

Vegetation Report Executive Summary

Affected Environment

Vegetation within the Pahvant analysis area has changed greatly over the last 150 years as a result of grazing by domestic livestock and fire exclusion. The assessment completed as part of the Prescribed Natural Fire Plan for the Fishlake National Forest indicates that the pinyon/juniper vegetation type has expanded while sagebrush/grass/forb communities have declined. Gambel oak communities have remained relatively stable but there is little diversity of age class and structure. BLM, state and private lands below the Forest Boundary are dominated by sagebrush and pinyon/juniper. Private lands have been greatly altered to provide croplands and pastures. BLM and state lands are experiencing the same encroachment of juniper into sagebrush/grass/forb communities as occurs on the Forest.

Please refer to the Vegetation Report for a detailed discussion of historical and existing vegetation condition and disturbance regimes.

Environmental Consequences

The No Action Alternative will not move any stands toward the desired future condition. Pinyon/juniper would continue to expand while sagebrush communities would decline. Vegetation diversity would decrease as stands become more homogeneous in species composition, age classes, and structure.

The Proposed Action would treat approximately 14,300 acres of Gambel oak, sagebrush, and pinyon/juniper. Treated areas would move toward the desired condition with increased species diversity, age classes and structure. However, due to the small portion of the analysis area being treated; there would be little effect at the landscape scale. Table 1 indicates the acres treated by vegetation type.

Table 1: Vegetation types to be treated and percent of type to be treated.

Vegetation Type	Acres of Vegetation Type in Analysis Area	Acres proposed for Treatment	Percent of Vegetation Type Treated
Gambel Oak	72,410	4,550	6
Sagebrush/Grass/Forb	70,570	3,140	4
Pinyon/Juniper	56,730	6,600	12
All Other Types	87,760		
TOTAL	287,470	14,290	5

There are several known locations of noxious weeds within or adjacent to proposed treatment units. It will be necessary to monitor areas treated with prescribed fire to determine if noxious weeds or invasive species threaten recovery of desired vegetation.

If noxious weeds or invasive species are present, appropriate treatment options would be analyzed. Areas that are broadcast prescribed burned would be rested from livestock grazing for two growing seasons to allow vegetation to recover.

The largest cumulative effect to vegetation on BLM and Forest Service lands will result from continued suppression of wildfires within the analysis area. Diversity of species composition, structure and age classes will continue to decline in all vegetation types at the landscape scale. Although wildland fires for resource benefits are allowed on Forest Service lands, political and resource concerns have generally limited the application of this management tool.

Please refer to the Vegetation Report, Environmental Consequences section for a more detailed discussion of direct, indirect and cumulative effects.

Pahvant Interagency Fuels Reduction Project

Vegetation

The vegetation analysis area for the Pahvant Interagency Fuels Reduction Project includes approximately 287,470 acres, incorporating those areas from the crest of the Pahvant Range west to Interstate 15. Most Forest Service lands lie within the Pahvant Range Geologic Subsection and most BLM and private lands lie within the Sevier Desert Subsection. Except for a small watershed that drains toward the north into the Scipio Valley the entire analysis area drains into the Pahvant Valley. Vegetation patterns and composition are ecologically similar throughout the analysis area. Aerial photo interpretation was used in conjunction with existing vegetation mapping to identify broad categories of existing vegetation within the Pahvant Analysis Area. These boundaries were adjusted as necessary to account for disturbances that have occurred since the photos were taken. Historical information is based on an assessment completed for the Fishlake National Forest Prescribed Natural Fire Plan (USDA 1998) as updated in 2002. Because treatments are only proposed within three vegetation types, this report will focus on Gambel oak, sagebrush/grass/forb, and pinyon/juniper communities.

Historical Perspective

Historically, fire was a dominant force on the landscape. Many plant communities were maintained in fire-induced disclimaxes that did not complete the successional path to the climax communities (USDA 1998). These historical patterns changed dramatically with the advent of livestock grazing (both sheep and cattle) in the mid 1800's and fire suppression efforts in the mid 1900's. Past fire management practices reduced the spread of fires and allowed many areas to become overstocked with fire-sensitive tree species (USDA, 2000). Grazing by ungulates and domestic livestock has and will continue to impact all fire-adapted ecosystems by removing fine fuels and preventing spread of fires (Burkhardt and Tisdale 1976, Bradley et.al. 1992, Ogle and DuMond 1997).

Pinyon/juniper has expanded greatly since the beginning of European settlement in the mid 19th century. Past overgrazing that reduced grasses and forbs, fire suppression, and changes in climate are all contributing factors. As a result of past heavy grazing and too few fires, grass/forb communities have converted to or are converting to lands dominated by sagebrush and/or pinyon/juniper (USDA 1998). Pinyon and juniper are very susceptible to fire caused mortality and under historic fire regimes these species tended to occur on rocky sites where there was not enough vegetation to carry a fire (Miller and Wigand 1994, Miller and Rose 1999).

Fire exclusion has increased density and decreased age class diversity in Gambel oak communities. In some areas, oak is more extensive than it was 75 to 150 years ago (Christensen 1949, Bradley et.al. 1992, Clary and Tiedemann 1992). Historically, more grass cover would likely have permitted frequent fires that would have inhibited seedling

establishment and killed smaller stems on the edges of existing oak clones (Bradley et.al. 1992). Research from southwest Colorado indicates that summer fires in consecutive years reduced the number of oak sprouts (Harrington 1985). On the other hand, research from west central Colorado indicates that oak has expanded very little in historical times (Brown 1958)

Affected Environment

Table 1 indicates the total acres and relative abundance of the major vegetation types within the analysis area. Please refer to Map 1 in Appendix A.

Table 1: Major Vegetation types within the analysis area.

Vegetation Type	Acres	Percent of Total
Gambel Oak	72,410	25
Sagebrush/Grass/Forb	70,570	24
Pinyon/Juniper	56,730	20
All Other Types	87,760	31
TOTAL	287,470	100

Gambel oak stands within the analysis area generally have a high component of other shrubs including sagebrush, mountain mahogany, serviceberry, currant, maple and snowberry. Over small areas, other species may actually be the dominant vegetation. Most oak stands also have a component of pinyon/juniper and occasionally other tree species such as Douglas-fir, white fir, or aspen. Many oak/mixed shrub stands are very dense and have a high component of dead. Due to fire exclusion, there are few newly regenerated stands. Oak clones are fairly stable but there may have been some expansion into other vegetation types along the edges of clones.

The dominant shrub in sagebrush/grass/forb stands is generally big sage. Associated shrubs may include oak, cliffrose, bitterbrush, and several species of rabbitbrush. A lack of fire has led to an increase in sagebrush density with a subsequent reduction in grasses and forbs. Pinyon/juniper are also actively encroaching on sagebrush sites in many locations. As pinyon/juniper density increases, shrubs and herbaceous plants decrease (Bunting et. al. 1999, Evans 1988). Many sagebrush and grassland areas have been treated to reduce or eliminate pinyon and juniper encroachment.

Pinyon/juniper stands in the Pahvant analysis area are generally dominated by juniper with pinyon being a minor component. Associated shrubs include Gambel oak, mountain mahogany, and cliffrose. On more mesic sites, Douglas-fir and white fir may be present. Pinyon/juniper are encroaching on oak/mixed shrub communities as well as sagebrush/grass/forb communities. As pinyon and juniper encroach on sagebrush/grass/forb communities there is often a sharp reduction in the herbaceous vegetation, particularly on dry sites with restrictive soil layers (Miller, Svejcar, and Rose 2000). Where crown closure is highest, pinyon and juniper dominated areas tend to have very little understory vegetation. An extensive lateral root system as well as deep roots make pinyon and juniper formidable competitors for water and nutrients; often

preventing growth of understory vegetation, even in the interspaces between trees (Evans 1988). Leachates from juniper and pinyon foliage inhibit the germination of some associated understory species although these effects are probably secondary to drought stress (Evans 1988).

Past disturbances have affected vegetation on approximately 103,000 acres within the analysis area. About 60,650 acres of this has occurred on private lands that have been treated to provide cropland or to maintain pastures for livestock. Wildfires have burned approximately 27,000 acres, although this figure could be greater since data is incomplete. Approximately 6,150 acres were chained and seeded with grasses between the 1960's and 1980's. Chaining is the process of uprooting unwanted vegetation, usually pinyon and juniper trees, by dragging a large chain between two crawler tractors. Terracing occurred on about 9,200 acres at higher elevations within the analysis area. Terracing or contour plowing was used on moderate to steeply sloping ground to reduce erosion on unstable soils. These areas had been overgrazed in the late 1800s and early 1900s and were seeded with grasses to re-establish vegetation following treatment.

National Forest lands within the Pahvant analysis area were assessed as part of the Pahvant subsection of the Fishlake National Forest Prescribed Natural Fire Plan (USDA 1998). This assessment was updated in 2002 as more accurate vegetation data became available. Properly functioning condition (PFC) exists when all plants, animals, and physical parts of an area are sustainable. This occurs when soil, water, plants, and animals are dynamic and resilient to disturbance (USDA 1998). A comparison of historical vegetation with current vegetation on the Fishlake National Forest indicates that many vegetation communities are not resilient to disturbance and therefore not in PFC. The desired future condition (DFC) for landscapes is to restore them to PFC while meeting the goals and objectives of the Forest Plan and Resource Management Plan. Within the Pahvant subsection pinyon/juniper and sagebrush/grass/forb are two vegetation types that are furthest from the desired future condition. Less than 10 percent of the pinyon/juniper type and less than 25 percent of the sagebrush/grass/forb type are currently considered to be in properly functioning condition. The assessment recommends reductions in the pinyon/juniper cover types with corresponding increases in the sagebrush/grass/forb cover types as the DFC. Over 70 percent of Gambel oak stands are in PFC so treatments would be to improve age class and structural diversity. Please refer to the Fishlake National Forest Prescribed Natural Fire Plan (USDA 1998) and Appendix B for further information.

There are approximately 3,070 acres of noxious weeds identified on BLM and Forest Service lands within the analysis area. These include musk thistle, white top, scotch thistle, yellow toadflax and leafy spurge. Please refer to Map 2 in Appendix A. Herbicide treatments have been applied to these areas and they are monitored on a yearly basis to determine if there has been recurrence or spread. There is no information on noxious weeds that may be present on private or state lands within the analysis area.

Environmental Consequences

Cumulative Effects Common to All Alternatives

The cumulative effects area for vegetation is the same as the analysis area.

Past activities such as grazing, fires, chaining, terracing, conversions to croplands and pasture on private lands, and fire exclusion have all had impacts to vegetation. These disturbances have been analyzed to develop the existing vegetation condition described in the Affected Environment section. Please refer to Map 3 in Appendix A.

Ongoing activities on federal lands within the analysis area include livestock grazing, hunting, ATV use, cricket control, noxious weed control, electronics sites, developed recreation sites, other facilities, dispersed recreation, fire suppression, and thinning of juniper and pinyon. Of these, only livestock grazing, fire suppression, noxious weed control, and thinning of pinyon and juniper will have impacts to vegetation over large areas. Other activities may impact vegetation on small sites.

Grazing tends to reduce the height of grasses and forbs that carry fire. In some areas that are heavily impacted by grazing, there may be a reduction in the number of grasses and forbs. These factors may reduce the potential for naturally occurring fires to spread under moderate weather conditions. Nonetheless, approximately 27,000 acres have burned within the analysis area since 1972. Since 1970 there have been over 350 fires within the analysis area, most of which were suppressed. Please refer to Map 4 in Appendix A. It is likely that a much larger area would have burned had these fires not been suppressed. Even though the importance of wildfires in maintaining vegetation diversity across the landscape is recognized and the Fishlake National Forest allows the use of wildland fires for resource benefits, it is likely that most wildfires will continue to be suppressed in the future to protect other resource values and uses.

Noxious weed control is continuing on known locations within the analysis area. Sites are monitored and treated each year unless weeds are no longer present. This will help control spread of unwanted species, particularly following any large-scale disturbance such as wildfire.

Alternative 1 – No Action

The analysis of Alternative 1 assumes no treatment and no natural disturbance such as wildfire in the short term.

Direct and Indirect Effects

Gambel Oak

Changes in Gambel oak communities will be minor over the short term. Shrub density will continue to increase and the dead component of these stands will also increase. Grasses and forbs will decrease with increased shrub density. A slow expansion of

Gambel oak into other communities will occur at the edges of clones. Pinyon/juniper will increase as a component of these stands, further decreasing the grasses and forbs. Over the long term pinyon/juniper encroachment will also decrease the amount of shrubs.

Sagebrush/Grass/Forb

Sagebrush will increase as a component of sagebrush/grass/forb communities causing a decrease in associated grasses and forbs. On some sites, pinyon/juniper encroachment into sagebrush communities will continue, leading to a further reduction of grasses and forbs. As the pinyon/juniper component increases over the long term, sagebrush and associated shrubs will also be lost.

Pinyon/Juniper

Pinyon/Juniper communities will continue to increase in density with a corresponding reduction of associated grasses and forbs.

Alternative 1 - Cumulative Effects

Pinyon and juniper have been felled or will be felled on approximately 5,600 acres of BLM lands within proposed treatment units, as per the Holden, Frampton, and Meadow EAs, updated in June 1999. Treatments will occur within both pinyon/juniper and sagebrush/grass/forb vegetation types. Grasses, forbs, and shrubs will increase in these areas without further treatments. Over the long term, increased fuel loading as a result of debris from these treatments increases the risk of high severity wildfires. If a high intensity wildfire were to occur during periods of low soil moisture, loss of existing vegetation could delay vegetation recovery or allow encroachment by noxious weeds or invasive species.

Over the long term, wildfires are likely to occur within the analysis area. The size and severity of these fires will vary but based on past wildfires within the analysis area, the results will be an improvement in diversity of plant species, structure and age classes for all vegetation types. For sprouting species such as Gambel oak that recover quickly following disturbance, these effects are often short term. In some areas high severity fires may delay vegetation recovery. Noxious weeds are capable of rapid expansion following disturbance. However, this has not been noted after past wildfires within the analysis area.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

Table 2 shows acreage and percentage of each vegetation type that would be treated within the analysis area. Only five percent of the analysis area would be treated.

Table 2: Vegetation types to be treated and percent of type to be treated.

Vegetation Type	Acres of Vegetation Type in Analysis Area	Acres Proposed for Treatment	Percent of Vegetation Type Treated
Gambel Oak	72,410	4,550	6
Sagebrush/Grass/Forb	70,570	3,140	4
Pinyon/Juniper	56,730	6,600	12
All Other Types	87,760		
TOTAL	287,470	14,290	5

Approximately 25 percent of the areas proposed for treatment were chained in the past to remove pinyon, juniper, and shrubs and promote grasses for forage. Although records are incomplete, it is estimated that approximately 4 % of proposed treatment areas were burned in wildfires sometime in the early 1980s. Approximately 40 to 80% of the acres indicated would actually be treated by cutting or the use of prescribed fire. Prescribed fire is likely to burn a higher percentage of acres in those units where pinyon and juniper have been thinned prior to burning because there would be more continuous fuels to carry fire.

There is potential for prescribed fires to burn outside designated units. All fires that burn outside units will be considered escaped fires and appropriate suppression action taken. Because such a small percentage of the analysis area is proposed for treatment compared to treatment levels recommended in the Prescribed Natural Fire Plan, escaped fires are likely to benefit vegetation diversity and move burned areas toward the desired future condition regardless of vegetation type involved. Suppression efforts, such as machine fire line construction, could also delay vegetation recovery but relatively small areas are generally impacted.

Gambel Oak

Because ground fuels within Gambel oak communities tend to be discontinuous, a mosaic of burned and unburned areas would be created. This mosaic would create structural as well as age class diversity. Following prescribed fire, there would be an increase in grasses and forbs. Shrubs that regenerate from seeds, such as sagebrush and curl leaf mountain mahogany may also increase in abundance. Gambel oak and many associated shrubs, such as maple and serviceberry, sprout following death of the above ground portion of the plant. Therefore, vegetation recovery is rapid and increases in other plant species may be of relatively short duration. The sprouting species can be expected to reach pre-burn height within seven to fifteen years. Encroaching pinyon and juniper would be greatly reduced in burned areas. Pinyon and juniper within the Grabalt Unit would be thinned within Gambel oak areas prior to burning so treatment would be more effective than in other areas where only prescribed fire would be utilized within the oak vegetation type.

Thinned Sagebrush/Grass/Forb and Pinyon/Juniper

All of the sagebrush/grass/forb vegetation type proposed for treatment occurs on BLM lands. Approximately 3,140 acres of this vegetation type has been or will be hand treated to thin encroaching pinyon and juniper (EA updated in 1999). An additional 5 acres is proposed for similar treatment in the Grabalt Unit.

Approximately 2455 acres of the pinyon/juniper vegetation type has been or will be thinned to restore shrubs, grasses, and forbs on BLM lands. Additionally, approximately 1840 acres of pinyon and juniper in the Grabalt Unit would be thinned under the proposed alternative. Grasses, forbs and shrubs would increase on these sites without further treatment due to improved moisture availability.

The proposed action would allow burning of the thinning debris within these sagebrush and pinyon/juniper sites to remove hazardous fuels. Prescribed burning would reduce the potential for a high intensity wildfire causing damage to existing vegetation over large areas. Prescribed burning may damage existing vegetation where fuels are heaviest. Because prescribed burning would occur under moderate weather and fuel moisture conditions, the potential for resource damage would be greatly reduced compared to a wildfire. However, seeding of grasses, forbs, and/or shrubs may be desirable on some sites following treatment.

Unthinned Pinyon/Juniper

The remaining 2475 acres of pinyon/juniper would be treated with prescribed fire only. Because ground fuels within pinyon/juniper communities tend to be discontinuous, a mosaic of burned and unburned areas would be created. Grasses, forbs, and shrubs are expected to recover rapidly following treatment. Where pinyon and juniper are densest, there may be little ground vegetation and recovery may be delayed. Sprouting shrubs, such as oak, that are often associated with pinyon and juniper would respond the quickest. Shrubs like cliffrose and curleaf mountain mahogany that regenerate from seed would take longer to become established. Some sites where ground vegetation is currently lacking and where fire burns with high intensity may require seeding to quickly establish ground cover.

Noxious Weeds/Invasive Species

There are approximately 180 acres of musk thistle and 20 acres of white top within areas proposed for treatment. Although noxious weeds have the potential to expand rapidly following disturbance, this has not occurred following past wildfires within the analysis area. There is potential for cheat grass to invade treated sites at lower elevation. Areas where vegetation recovery is delayed may require seeding to prevent cheat grass establishment.

Alternative 2 - Cumulative Effects

Recovery of vegetation may be delayed if grazing is allowed to occur before vegetation is established following burning. Grazing may also encourage dominance of less desirable plants or noxious weeds over more desirable species. The project design would defer grazing from broadcast prescribed burn areas for two growing seasons following

treatment. This should be adequate to protect the vegetation resource, but environmental factors may affect the time it takes vegetation to recover.

Over the long term, wildfires are likely to occur within the analysis area. The size and severity of these fires will vary but based on past wildfires within the analysis area, the results will be an improvement in diversity of plant species, structure and age classes for all vegetation types. For sprouting species such as Gambel oak that recover quickly following disturbance, these benefits are often short term. In some cases high severity fires may delay vegetation recovery. The risk of high severity wildfires would be reduced within treatment areas. However, because such a small percent of the analysis area is being treated there will be little impact at the landscape scale.

Monitoring

Locations where broadcast prescribed fire is used would be monitored to determine if noxious weeds have expanded into treated areas and to determine if vegetation recovery is adequate enough to permit resumption of livestock grazing. If noxious weeds or invasive species would be located, appropriate treatments options would be analyzed. Generally, visual inspections of treated areas should be sufficient to accomplish monitoring objectives.

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Date

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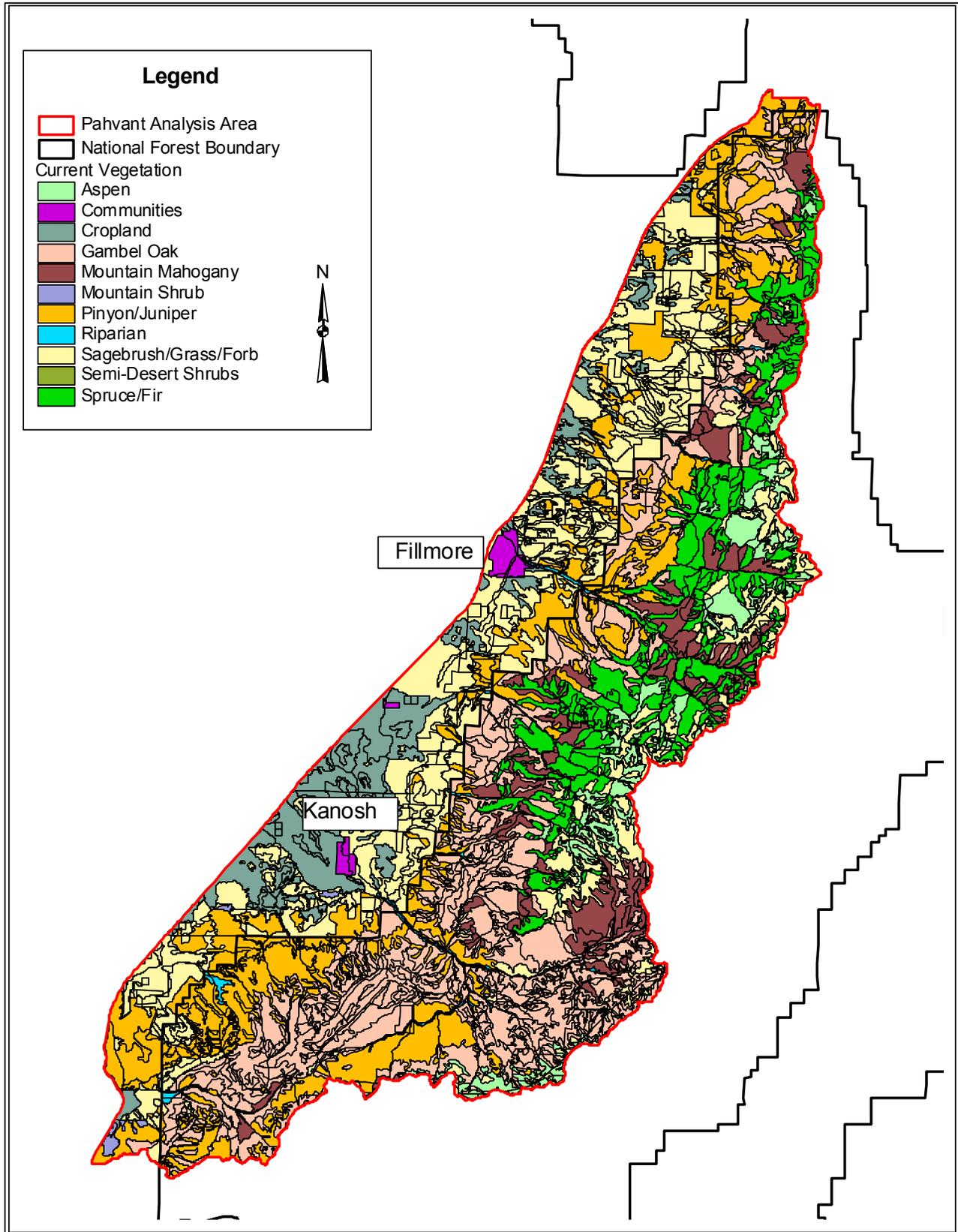
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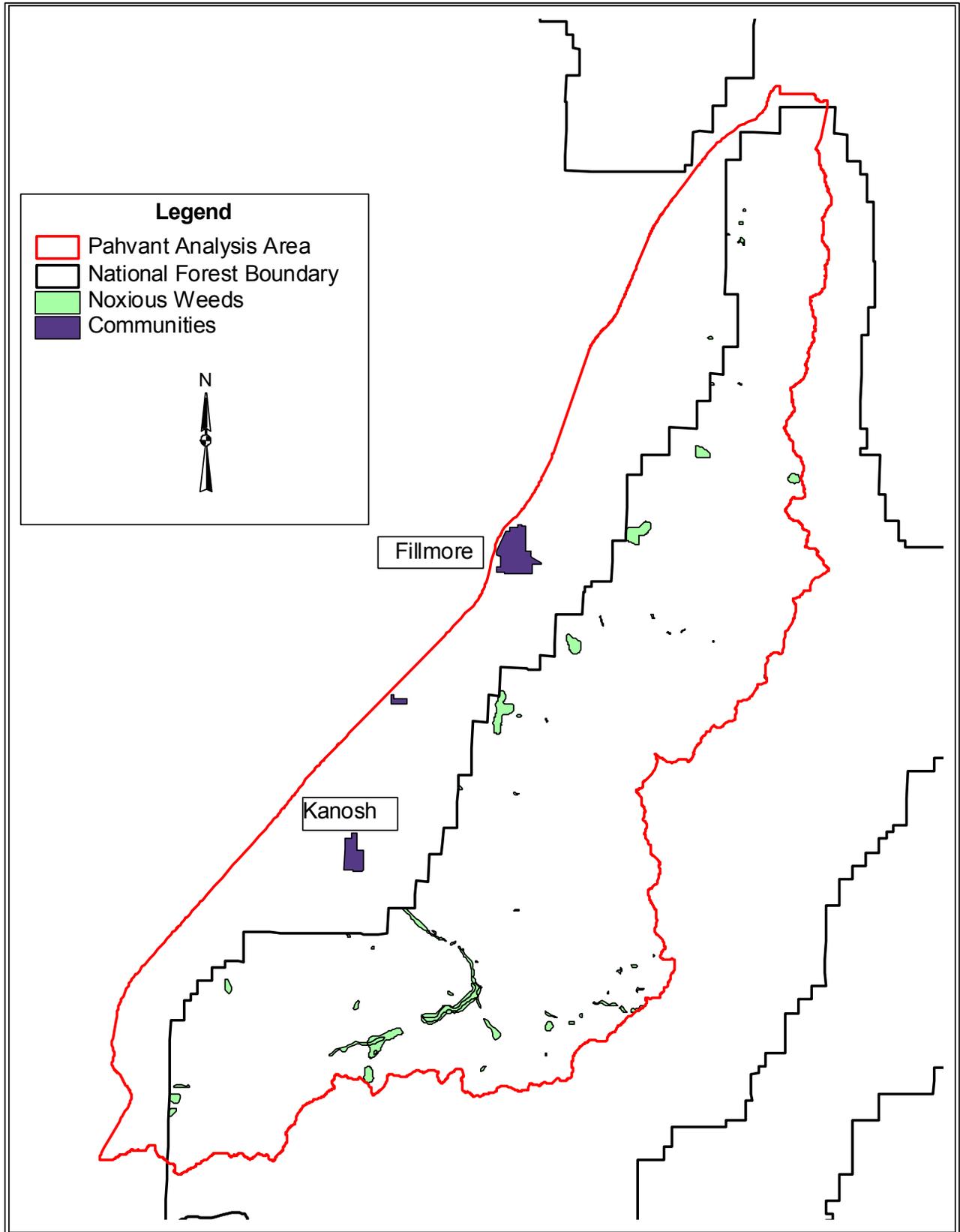
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Appendix A: Maps

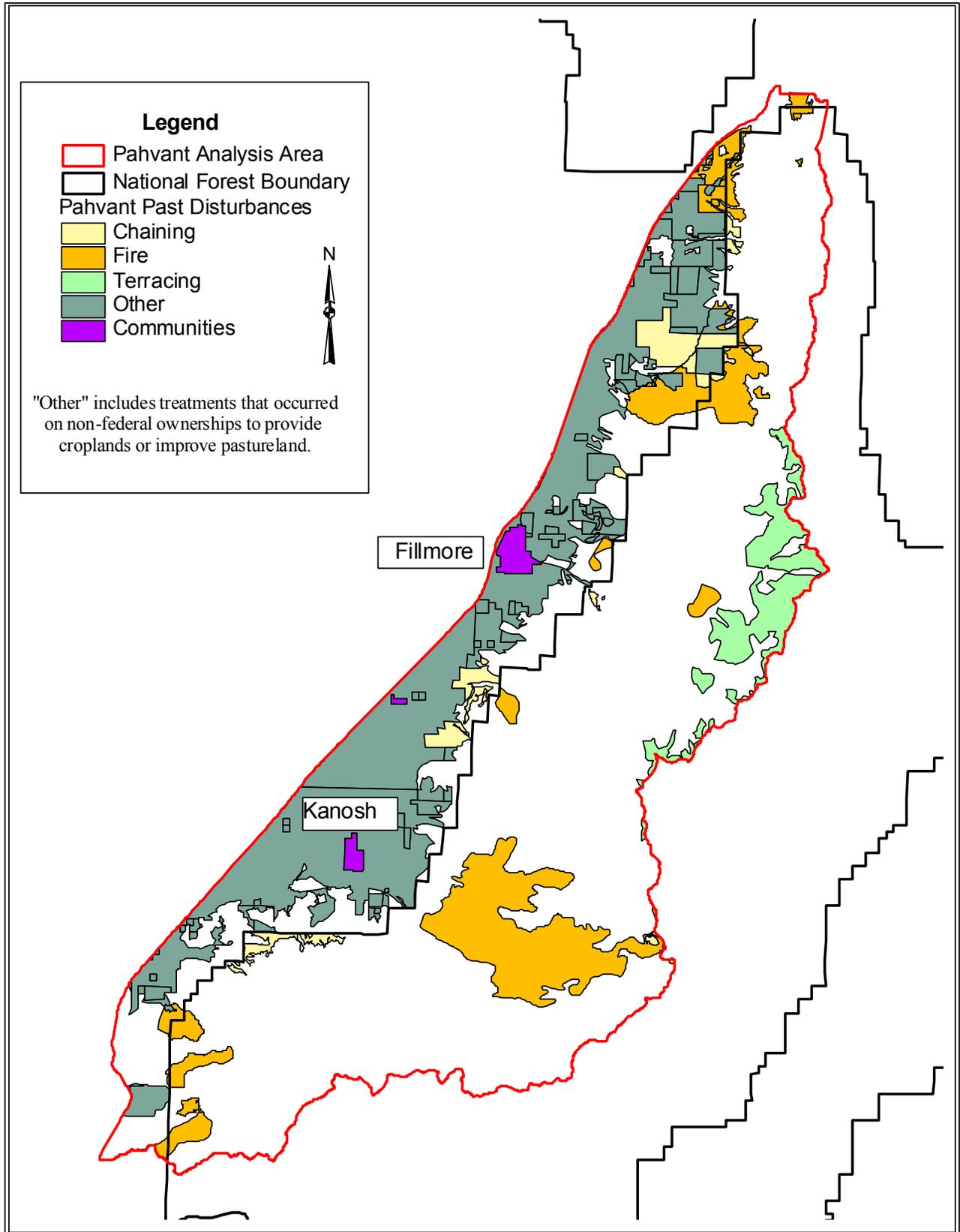
Map 1: Current Vegetation



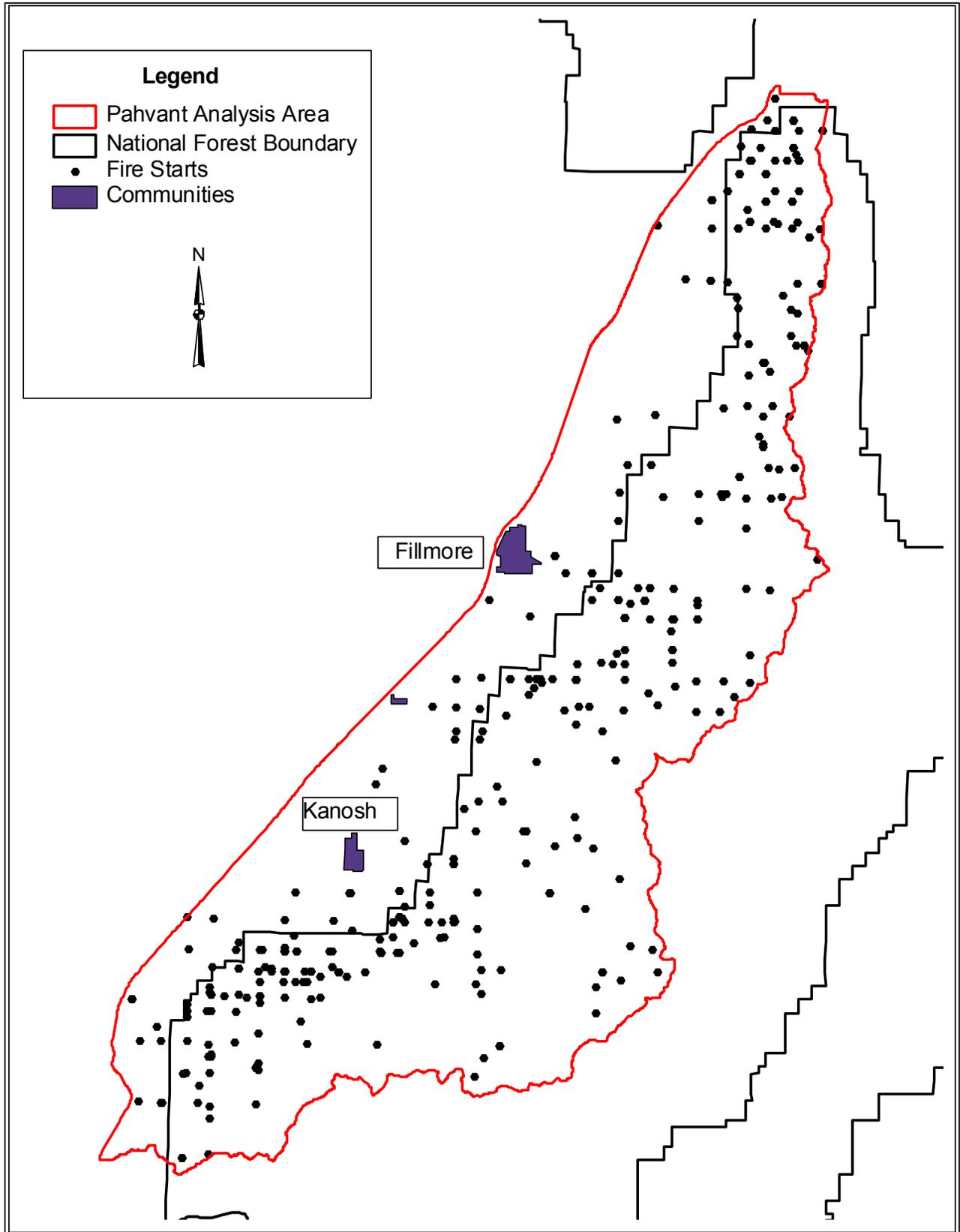
Map 2: Noxious Weeds



Map 3: Past Disturbances

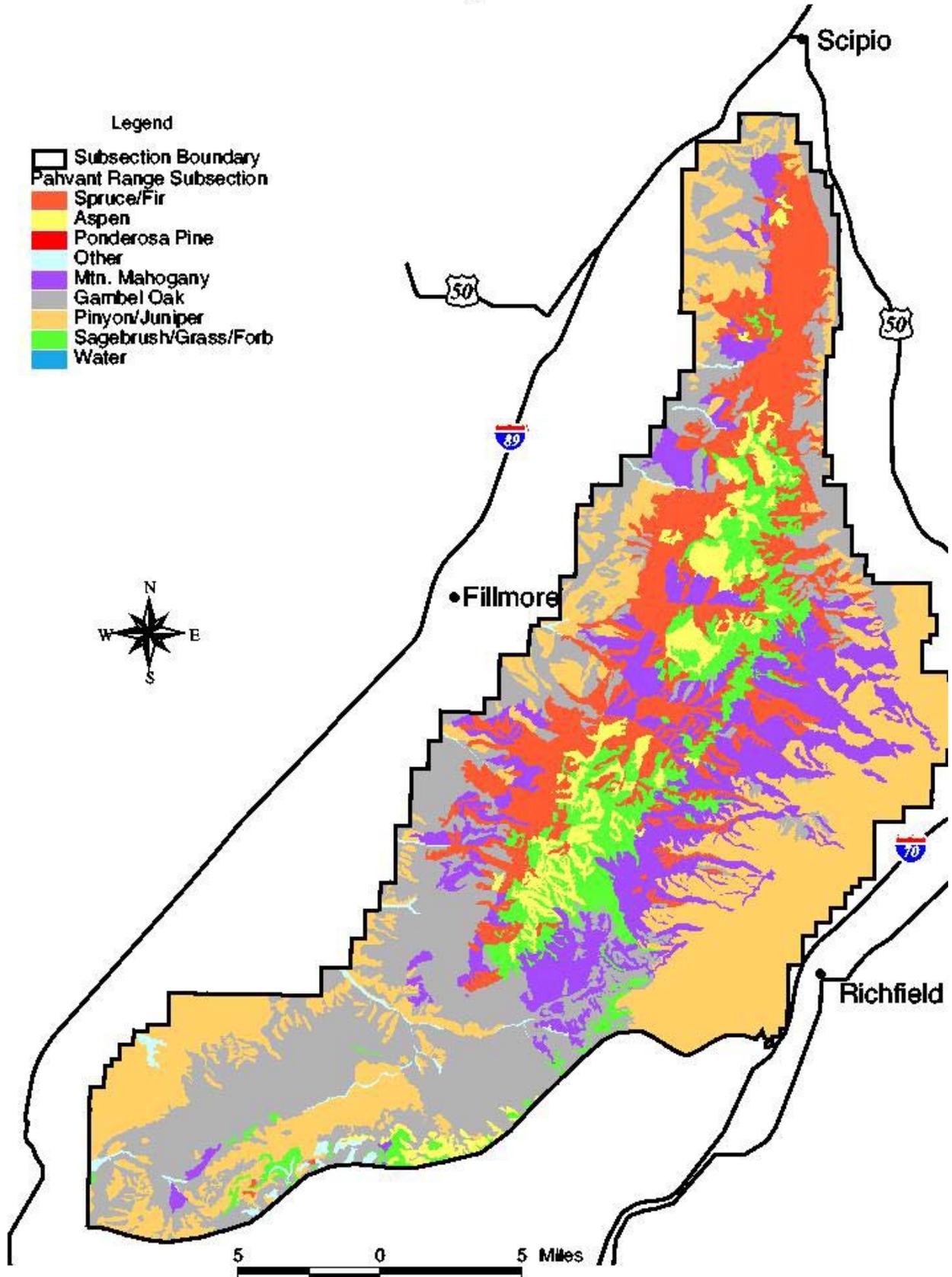


Map 4: Past Fire Occurrences



**Appendix B: Prescribed Natural Fire Assessment
Information (USDA, 1998; Revised 2002)**

Pahvant Range Subsection



Vegetation Type	Pahvant Subsection (acres)						Veg Type
	Historical	Existing	Desired	HPFC	EPFC	DPFC	
Spruce/Fir	7000	46000	25000	7000	4000	22500	S/F
Aspen	38000	12000	20000	38000	2000	18000	As
Ponderosa Pine	3000	0	3000	3000	0	2700	PP
Other	3000	3000	3000	3000	2000	2700	O
Mountain Mahogany	41000	41000	41000	41000	30000	36900	MM
Gambel Oak	92000	83000	85000	92000	60000	76500	GO
Pinyon/Juniper	17000	85000	40000	17000	8000	36000	P/J
Sagebrush/Grass/Forb	91000	22000	75000	91000	5000	67500	S/G/F
Totals	292000	292000	292000	292000	111000	262800	

HPFC = Historic Properly Functioning Condition

EPFC = Existing Properly Functioning Condition

DPFC = Desired Properly Functioning Condition

Properly functioning condition (PFC) exists when all plants, animals, and physical parts of an area are sustainable. This occurs when soil, water, plants, and animals are dynamic and resilient to disturbance (USDA 1998). A comparison of historical vegetation with current vegetation on the Fishlake National Forest indicates that many vegetation communities are not resilient to disturbance and therefore not in PFC. The desired future condition (DFC) for landscapes is to restore them to PFC while meeting the goals and objectives of the Forest Plan. This table displays the disparity between the existing vegetation condition, the historical condition and the desired condition. Pinyon/juniper, sagebrush/grass/forb, spruce/fir and aspen are furthest from the desired condition. Lack of fire has allowed pinyon/juniper to expand into sagebrush/grass/forb communities and for sagebrush to increase as a component of these communities. Both these factors have led to a decrease in the grass and forb components. Not only is there less sagebrush/grass/forb vegetation type than there was historically, but most existing communities are not in PFC. Not only has pinyon/juniper expanded into other plant communities, it has increased in density within sites it occupied historically. Therefore, less than 10 percent of existing pinyon/juniper stands are considered to be in properly functioning condition. About 70 percent of existing Gambel oak stands are in properly functioning condition but there is often a lack of structural and age class diversity.

The desired condition does not attempt to recreate the historical condition. This is probably not feasible nor desirable in light of other resource goals and objectives for National Forest lands as identified in the Fishlake National Forest Land and Resource Management Plan.

