Table 7. Non-FEIS species' responses to clearcutting and broadcast burning and their biological characteristics

Species	Postdisturbance response	Biological characteristics
Shrubs		
snow raspberry	Absent from heavily burned plots [4]	Trailing, evergreen, subshrub [7]
whitebark raspberry	Showed a marked preference for disturbed-unburned areas during the first 5 postfire years on watershed 3 [4]; among the community dominants on heavily burned plots 5-10 years after disturbance [6,8]. Cover and constancy peaked around 3 to 5 years after disturbance and declined thereafter [7]. Individuals may have persisted through disturbance [7].	Rhizomatous perennial that produces abundant seed [7]. Gradual increases in abundance may have been from continuous recruitment of seedlings from fruits dispersed by animals or from buried seeds, or by lateral growth of adjacent individuals. Longevity of its buried seeds is unknown, but other raspberry species form persistent seed banks ([6] and references therein).
Herbs and subshrubs		
agoseris	Bigflower agoseris occurred on lightly burned plots but was absent from heavily burned plots during the first 5 years on watershed 3 [4]. Annual agoseris and bigflower agoseris were among species that were most abundant within both lightly and heavily burned plots 3-9 years after disturbance [6,7], and were among the community dominants on heavily burned plots 5-10 years after disturbance [6,8]. They were otherwise rare [7].	Agoseris are wind-dispersed Asteraceae [6]; bigflower agoseris is a taprooted perennial, and annual agoseris is an annual [7].
broadleaf starflower	Residual species that showed a preference for disturbed-unburned plots on watershed 3; also among the most important residual species in both lightly and heavily burned plots [4]. Increased in cover during postdisturbance years 2-9 and gradually decreased thereafter [7]. Spread within all soil disturbance classes, but progressively later as disturbance severity increased [6], and to a greater degree on undisturbed plots on watershed 1 [7].	Perennial forb with short, thickened, deeply buried tubers [6]
clustered thistle	Occurred on lightly burned plots but was absent from heavily burned plots in the early years on watershed 3 [4]; reached greatest abundance between years 3 and 5, when it was most abundant on lightly and heavily burned plots [6]	Wind-dispersed Asteraceae [6]; taprooted, herbaceous perennial [7]
common whipplea	A residual subshrub that showed a preference for disturbed-unburned plots and was absent from heavily burned plots in early years on watershed 3 [4]. Frequency increased shortly after disturbance and stayed high 17-20 years after disturbance; cover increased 2 to 6 years after disturbance, then gradually declined [7]; most abundant within the 2 unburned soil classes and uncommon within the heavily burned class [6].	A trailing subshrub that freely roots at the nodes [6]. Its susceptibility to fire is probably due to the location of its perennating structures, which are on the soil surface [7].
evergreen violet	A residual herbaceous species that showed a preference for disturbed-unburned plots [4]; not reduced by burning, but spread only on undisturbed plots [6]. Vegetative spread was apparent on watersheds 1 and 3, although not to the extent of the more vigorous subshrubs [7].	Although it appears to spread vegetatively through stolons and slender rhizomes, the location of perennating buds on or near the soil surface provides little resistance to fire [6]. Thus, clonal spread may be expected only within unburned microsites [7].
fringed willowherb	Absent from heavily burned plots in the first postdisturbance season on watershed 3 [3]; common on both lightly and heavily burned plots in later years, but as or more abundant on disturbed-unburned and undisturbed plots [4]	Perennial herb with a "short rootstock" [7]
Little Mountain thimbleweed	Absent only from burned plots [12]	Perennial herb with a slender rhizome [7]
Oregon drops of gold	Widespread before clearcutting but absent from plots 5 years after broadcast burning [4]; absent only from burned plots [12].	Perennial rhizomatous herb [7]
Oregon goldthread	A residual herbaceous species that showed a preference for disturbed-unburned plots [4]. Increased briefly on undisturbed plots but greatly reduced on burned plots [6,7]. Vegetative spread was apparent on watersheds 1 and 3, although not to the extent of the more vigorous subshrubs [7], with relatively minor long-term changes in abundance [6,7].	Appears to spread vegetatively through stolons and slender rhizomes, although the location of perennating buds on or near the soil surface provides little resistance to fire [6]. Thus, clonal spread may be expected only within unburned microsites [7].
pale bellflower	Confined to disturbed-unburned plots [4]	A taprooted, perennial herb; sometimes with a caudex [7]
prickly lettuce†	Occurred on lightly burned plots but was absent from heavily burned plots [4]; a minor invading herb that reached greatest abundance between years 3 and 5 [6]	Wind-dispersed Asteraceae [6]
redwood-sorrel	Initially reduced but showed relatively minor long-term changes in abundance [6]; largely restricted to undisturbed areas [4]	Perennial rhizomatous herb [7].
Siberian springbeauty	Locally common and initially dominant on heavily burned plots [7,8]; most prominent following peaks in winter annuals. Dominance decreased with disturbance severity [7].	Taprooted, annual herb [7]

snowqueen	Widespread before clearcutting but absent from plots 5 years after broadcast burning [4]; had minimal postdisturbance recovery [6].	Perennial, rhizomatous herb with a caudex [7]
vanilla-leaf	Absent only from burned plots [12]	Perennial rhizomatous herb [7]
tall annual willowherb	Widespread invader; ubiquitous, occurring in 80-100% of plots in all communities [7]. Sharp spike in canopy cover 2 years after disturbance; most prominent on burned plots [6] in all plant communities [8]. Staggered harvesting on watershed 1 provided germination sites for 1 to 3 years before broadcast burning, which allowed winter annuals to produce an abundance of seeds and may account for their greater abundance on watershed 1 (review by [6]).	Winter annual; typically occurs during the 2nd growing season after fire due to the timing of seed availability and the tendency for slash burning or wildfire to occur in the fall; dominance is short lived (review by [6]). Local abundance of this species reflects the interaction of fall burning with copious seed production, a winter annual life cycle, and an affinity for high soil fertility associated with recent burns [8].
western fescue	A residual herbaceous species that showed a preference for disturbed-unburned plots [4].	Caespitose, perennial grass [7]
western pearly everlasting	Initially occurred on lightly burned plots but was absent from heavily burned plots; showed a preference for disturbed-unburned plots [4]. A minor invading herb that reached peak abundance between years 3 and 9 [6]; canopy cover peaked about 8 years after disturbance, then gradually declined; dominated on heavily burned plots following peak abundance of annuals [7].	Perennial, rhizomatous herb that produces abundant seed. Initial establishment was most likely by wind-dispersed seed [6], although buried viable seeds (of indeterminate age) have also been found in forest communities [13]. Gradual increases in abundance may have been from continuous recruitment of seedlings or lateral growth of adjacent individuals [6].
white insideout flower	A residual herbaceous species that showed a preference for disturbed-unburned plots [4]	Perennial, rhizomatous herb [7]
woodland ragwort†	Herbaceous invader common to both lightly and heavily burned plots [4]. Ubiquitous, occurring in 80-100% of plots in all communities [7]. Cover peaked at about 15% on burned plots 2 years after burning, decreased to negligible amounts during the next 2 years, and increased to about 1.5% in the 5th year [4]. Although absent from heavily burned plots in the first postdisturbance season on watershed 3 [3], later its greatest abundance was on burned plots [6,7]. Staggered harvesting on watershed 1 provided germination sites for 1 to 3 years before broadcast burning, which allowed winter annuals to produce an abundance of seeds and may account for their greater abundance on watershed 1 (review by [6]).	Winter annual, taprooted herb; a nonnative species with a wide distribution [7]; produces copious amounts of wind-dispersed seed between July and September. Most seeds germinate in fall and overwinter as rosettes, although some germinate in spring. Regardless of timing of germination, seeds are produced by late summer. Dominance is typically short-lived and occurs during the 2nd growing season after fire due to the timing of seed availability and the tendency for slash burning or wildfire to occur in the fall (review by [6]). Local abundance of this species reflects the interaction of fall burning with copious seed production, a winter annual life cycle, and an affinity for high soil fertility associated with recent burns [8]. Its affinity for burned soils has been attributed to a requirement for high soil fertility [18], and its transient dominance attributed to poor competitive ability with perennials such as fireweed (van Andel and Vera 1977 cited by [6]).
Wright's cudweed	Most abundant within lightly and heavily burned plots [6]	Short-lived, perennial, taprooted herb [7]

†Nonnative species.

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