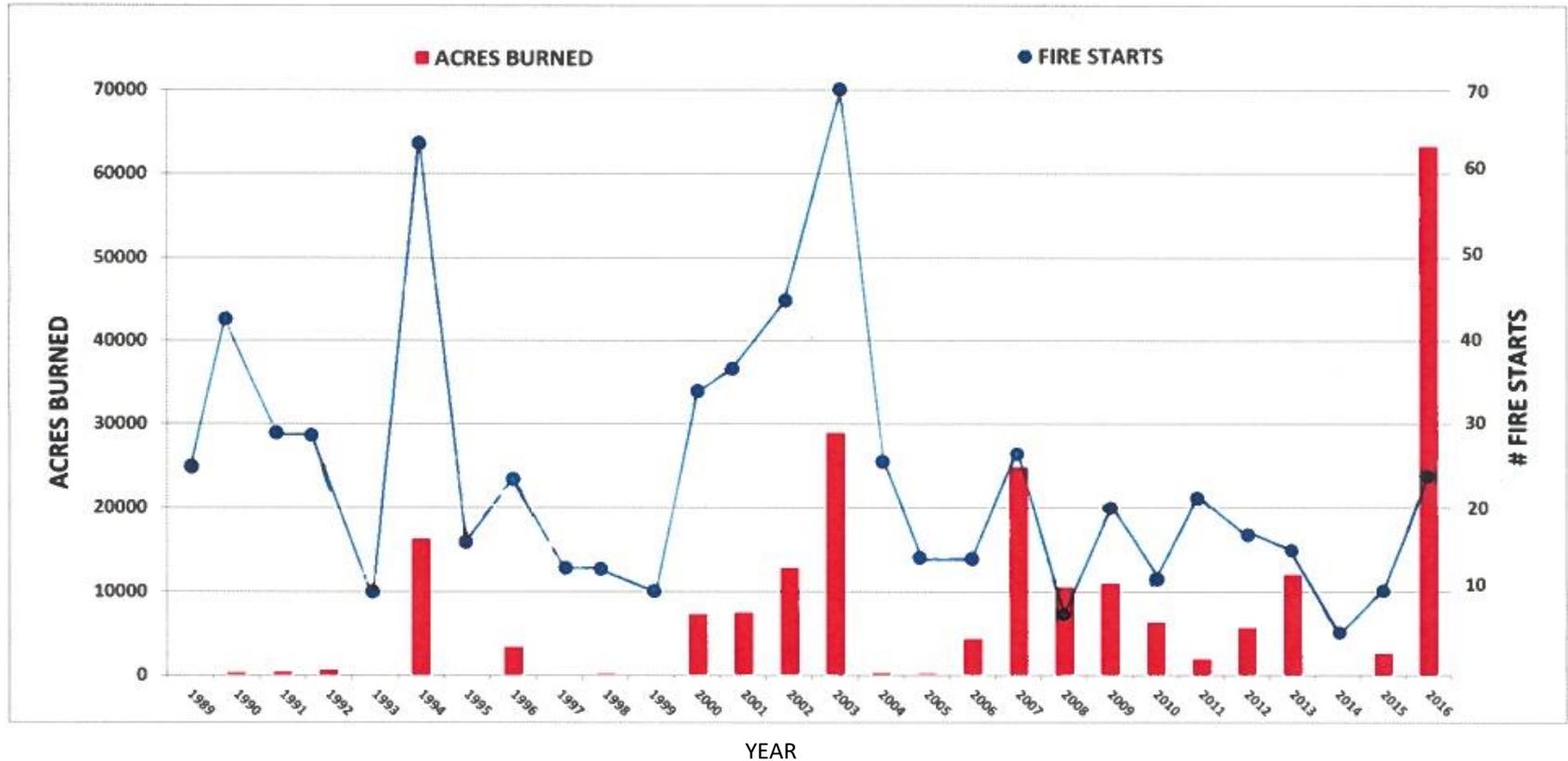


**2016 FIRE ACTIVITY IN YELLOWSTONE NATIONAL PARK**  
(with a bison twist)

**Roy Renkin, National Park Service, Yellowstone National Park**



## Number of Fires and Acreage Burned in Yellowstone NP, 1989-2016



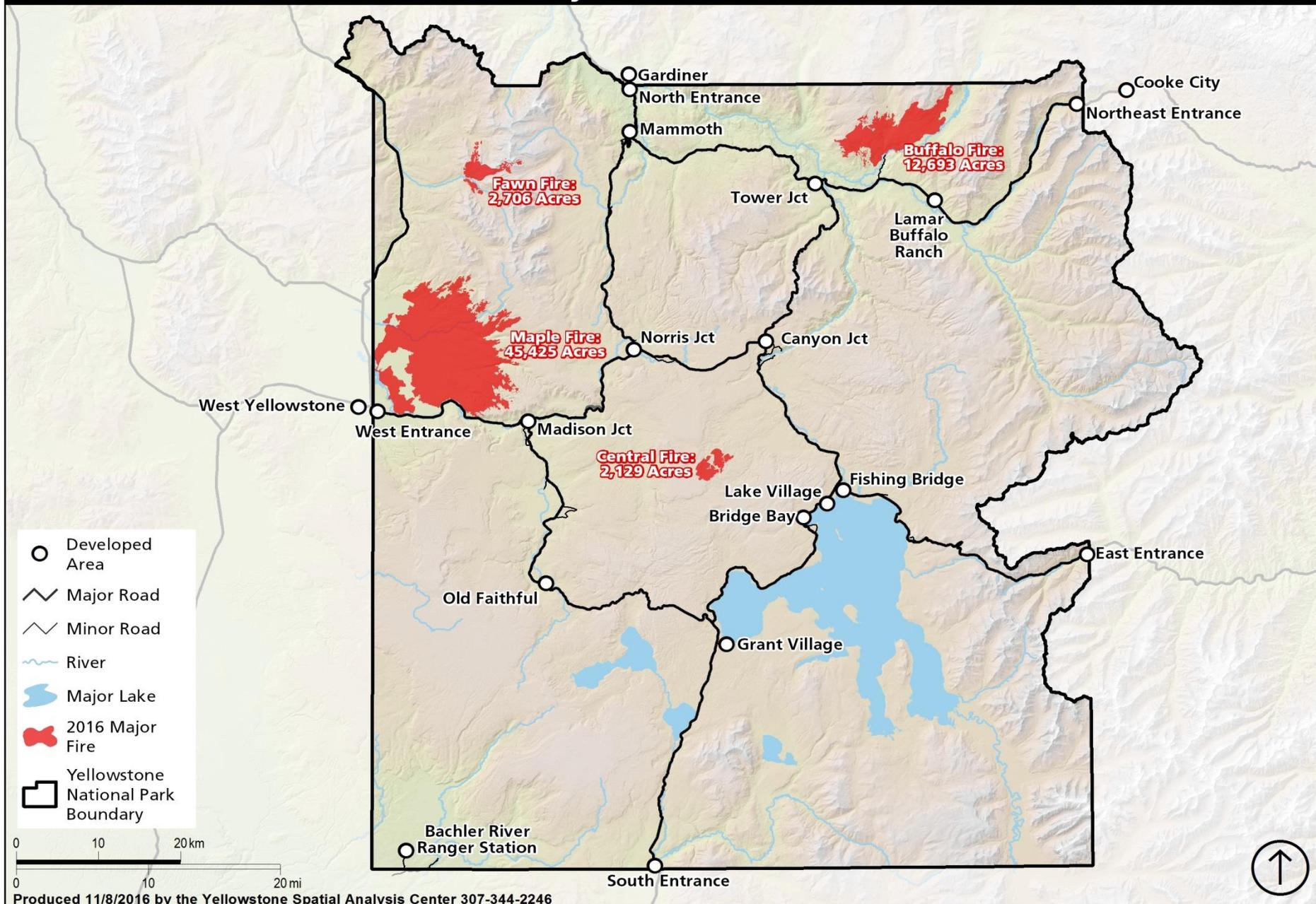
1988: 50 fires burned 794,000 acres

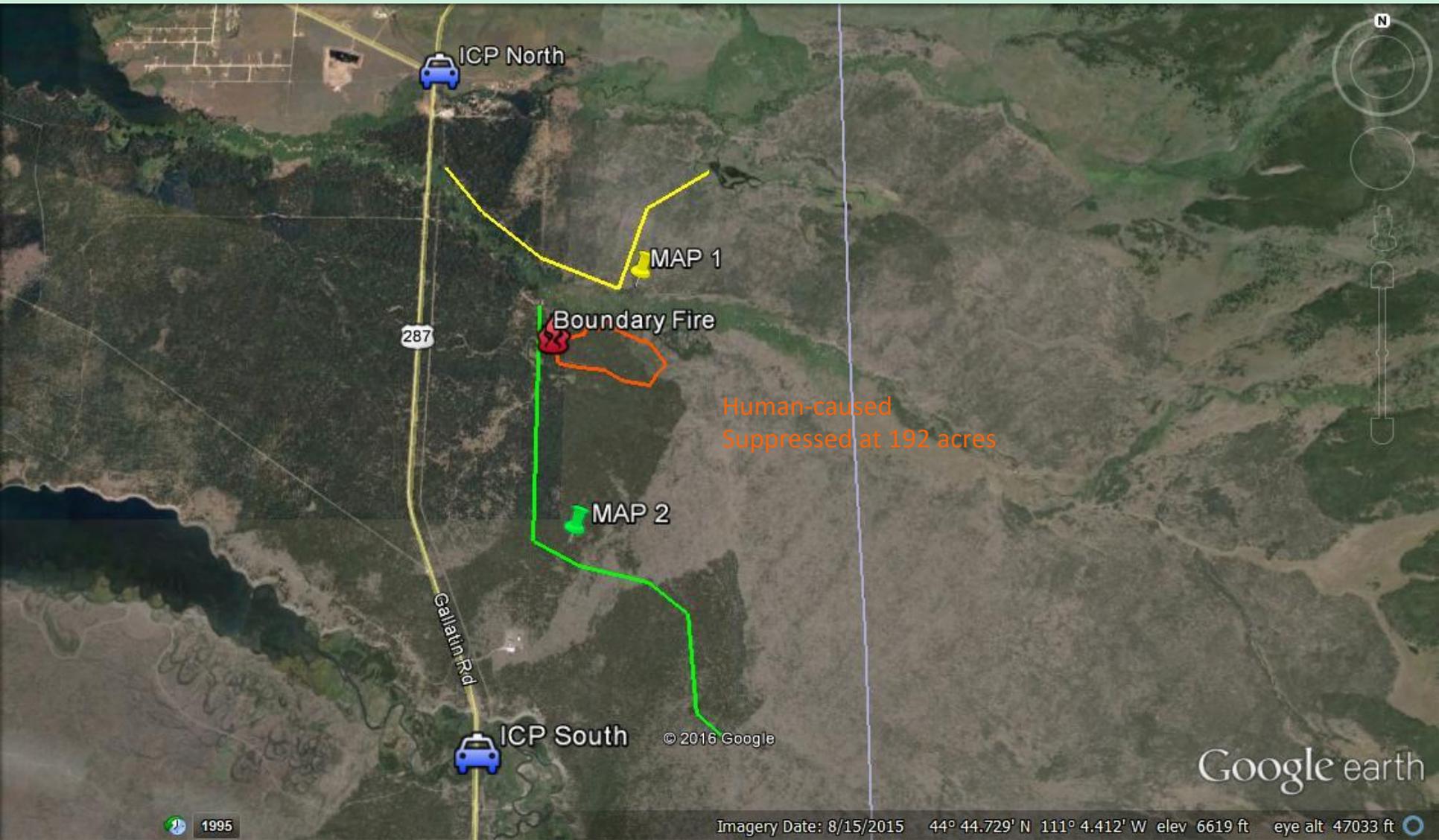
Ave. # fires = 24

Ave. acres burned = 7,809

2016: 24 fire starts, 63,159 acres burned

# 2016 Major Fires: Overview





ICP North

287

MAP 1

Boundary Fire

Human-caused  
Suppressed at 192 acres

MAP 2

Gallatin Rd

ICP South

© 2016 Google

Google earth

1995

Imagery Date: 8/15/2015 44° 44.729' N 111° 4.412' W elev 6619 ft eye alt 47033 ft

**BUFFALO FIRE**  
**1 SEPTEMBER, 2016**



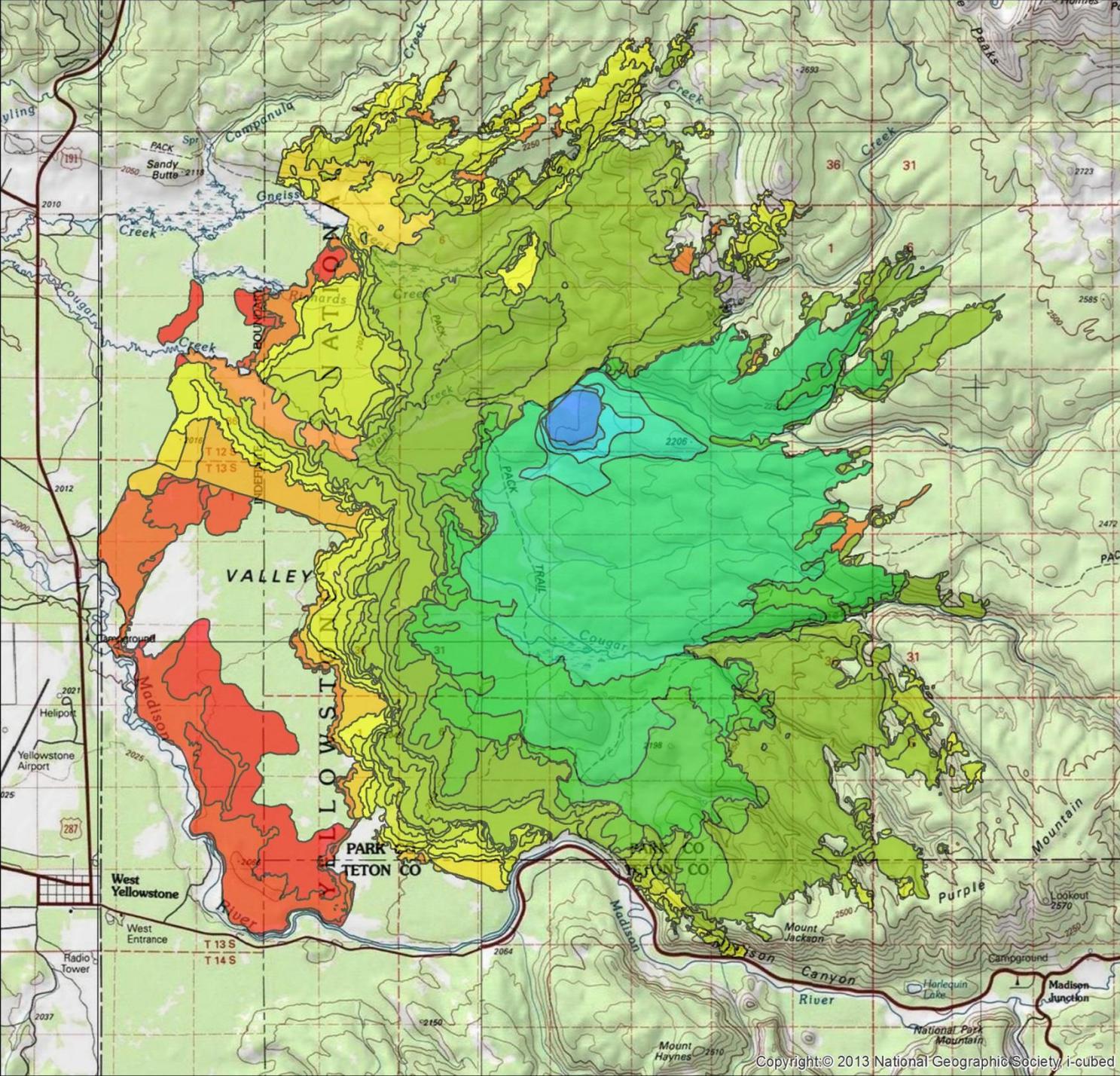
# Maple Fire 15 August 2016







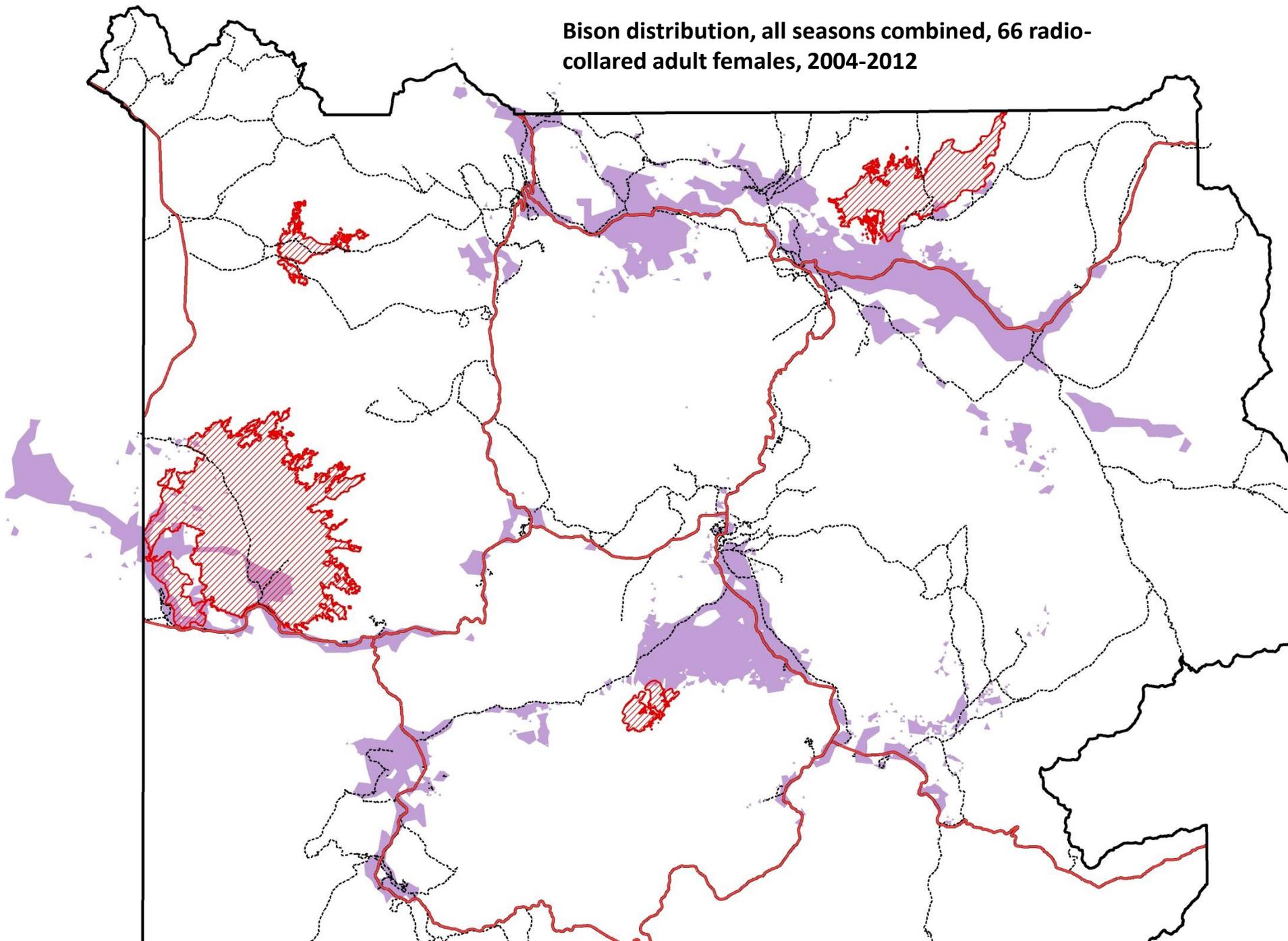




### Maple fire progression

| Date/Time     | Growth     |
|---------------|------------|
| 20160811 1538 | 218 Acres  |
| 20160812 1035 | 75 Acres   |
| 20160814 1232 | 171 Acres  |
| 20160814 1747 | 639 Acres  |
| 20160816 2131 | 7767 Acres |
| 20160818 0102 | 3326 Acres |
| 20160818 2134 | 2398 Acres |
| 20160820 0046 | 1343 Acres |
| 20160822 0118 | 6507 Acres |
| 20160822 2050 | 4652 Acres |
| 20160824 2153 | 3150 Acres |
| 20160827 0056 | 814 Acres  |
| 20160827 2104 | 375 Acres  |
| 20160829 0035 | 1655 Acres |
| 20160829 2232 | 1911 Acres |
| 20160830 2304 | 1754 Acres |
| 20160831 2042 | 1285 Acres |
| 20160902 1300 | 868 Acres  |
| 20160902 2128 | 572 Acres  |
| 20160903 1500 | 536 Acres  |
| 20160904 1200 | 439 Acres  |
| 20160904 2143 | 726 Acres  |
| 20160909 0033 | 528 Acres  |
| 20160910 2221 | 1854 Acres |
| 20160912 1230 | 1905 Acres |

**Bison distribution, all seasons combined, 66 radio-collared adult females, 2004-2012**



## BISON DISTRIBUTION & VEGETATION TYPE:

**5,423 TOTAL ACRES**

**3,674 FORESTED ACRES**

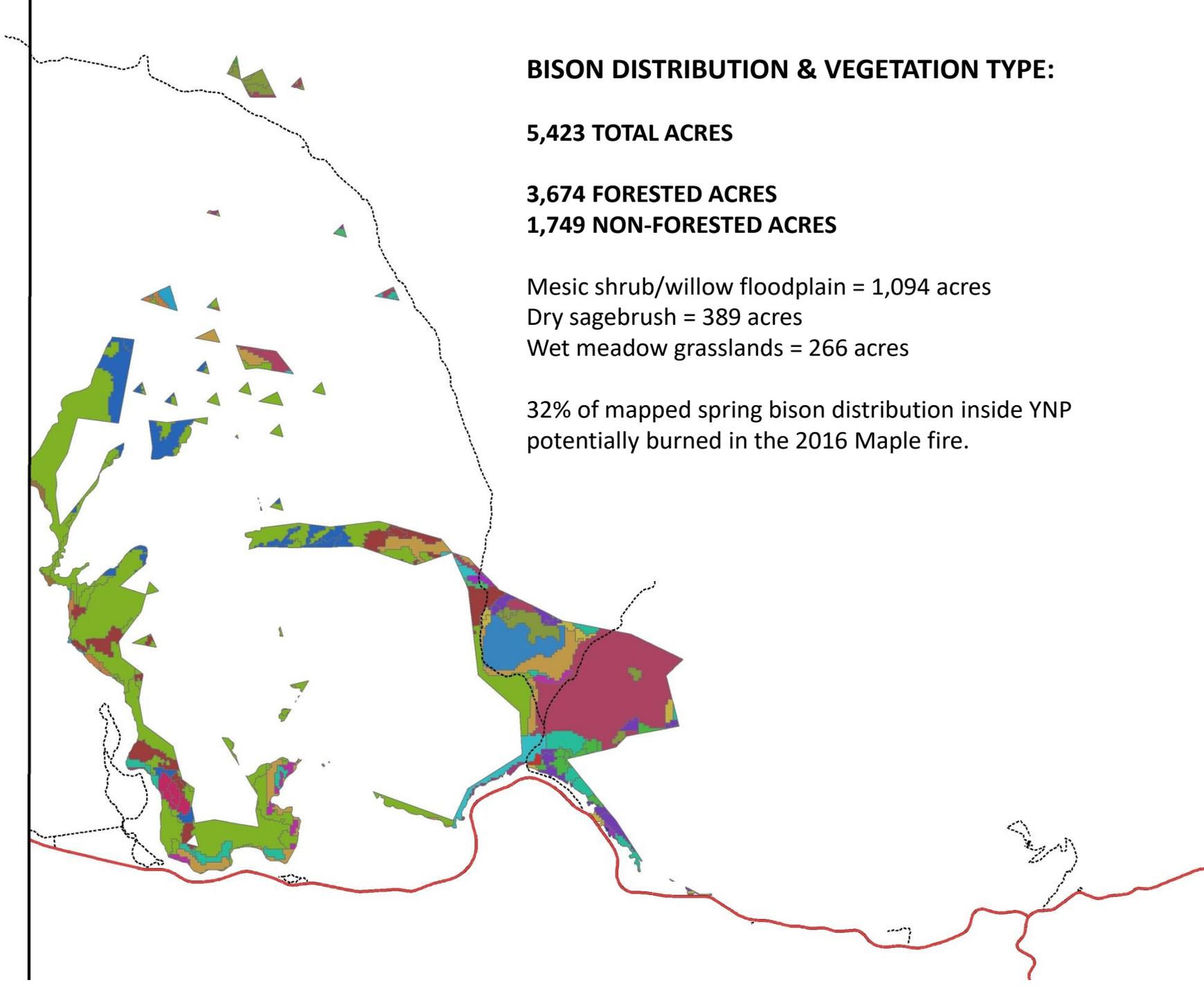
**1,749 NON-FORESTED ACRES**

Mesic shrub/willow floodplain = 1,094 acres

Dry sagebrush = 389 acres

Wet meadow grasslands = 266 acres

32% of mapped spring bison distribution inside YNP  
potentially burned in the 2016 Maple fire.



## **Norland et al. (1996), Singer et al. (2003):**

Burned vs. Unburned- 2 yrs (1989 & 1990)

### BIOMASS PRODUCTION:

- Grass biomass production increased by 20% in wet meadows 1<sup>st</sup> and 2<sup>nd</sup> season postfire; small to no increase in grass biomass production in sagebrush communities.
- Forb biomass increased in burned sagebrush, 1<sup>st</sup> season only.

### FORAGE QUALITY:

- Digestibility (DMD) was higher for 3 common plant species (AGSP, FEID, KOGR) during 1<sup>st</sup> yr postburn, but only higher for FEID by 2<sup>nd</sup> yr.
- N concentration 32% higher both yrs in burned areas.
- Macronutrients (Ca, P, K, Mn, Mg) were higher both yrs in burned areas.

## **Tracy and McNaughton (1996):**

Winter (Hellroaring) vs. Summer (Hayden Valley) Range Sites  
Burned vs. Unburned – 2 yrs , 1991-92 (3<sup>rd</sup> and 4<sup>th</sup> yrs postburn)

### BIOMASS PRODUCTION:

- Grass biomass production not statistically between ranges, but significantly higher (42%) in burned vs. unburned on winter range site in 1991 only.

### FORAGE QUALITY (N and P concentrations):

- N and P not different between sites, but N was significantly higher in burned vs unburned on winter range site early spring in 1991 only.
- Difference not significant by late summer

**DIFFERENCES IN BURNED VS UNBURNED NOT EVIDENT IN 1992 (4<sup>TH</sup> YR POSTBURN)**

## TRACY AND McNAUGHTON (1997); TRACY (2004):

1992 Experimental Re-burn of Winter Range Site

4 Treatments: 1988/92 burn; 1988 burn only; 1992 burn only; unburned control  
Biomass Production and Forage Quality (Ca, Fe, K, Mg, N, Na, P, Zn) in 1993

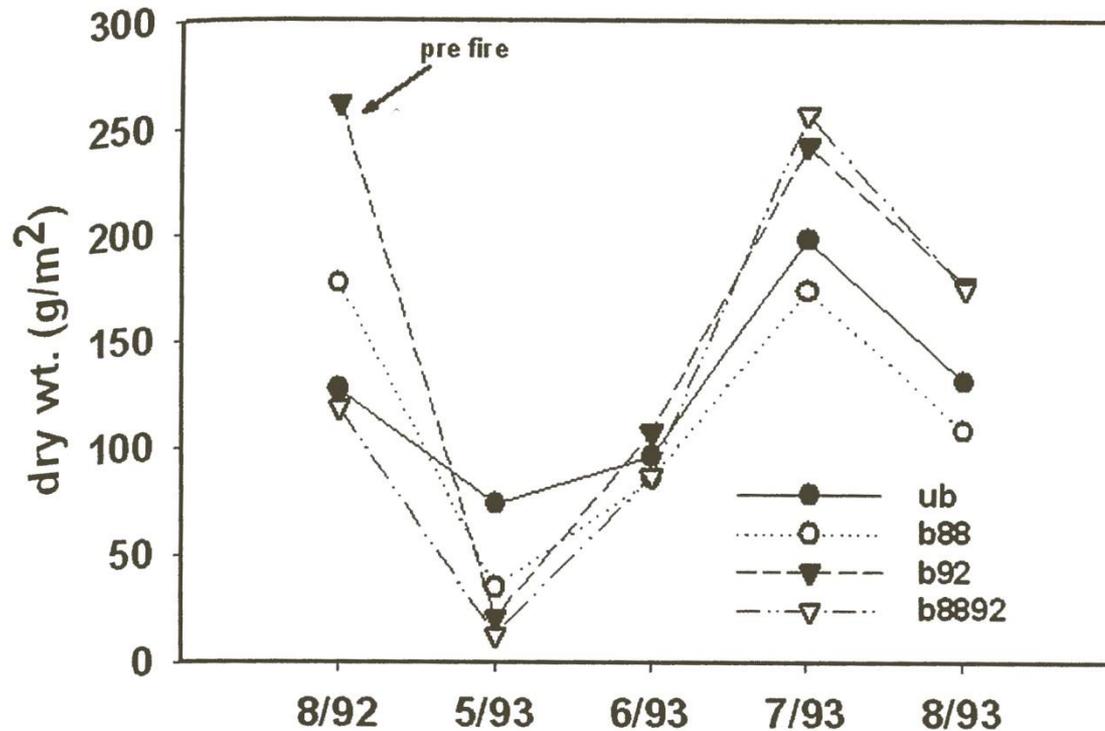


Figure 5.2. Aboveground plant biomass for grasses measured from August 1992 (prefire) to August 1993 at the Hellroaring site. Abbreviations for the study plots are unburned (ub), burned in 1988 (b88), burned in 1992 (b92), and burned both in 1992 and 1988 (b8892).

- Preburn grass production differed among sites, but was similar during early greenup 1<sup>st</sup> yr postburn.
- Recent burn (88/92; 92 only) produced significantly more grass biomass than unburned or 1988 only (5 yrs postburn)
- Same trends observed for macronutrient levels.
- **Burning effects short-lived (< 4 yrs).**

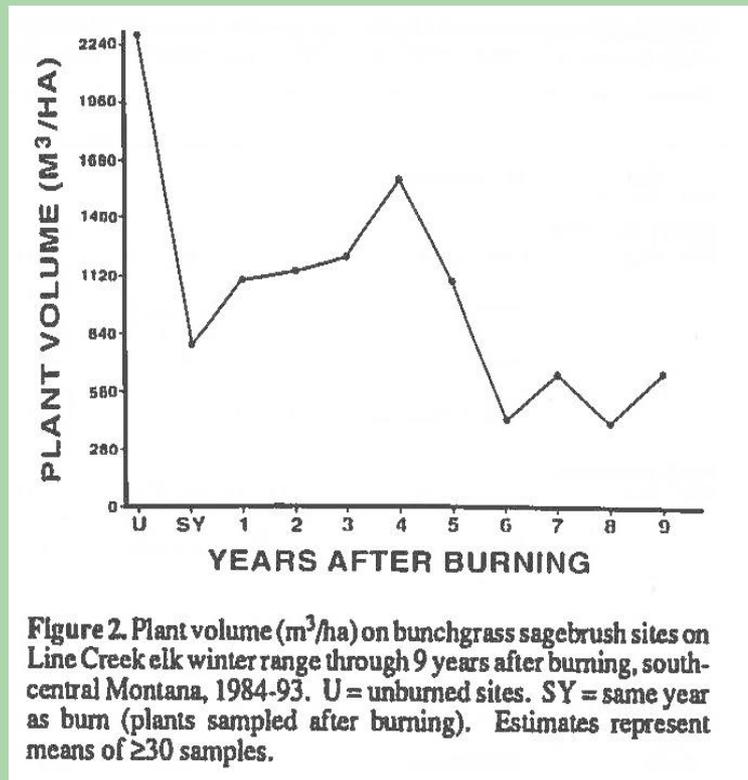
## Van Dyke et al. (1996):

S.C Montana on Beartooth District of Custer-Gallatin NF

2 prescribed burns: Fall 1984 and Spring 1988 (total ~175 acres)

Sagebrush-dominated elk winter range

Plant Production and Forage Value (protein) sampled annually 1988-93 (5-9 yrs postburn)



- Plant production did not approach preburn levels after 9 yrs, but grass production was higher on burned sites most yrs.
- Grass cover peaked (60-70%) 7-8 yrs postburn; Forb cover (60%) peaked 1<sup>st</sup> yr postburn; Shrubs re-established in 1-2 yrs, and cover (~40%) peaked 6-7 yrs postburn.
- Elevated protein levels in shrubs (up to 6 yrs) and grasses/forbs (up to 4 yrs).

## LITERATURE CITED

Norland, J.E., F. J. Singer, and L. Mack. 1996. Effects of the Yellowstone fires of 1988 on elk habitats. Pp. 223-232 In J.M. Greenlee (ed.). Ecological Implications of Fire in Greater Yellowstone. Proceedings of the Second Biennial Conference on the Greater Yellowstone Ecosystem, 19-21 Sept. 1993. International Association of Wildland Fire, Fairfield, WA. 235 pp.

Singer, F.J., M.B. Coughenour, and J.E. Norland. 2004. Elk biology before and after the Yellowstone fires of 1988. Pp. 117-139 In L.L. Wallace (ed.). After the Fires: The Ecology of Change in Yellowstone National Park. Yale University Press. New Haven, CT. 390 pp.

Tracy, B.F. and S.J. McNaughton. 1996. Comparative ecosystem properties in summer and winter ungulate ranges following the 1988 fires in Yellowstone National Park. Pp. 181-192 In J.M. Greenlee (ed.). Ecological Implications of Fire in Greater Yellowstone. Proceedings of the Second Biennial Conference on the Greater Yellowstone Ecosystem, 19-21 Sept. 1993. International Association of Wildland Fire, Fairfield, WA. 235 pp.

Tracy, B.F. and S.J. McNaughton. 1997. Elk grazing and vegetation responses following a late-season fire in Yellowstone National Park. *Plant Ecology* 130:111-119.

Tracy, B.F. 2004. Fire effects, elk, and ecosystem resilience in Yellowstone's sagebrush grasslands. Pp. 102-116 In L.L. Wallace (ed.). After the Fires: The Ecology of Change in Yellowstone National Park. Yale University Press. New Haven, CT. 390 pp.

Van Dyke, F., M.J. Deboer, and G.M. Van Beck. 1997. Winter range plant production and elk use following prescribed burning. Pp. 193-200 In J.M. Greenlee (ed.). Ecological Implications of Fire in Greater Yellowstone. Proceedings of the Second Biennial Conference on the Greater Yellowstone Ecosystem, 19-21 Sept. 1993. International Association of Wildland Fire, Fairfield, WA. 235 pp.