

Fire Effects Information System (FEIS)

Artemisia tridentata subsp. vaseyana

Table A3—Summary of postfire recovery studies

Table A3—Summary information from postfire recovery studies in mountain big sagebrush communities, organized by ecoregions.				
Location; elevation	Vegetation description and grazing information	Methods	Results (data are means unless otherwise indicated)	Citation(s)
Central Basin and Range, Colorado Plateau, and Wasatch and Uinta Mountains				
Throughout Utah and adjacent Nevada; 1,926-2,788 m	Mountain big sagebrush steppe Only sites without evidence of reseeding or "conspicuous" livestock grazing effects were selected.	Developed regression models using data from 36 wild and prescribed fires, 1-36 years old Burns were 20-35,200 ha.	0%-2% cover 1-7 years after fire; 16%-39% cover on unburned sites 0.2%-10% cover 8-11 years after fire; 4%-22%cover on unburned sites 6%-32% cover 13-15 years after fire; 13%-39%cover on unburned sites 6%-47% cover 18-23 years after fire; 19%-31%cover on unburned sites 9%-45% cover 27-29 years after fire; 18%-30%cover on unburned sites 7%-31% cover 30-36 years after fire; 23%-34%cover on unburned sites Based on mountain big sagebrush recovery (using 27 paired burned/unburned sites), the model estimated 37 years (95% CI: 24-84 years) to reach unburned cover values. For our analyses (figure A1), these data were split by ecoregion, and additional burned sites were included (39 total). Based on mountain big sagebrush canopy cover at 36 sites (independent of paired unburned sites), the model estimated 27 years (95% CI: 19-51 years) to reach mean unburned cover of 24%.	Data from [459]; summary information in [460]

Uinta Mountains and Tavaputs Plateau, Ashley National Forest, Utah; elevation not provided	Mountain big sagebrush/intermediate needle-and-thread grass (most sites), mountain big sagebrush/bluebunch wheatgrass (warm aspects), and mountain big sagebrush/saline wildrye (few sites) Burns had varied history of livestock grazing.	Measured canopy cover on 136 burns, 1-42 years after fire	0%-18.4% cover 1-10 years after fire 0.2%-46.0% cover 11-20 years after fire 6.6%-43.7% cover 21-30 years after fire 17.8%-36.6% cover >31 years after fire Unburned values were not provided, but "the data show mountain big sagebrush strongly trending toward >25% crown cover in the absence of fire or other disturbance". Seven of the 10 burns that were 25-35 years old had >25% mountain big sagebrush canopy cover; the other 3 had 12%-18% mountain big sagebrush canopy cover. Differences among sites were attributed to differences in soil nutrients, prefire cover of mountain big sagebrush, weather, and livestock use. The authors concluded that many stands of mountain big sagebrush could be sustained at >20% cover with a fire interval of 25-30 years.	[230]
Eastern Cascades Slopes and Foothills and Northern Basin and Range				
Clear Lake Hills, Modoc National Forest; elevation not provided	Mountain big sagebrush steppe with an understory of perennial grasses and forbs, scattered western juniper, and patches of cheatgrass Sites were rested from livestock grazing 2 years before fire. Burns were grazed by sheep the first spring after fire and each spring thereafter; starting 2 years after fire, burns were grazed in summer by cattle and grazed each summer thereafter by cattle or by cattle and sheep.	Compared canopy cover on burned sites 1, 2, 3, 10, 20, and 28 years after a 120-ha, late-summer prescribed fire, to prefire canopy cover; and compared canopy cover on burned sites 1, 2, 3, 10, 20, and 29 years after a 280-ha prescribed fire to canopy cover on 3 adjacent, unburned sites.	Canopy cover was similar to prefire and unburned values (~30%) 28 and 29 years after fire.	[246]
Southeastern Oregon, northwestern Nevada, and northeastern California; 1,400-2,000 m	Mountain big sagebrush steppe alliance with common shrub associates including antelope bitterbrush, rabbitbrush, mountain snowberry and spineless horsebrush; perennial grass associates including bluebunch wheatgrass, Columbia needlegrass, and	Compared canopy cover on 16 burned sites, 4-44 years after uniformly high-severity wild and prescribed fires, to canopy cover on 2 unburned sites Burns were 400-4,000 ha.	0.4% cover 4 years after fire 2.0% cover 6 years after fire 0.5% cover 9 years after fire 2.9% cover 9 years after fire 8.7% cover 10 years after fire 5.5% cover 10 years after fire 3.0% cover 10 years after fire 5.9% cover 11 years after fire 9.1% cover 14 years after fire	Data from [767]; also see [768]

	Idaho fescue; western juniper present on some sites Burns were grazed by livestock, but were "not heavily impacted".		16.9% cover 15 years after fire 6.9% cover 16 years after fire 9.0% cover 20 years after fire 27.7% cover 27 years after fire 14.9% cover 41 years after fire 27.9% cover 42 years after fire 44.4% cover 44 years after fire 7.2% and 41.9% cover on unburned sites; median=25% Median mountain big sagebrush canopy cover reached 20%-25% around 32-36 years after fire.	
Badger Mountain, Sheldon National Wildlife Refuge, Nevada; 1,840-2,178 m	Mountain big sagebrush or mountain big sagebrush-antelope bitterbrush communities; understories mostly a mix of bluebunch wheatgrass, Idaho fescue, Thurber's needlegrass, and bottlebrush squirreltail with a "minor component" of cheatgrass	Compared canopy cover on 2 burned sites, 8-9 and 13-14 years after wildfire, to unburned sites Burns were 15,378 ha and 2,792 ha.	2% cover (95% CI = 1%-2%) 8-9 years after fire 8% cover (95% CI = 7%-10%) 13-14 years after fire 16% cover (95% CI = 14%-18%) on unburned plots	Data from [272]; also see [270]
Bald Mountain, Sheldon National Wildlife Refuge, Nevada; 1,763-2,097 m	Sites were rested from livestock grazing before fire, and burns were not grazed by livestock after fire.	Compared canopy cover on a burned site, 10-20 years after an August wildfire, to unburned sites The burn was 914 ha.	7% cover 10-11 years after fire; 19% cover on unburned sites 11% cover (95% CI = 8%-14%) 19-20 years after fire; 9% cover (95% CI = 8%-11%) on unburned sites	Data taken from [169,272]; also see [270]
Catnip Mountain, Sheldon National Wildlife Refuge, Nevada; 1,812-2,216 m		Compared canopy cover on a burned site, 2-12 years after an October wildfire to unburned sites The burn was 2,727 ha.	2% cover 2-3 years after fire; 22% cover on unburned sites 8% cover (95% CI = 7%-9%) 11-12 years after fire; 17% cover (95% CI = 14%-20%) on unburned sites	
South Steens Mountain, Oregon, and Hart Mountain National Antelope Refuge, Nevada; 1,700-2,300 m	Mountain big sagebrush/Idaho fescue and mountain big sagebrush/rough fescue Sites had a varied history of livestock grazing.	Compared mean canopy cover of 40-80 cm-tall mountain big sagebrush plants on 10 burned sites, 5-43 years after prescribed fires, to canopy cover on adjacent, unburned sites	1% cover 5 years after fire; 18% cover on unburned sites 1% cover 7 years after fire; 20% cover on unburned sites 11% cover 11 years after fire; 26% cover on unburned sites 3% cover 12 years after fire; 35% cover on unburned sites 8% cover 14 years after fire; 6% cover on unburned sites	[391]

			2% cover 17 years after fire; 20% cover on unburned sites 18% cover 25 years after fire; 17% cover on unburned sites 21% cover 35 years after fire; 36% cover on unburned sites 27% cover 38 years after fire; 11% cover on unburned sites 21% cover 43 years after fire; 15% cover on unburned sites	
Middle Rockies				
Beaverhead, Jefferson, and Silver Bow counties, Montana; 1,830-2,290 m	Mountain big sagebrush/Idaho fescue Sites were heavily grazed by wild ungulates.	Compared canopy cover on 10 burned sites, 2-16 years after prescribed fires, to cover on paired, unburned sites	0% cover 2 years after fire; 18% cover on unburned sites 0% cover 7 years after fire; 9% cover on unburned sites 3%-4% cover 8 years after fire; 13%-15% cover on unburned sites 0% cover 11 years after fire; 23% cover on unburned sites 4% cover 14 years after fire; 28% cover on unburned sites 1% cover 15 years after fire; 13% cover on unburned sites 3% cover 16 years after fire; 24% cover on unburned sites	Data from [671], also see [664]
Beaverhead and Madison counties, Montana; 1,840-2,400 m	Mountain big sagebrush/Idaho fescue steppe Sites were grazed by livestock.	Compared canopy cover on 28 burned sites, 3-34 years after wild and prescribed fires, to canopy cover on nearby unburned sites	0%-0.57% cover 1-7 years after fire; 25%-30% cover on unburned sites 0%-11% cover 8-10 years after fire; 16%-40% cover on unburned sites 0%-8% cover 13-16 years after fire; 11%-42% cover on unburned sites 1%-31% cover 17-21 years after fire; 13%-30% cover on unburned sites 8%-41% cover 22-26 years after fire; 30%-48% cover on unburned sites 9% cover 34 years after fire; 29% cover on unburned sites Regression analysis indicated that mean canopy cover reached unburned levels (28%) in 32 years, on average ($R^2 = 0.75$, $P < 0.05$).	Cover data from [347]; summary data in [348,349]

Blacktail Butte, Grand Teton National Park, Teton County, Wyoming; 1,980 m	Mountain big sagebrush-antelope bitterbrush steppe	Compared canopy cover on two adjacent sites (113 ha and 979 ha) burned under prescription during 1998 and sampled 10 and 15 years after the fires to canopy cover on a nearby unburned site	1.3%-3.4% cover 10 years after fire; 24% cover on an unburned site 1.5%-20.0% cover 15 years after fire; 30% cover on unburned sites	[2]
Fremont Ridge, Sublette County, Wyoming; ~2,260 m	Mountain big sagebrush-antelope bitterbrush/bluebunch wheatgrass-Idaho fescue-needlegrass steppe The site is important winter range for elk.	Compared canopy cover on a 574-ha burned site, 1-15 years after prescribed fires, to prefire canopy cover Part of the site was burned in fall 1999 and another part in spring 2000.	0% cover 2 years after fire 0.2% cover 5 years after fire 1% cover 10 years after fire 1.5% cover 15 years after fire 20.8% cover before fire	[3]
Gardiner Basin, Northern Yellowstone Winter Range, Montana; ~1,800-2,500 m	Mountain big sagebrush/bluebunch wheatgrass and mountain big sagebrush/Idaho fescue steppe, with rabbitbrush and spineless horsebrush as common associates	Compared canopy cover on 7 burned sites, 9-15 years after prescribed fires, to mean cover on 33 unburned sites	0.8%-6.7% cover 9 years after fire 0%-0.3% cover 11 years after fire 0%-0.4% cover 14 years after fire 0% cover 15 years after fire 14.2% mean cover on unburned sites	Data from [681]; also see [267]
Gardiner Basin, Northern Yellowstone Winter Range, Montana; 1,550-2,050 m	Heavy browsing by wild ungulates occurred before and after fire.	Compared canopy cover on burned sites, 19 years after a uniformly high-severity, 80-ha, July wildfire, to mean cover on 3 adjacent, unburned sites	0.07% cover 19 years after fire; 4.4% mean cover on unburned sites	[398]
Gold Creek, Line Creek Plateau, Montana; 1,770 m	Mountain big sagebrush/bluebunch wheatgrass steppe The site was not grazed by livestock.	Compared canopy cover on burned site, 10 years after a uniformly high-severity, April prescribed fire to prefire canopy cover	<1% cover 10 years after fire; 23% cover before fire Because of well-established graminoids and forbs, the authors did not expect mountain big sagebrush to recover until 20-30 years after fire.	[654]
Northern Yellowstone National Park, Montana and Wyoming; elevation not provided	Mountain big sagebrush/Idaho fescue and mountain big sagebrush/bluebunch wheatgrass steppe ^a	Examined 4 areas burned by high-severity fires, 6-13 years prior; none had mountain big sagebrush plants, although the author states that "sagebrush was slowly reinvading" the two younger burns.	0% cover on burned sites, 6, 9, 11, and 13 years after fire; cover on adjacent unburned areas was 40%, 30%, 23%, and 18%, respectively. These data and observations of 30- to 40-year-old burns led the author to suggest that it may take 10-30 years for mountain big sagebrush plants to reestablish after fire.	[280]

Spring Creek, Lincoln County, Wyoming; 1,980-2,260 m	Mountain big sagebrush-antelope bitterbrush steppe	Compared canopy cover 4, 9, 15, and 20 years after a prescribed fire on a 607-ha site to prefire canopy cover	1.6% cover 4 years after fire 3.1% cover 9 years after fire 4.0% cover 15 years after fire 5.3% cover 20 years after fire 21.6% cover before fire	[4]
Steep Mountain, northwest of Butte, Montana; 2,010 m	Antelope bitterbrush-mountain big sagebrush/bluebunch wheatgrass community Cheatgrass frequency was ~2% on burned plots and 0% on unburned plots. The area was rested from cattle-grazing the summer prior to the fire and until the September after the fire, and grazing occurred each summer thereafter.	Compared canopy cover 8 years after a November prescribed fire to canopy cover on an adjacent, unburned area	1% median cover 8 years after fire; 12% median cover on unburned plots	[206]
Teton Science School campus, Grand Teton National Park, Teton County, Wyoming; ~2,130 m	Mountain big sagebrush-antelope bitterbrush steppe	Compared canopy cover 15 years after a 40-ha prescribed fire to canopy cover on a nearby unburned site	6.7% cover 15 years after fire; 27.7% cover on unburned site	[5]
Snake River Plain				
US Sheep Experiment Station near Dubois, Idaho; 1,690-1,890 m	Mountain big sagebrush steppe where subdominant shrubs included antelope bitterbrush, yellow rabbitbrush, threetip sagebrush, and spineless horsebrush; herbaceous understory dominated by Sandberg bluegrass, bluebunch wheatgrass, sedge, Idaho fescue, and forbs Sites were lightly to moderately grazed by sheep biannually in spring and fall.	Compared canopy cover on burned sites, 1-69 years after wild or prescribed fires, to canopy cover (23%) on sites not burned for >70 years	1%-11% cover 1-8 years after fire 10%-26% cover 11-16 years after fire 27%-37% cover 25-32 years after fire 20%-57% cover 54-69 years after fire 23% cover on unburned site Regression analysis showed that mean cover plateaued at 31%, 19 years after fire.	[432]
Wyoming Basin				

Carbon County, south of Rawlins, Wyoming; 2,100-2,700 m	Mountain big sagebrush communities on moderately deep to deep loamy soils	Compared canopy cover on 6 burned sites ($n = 10$ plots), 13-25 years after wild or prescribed fires, to canopy cover on 6 paired, unburned sites; and compared canopy cover on 4 additional burned sites ($n = 5$ plots), 17-19 years after wild or prescribed fires, to average canopy cover on the 6 unburned sites (56%)	30% cover 13 years after fire ($n = 1$); 62% cover on unburned site 16%-18% cover 15 years after fire ($n = 2$); 55% cover on unburned site 1%-37% cover 17-19 years after fire ($n = 6$); 45%-56% cover on unburned sites 18%-47% cover 22-25 years after fire ($n = 6$); 42%-71% cover on unburned sites	[686]
^a Baker [31] identified the taxa covered in this study as mountain big sagebrush based on elevation and other aspects of the environmental setting.				