

APPENDIX B

VEGETATION RESPONSE UNITS

Vegetation Response Units (VRUs) are a land classification and mapping system that delineates units of lands based on predictable patterns of potential vegetation and disturbance dynamics, predominantly fire regimes. The potential vegetation groups used here are those developed by Applegate et al. (1992) for northwestern Montana and northern Idaho. The terrain features that affect fire regimes include elevation, slope, and drainage dissection. For example, rolling unbroken terrain at mid elevations that support subalpine fir/beargrass and subalpine fir/menziesia habitat types tend to experience infrequent, often lethal fire. Such settings are mapped as VRU 6. See map XXX which shows VRUs in the Selway subbasin. VRUs are used to interpret historic and existing condition and trend in plant community composition, structure and process.

VRU 1 – CONVEX SLOPES, SUBALPINE FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is uncommon in the Selway and occurs in the upper reaches of Meadow Creek, and the Selway Headwaters ERUs at mid and upper elevations. This VRU comprises 144,668 acres in the subbasin. It is more common in other subbasins of the Forest.

Subalpine fir habitat types are dominant, and grand fir habitat types also occur. Lodgepole pine was historically a dominant cover type in many settings. Engelmann spruce, subalpine fir, western larch, Douglas fir, and whitebark pine were less common.

Large infrequent severe fires were typical of most settings. Historically, about 700 acres burned per year. About 60-80 percent of stands originated from stand replacing fire, and 20-40 percent from mixed severity fire. Moist lower slopes were most prone to mixed fire. Lodgepole, western larch and Douglas fir sometimes survived one or more fires to form a scattered overstory. Large blocks of pole and medium size fire killed trees (500 to 2000 acres) were typically present at any time within 10,000 acres of this VRU. Mountain pine beetle activity cycled with fire and lodgepole pine, and may have been important in developing fuel conditions that favored stand-replacing fire.

Wet meadows are important elements of this landscape.

Relative proportion by size class was about 5-10 percent nonforest, 20-30 percent seedling/sapling, 20-30 percent pole, 20-30 percent medium tree, and 5-15 percent large tree at any one time over this VRU in the Subbasin. Old growth was typically limited to moist draw bottoms and north slopes, and usually comprised from 10 to 15 percent of the area.

DEPARTURES FROM HISTORIC

With advancing forest succession and fire suppression, lodgepole pine has decreased by 7 percent and Engelmann spruce-fir forests have increased by 6 percent. Western larch and whitebark pine are thought to have declined but this is poorly documented in the small sample. More shade tolerant grand fir and subalpine fir have likely increased. More than half of the shrub-dominated old burns have become forested and many are now pole-sized. Blister rust has further reduced whitebark pine. Since 1935 only about 300 acres burn per year, an 82 percent decrease. Fire suppression has also resulted in increased stand densities in mature forest and many areas of young forest with low stand density.

Harvest has affected about 10 percent of the acres in this VRU. The ratio of stand-replacement to lower severity treatment is 80 to 20, which is within natural ranges. However, recent harvest patterns have replaced large-scale infrequent fire with frequent small harvest units more uniformly distributed across watersheds than occurred historically. The average harvest unit size is smaller than historic burn patch and there is not as much diversity in frequency of structural stages within subwatersheds. Each watershed is more like other watersheds in terms of the representation of structural stages. Historically extensive snag patches are no longer created as a result of fire suppression.

VRU 2 – GLACIATED SLOPES, SUBALPINE FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is common in the Selway at upper elevations. This VRU comprises 492,253 acres. It is concentrated in the eastern part of the Forest, primarily in wilderness or roadless areas.

Subalpine fir and whitebark pine habitat types are dominant. Lodgepole pine, Engelmann spruce, and subalpine fir were historically dominant on side slopes. Whitebark pine was important on ridges. Historically about 400 acres burned per year. Mid slopes tended to experience stand replacing fire at infrequent intervals. Open ridges or moist valley bottoms were more prone to mixed severity fire. Medium blocks of pole size fire killed trees (100 to 1000 acres) were often present at any time within 20,000 acres of this VRU.

Rock outcrop, lakes, wetlands, and montane parklands were important elements of this landscape.

Relative proportion by size class was about 10-25 percent nonforest, 10-30 percent seedling/sapling, 30-65 percent pole, and 5-15 percent medium tree. Old growth was typically limited to moist trough bottoms and open ridges, and usually comprised less than 10 percent of the area.

DEPARTURES FROM HISTORIC

With advancing forest succession and fire suppression, whitebark pine has declined. Blister rust has further reduced whitebark pine a total of more than 94 percent. Lodgepole pine forest has increased 55 percent and mixed conifer forest 43 percent. Since 1935, only about 1184 acres burn per year, a 78 percent decrease. Advancing forest succession has resulted in a 54 percent decline in nonforest openings, and large increases in seedling/sapling and pole structural stages. A large decline in medium trees is not offset by increases in large trees, and may represent whitebark pine loss or other loss to mortality. Fire suppression has also resulted in increased stand densities, as shade tolerant understories develop, and as open young forests become more dense. No recorded harvest has occurred. Historically extensive snag patches are no longer being created as a result of fire suppression.

VRU 3 – STREAM BREAKLANDS, GRAND FIR AND DOUGLAS FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is common at lower to mid elevations in canyons on steep south aspects. This VRU comprises 385,883 acres in the subbasin. It is more common in the Middle and Upper Selway Canyon compared to the Lower Canyon because of the shift from maritime to more continental climate. It is more common in other subbasins of the Forest.

On south aspects, Douglas fir habitat types are dominant. Open stands of large Douglas fir and ponderosa pine were historically common. Low and mixed severity fire at frequent intervals occurred on south aspects. Here, 40-60 percent of stands showed evidence of survival through

one to many fires. Ponderosa pine old growth occupied about 40 to 60 percent of these warm dry sites.

On north aspects, grand fir habitat types are dominant. Grand fir and Douglas fir were common cover types, with ponderosa pine and western larch and sometimes Engelmann spruce or lodgepole pine. Pacific yew occurred on lower slopes. Mixed severity fire at moderate intervals was common on north aspects. About 30-60 percent of stands retained 10 or more trees per acre through at least one fire. Twenty to 30 percent of stands included at least 10 trees per acre older than 150 years. Ponderosa pine, western larch, Douglas fir, and grand fir formed the old overstory.

Small to medium blocks of pole to medium fire-killed trees were abundant at any time within 10,000 acres of this VRU.

Old growth pine, bunchgrass understories, and rock outcrop are important elements of this landscape. Old growth larch was an uncommon element.

On the VRU as a whole, relative proportion by size class was about 5-20 percent nonforest, 5-30 percent seedling/sapling, 10-20 percent pole, 20-40 percent medium tree, and 20-40 percent large tree.

DEPARTURES FROM HISTORIC

With advancing forest succession and fire suppression, ponderosa pine/Douglas fir forests have declined by 13 percent. Annual grasslands and areas non-native herbs have increased. Harvest has resulted in a 128 percent increase in nonforest openings. Forest succession and fire suppression have resulted in a 33 percent decline in seedling and sapling structural stages, an 83 percent decline in pole stages, a 36 percent decrease in medium tree stages and a 6 percent increase in large tree stages. However, more of the large trees are in mixed conifer and less in open pine stands.

Harvest has affected less than 1 percent of the National Forest lands in this VRU in the Subbasin, over 50 years. Since 1935, only about 1055 acres burn annually, a decline of 83 percent. Prescribed fire on dry south aspects burns an additional 500 to 1,000 acres annually. The ratio of stand replacement harvest to mixed or low severity treatments has been about 60 percent replacement to 40 percent less severe treatments. This is a higher ratio of stand replacement than would have occurred under natural disturbance regimes. Total canopy cover appears to have declined. Whether this is due to increased mortality from insects and disease, or harvest, is uncertain. Historically extensive snag patches are no longer being created as a result of fire suppression.

VRU 4 – ROLLING UPLANDS, GRAND FIR AND DOUGLAS FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is rare in the Subbasin, and occurs at low to mid elevations in the Middle Fork and Clear Creek ERUs, mostly on private lands. This VRU comprises 29,337 acres. It is more common in the South Fork Clearwater subbasin

Grand fir and Douglas fir habitat types are dominant. Ponderosa pine, Douglas fir, grand fir, and western larch were the dominant seral species. Lodgepole pine and Engelmann spruce were less common. Historically, this VRU exhibited high diversity in patch size and composition. Ponderosa pine, western larch, Douglas fir and grand fir often survived mixed severity fires to form a scattered overstory of large trees. Medium to large mixed severity fires occurred at frequent intervals. About 50-60 percent of stands originated from stand replacing fire and 40-40 percent from mixed and low severity fire. Small to large blocks (100 to 2000) acres) of pole to medium fire killed trees were common at any time within 10,000 acres of this VRU. Ten to twenty five percent of stands included at least 10 trees per acre older than 150 years.

Old growth pine and western larch were important elements of this landscape.

VEGETATION RESPONSE UNITS

Relative proportion by size class was 5-10 percent nonforest, 5-50 percent seedling/sapling, 10-30 percent pole, 20-30 percent medium tree, and 10-50 percent large tree.

DEPARTURES FROM HISTORIC

This VRU was not included in mapping of 1930s vegetation. Compared to historic ranges, this VRU shows more nonforest, due to agricultural and residential development, and less medium and large tree components. With advancing forest succession and fire suppression in the unharvested lands, ponderosa pine and Douglas fir have decreased while mixed conifer has increased. Stand densities in mature forest have increased and multiple canopy levels have likely increased.

Harvest has affected a large portion of this VRU. No known acres have burned annually since fire suppression became effective, a decline of 100 percent. The ratio of stand replacement harvest to mixed or low severity treatments is not known but most harvest on private lands has been clear-cut or removal of the overstory pine. This is not within the range of what would have occurred under natural disturbance regimes. Historically frequently created snag patches are no longer being created as a result of fire suppression.

VRU 6 – COLD BASINS, GRAND FIR AND SUBALPINE FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is uncommon in the Subbasin, and occurs at mid elevations in the headwaters of Meadow Creek, Halfway Creek, Meeker Creek and Lynx Creek. It comprises 14,093 acres in the subbasin. It is more common in the other subbasins of the Forest.

Grand fir and subalpine fir habitat types are dominant. Lodgepole pine was the dominant seral species. Western larch, Douglas fir, and Engelmann spruce were important. Grand fir was important on mesic sites. Whitebark pine was historically occasional. Medium to large stand replacing fires occurred at infrequent intervals. About 60-90 percent of stands originated from stand replacing fire and 10-40 percent had mixed severity fire. Moderate to large blocks (500 to 1000) acres) of pole to medium fire killed trees were common at any time within 10,000 acres of this VRU. Five to 10 percent of stands included at least 10 trees per acre older than 150 years.

Large patch sizes (100s to 10,000s of acres) and meadow complexes were important elements of this landscape.

Relative proportion by size class was 5-10 percent nonforest, 10-30 percent seedling/sapling, 30-45 percent pole, 20-40 percent medium tree, and 5-20 percent large tree, but this could fluctuate widely in response to large fires.

Departures from Historic

This VRU is poorly sampled for historic conditions in the subbasin. These conclusions also draw on observations in other subbasins. With advancing forest succession and fire suppression, lodgepole pine has increased as shrub dominated old burns have become reforested. More shade tolerant mixed conifer forests have increased. Whitebark pine has essentially disappeared as even a minor component. Forest succession and fire suppression have resulted in a 59 percent decline in nonforest, a 49 percent decline in pole structural stages, and a 708 percent increase in medium tree and an increase in large tree stages. Stand density has increased as seedlings have grown into pole stands, and as mature forest has become more multilayered.

Harvest has not affected the Forest acres. About 4 acres have burned annually since fire suppression became effective, a decline of about 99 percent. Historically extensive snag patches are no longer being created as a result of fire suppression.

VRU 7 – MOIST UPLANDS, GRAND FIR AND PACIFIC YEW

HISTORIC COMPOSITION AND PROCESS

This VRU is uncommon in the Subbasin, and occurs in Clear Creek, Ohara Creek, and Lower Meadow Creek, at mid elevations in headwater locations. It comprises 7446 acres in the subbasin. It is occasional throughout the western part of the Forest.

Mesic grand fir habitat types are dominant, and Pacific yew phases are common. Stands were usually mixed species, dominated by grand fir, and Douglas fir. Pacific yew, western larch, Engelmann spruce and lodgepole pine were less common. Usually small to medium fires of mixed severity occurred at infrequent intervals. Large stand replacing fires occurred more infrequently. About 20-40 percent of stands originated from mixed severity fire and about 60-80 percent from stand replacing fire. Small and scattered blocks (5-100 acres) and infrequent large blocks of fire killed medium and large trees were occasional at any time within 10,000 acres of this VRU. Old overstory trees were common and could be grand fir, western larch, Douglas fir, Engelmann spruce, or lodgepole pine. About 20-40 percent of stands had 10 or more trees per acre older than 150 years. Two or more age classes were common.

Pacific yew and mesic old growth were important elements of this landscape.

Relative proportion by size class was about 1-10 percent nonforest, 5-20 percent seedling/sapling, 10-25 percent pole, 25-35 percent medium tree, and 35-45 percent large tree.

DEPARTURES FROM HISTORIC

This VRU is poorly sampled in the subbasin. Conclusions also draw on observations from other subbasins. With harvest, nonforest shrub and herbaceous communities have increased. Small patches of early seral lodgepole and larch are probably declining. Old growth patches have been fragmented by harvest. Total old growth appears to be substantially below historic ranges.

Harvest has affected about 15 percent of the Forest acres within the last 50 years. This is a high percent compared to most other VRUs. About 1 acre has burned annually since fire suppression became effective, a decline of about 99 percent. The ratio of stand replacement harvest to mixed or low severity treatments has been about 80 percent replacement to 20 percent less severe treatments. This relative proportion of stand replacement is at the high end of the historic range. Historically common snag patches are no longer being created as a result of fire suppression.

VRU 8 – STREAM BREAKLANDS, CEDAR AND GRAND FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is common in the Subbasin, and occurs at low and mid elevations in the Middle Fork Clearwater, Clear Creek, Ohara Goddard, Lower Selway Canyon, and Lower Meadow Creek. This VRU comprises 158,823 acres in the subbasin. It becomes increasingly confined to lower slopes and riparian areas in Moose Creek, Bear Creek, and the Upper Selway Canyon. It is rare throughout the rest of the Forest.

Moist grand fir and cedar habitat types are dominant. Grand fir, Douglas fir and western red cedar were the dominant species. Western larch, western white pine, Engelmann spruce, and Pacific yew were less common. Ponderosa pine and lodgepole pine were minor. Small to medium fires occurred at infrequent intervals and large stand replacing fires at very infrequent intervals. About 40-50 percent of stands originated from mixed severity fire, and 50-60 percent from stand replacing fire. Small and scattered blocks (5-100 acres) of fire killed medium and large trees were common at any time within 10,000 acres of this VRU, and large blocks (500 to 1000 acres) were occasional. Old overstory trees were common on ridges and lower slopes. They could be Douglas fir, western larch, grand fir, or occasionally ponderosa pine. About 15-30 percent of stands had 10 or more trees per acre older than 150 years.

VEGETATION RESPONSE UNITS

Coastal disjunct plant species, early seral tall shrub and hardwood communities, and cedar old growth along major streams were important elements of this landscape. Western white pine was an uncommon element.

Relative proportion by size class was about 5-20 percent nonforest, 5-30 percent seedling/sapling, 10-20 percent pole, 30-50 percent medium tree, and 20-30 percent large tree.

DEPARTURES FROM HISTORIC

Western white pine has almost disappeared because of blister rust and forest succession. Shrub stages have decline 73 percent. Hardwood communities have also probably declined, although mapping inconsistencies suggest an increase. Seedling/sapling, and pole structural stages have increased as fire-created shrub fields have regenerated to forest. Medium tree stages have decreased and large tree size classes have increased. Harvest on National Forest lands has affected 6 percent of the VRU acres. The ratio of stand replacement harvest to mixed or low severity treatments has been about 60 percent replacement to 40 percent less severe treatments on National Forest lands. This relative proportion of stand replacement is at the high end of what would have occurred under natural disturbance regimes. About 38 acres have burned annually since fire suppression has become effective, a decline of 99 percent. Historically extensive snag patches are no longer being created as a result of fire suppression. Old growth is probably at the low end of the historic range, probably because of harvest.

VRU 9 – HIGH ELEVATION RIDGES, SUBALPINE FIR AND WHITE BARK PINE

HISTORIC COMPOSITION AND PROCESS

This VRU is better represented in this Subbasin than elsewhere on the Forest. It comprises 95,528 acres in the subbasin. It occurs at highest elevations in the eastern part of the Subbasin, primarily in wilderness and roadless areas.

Cold subalpine fir and whitebark pine habitat types are dominant.

This was the major stronghold of whitebark pine. Subalpine fir, Engelmann spruce, and lodgepole pine were common. Mixed severity fire occurred at frequent to infrequent intervals. About 40-60 percent of stands originated from mixed severity fire and 40-60 percent from stand replacing fire. Small to moderate (50-200) acres of fire killed trees were common at any one time in 10,000 acres of this VRU. Old whitebark pine or lodgepole pine was common on rock outcrop and open ridges. About 5-15 percent of stands had 10 or more trees per acre older than 150 years.

Whitebark pine and open alpine communities were important elements of this landscape.

Relative proportion by size class was 30-50 percent nonforest, 5-30 percent seedling/sapling, 5-60 percent pole, 5-40 percent medium tree, and 1 percent or less large tree.

DEPARTURES FROM HISTORIC

With advancing forest succession, fire suppression, and blister rust, whitebark pine has declined by 93 percent, and lodgepole pine and mixed conifer forest have increased by 35 to 55 percent. Montane park has increased on recent burns and areas of whitebark pine mortality. About 202 acres have burned annually since fire suppression became effective, a decline of about 65 percent. Advancing forest succession has resulted in an increase in seedling/sapling and pole stages, while loss of medium and large trees have declined 31-41 percent. No recorded harvest has occurred. Historically common snag patches are no longer being created as a result of fire suppression, but whitebark pine snags are much more abundant.

VRU 10 – UPLANDS, ALDER, GRAND FIR AND SUBALPINE FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is common only in the western half of the Subbasin. It comprises 50,254 acres. It is also common in the South Fork Clearwater subbasin and to the north. It is also called the grand fir mosaic.

Moist grand fir, subalpine fir, cedar and alder habitat types are dominant. Grand fir, Engelmann spruce, subalpine fir, western red cedar, and Sitka alder were historically important cover types. Douglas fir, western larch, lodgepole pine, and Pacific yew occurred on ridges. Small fires occurred frequently, but mixed severity very infrequent fire was typical, with stand replacement usually confined to ridges. About 40-60 percent of stands originated from mixed severity fire and 40-60 percent from stand replacing fire. Small blocks of (5-50 acres) fire-killed medium and large trees were common at any one time in 10,000 acres of this VRU. About 15-30 percent of stands had 10 or more trees per acre older than 150 years.

Open canopied and multi-aged old growth and tall shrub communities were important elements of this landscape.

Relative proportion by size class was 10-25 percent nonforest, 15-25 percent seedling/sapling, 20-30 percent pole, 20-30 percent medium tree, and 15-40 percent large tree. However, extensive areas might consist of mature forest at any one time.

DEPARTURES FROM HISTORIC

This VRU has been slightly affected by harvest. Shrublands (harvested areas) have increased. Other changes in cover type and size class appear to be due to mapping inconsistencies. Areas of high tree canopy cover have increased slightly. Area in old growth is still within historic range, but has been fragmented by harvest.

Harvest has affected about 7 percent of the Forest acres within the last 50 years. About 4 acres have burned annually since fire suppression became effective, a decline of about 99 percent. The ratio of stand replacement harvest to mixed or low severity treatments has been about 80 percent replacement to 20 percent less severe treatments. This relative proportion of stand replacement is higher than would have occurred under natural disturbance regimes. Historically occasional snag patches are no longer being created as a result of fire suppression.

VRU 12 - Stream breaklands, bunchgrass and shrubs

Historic Composition and Process

This VRU is rare in the subbasin and occurs at lowest elevations in the main canyon, generally on steep south aspects, with abundant rock outcrop. This VRU comprises 11,099 acres in the subbasin. Nonforest habitat types dominate this VRU, including warm and dry grassland steppe. Bluebunch wheatgrass dominated most grassland sites. Diverse perennial forbs occurred with the grasses. Sandberg bluegrass, prairie junegrass and Idaho fescue occurred less commonly. Shrub communities and warm dry ponderosa pine habitat types occurred on more sheltered aspects or areas with deeper soil, and more mesic forest habitat types in draws. Dwarf cryptogams and litter dominated the ground cover. Low severity fires burned at very frequent intervals.

DEPARTURES FROM HISTORIC

Grasslands have been invaded by non-native grasses and forbs. Cheatgrass and other annual grasses, knapweed, sulfur cinquefoil, and other non-native forbs are established on lower slopes, especially near trails and campsites. Departures of plant species composition are greater in this VRU and in similar settings in VRU 3, than in any other. This alteration has occurred with relatively little historic use by domestic livestock. The reduced levels of root biomass and litter associated with these annual grasses and forbs suggest that soil aggregation and resistance to erosion may be reduced in these areas. Loss of forage for ungulates and small mammals has

occurred. Species, community, and genetic diversity have been lost. About 1 acre has burned annually since fire suppression became effective, a decline of about 97 percent.

VRU 17 – ROLLING HILLS, CEDAR AND GRAND FIR

HISTORIC COMPOSITION AND PROCESS

This VRU is common in the western half of the subbasin, at mid elevations in Clear Creek, Ohara Goddard Creeks, Middle Fork Clearwater, and lower Meadow Creek. It comprises 36,417 acres. It is rare throughout the rest of the Forest, but common northward.

Mesic cedar and grand fir habitat types are dominant. Western red cedar and grand fir were historically important cover types. Douglas fir was less important and western white pine and western larch were uncommon. Small fires occurred frequently, but mixed severity infrequent fire was typical, with stand replacement very infrequent and usually confined to ridges. About 40-60 percent of stands originated from mixed severity fire and 40-60 percent from stand replacing fire. Small blocks of (5-50 acres) fire-killed medium and large trees were common at any one time in 10,000 acres of this VRU. About 25-35 percent of stands had 10 or more trees per acre older than 150 years.

Open canopied and multi-aged old growth and tall shrub communities were important elements of this landscape.

Relative proportion by size class was 10-25 percent nonforest, 15-25 percent seedling/sapling, 20-30 percent pole, 20-35 percent medium tree, and 15-40 percent large tree.

DEPARTURES FROM HISTORIC

As a result of harvest, shrublands have increased by 576 percent and large trees have declined by 58 percent. Herbaceous clear-cut openings now occur. Ponderosa pine and Douglas fir have declined with succession. Other changes in cover type have been minor. Tree canopy cover has declined substantially because of harvest.

Harvest has affected about 41 percent of the National Forest lands within the last 50 years. This is more than in any other VRU. In contrast, VRU 17 is one that functioned as naturally quite stable over long periods of time. Virtually no acres have burned annually since fire suppression became effective, a decline of 100 percent. The ratio of stand replacement harvest to mixed or low severity treatments has been about 60 percent replacement to 40 percent less severe treatments. This relative proportion of stand replacement is at the high end of what would have occurred under natural disturbance regimes. Historically occasional snag patches are no longer being created as a result of fire suppression.