Effects of Prescribed Fire on Forest Canopy Cover in the George Washington and Jefferson NF

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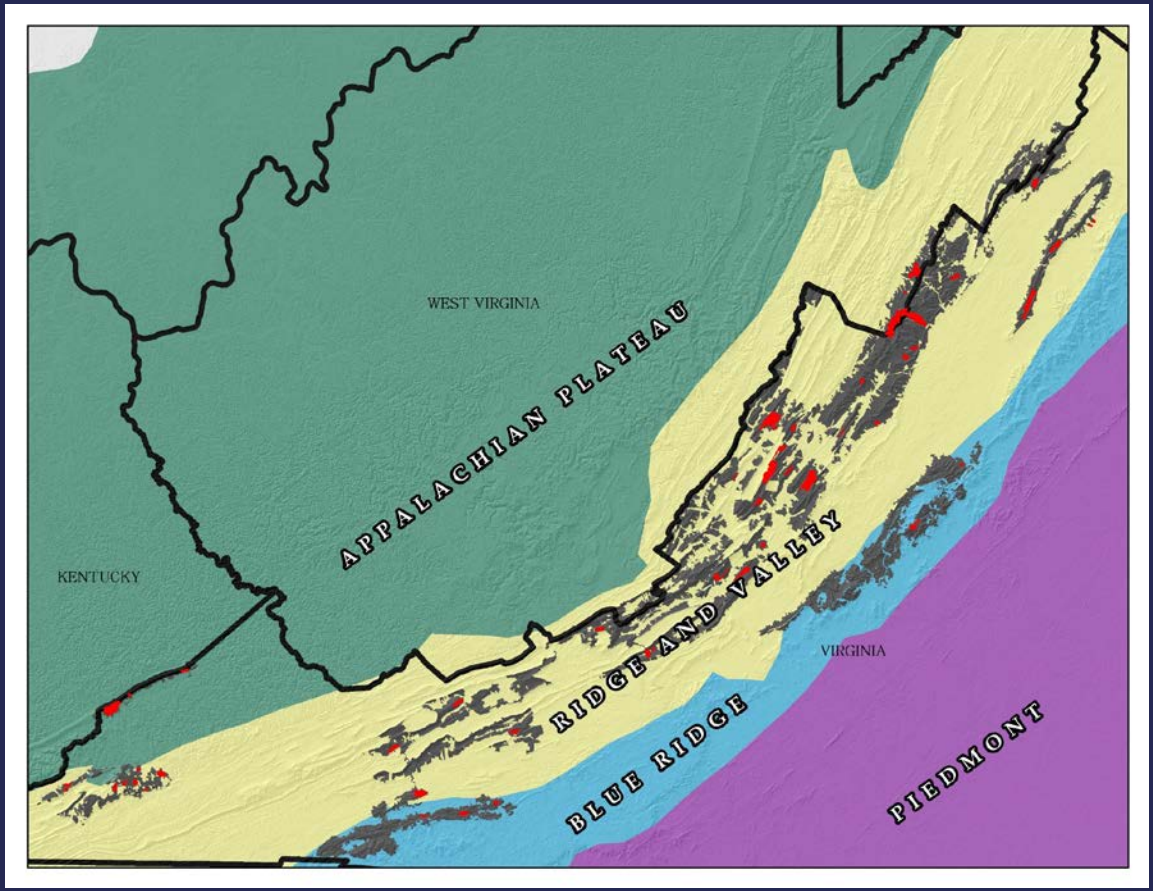
THE QUESTIONS

What happens to tree canopy with prescribed fire?

Are we meeting Forest Plan goals?

Can we predict canopy gaps?

WHERE ARE WE?


WEST VIRGINIA
APPALACHIAN PLATEAU
KENTUCKY
RIDGE AND VALLEY
VIRGINIA
BLUE RIDGE
PIEDMONT

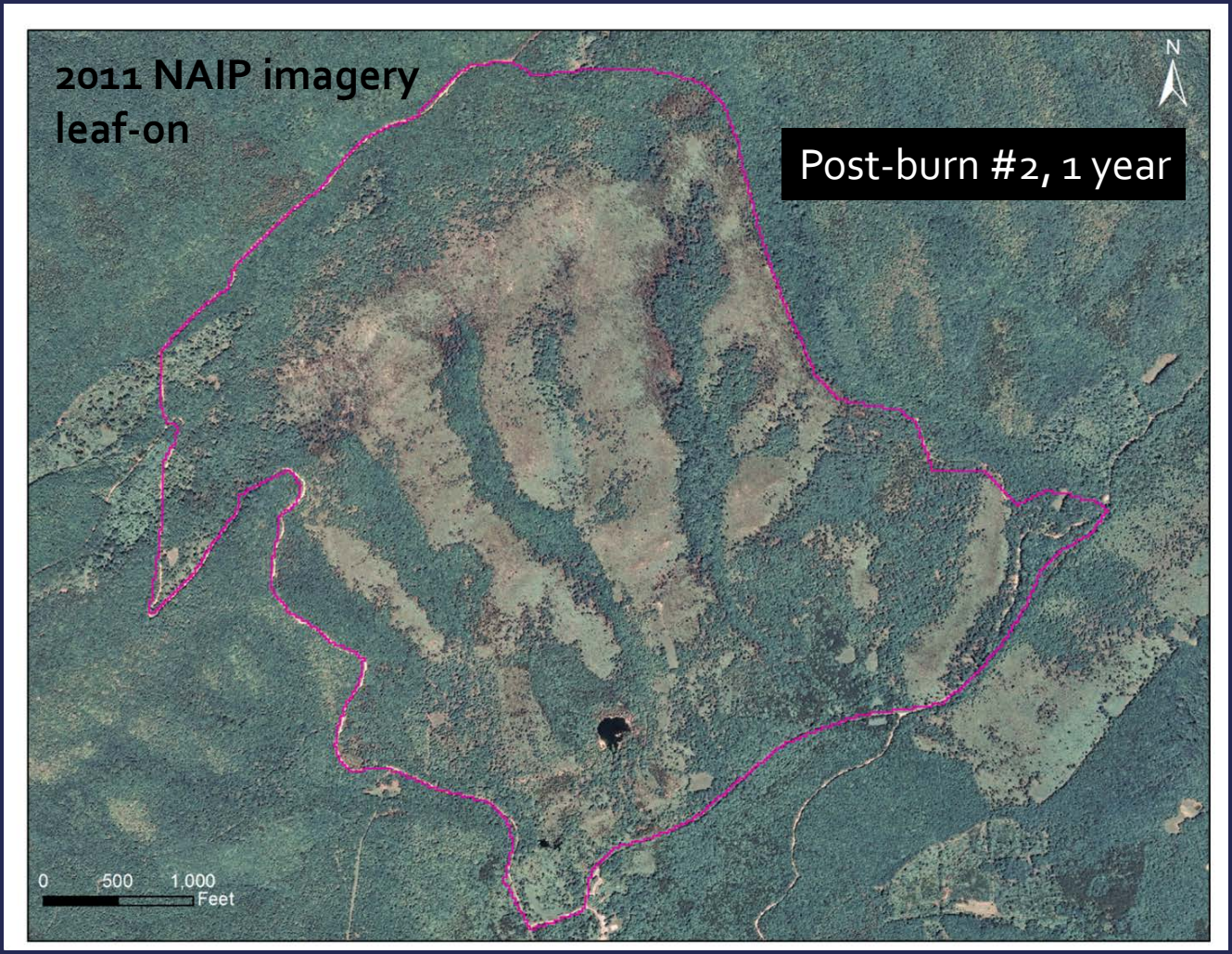
WHAT'S THE GOAL?

Re-establish the Natural Range of Variation (NRV) of forest age and structure at a landscape level

EARLY successional forest	**12% of acreage**
OPEN forest, all ages	**67% of acreage**

Oak Forest types	EARLY	Mid-CLOSED	Mid-OPEN	Late-OPEN	Late-CLOSED	Total
Desired % on landscape	**12%**	**7%**	**10%**	**57%**	**14%**	**100%**

HOW CAN WE FIND OUT?



HOW CAN WE FIND OUT?

74 burn units were examined (over 85,000 ac)

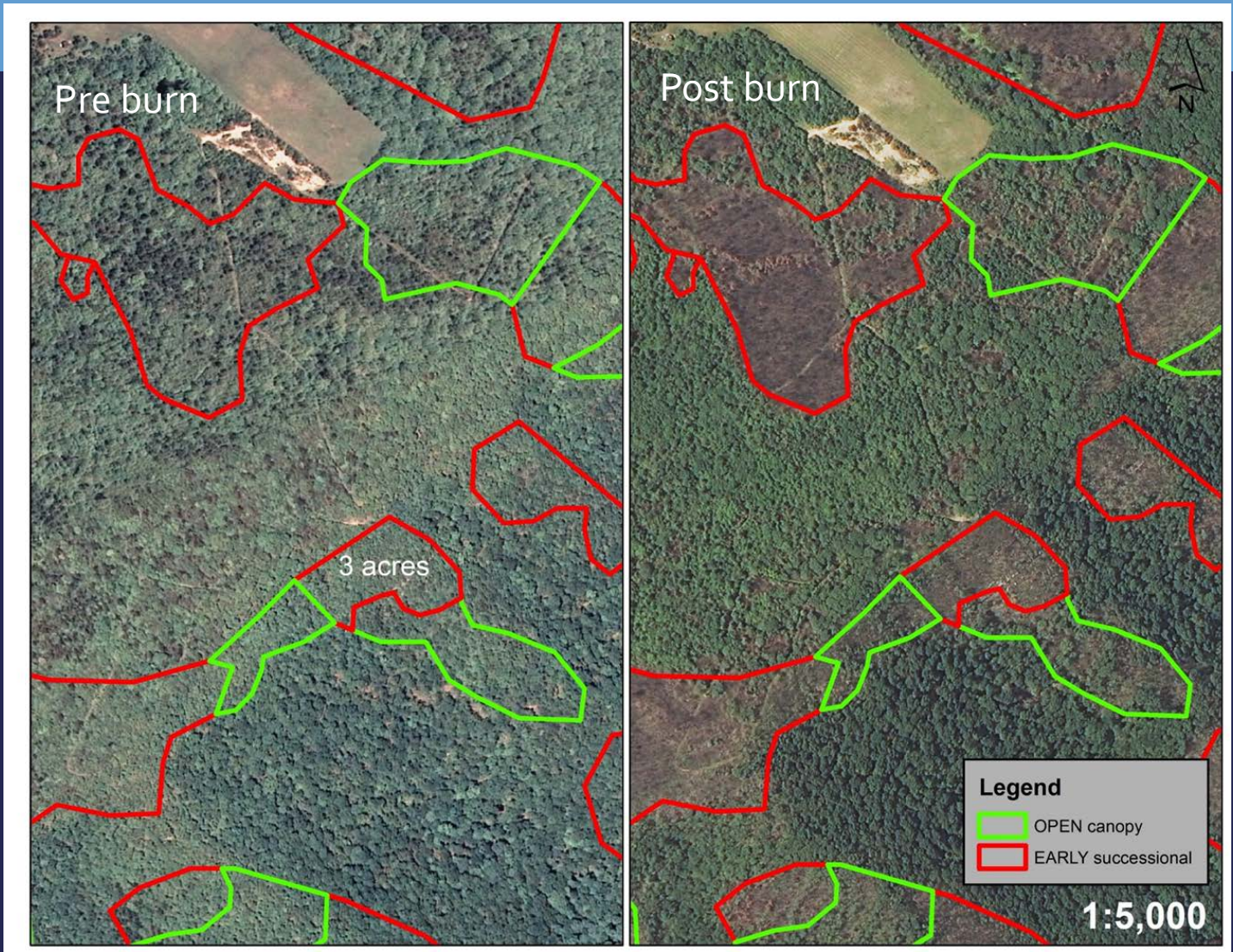
117 burn events, primarily from the late-1990s through 2014

Only burn units over 250 acres were included

Examined canopy cover post-burn, using leaf-on imagery (NAIP)

- 1:5,000 scale
- delineated areas of canopy mortality (gaps)
- **EARLY** <30% canopy cover
- **OPEN** 30-50% canopy cover
- gaps larger than 0.25 ac
- to minimize variability, one person (Jean) digitized all gaps

MORE HOW

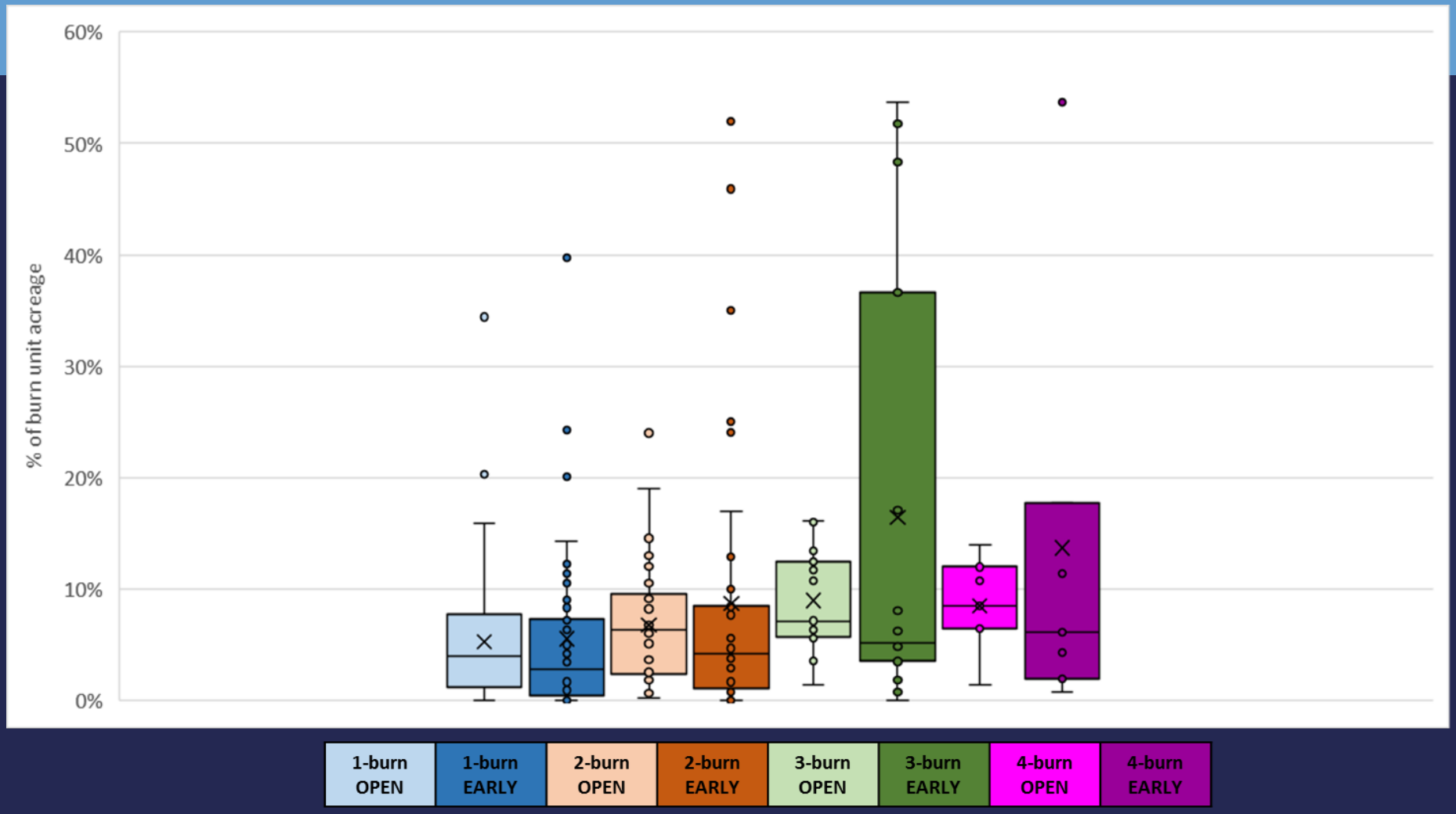

Pre burn
3 acres
Post burn
N
Legend
OPEN canopy
EARLY successional
1:5,000

ARE WE MEETING THE GOALS?

Burn history category	Mean percentage EARLY ± SE (range)	Mean percentage OPEN ± SE (range)	Mean percentage All GAPS ± SE (range)
1-burn	**5.0** ± 1.0 (0-40)	**5.0** ± 1.0 (0-34)	**11.0** ± 2.0 (0-54)
2-burn	**9.0** ± 2.0 (0-52)	**7.0** ± 1.0 (0-24)	**16.0** ± 3.0 (0-64)
3-burn	**17.0** ± 5.0 (0-54)	**9.1** ± 1.0 (1-16)	**26.0** ± 6.0 (2-64)
4-burn	**14.0** ± 7.0 (1-54)	**8.0** ± 2.0 (1-14)	**22.0** ± 8.0 (8-64)

EARLY **12% of acreage**

OPEN **67% of acreage**


60%
50%
40%
30%
20%
10%
0%
% of burn unit acreage
1-burn OPEN
1-burn EARLY
2-burn OPEN
2-burn EARLY
3-burn OPEN
3-burn EARLY
4-burn OPEN
4-burn EARLY

MEAN GAP SIZE

Burn history category	EARLY		OPEN	
	Mean gap size (ac)	Median gap size (ac)	Mean gap size (ac)	Median gap size (ac)
1-burn	7.2	3.1	4.6	2.7
2-burn	6.6	2.0	4.0	2.3
3-burn	13.8	2.9	5.2	3.0
4-burn	8.2	2.5	4.7	3.2

REPEATED BURNS

Burn history category	Total area (acres)	Mean percentage EARLY ± SE	Mean percentage OPEN ± SE
1-burn (n=24)	24,810	5.2 ± 2.0	5.1 ± 1.5
2-burn (n=24)		10.2 ± 3.0	5.7 ± 0.9
2-burn (n=10)	8,360	16.6 ± 6.3	8.2 ± 1.2
3-burn (n=10)		18.0 ± 6.5	9.2 ± 1.3
1-burn (n=6)	5,356	14.7 ± 6.6	10.3 ± 5.3
3-burn (n=6)		25.3 ± 9.7	9.2 ± 1.9

CAN WE PREDICT CANOPY GAPS?