

Fossil Butte National Monument

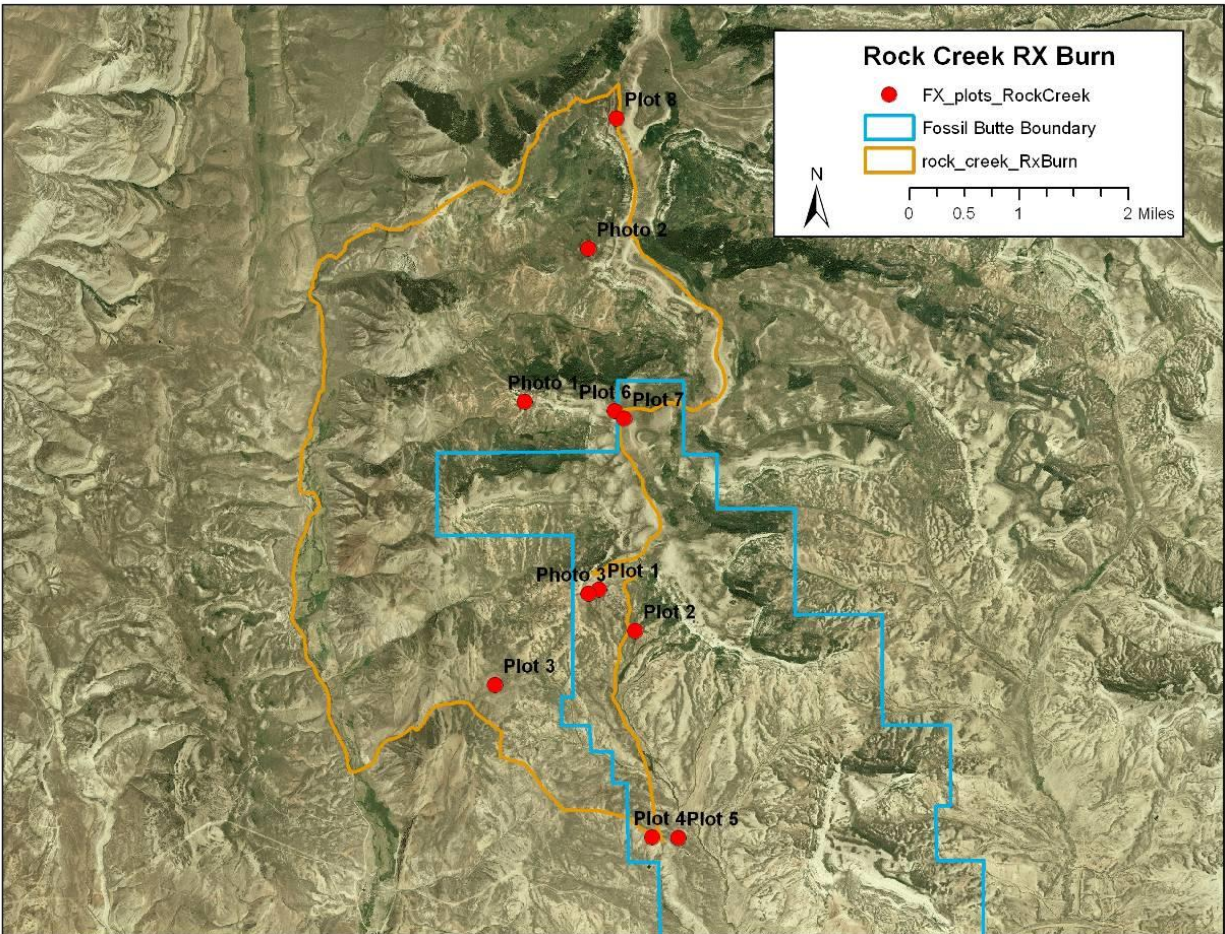
2021 Project Level Fuels & Fire Effects Monitoring Reports

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Rock Creek Prescribed Burn – Year 15 Post 1

Rock Creek Prescribed Burn – Year 15 Post

The Rock Creek interagency prescribed burn was conducted in September 2005. The Rock Springs Bureau of Land Management (BLM), Wyoming Game & Fish Department, Bridger-Teton National Forest, Fossil Butte National Monument (FOBU), and Grand Teton National Park fire personnel collaborated to complete this 12,000-acre unit on BLM and FOBU land near Kemmerer, WY. Prescribed burn objectives included reducing hazard fuels, achieving a burn mosaic to rejuvenate decadent shrub communities, regenerating aspen stands, and improving habitat for mule deer, elk, moose, sage grouse, and antelope.



Specific monitoring objectives

- *Blacken 30-60% of the unit of BLM land, and 25-35% on Fossil Butte land (Achieved based on estimates).*
- *Shrub regeneration:*
 - a. *Achieve 70% resprout density of pre-burn serviceberry and snowberry two years post burn (May have been achieved, but not statistically demonstrated).*
 - b. *Achieve 50% resprout density of pre-burn bitterbrush two years post burn (Not achieved).*
 - c. *Achieve at least 1000 sagebrush stems per acre five years post burn (May have been achieved but not statistically significant).*

Eight fire effects monitoring plots were installed at Rock Creek on FOBU and BLM land. Three plots were designated as controls. Ultimately four plots burned, and two controls were retained. Although burn mosaic

mapping was not formally conducted with aerial photos and GIS, ocular estimates indicated that the 30-60% objective was met on BLM land and likely exceeded on Fossil Butte land.

The Fire Effect Crew returned the FOBU in the summer of 2021 to remeasure plots in the Rock Creek RX at 15-years post burn. The crew collected data exclusively on sagebrush and bitterbrush cover and density, and ground cover with the addition of cheatgrass cover.

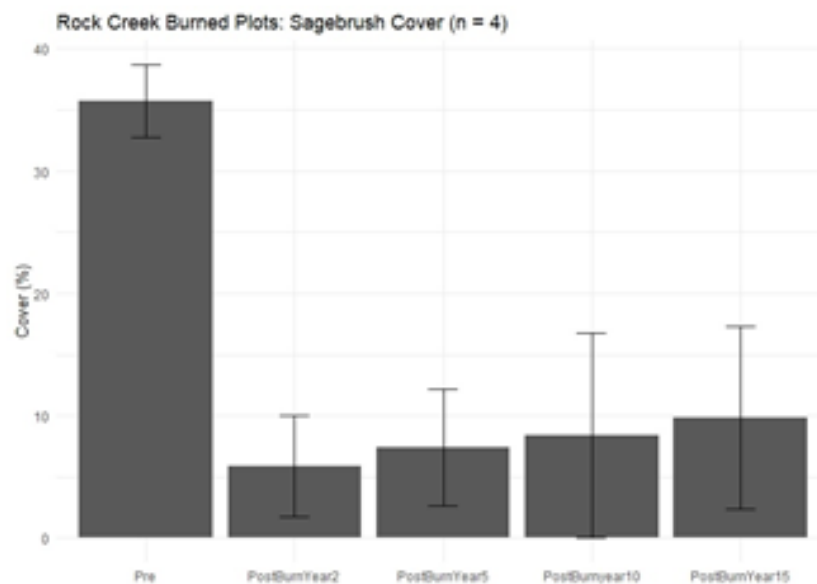
Burn Severity

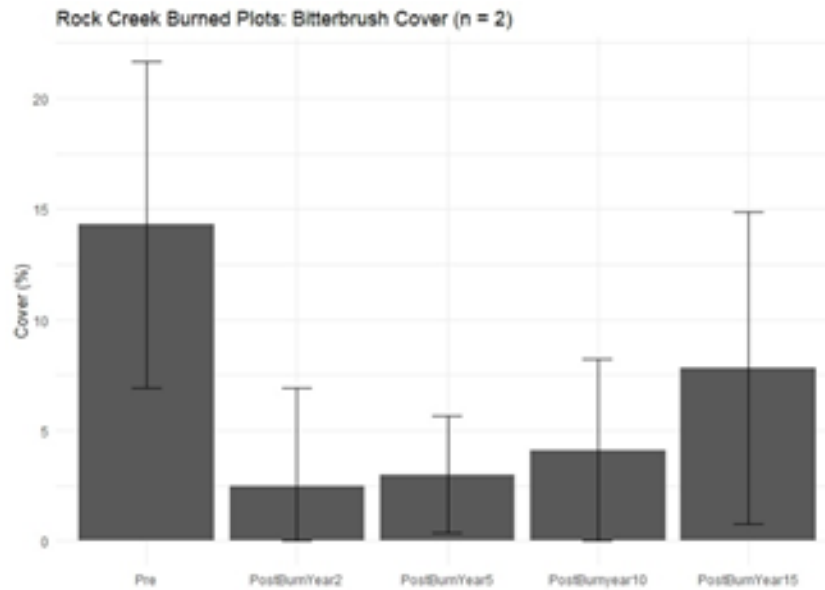
Burn severity monitoring was conducted by fire effects and FEMO personnel on five burned plots immediately post burn using FMH burn severity protocols and scoring. Average burn severity ratings were in the category of “lightly to moderately burned” for vegetation effects. Substrate effects ranged from “scorched” to “lightly burned.”

Shrub Cover

Percent cover of shrubs is a better way to assess post-burn recovery than is shrub density because it is difficult to distinguish individuals when these plants exhibit multiple stems, which is common. Also, percent cover can give a more realistic assessment of wildlife habitat characteristics. Note that there is insufficient data to show statistically significant differences between post burn sampling events

Sagebrush and bitterbrush data from year-15 post burn show a slow recovery (Figure 1). Sagebrush recovery to pre-burn levels may take 30 years based on fire effects monitoring done elsewhere in western Wyoming. At year-15 post burn, sagebrush cover only averages 30% of the pre-burn cover. However, the average cover is now almost two times greater than the average cover at two years post burn. Bitterbrush averaged an almost 75% increase in cover since year-two post burn, but it still has 50% less cover than pre burn.





Figures 1 and 2. 2004-2021 Mean $\pm$ 80% CI of sagebrush and bitterbrush cover (%) in the burned plots in the Rock Creek RX.

Despite the severity of the burn in some places, resprouting horsebrush, snowberry, and rabbitbrush recovered to pre-burn canopy cover at 10 years after the burn (Figure 2). Serviceberry cover has not recovered to pre-burn density levels. However, serviceberry may be affected by browsing ungulates that prefer that species.

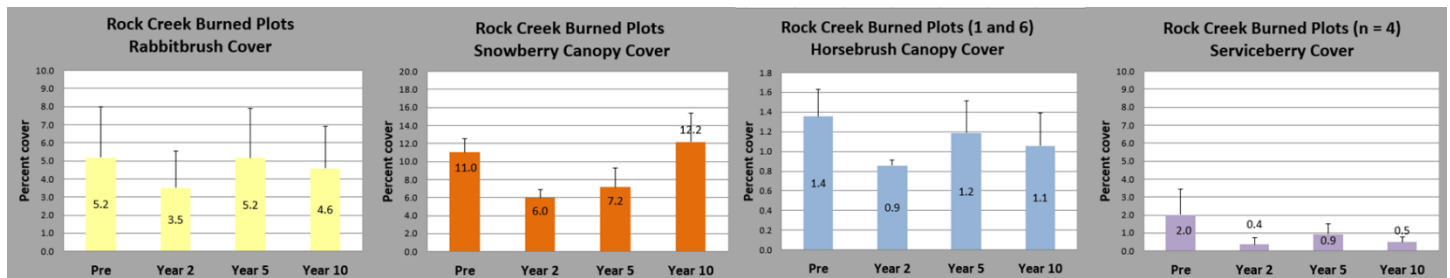


Figure 3. Mean $\pm$ 80% CI of rabbitbrush, snowberry, horsebrush and serviceberry cover (%) in the burned plots in the Rock Creek RX from previous monitoring.

Shrub Density

Shrub density data is provided for bitterbrush and sagebrush because those species can be assessed with higher accuracy than snowberry and greater precision than serviceberry (rarely encountered in the plots). Density of both sagebrush and bitterbrush was significantly decreased after the burn according to the plot data (Figure 3). Average sagebrush density exceeded the 1000 stems per acre objective in year-2 post burn, but that may be due to unburned areas in one of the plots. Bitterbrush did not meet the objective of 50% recovery two years post burn. Neither species has demonstrated a recovery to pre burn levels by year-15 post burn. This may indicate that the slight increase seen in percent cover is related to increasing size of the plants rather than more plants appearing.

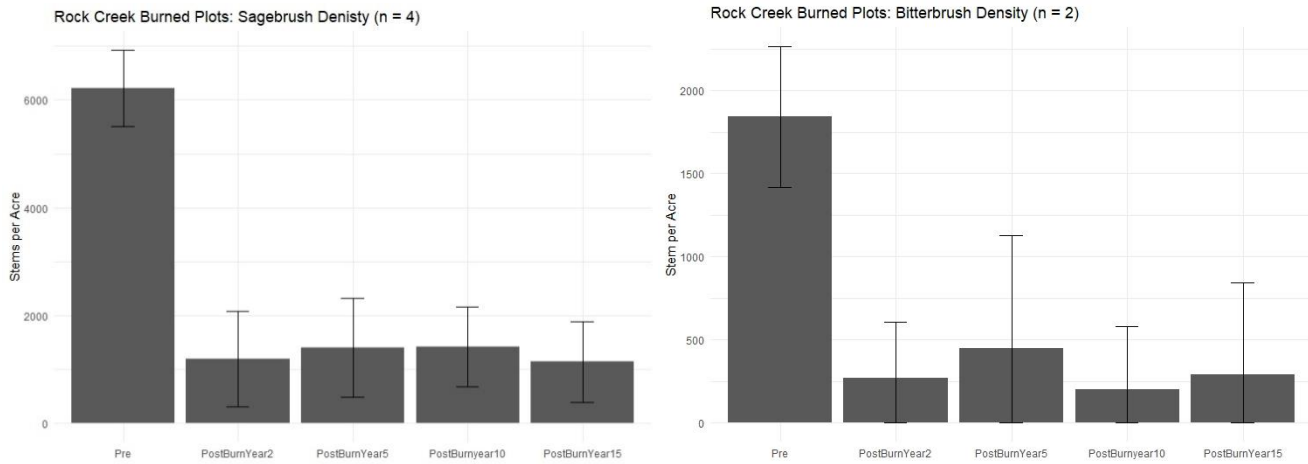


Figure 4 and 5. Mean $\pm$ 80% CI of sagebrush and bitterbrush density (stems per acre) in the burned plots in the Rock Creek RX.

Ground Cover

Ground cover data from point intercept transects demonstrates that the plots have returned to pre-burn levels of bare ground and litter at Year 15. A few of the plots at Rock Creek included the invasive grass *Bromus tectorum*, or cheatgrass, in the years-5 and -10 post-burn observations. At Year 10, one plot recorded 16% cover of cheatgrass, and at year 15, cheatgrass averaged 5% in all burned plots. This grass has the potential to change the fire regime and diminish wildlife habitat values. Areas with cheatgrass should be treated with herbicide to control spread if possible. It appears that severely burned areas adjacent to roads and/or experiencing livestock grazing have the most cheatgrass at this time.

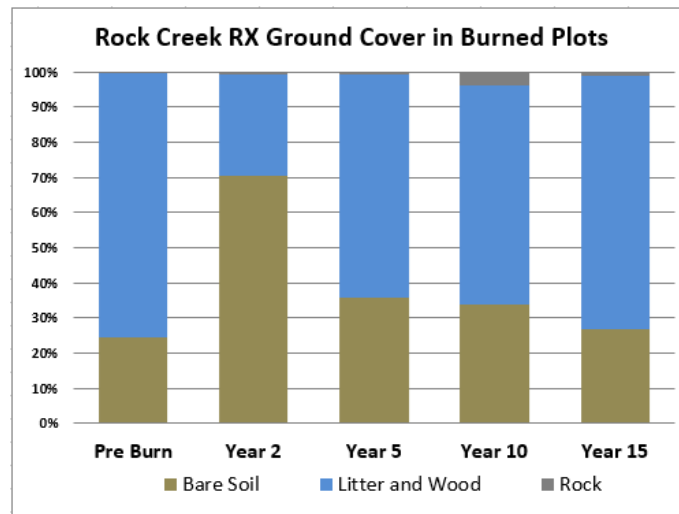
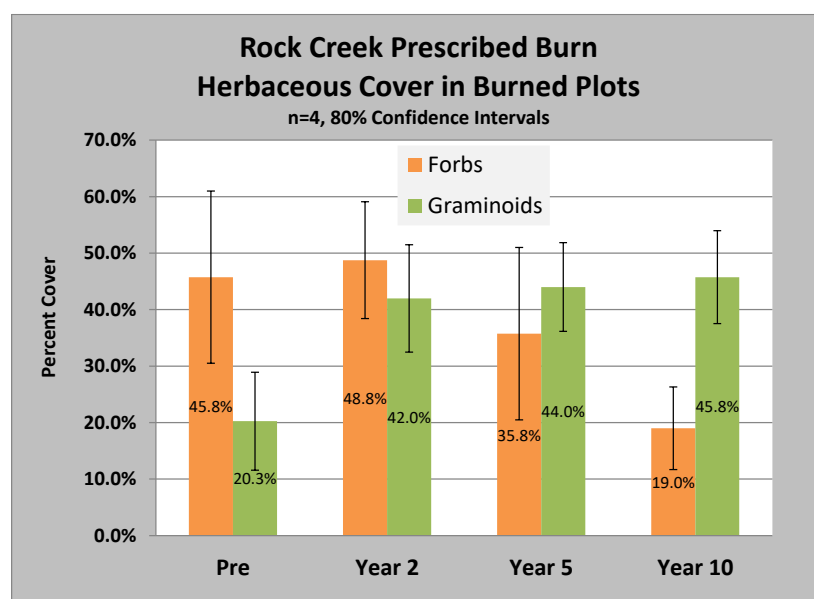
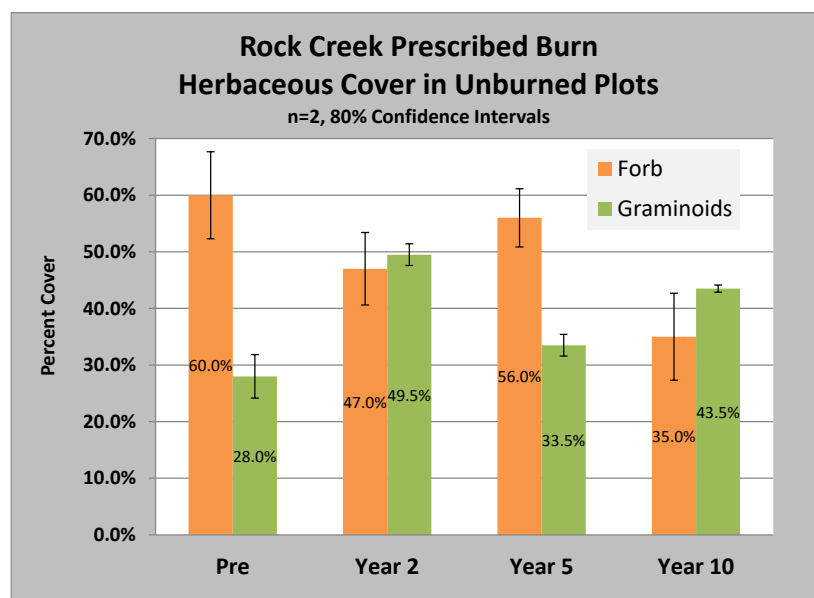


Figure 6. Mean of ground cover (%) in the burned plots in the Rock Creek RX.

Herbaceous Cover

The following graphs show the percent cover of grass/grasslike plants and forbs in burned and unburned plots over the history of the burn. As expected, the cover changes from year to year even in the unburned plots, probably according to growing season conditions. There is a slight downward trend post burn in forb cover and an apparent increase in grass cover. After the initial growing season post burn, grasses do tend to dominate in a burned area.



Photopoints from the BLM plot: This plot had a moderate burn with partial removal of sagebrush

Rock Creek

RC03, 0P-30P



RC03: 0P-30P, PRE, 2005



RC03 : 0P-30P, IMMPOST, 2005



RC03 : 0P-30P, YR05, 2010



RC03: 0P-30P, YR10, 2015



RC03: 0P-30P, YR10, 2015



RC03: 0P-30P, YR15, 2021

Photopoint from a plot on Fossil Butte: Note cheatgrass in purple stage in 2015

Rock Creek

RC01, 0P-30P



RC01: 0P-30P, PRE, 2005



RC01: 0P-30P, IMMPOST, 2005



RC01: 0P-30P, YR02, 2007



RC01: 0P-30P, YR05, 2010



RC01: 0P-30P, YR10 2015



RC01: 0P-30P, YR15 2021