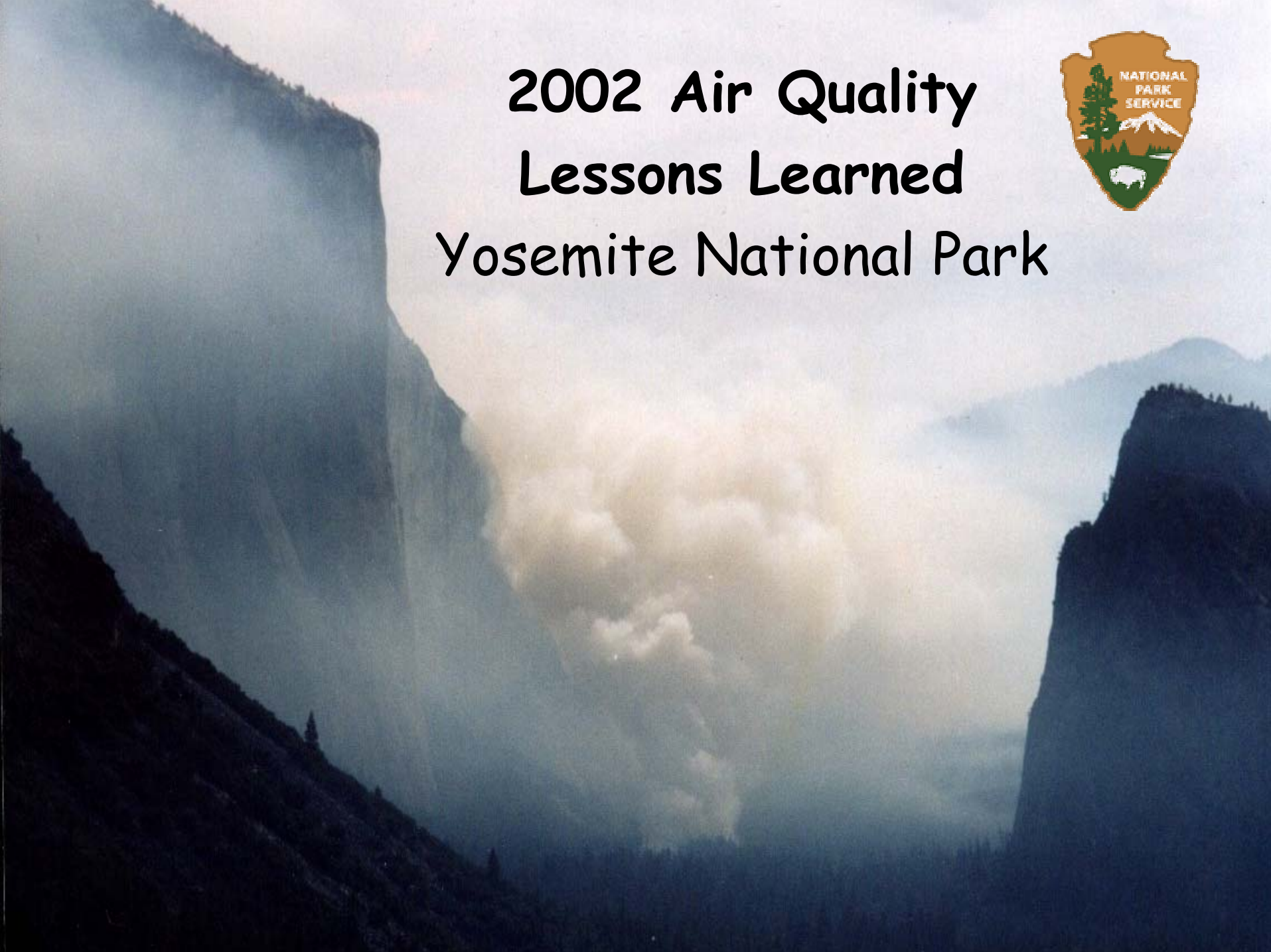
2002 Air Quality Lessons Learned

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

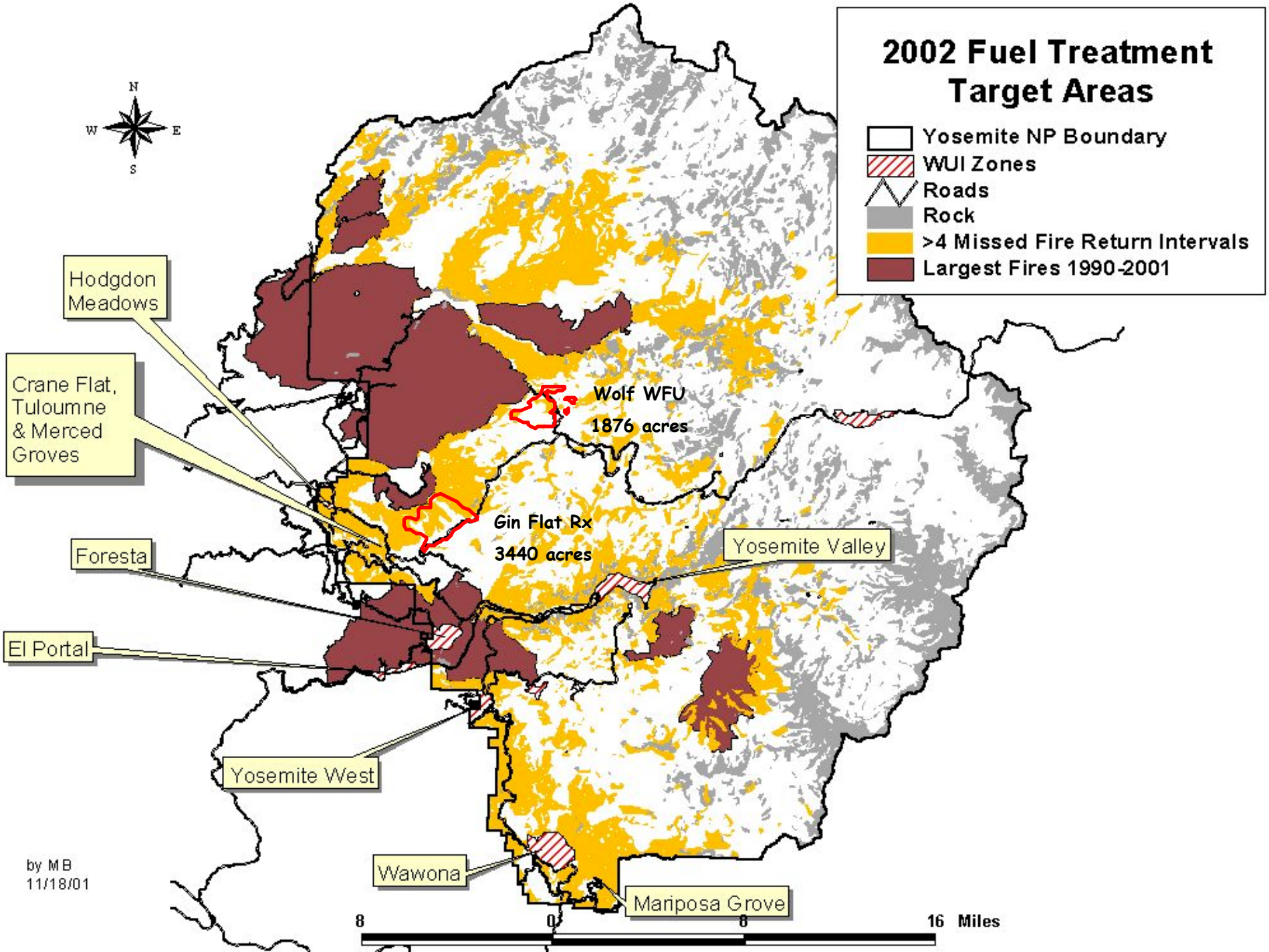
- May 1996 - *Policy Review* Action Plan identifies action items under new guidelines including:
- "..jointly develop programs to plan, fund, an implement an expanded program of prescribed fire in fire-dependent ecosystems."
- "..facilitate the planning and implementation of landscape-scale prescribed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

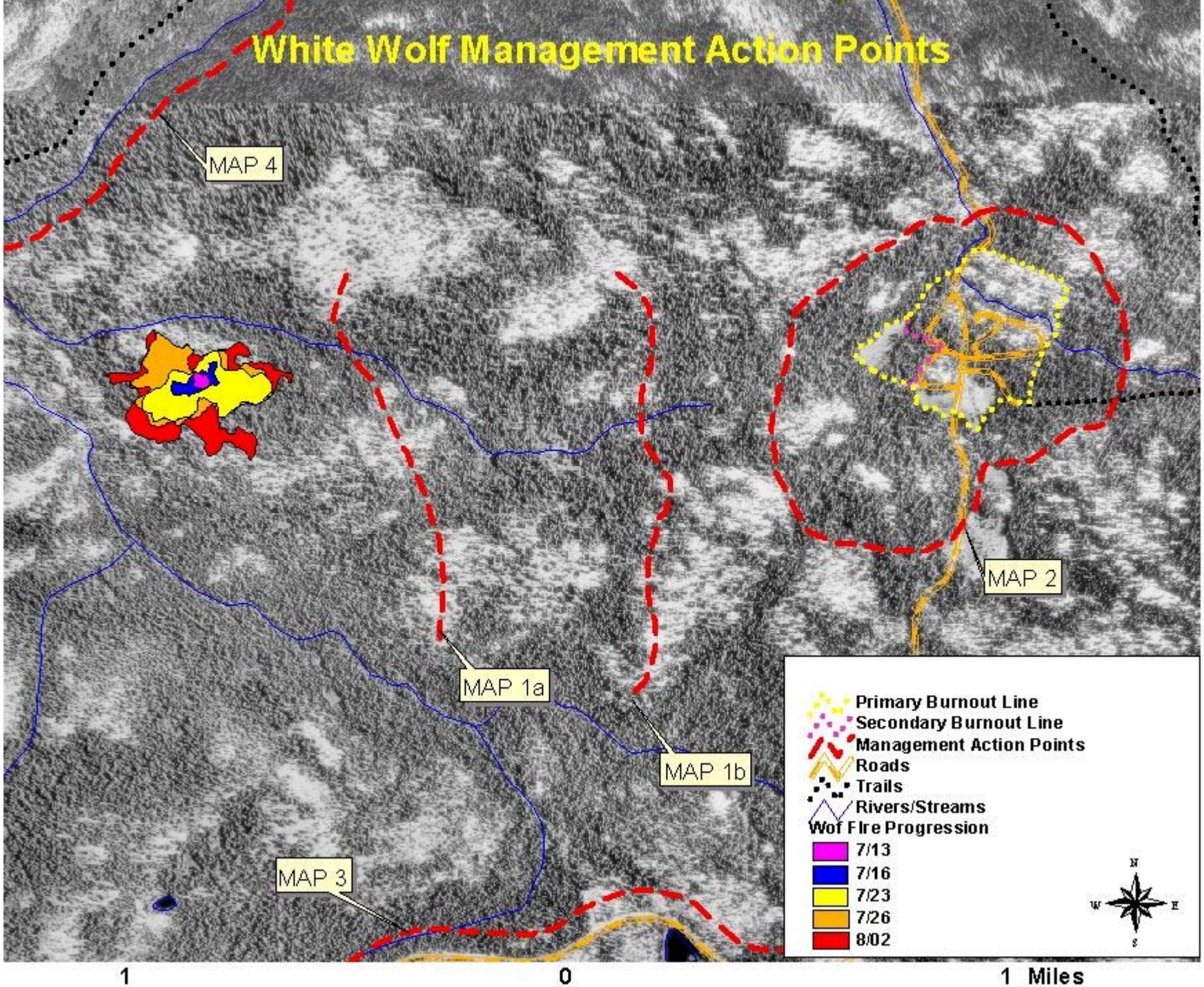
Director's Order #18
"Fire is Fire"

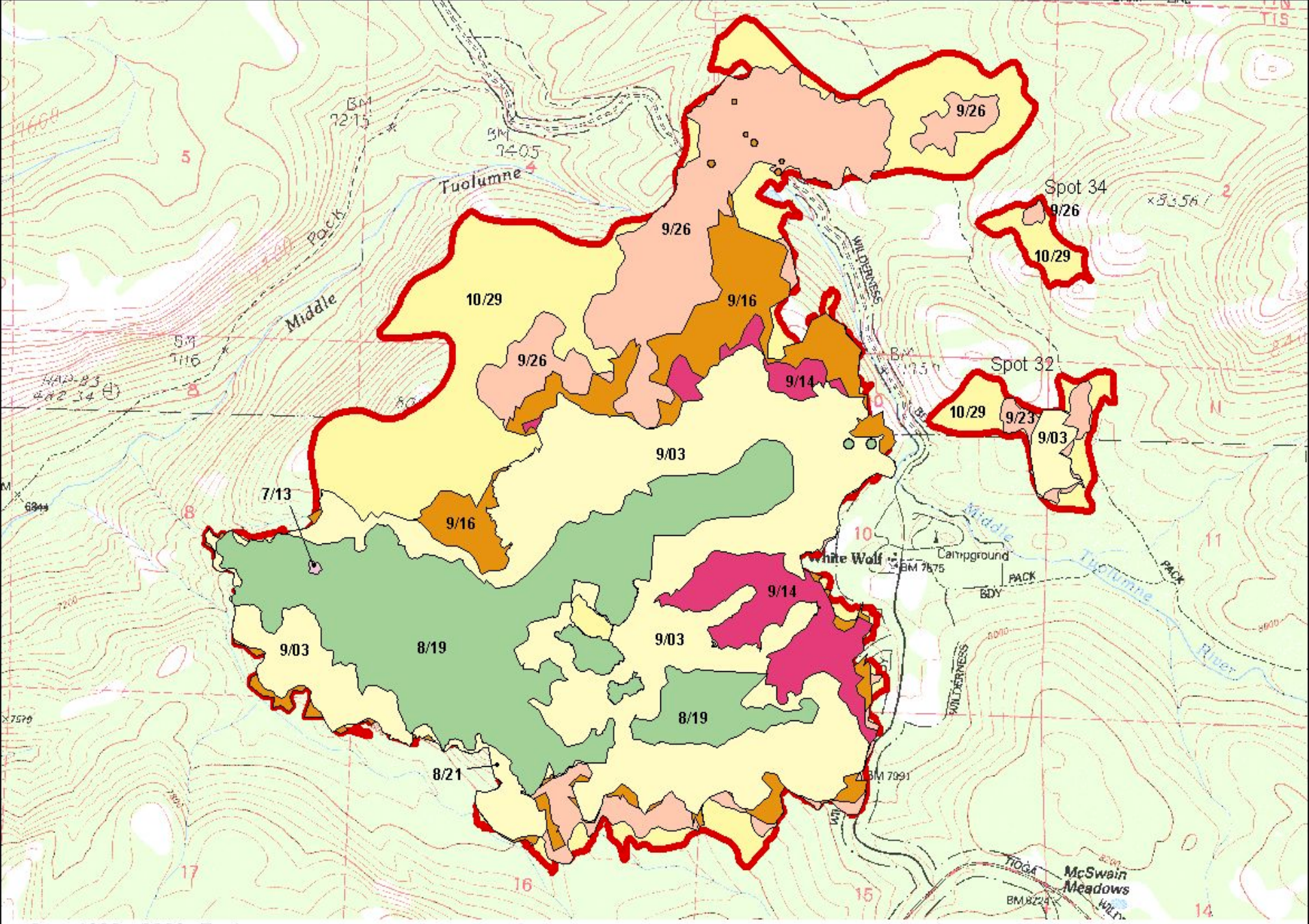
- Replaces the distinction between wildfires and prescribed fires with the philosophy of **appropriate management action**.
- "All ignitions are classified as wildland fires and permit management to meet a continuum of land and resource management objectives."

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.

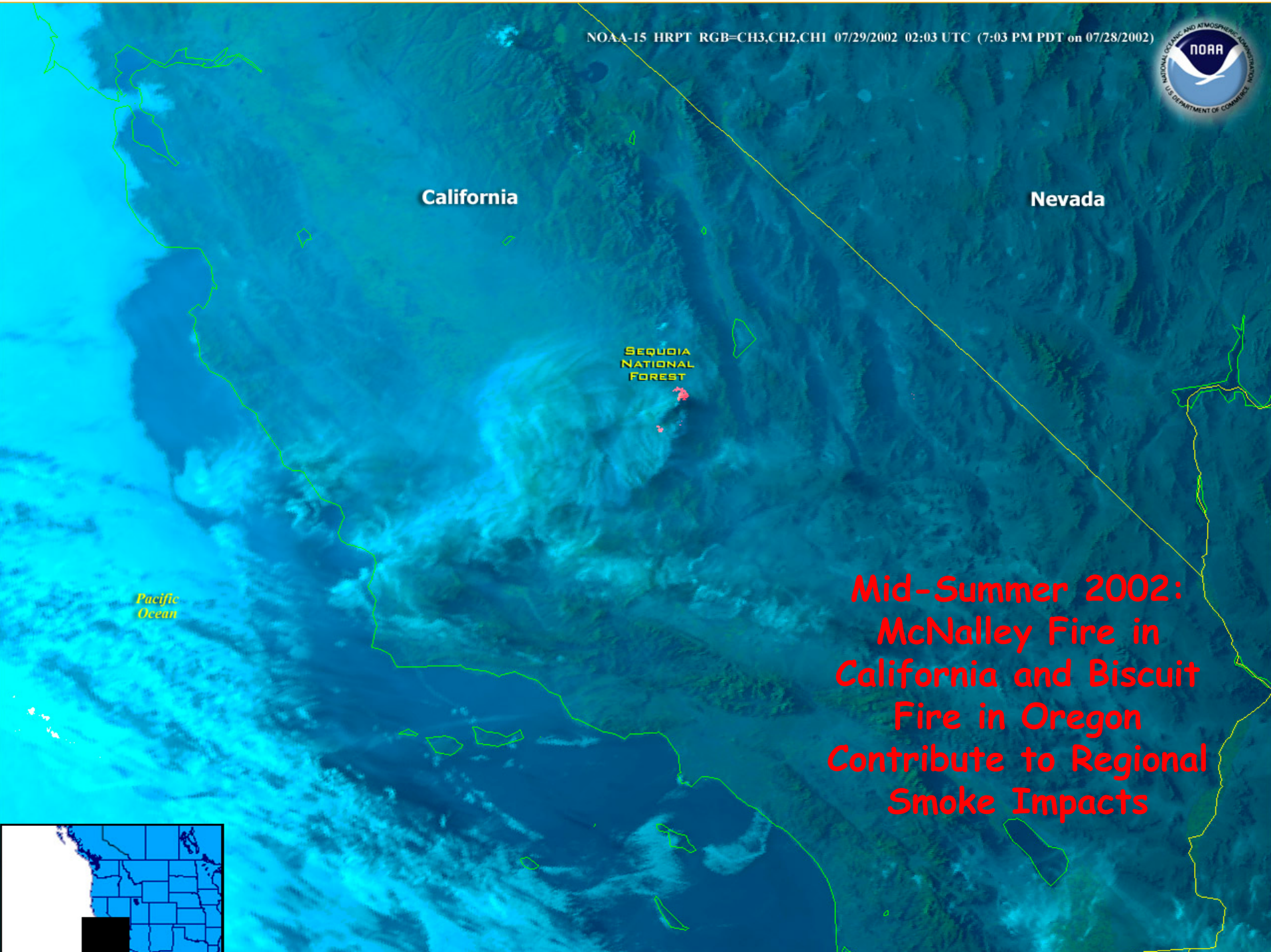

2002 Fuel Treatment Target Areas
Yosemite NP Boundary
WUI Zones
Roads
Rock
>4 Missed Fire Return Intervals
Largest Fires 1990-2001
N
W
E
S
Hodgdon Meadows
Crane Flat, Tuloumne & Merced Groves
Foresta
El Portal
Yosemite West
Wawona
Mariposa Grove
Yosemite Valley
Wolf WFU
1876 acres
Gin Flat Rx
3440 acres
by MB
11/18/01
8
0
8
16 Miles


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
Wof Fire Progression
7/13
7/16
7/23
7/26
8/02
N
W
E
S
1
0
1 Miles



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

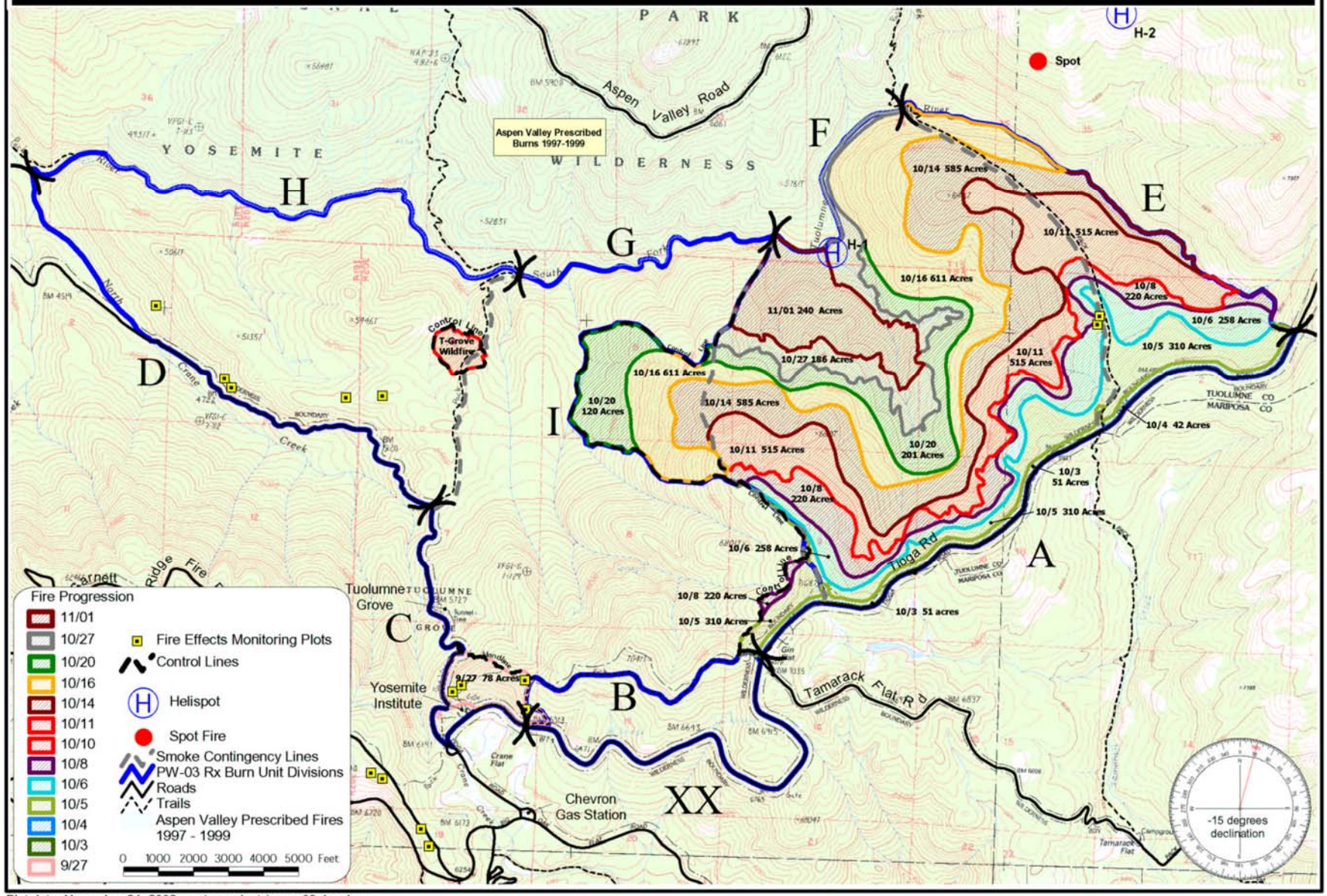
Yosemite National Park
10/30Wolf lyt Wolf_02.apr


NOAA-15 HRPT RGB=CH3,CH2,CH1 07/29/2002 02:03 UTC (7:03 PM PDT on 07/28/2002)
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

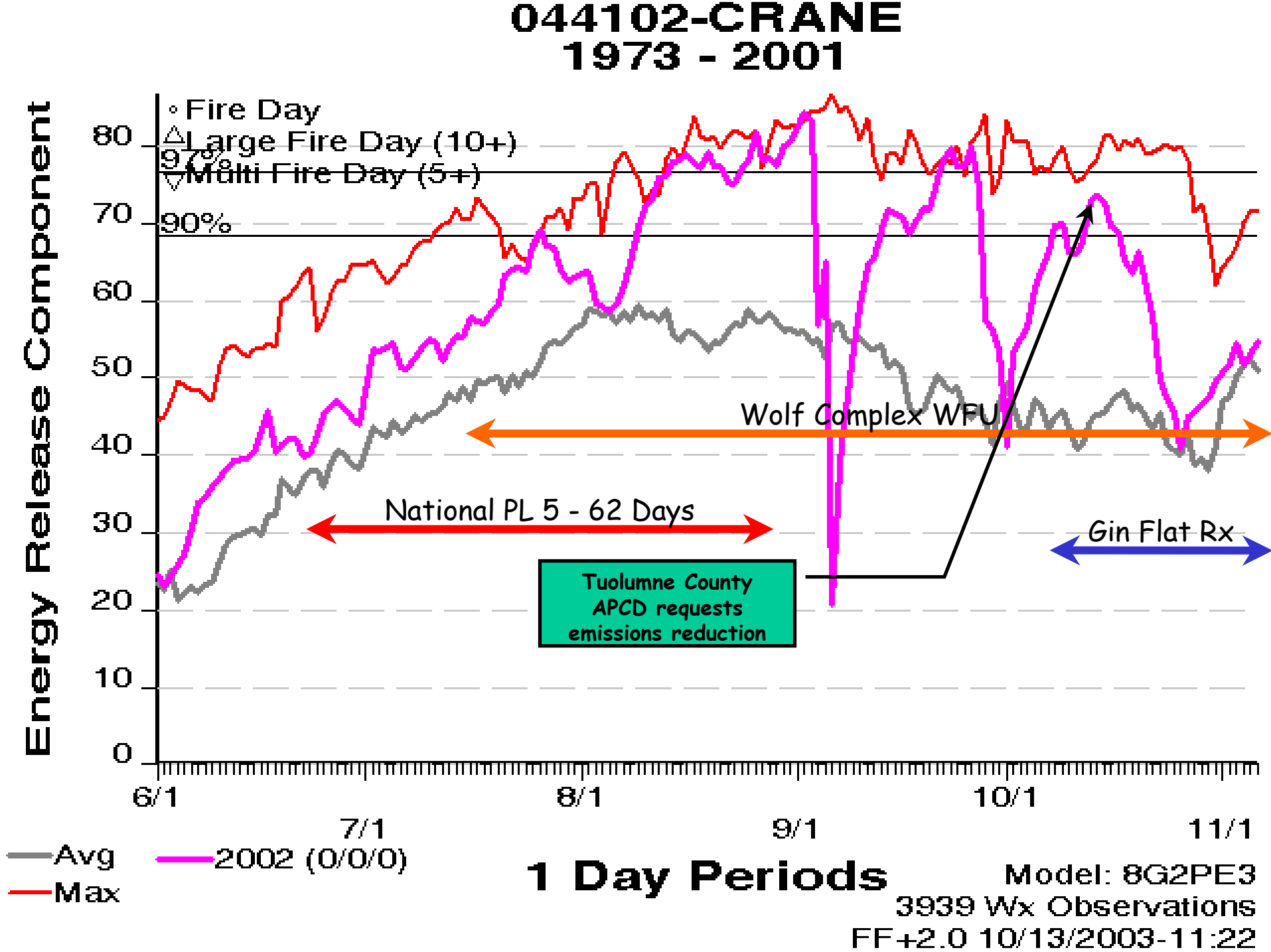
Yosemite National Park

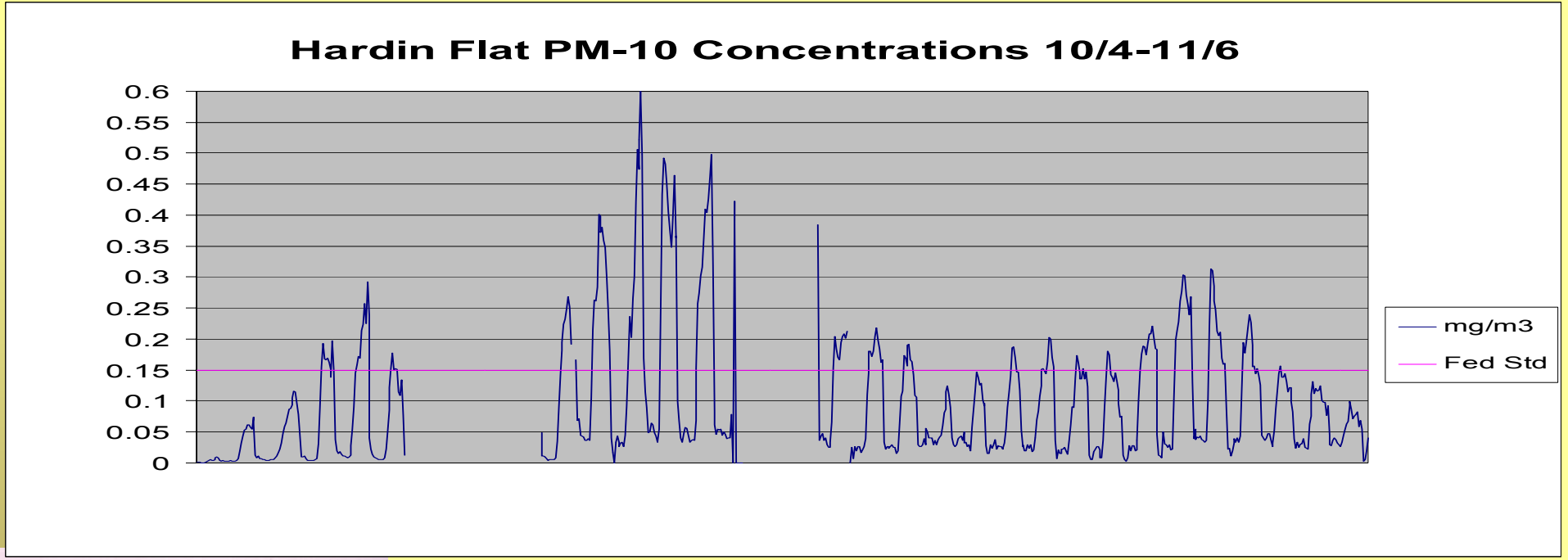


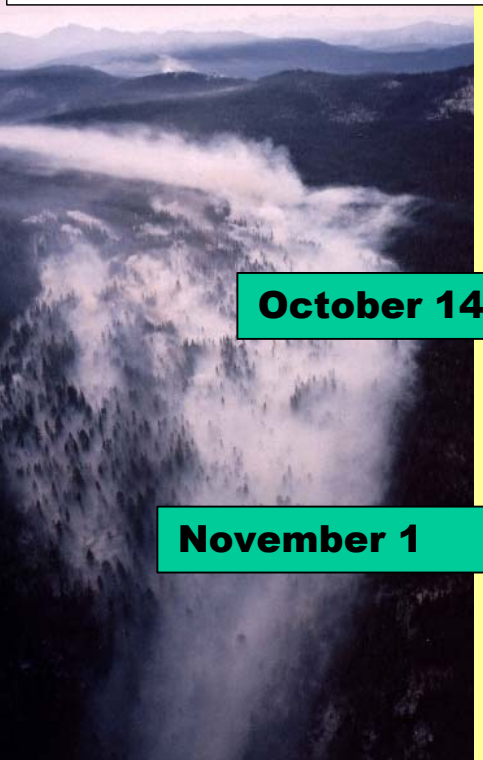
Plot date: November 24, 2002 c:\avprojects\rx-pw03_local.apr

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
Fire Day
Large Fire Day (10+)
Multi Fire Day (5+)
97%
90%
Energy Release Component
80
70
60
50
40
30
20
10
0
Wolf Complex WFU
National PL 5 - 62 Days
Gin Flat Rx
Tuolumne County APCD requests emissions reduction
6/1
7/1
8/1
9/1
10/1
11/1
Avg
Max
2002 (0/0/0)
1 Day Periods
Model: 8G2PE3
3939 Wx Observations
FF+2.0 10/13/2003-11:22

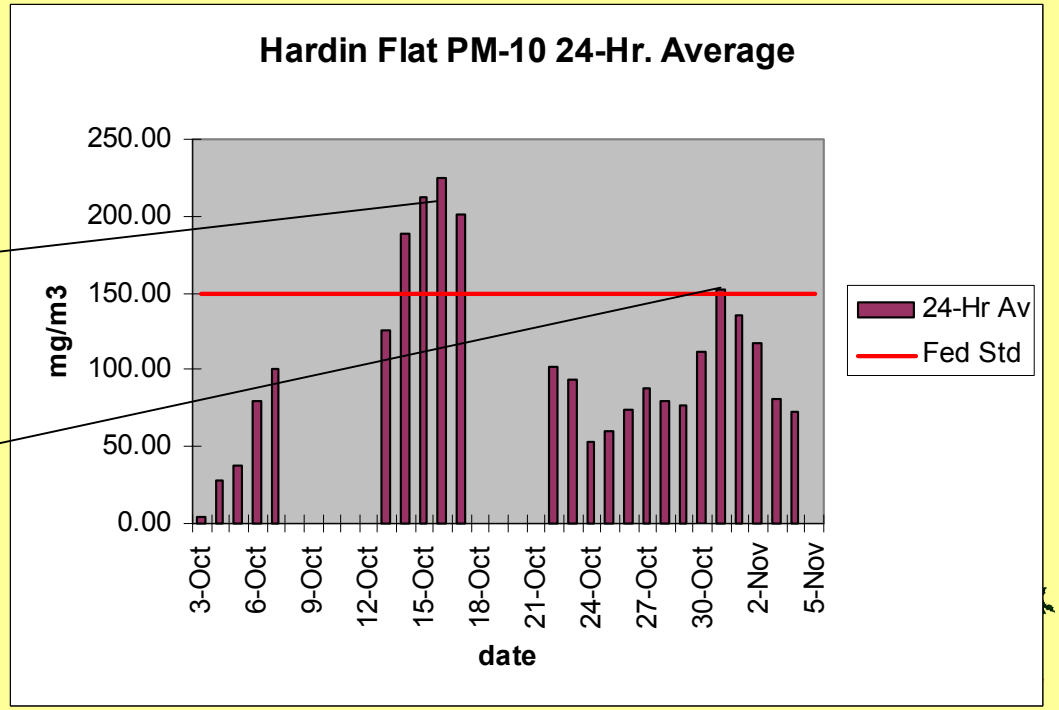




EXCEEDENCE OF FEDERAL 24-HOUR PM10 STANDARD

October 14-17

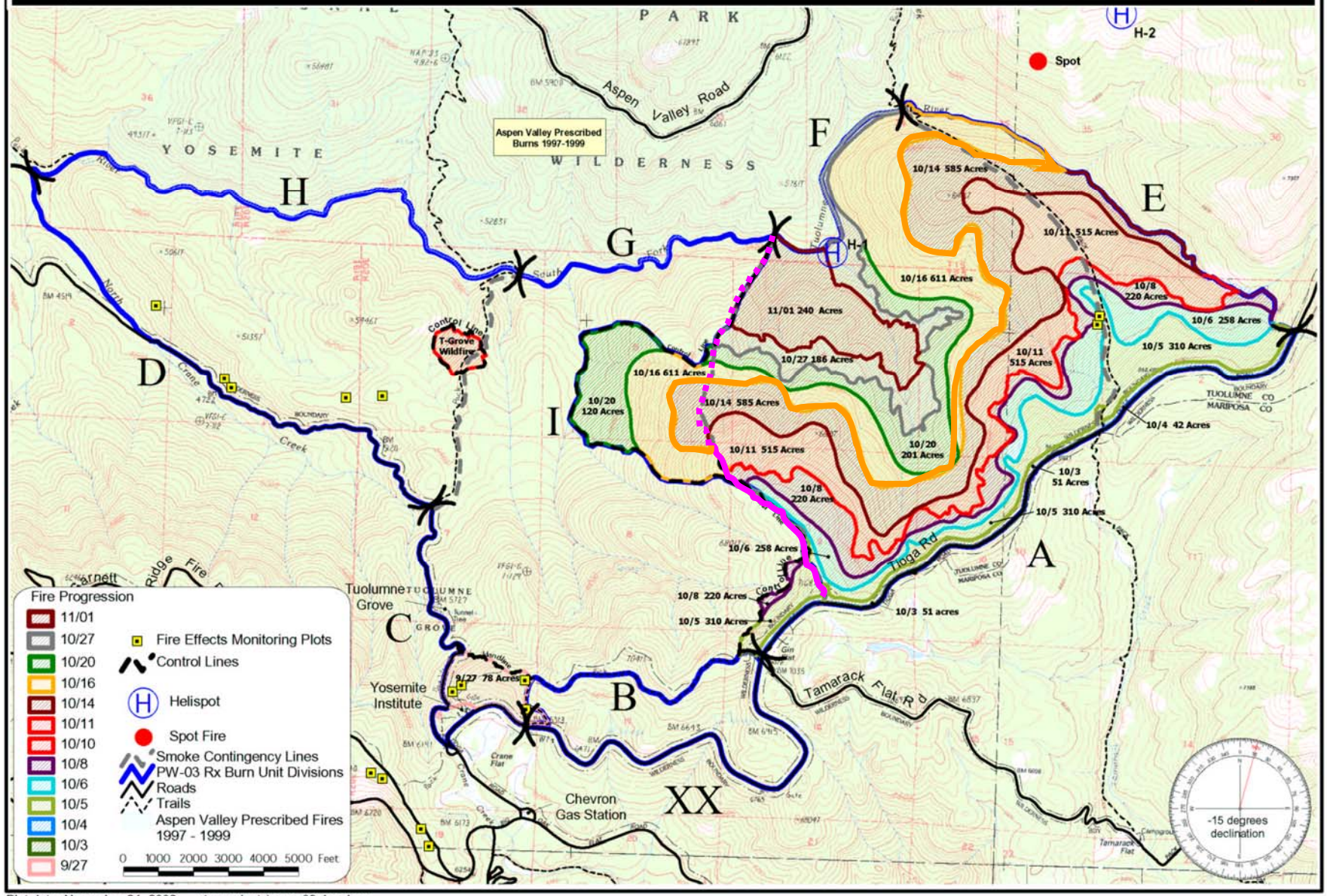
November 1



PW-3 Gin Flat Prescribed Burn

September 27 - November 1, 2002 3440 Acres

Yosemite National Park



Plot date: November 24, 2002 c:\avprojects\rx-pw03_local.apr

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.

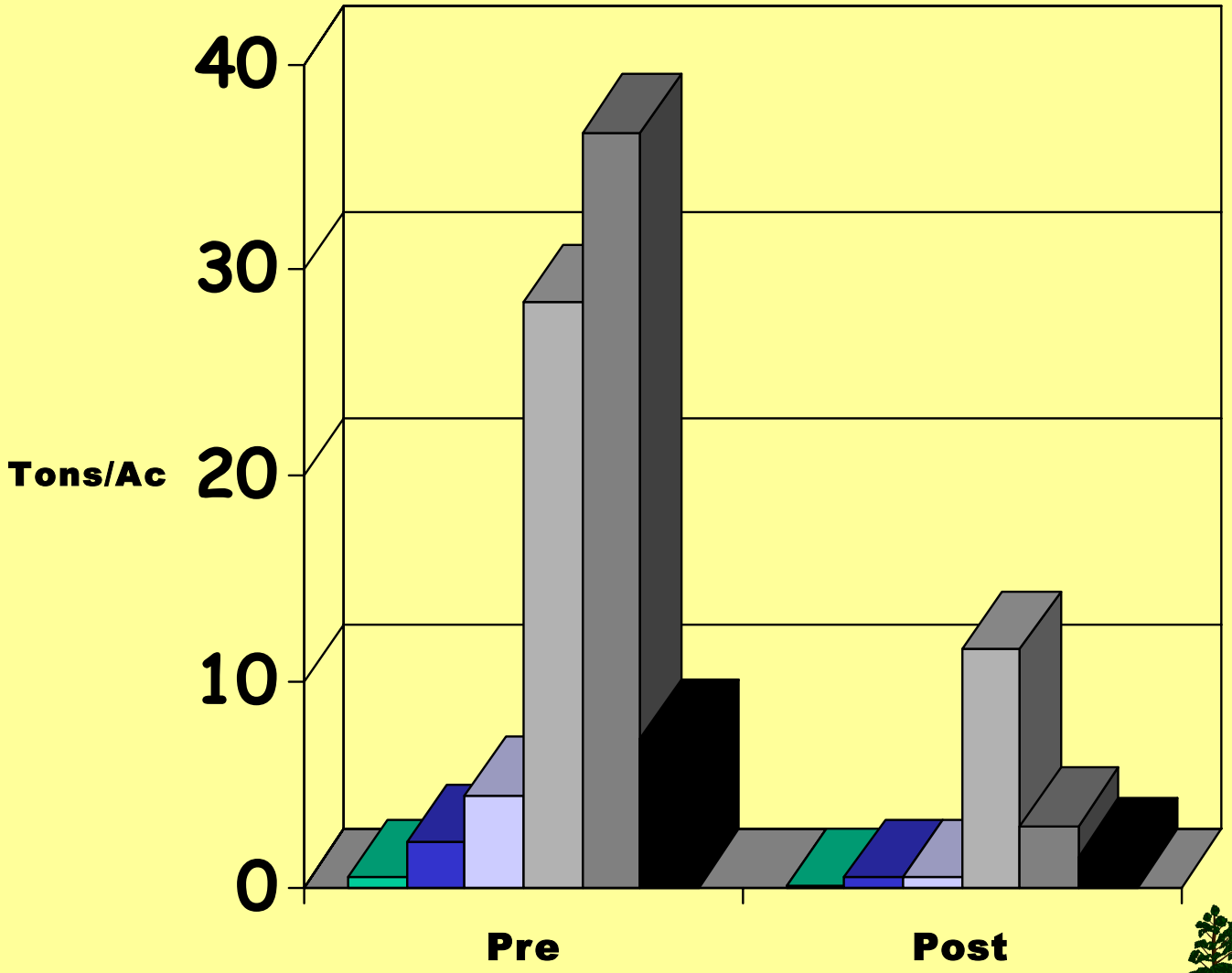
Incident Reviews/Additional Items

- 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)



Yosemite West WUI Fuel Reduction Contract

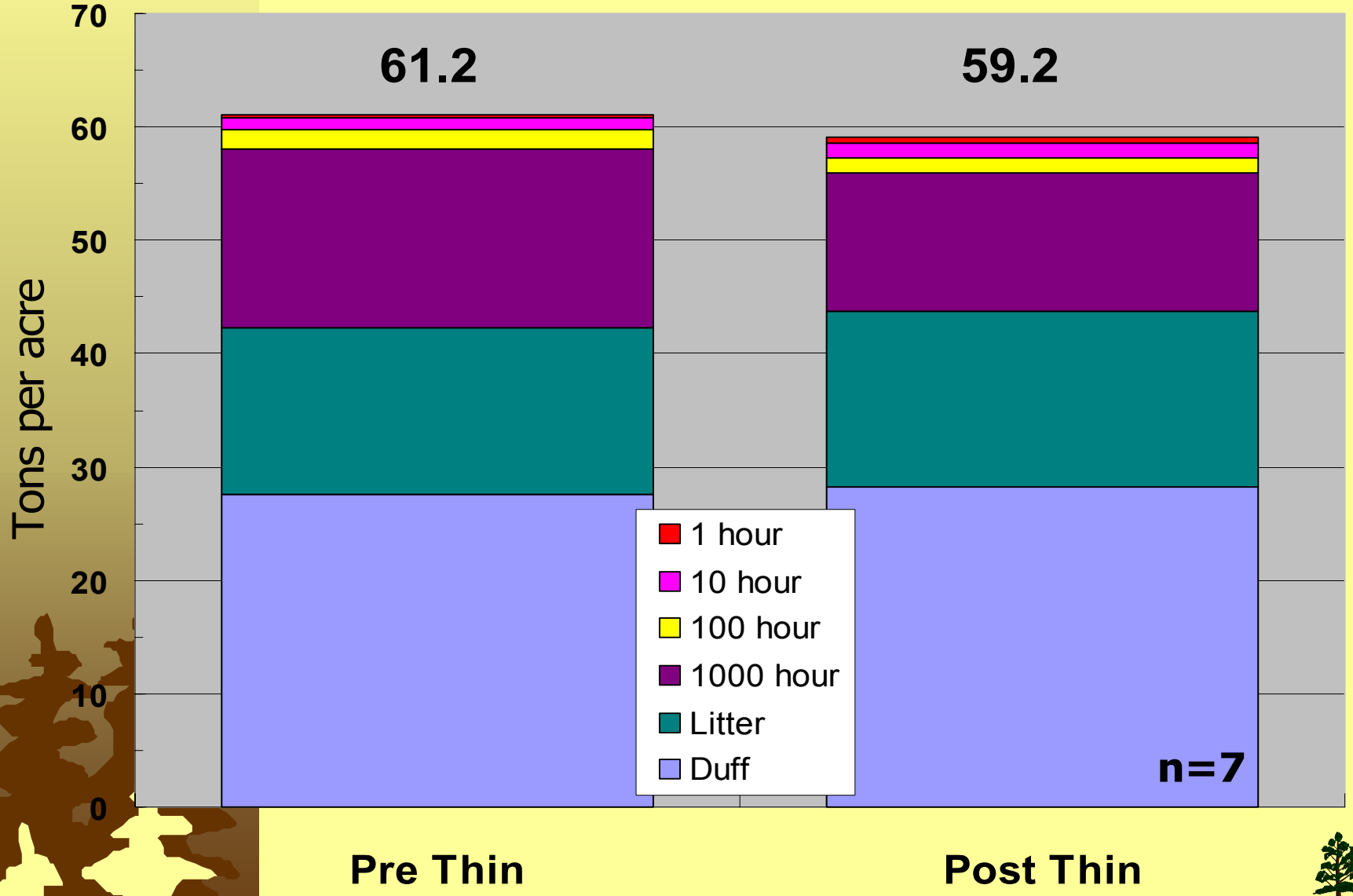
ATV "Forwarding Arch"

Log Deck for Firewood Cutting

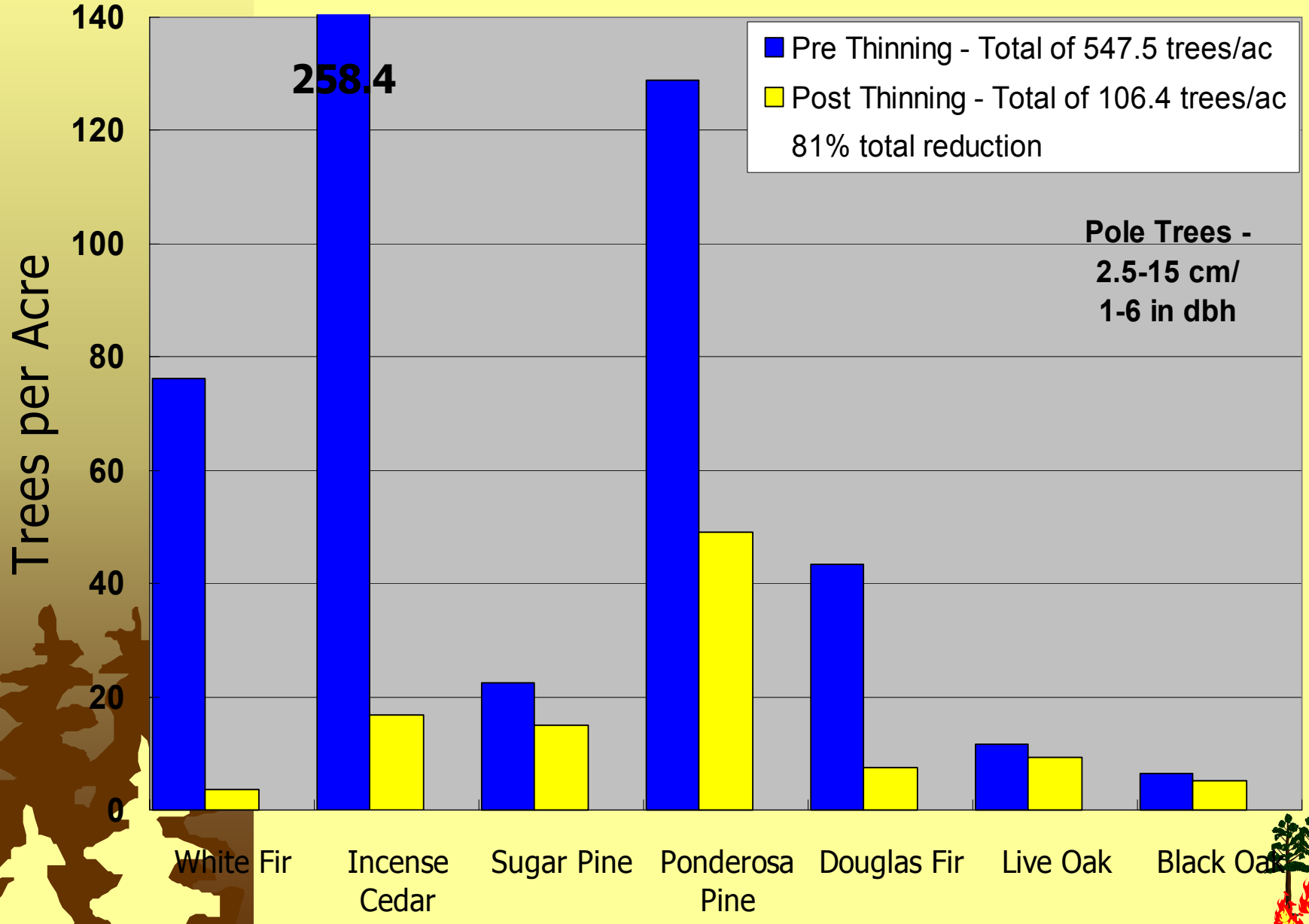
Before

After

Total Dead Fuel Reduction After Thinning



Pole Density After Thinning (n=7)



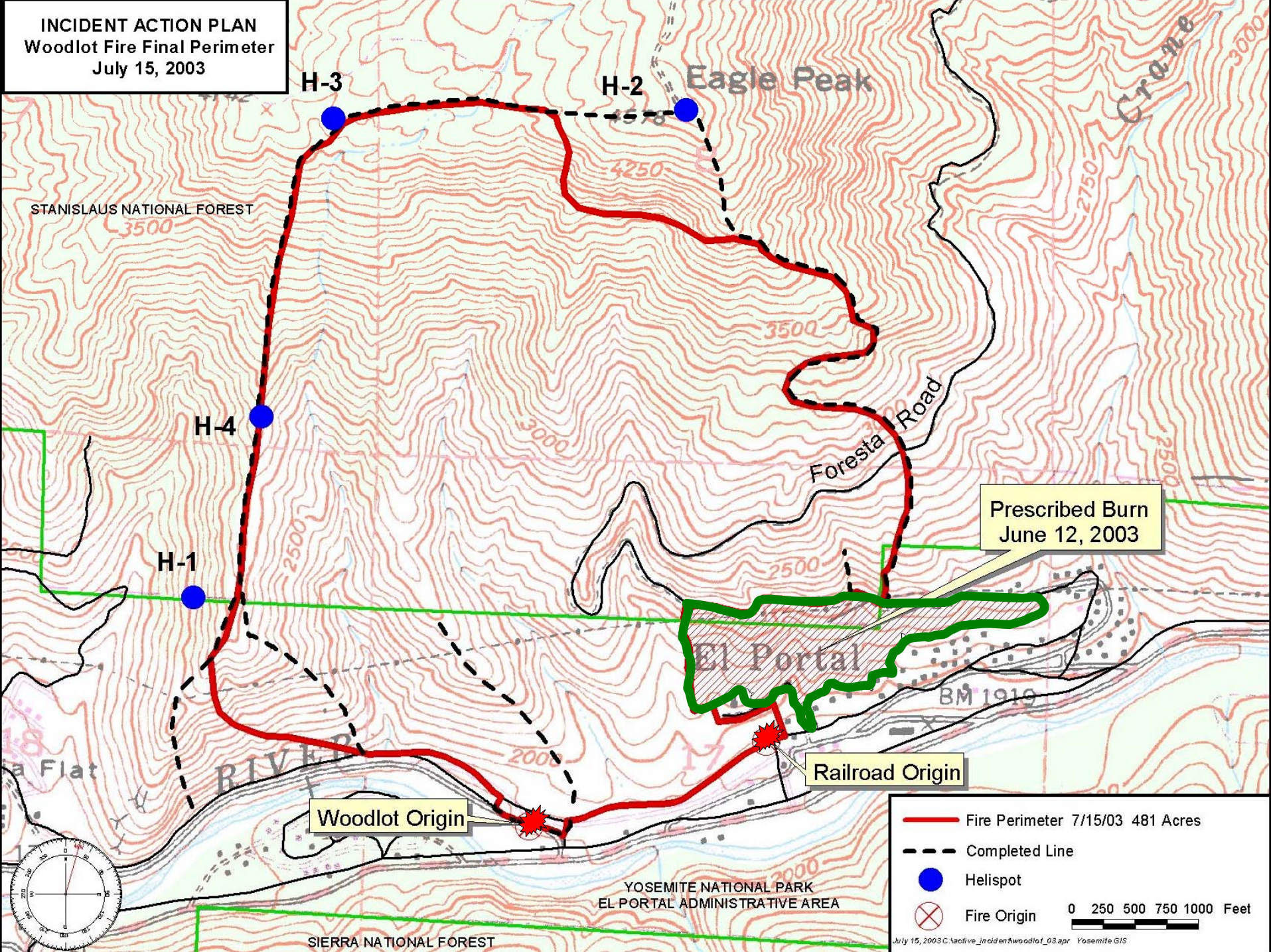
Thinning has…

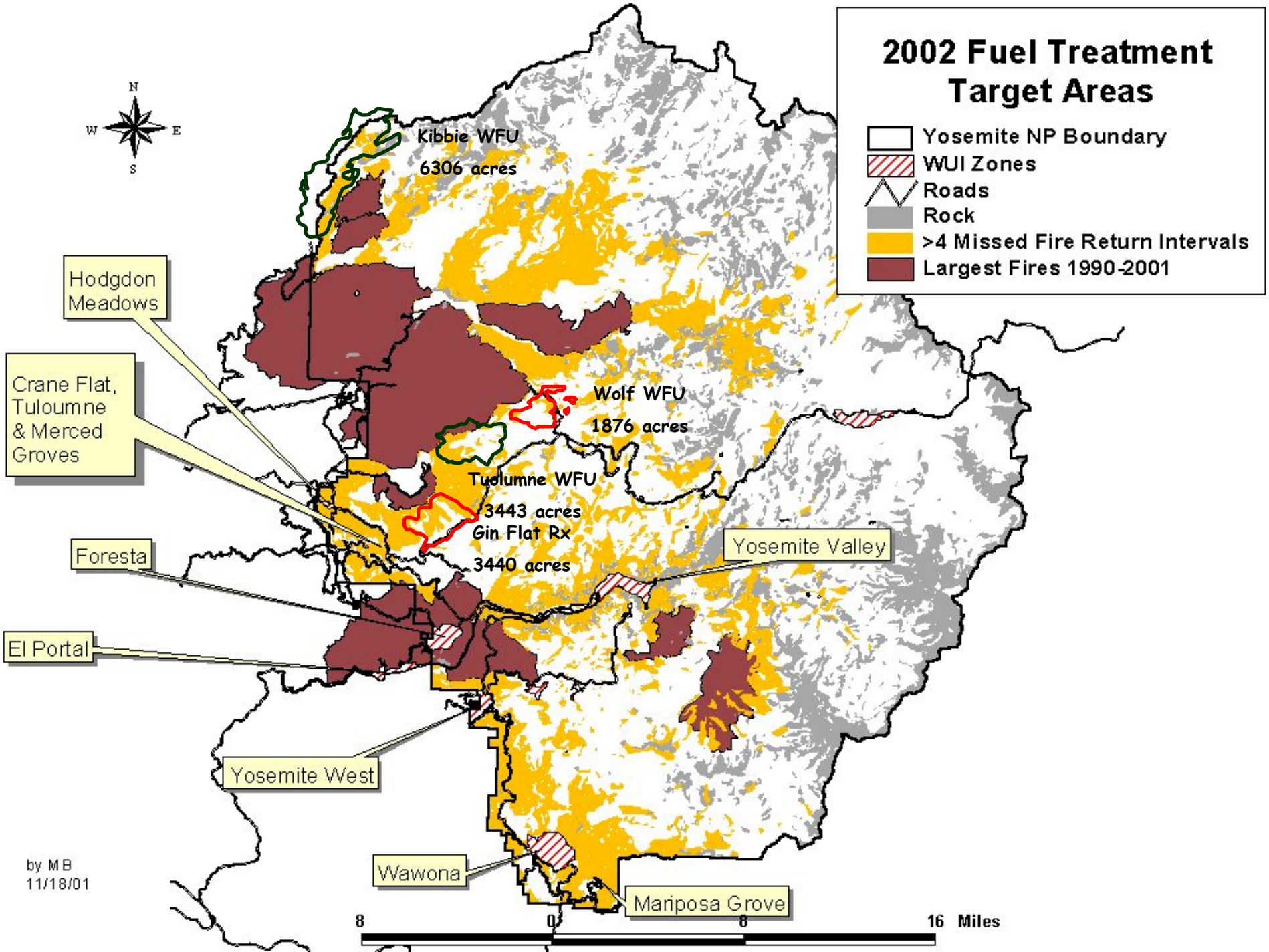
- Increased flashier fuels (1,10 hr) that contribute to rapid fire spread
- Slightly decreased large woody fuel load
- NOT significantly decreased total fuel load
- Significantly reduced pole sized trees (81% reduction)
- Decreased chance of torching and crown fire
- Per acre costs of PW-3, Tuolumne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

Thanks!
michael_beasley@nps.gov
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
H-3
H-2
Eagle Peak
STANISLAUS NATIONAL FOREST
H-4
H-1
Foresta Road
Prescribed Burn
June 12, 2003
El Portal
BM 1910
Railroad Origin
Woodlot Origin
YOSEMITE NATIONAL PARK
EL PORTAL ADMINISTRATIVE AREA
SIERRA NATIONAL FOREST
Fire Perimeter 7/15/03 481 Acres
Completed Line
Helispot
Fire Origin
0 250 500 750 1000 Feet
July 15, 2003 C:\active_incident\woodlot_03.apr Yosemite GIS


2002 Fuel Treatment Target Areas
Yosemite NP Boundary
WUI Zones
Roads
Rock
>4 Missed Fire Return Intervals
Largest Fires 1990-2001
N
W
E
S
Kibbie WFU
6306 acres
Hodgdon Meadows
Crane Flat, Tuloumne & Merced Groves
Wolf WFU
1876 acres
Tuolumne WFU
3443 acres
Gin Flat Rx
3440 acres
Foresta
Yosemite Valley
El Portal
Yosemite West
Wawona
Mariposa Grove
by MB
11/18/01
8
0
8
16 Miles

2003 Season At-A-Glance

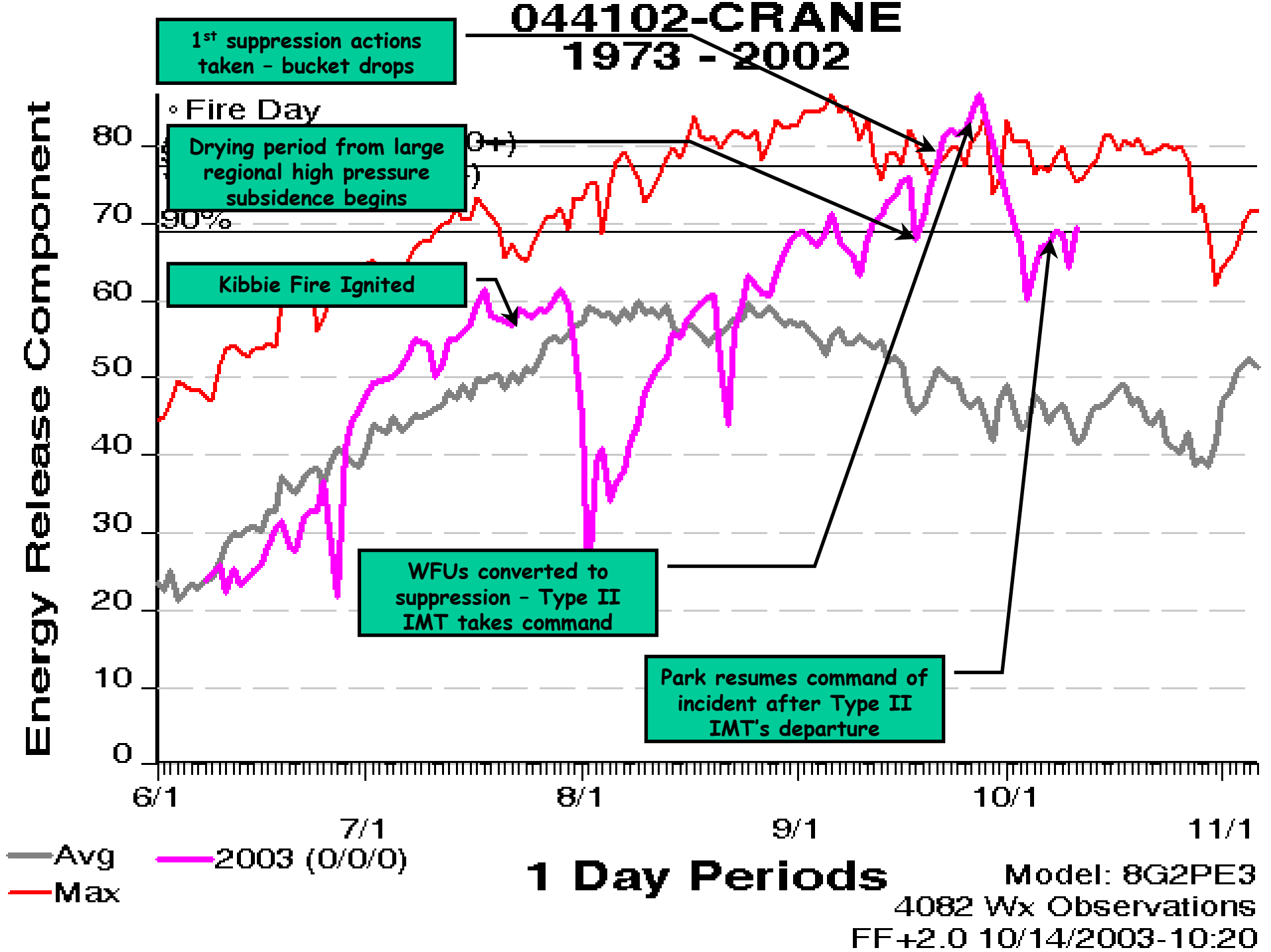
- Near record-breaking April precipitation.
- 2 Fires ignited near Kibbie Lake in late July, followed by over 2" of rain parkwide on August 1st and 2nd.
- Kibbie Fire extinguished at 32 acres, SOK Fire relatively inactive for some time.
- At least two significant monsoonal rain events occur later in 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 teperatures 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
1st suppression actions taken – bucket drops
Fire Day
Drying period from large regional high pressure subsidence begins
90%
Kibbie Fire Ignited
WFUs converted to suppression – Type II IMT takes command
Park resumes command of incident after Type II IMT's departure
Energy Release Component
80
70
60
50
40
30
20
10
0
6/1
7/1
8/1
9/1
10/1
11/1
Avg
Max
2003 (0/0/0)
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.*

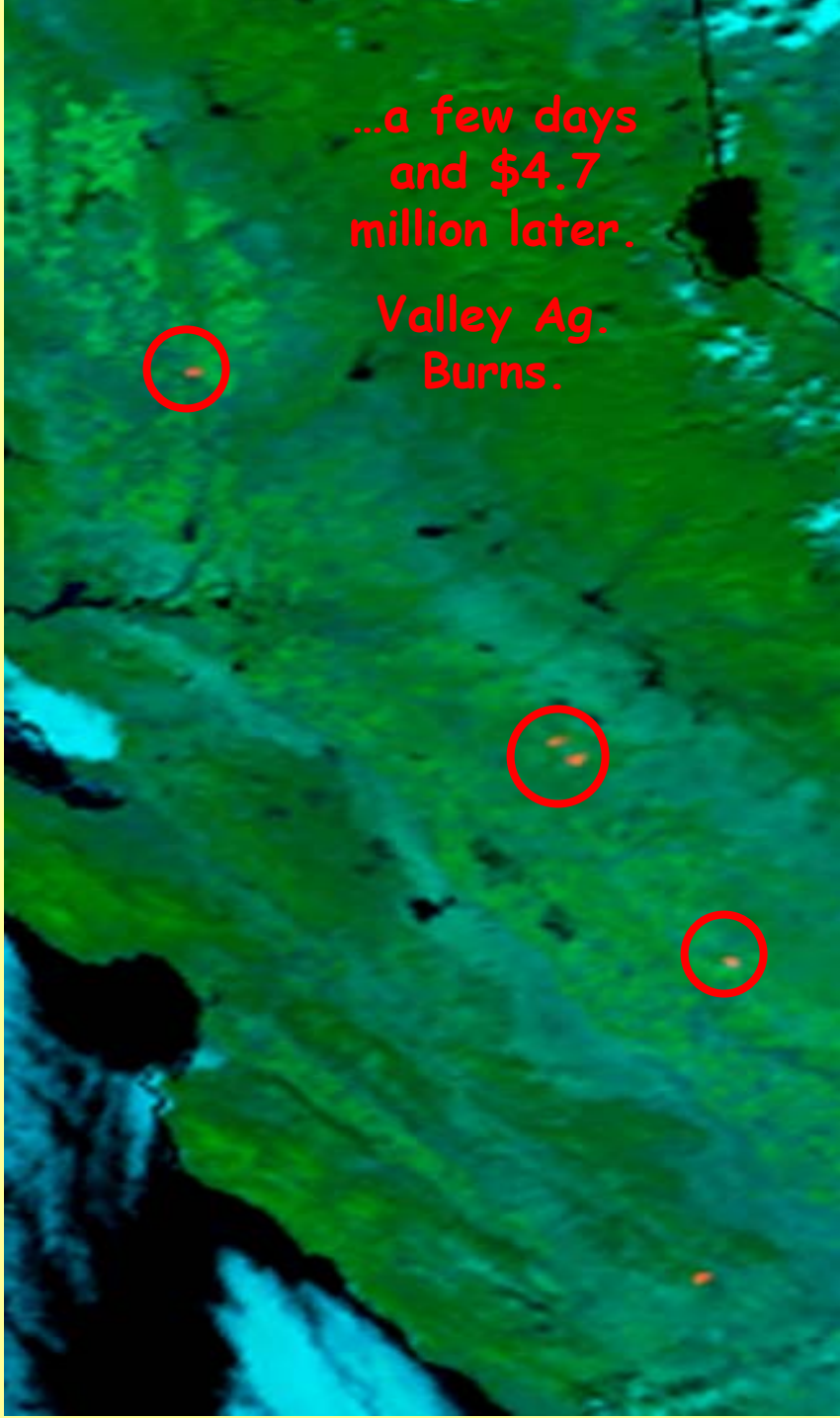
2002 vs. 2003 Smoke Impacts & Mitigation Costs

- 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.	*1,817 to 9,194 acres per year.*
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.		

California
tradeoff?....
High Sierra
Forest
Restoration
Mono Lake


…a few days
and $4.7
million later.
Valley Ag.
Burns.

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