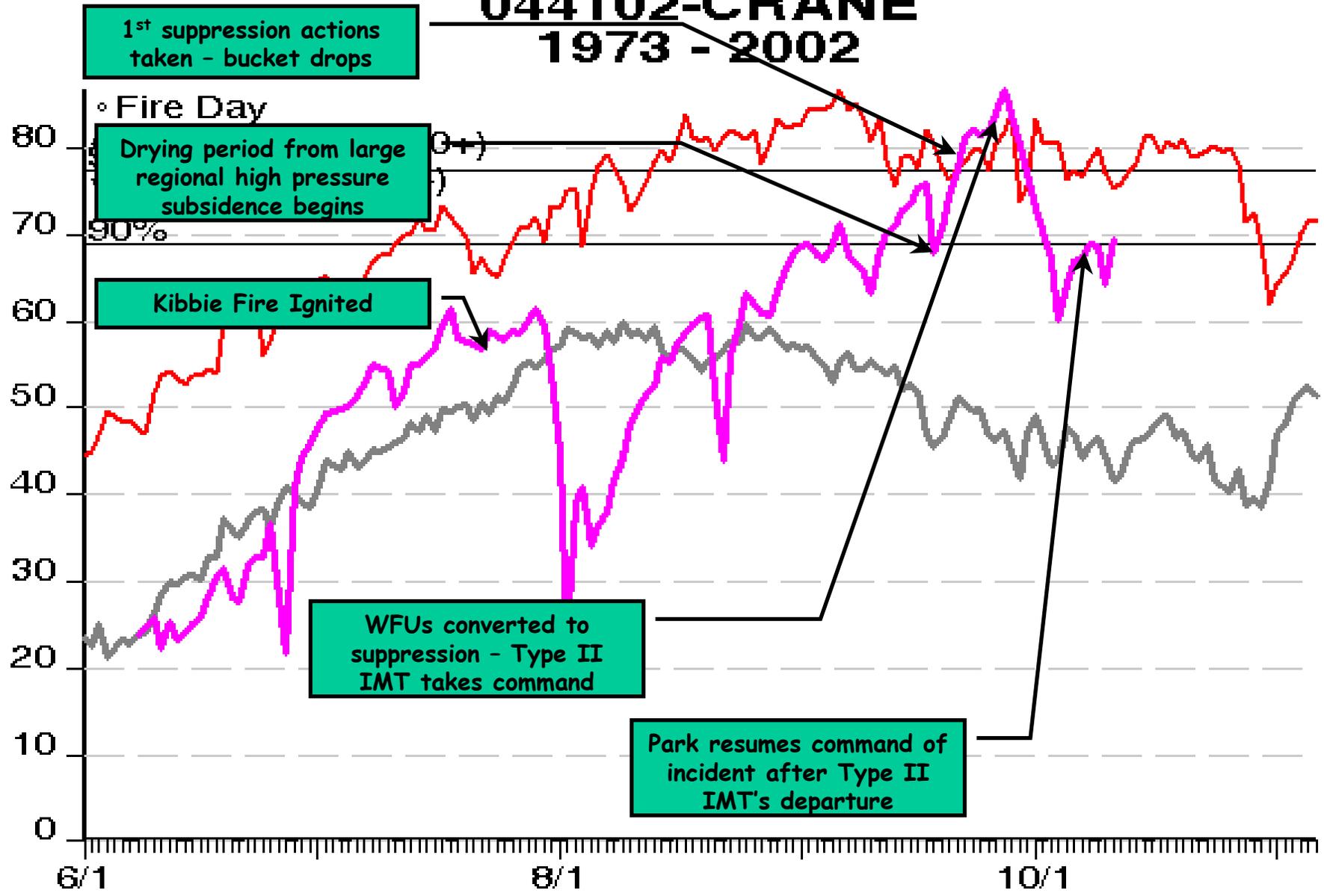
2003 Season At-A-Glance

- Actual transition from WFU to suppression at 1430 because of *smoke emissions, logistical needs* on two fires in remote locations and *extreme fire behavior*.
- Weather moderates with a return of more seasonable temperatures and humidities at the end of the month, aiding suppression efforts.
- Both fires contained on Oct. 2nd and returned to park control on Oct. 5th.



044102-CRANE 1973 - 2002

Energy Release Component



1st suppression actions taken - bucket drops

Fire Day
Drying period from large regional high pressure subsidence begins

Kibbie Fire Ignited

WFUs converted to suppression - Type II IMT takes command

Park resumes command of incident after Type II IMT's departure

Avg
2003 (0/0/0)
Max

1 Day Periods

Model: 8G2PE3
4082 Wx Observations
FF+2.0 10/14/2003-10:20

2002 vs. 2003 Smoke Impacts & Mitigation Costs

- In 2002 less than 100 smoke complaints resulted from a smoke episode lasting *at least a month*.
- Federal PM10 24-hr. standard is exceeded on at least 4-5 days in Hardin Flat (BAM). No exceedences measured during the critical period in Groveland (DataRAM).
- Suppression cost to limit the Gin Flat Rx burn to half the original planned acres: *~\$200-300K and no significant firefighter injuries.*



2002 vs. 2003 Smoke Impacts & Mitigation Costs

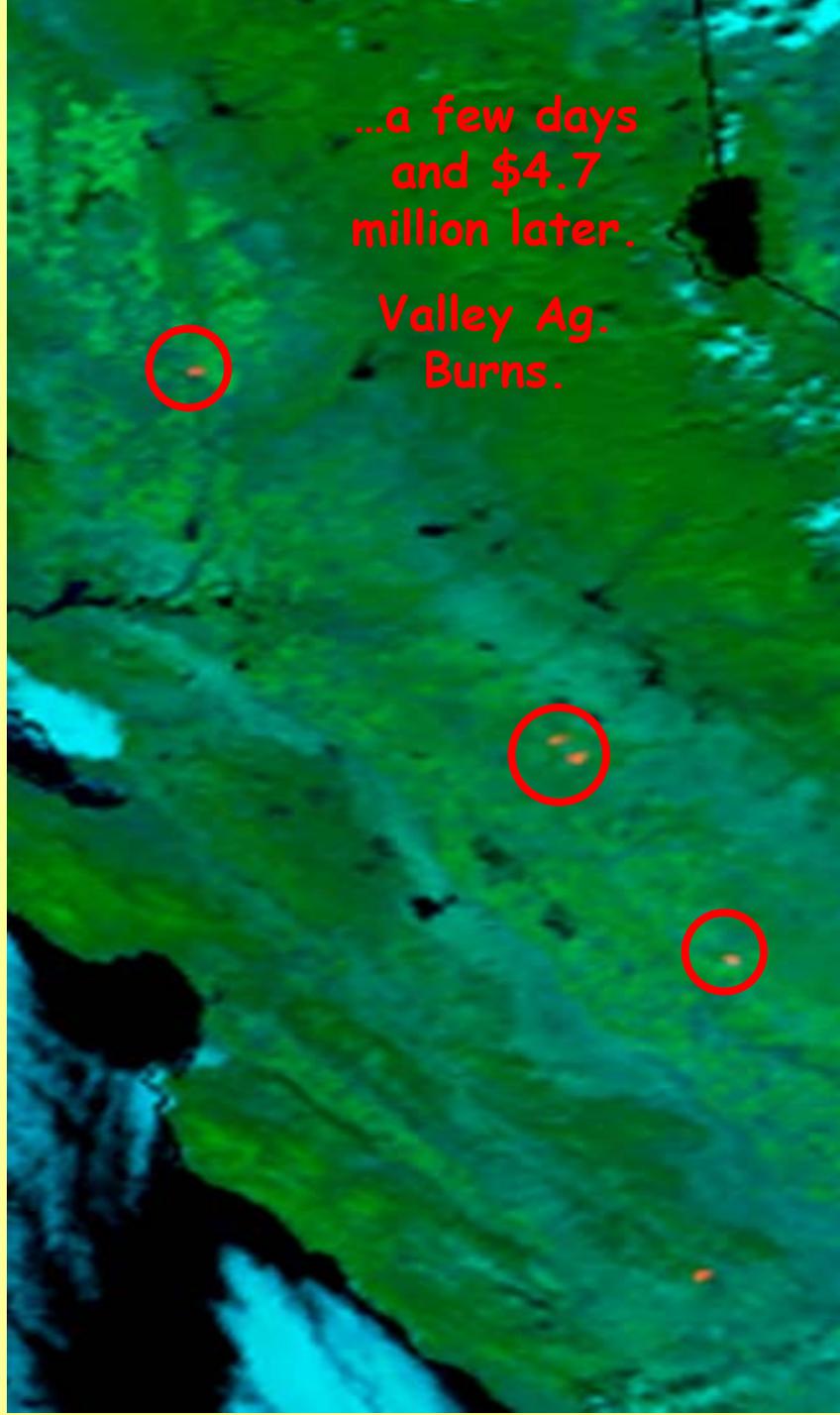
- In 2003 less than 50 smoke complaints *and inquiries* are documented for a smoke event lasting only days.
- No data is available, but localized (<10-15 miles downriver) exceedence of the federal standard *may* have occurred during one or two 24-hr. periods.
- Suppression cost to contain the Tuolumne and Kibbie Fires: ~\$4.7 million and three significant firefighter injuries. *What next?.....*
- Early suppression only leads to increased fuel accumulations, increased suppression costs and a greater threat to public & firefighter safety.



Mean Acres of Annual Accomplishment (FMP DEIS)

	Alt. A	Alt. B	Alt. C	Alt. D
Wildland/ Urban Interface	Less than 100 acres per year for all developed areas.	~ 1,553 acres treated per year.	~ 766 acres treated per year.	~ 1,095 acres treated per year.
Prescribed Fire	1,472 acres per year (over the past 29 years).	2,520 to 12,872 acres per year.	1,260 to 6,436 acres per year.	<i>1,817 to 9,194 acres per year.</i>
Managed Wildland Fire	2,567 acres per year (average over the past 27 years).	Maximize managed wildland fire with a target of 16,000 acres per year (all treatments) based on fire history indications.		





"When you try to change any single thing, you find it hitched to everything else in the universe."

-John Muir

