CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

Document Structure

The Forest Service has prepared this Final Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Final Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action, the implementation of fuels reduction activities, and alternatives to the proposed action. The document is organized into four chapters:

- *Chapter 1. Purpose and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also discusses how the Forest Service informed the public of the proposal.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3. Affected Environment and Environmental Consequences*: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource issue.
- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
- *Appendices:* The appendices provide more information to support the analyses presented in the environmental impact statement.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record.

Background

Since 2003, three separate landscape scale forest condition analyses have been completed within the study area, including one conducted by the Forest Service. The "Sourdough Creek Watershed Assessment", (Bozeman Watershed Council, Bozeman, 2004) was a study contracted by a private interest group that provided baseline resource information and identified conditions which limit watershed integrity and function within the Bozeman Creek watershed. This analysis showed that the Bozeman Creek municipal watershed is "at risk of high severity fire and fuel reduction measures may be necessary to protect water quality from extensive sediment delivery". The Bozeman Watershed

Council has recommended the Forest Service reduce the heavy fuel loading through vegetative fuel treatments, including prescribed fire, timber harvest and thinning.

The City of Bozeman contracted with Western Groundwater Services to complete a Source Water Protection Plan focusing on the water supply sources for Bozeman's public water system. The report studied the potential impacts that could occur to these sources and identifies activities the city could use to protect these source waters. It concluded that wildfire is the highest potential threat to the Hyalite Creek and Bozeman Creek watersheds. The report states, "a significant wildfire in one drainage would likely enter the other resulting in a complete shutdown of the City of Bozeman water treatment plant during runoff events" (City of Bozeman Source Water Protection Plan, Western Groundwater Services, Bozeman, 2004).

The Gallatin National Forest conducted a watershed analysis and risk assessment for the entire 50,000 acre Bozeman Municipal Watershed (Bozeman Creek drainage and Hyalite Creek drainage) in 2003. Initial assessment indicated that both Bozeman Creek and Hyalite Creek should be analyzed together because of their proximity and similar vegetative conditions. Fire simulation models showed that a large fire started in either Bozeman Creek or Hyalite Creek could easily burn into the adjacent drainage, resulting in simultaneous impact on both major sources of city water supply. Like other studies, a key finding of this assessment was that burned areas could become significant sources of sediment and ash delivery to streams. Major rainfall or runoff events following a wildfire could result in heavy sediment loads that would exceed the capacity of the city's water treatment plant. Under such conditions, which could last from days to weeks and persist for several years following a major fire event, the city could be incapable of meeting water demand, resulting in a critical shortfall of the local water supply. Another conclusion of the Forest Service assessment was that a major wildfire within the municipal watershed would pose significant danger to both firefighters and the recreating public due to limited road access in these areas. These findings helped Forest Service managers determine that both Hyalite and Bozeman Creek drainages were high priority, full suppression areas in the event of a wildfire (USFS, Bozeman Municipal Watershed Risk Assessment. Bozeman, MT, 2003).

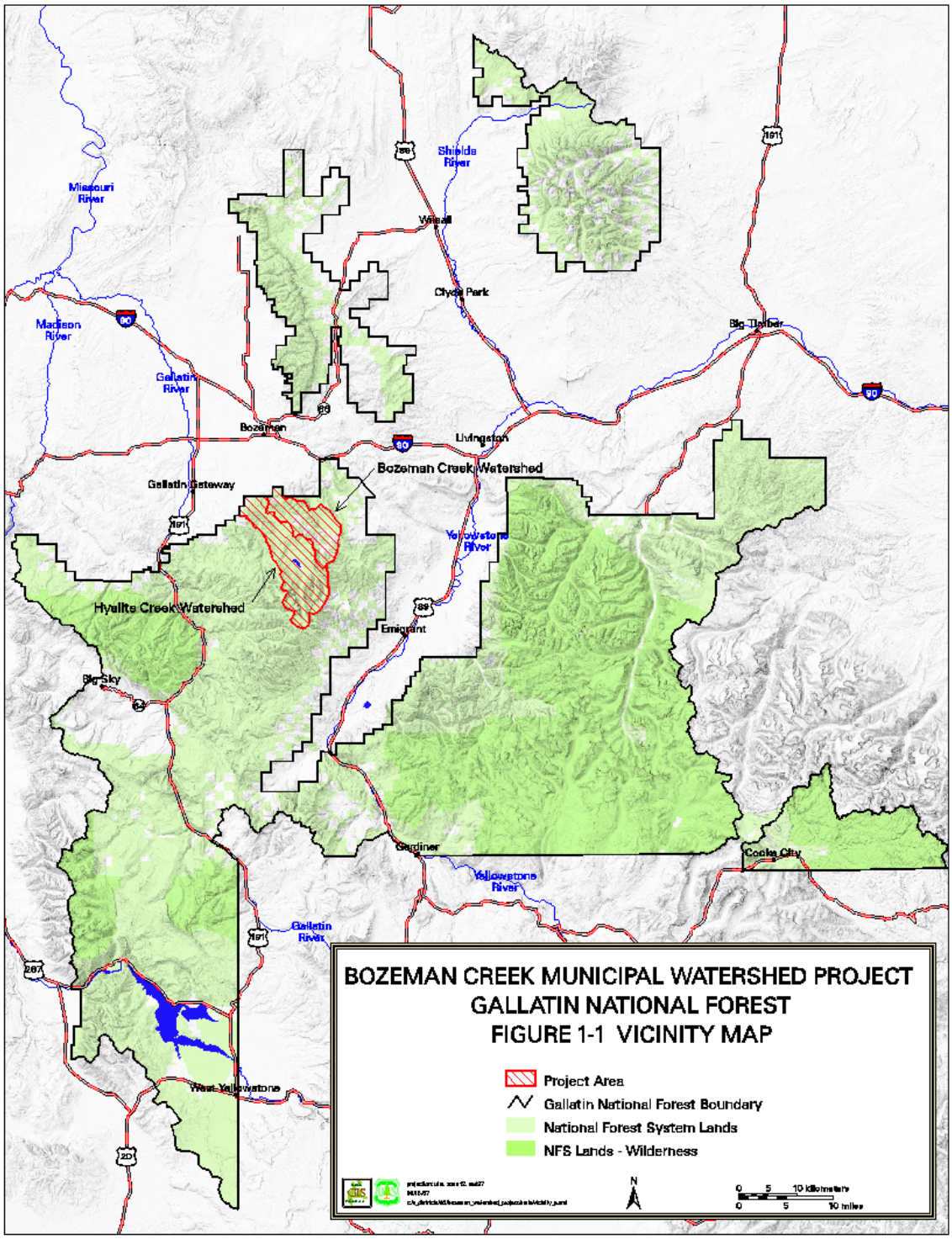
These studies, coupled with discussions involving local and state government officials, prompted Gallatin National Forest personnel to begin working with key stakeholders to find solutions to the serious fuels situation and to protect the long term municipal watershed health. Watershed sedimentation models were used to identify the limitations on the areas of potential treatment that could occur in the drainage and remain within Forest Plan standards.

The Bozeman Ranger District has worked with the following groups and organizations to discuss the assessment findings and potential activities relative to the identified watershed risks:

- Bozeman Watershed Council
- Bozeman City Commissioners
- Bozeman City Staff

- Montana Department of Natural Resources
- Sourdough & Rae Fire Department
- Gallatin County Commissioners

Based on these findings and collaborative discussions, the Bozeman Ranger District proposes to implement a fuels reduction project within the Bozeman Creek and Hyalite drainages and to begin restoration of the fire-adapted ecosystem.


Missouri River
Madison River
Gallatin River
Shields River
Wilsall
Clyde Park
Big Timber
Bozeman
Livingston
Bozeman Creek Watershed
Gallatin Gateway
Yellowstone River
Hyalite Creek Watershed
Emigrant
Big Sky
Gardiner
Cooke City
West Yellowstone
BOZEMAN CREEK MUNICIPAL WATERSHED PROJECT
GALLATIN NATIONAL FOREST
FIGURE 1-1 VICINITY MAP
Project Area
Gallatin National Forest Boundary
National Forest System Lands
NFS Lands - Wilderness
N
0 5 10 Kilometers
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Restoration of Fire-Adapted Ecosystems

(Exerpted from Mimicking Nature's Fire, Restoring Fire-Prone Forests in the West, Stephan F. Arno and Carl E. Fiedler, Island Press, 2005, page 39).

"The philosophy of restoration forestry seems intuitively sensible: To the extent feasible, return the vital natural fire process and its useful effects to forests that evolved under its influence."

"The compelling case for forest restoration today parallels legendary ecologist Aldo Leopold's call for watershed restoration early in the 20th century….Although natural fires can be returned to their historical role in some secluded backcountry areas with mixed or stand replacement fire regimes, we must rely on judicious tree cutting (at least initially) and prescribed burning to restore most other fire-prone forests in the West." p.203

"Studies of fire history and forest succession coupled with decades of experience in fire behavior and suppression shows that fuels in today's forests differ markedly from those associated with the historical understory and mixed fire regimes (Arno 2000, Quigley, Haines, and Graham 1996)….Studies focused on historical understory and mixed fire regimes commonly reveal that the structure of contemporary stands contrasts with pre-1900 conditions, with many current stands being outside the range of historic variation (Agee 1993, Arno 2000, Morgan and others 1994)….The historical stand was much more likely to survive the average fire… .Absent fire, the understory trees out-compete the old trees for moisture and nutrients. The old trees loose vigor and often succumb to insects, disease, or the stress imposed by burning in even low- to moderate-intensity fires (Arno, Scott, and Hartwell 1995, Biondi 1996)." Pp.31-32

"Today, the concept of restoration forestry is broadly accepted by federal land managers but is scarcely known to the public. Restoration forestry in its many forms is being implemented in diverse forest types in on different ownerships across the West….Present knowledge is sufficient to carry us beyond today's mostly small, isolated projects toward larger treatment areas and landscape-scale strategies. However, despite deteriorating forest conditions and unprecedented fire hazard across millions of acres, the proposition that restoration forestry is an ecological and practical imperative has not gone unchallenged." P.12

Current Vegetative Condition

The Bozeman Municipal Watershed analysis area can be characterized as a landscape dominated by steep canyons and timbered slopes in the lower reaches of Bozeman and Hyalite creeks. Dominant vegetative types communities include Douglas-fir and lodgepole pine. There are also minor amounts of aspen, some grassland and sagebrush sites, and grassland/meadows where Douglas-fir is encroaching. Douglas-fir generally occurs on the warmer, drier aspects (south-west), and lodgepole pine on the cooler, moister aspects (north to east). Many of the middle to upper slopes that are cooler and

moister have a mixture of Douglas-fir and lodgepole pine, as well as Englemann spruce and small amounts of subalpine fir.

The entire Hyalite and Bozeman Creeks area is approximately 91 percent forested with lodgepole pine, Douglas-fir, subalpine fir, Englemann spruce and whitebark pine. The general area is composed of cool to moist Douglas-fir habitat types (about 18 percent) on the lower elevations facing south and west, with cooler and moister subalpine fir habitat types at the higher elevations or on the lower elevations facing north and east (about 82 percent). The most common habitat types include: subalpine fir/twinflower, subalpine fir/grouse whortleberry, subalpine fir-whitebark pine/grouse whortleberry and whitebark pine

Forested stands are predominantly single-storied, but two-storied and multi-storied stands also occur across the project area. Stand composition ranges from a mix of Douglas-fir and lodgepole pine (about 5 percent), pure Douglas-fir (26%), lodgepole pine (about 44 percent) to a mix of subalpine fir, Englemann spruce and lodgepole pine (15%). Whitebark pine stands are found at the highest elevations (and comprise about 11 percent of the forested area). About 88 percent of the stands within the entire general area are moderately to well stocked with cover from 40% to 90%.

Basic timber stand information for the project area is based on intensive and quick plot stand examinations and mathematical regression estimates. Tree densities range from 120 to 4400 trees per acre. On steep, north and northwest-facing slopes, stand densities are at the higher end of the range with 200 to 500 trees per acre greater than 5 inches diameter at breast height. On the more gentle slopes, overall densities are highly variable, but densities in trees greater than 5 inches diameter at breast height are between 200 and 300 trees per acre. Average stand diameters range from 1 to 15 inches with the majority between 6 and 9 inches at breast height. Tree heights typically average less than 70 feet. Stands in both drainages are predominantly in the mature and older age/size class (72%) with fewer stands labeled as seedling or sapling (18%) as shown by the following tables.

Table 1. Forest Size Classes In Bozeman Creek (based on 17,317 forested acres)

Successional Stages	Acres	Successional Stage Percent
Forested Grass	138	<1%
Seedling	140	<1%
Sapling	1,496	9%*
Pole	1,636	9%*
Mature	8,287	48%
Old Growth	5,620	32%

Table 2. Forest Size Classes In Hyalite Creek (based on 20,641 forested acres)

Successional Stages	Acres	Successional Stage Percent
Forested Grass	486	2%
Seedling	1,075	5%
Sapling	3,731	18%
Pole	2,329	11%
Mature	7,247	35%
Old Growth	5,773	28%

Lodgepole pine old growth is found at all elevations and aspects. This forest type has a natural fire frequency that ranged from thinning fires on a 35 to 40 year frequency to stand replacing fires approximately every 150 to 200 years. Without periodic disturbances like fire, subalpine fir eventually dominates. Subalpine fir old growth is found at most elevations and aspects with a natural fire frequency similar to lodgepole. On Douglas-fir sites, natural fire frequency ranges from 35 to 45 years.

Existing Fuels Condition

Bozeman and Hyalite Creeks both drain to the north into the Gallatin Valley. The terrain is steep with many small side drainages flowing east and west into the main streams. These minor drainages create terrain features of alternating north and south aspects that repeat up and down both sides of Bozeman and Hyalite Creeks. One exception is the divide between the two drainages where the slopes are gentler as the ridge tops become more broad and rounded. Some of the terrain falls to the north toward the valley, mainly within 1 mile of the forest boundary, in the northern part of the proposal area. This complex terrain with all aspects represented (dry southerly and west to cool, moist northerly and east) results in vegetative patterns and fuel conditions that are also complex. Elevations in the area range from about 5300' at the mouths of the canyons to over 7800' on the higher ridges.

The forested landscape in the proposal area was more open under historic conditions, particularly on the high energy aspects (southerly to west) that tended to burn more often. The trees were more widely spaced apart due to low intensity surface fires that tended to thin out the smaller trees (underburning). A low intensity or cool fire is one that has minimal impact on the site. This type of fire burns in surface fuels consuming only the litter, herbaceous fuels, and foliage and small twigs on woody undergrowth, but can still kill small conifers. Very little heat travels downward through the duff. The effects of this type of fire are considered ***low severity***. There were also more natural openings where more intense burning created mosaics of surface fire and crown fire. This type of burn is considered mixed or ***moderate severity***. This tends to occur more on the cool, moist sites that burn under less common drought conditions. Moderate severity fires can pose a threat to water quality.

Fire along with insects and disease has been the major ecological disturbance to the area, which is typical of western coniferous forests. Timber harvest and fire suppression have replaced wildfire as the primary disturbance process. Biomass accumulates faster than it decomposes in these dry forest types of the interior West. Fire is the ecological force that restores balance to these ecosystems. The decrease in fire occurrence in the ecosystem has disrupted the process, which adds to available fuel and changes forest structure. These changes increase the potential for uncharacteristically severe surface fires that can initiate and sustain crown fires (Graham et al, 2004, pg.35). The natural cleansing and renewal process that natural fire disturbance brings has been mostly eliminated.

The forest landscape cover type is dominated by mature forest as described above. The past 60–80 years of successful fire suppression has eliminated the low intensity underburning that occurred historically. The understory vegetation, particularly of shade tolerant tree species, flourishes in areas where it was typically killed by frequent low intensity, surface fires. Forested stands have become dense and crowded with increased ladder fuels (attached low branches close to the ground, and small trees growing up into the crowns of larger trees). Dead and dying trees and accumulated surface fuels have increased. These fuel conditions set the stage for wildland fires to potentially burn extensively as active crown fires, rather than underburns or mosaics of light surface fire and patches of crown fire.

Historically, undergrowth and ladder fuels are removed by the low intensity fire, resulting in little to no mortality in mature trees (Fischer, Wm. and B.D. Clayton, 1983, Fire Ecology of Montana, Forest Habitat types East of the Continental Divide, INT General Technical Report 141, 83pp.). Ladder fuels are an important factor in a fire reaching the crowns (tops) of the trees, which is usually fatal to an individual tree. A fire may become very severe, under the right weather conditions, such as drought and high winds. The fire may spread through the crowns at high intensity, killing entire stands (stand replacement fire), consuming large woody fuels and removing the entire duff layer over much of an area. The effects of this type of fire are considered ***high severity***. These types of fire pose a threat to water quality.

Along with the fuel conditions, weather and climate, and physical setting are the factors that influence fire behavior (Graham et al, 2004, pg.17). Fire behavior is the way fire ignites and spreads. Climate can influence when fires will occur and readily burn. The climate is cool and dry, with periods of heavy snow in winter followed by spring rains. A hot, dry period usually dominates in July and August. Average annual precipitation is 25 inches at 5300' and increases with elevation (Sourdough Creek Watershed Assessment, 2004). The fire season typically runs from late June through September. Wind is the primary weather factor affecting fire spread. The wind prevails from the west and southwest in this area. However, terrain features such as canyons can funnel and steer the winds in the direction of their flow, which could be southerly in this case. In the absence of strong prevailing winds, fire will tend to spread in the direction and speed dictated by the local diurnal conditions and topographic features. Thunderstorms and associated lightning ignite natural wildland fires in the area.

Both the Bozeman and Hyalite Creek road systems are potential evacuation corridors for the recreating public in the area should a large fire event occur. At the same time, these

roads are the access route for incoming firefighters and equipment to fight the fire. This is essentially a one-way in, one-way out situation in both drainages. The corridors are narrow and winding with few places to pull off the road or turn vehicles around. Hyalite Canyon is one of the most heavily used recreation areas on the forest. This is a safety concern because of potential traffic jams during a fire event. The situation is compounded when smoke impairs visibility and breathing; heat, flames and burnt trees falling can block passage along the corridors and potentially injure firefighters and the public.

Much of the vegetation along both sides of the Bozeman and Hyalite roads are in a high fire hazard condition. The vegetation is such that tree density is greater and dead and down fuel loadings are higher because natural fire frequencies have been missed. This means there is great potential for fires to burn hotter and spread faster. Safety concerns outlined above in regards to the evacuation corridors could begin to be mitigated with fuel reduction treatments.

Firefighters are experiencing greater fuel loadings, increased ladder fuels from multi-storied stands, dense canopy closures and continuity that can support active crown fires, and the complexities that exist from interface fires. Land managers have the ability to modify fuels, which has a direct result on fire behavior. In a national survey, nearly 80% of all wildland firefighters identified fuel reduction as the single-most important factor for improving their margin of safety on wildland fires (Tri-Data 1996).

Fire History

Fire, insects and disease have played a definite role in determining the current vegetative composition and structure. Fire in the area occurred either as localized spot fires or as large conflagrations. Based on fire history studies in adjacent areas such as the Spanish Peaks breaks (Losensky-1993), and the Squaw Creek drainage (Losensky-1993) to the southwest, there have apparently been no major fires in the area since the mid to late 1800's. One of the latest documented examples of a large, stand replacement fire event near the project area was the fire of 1881 that burned along both sides of the Gallatin Canyon from the Big Sky area to Spanish Creek. The fire was about 40 miles long in distance, and about 45,000 acres in size (Lee Metcalf Wilderness Fire Management Guidebook, 1997). Another example noted by local historians, "effects of a large fire in 1909 are still visible on Mount Ellis" (Sourdough Creek Watershed Assessment, 2004). From that time until recently, large fires have been rare partly due to increased effectiveness of fire suppression.

Fire occurrence records from 1940 to 2004 identify 64 fires in the Bozeman and Hyalite drainages (see project files). Twenty five fires were lighting caused (40%), and 39 human caused (60%). Only one fire reached Class C in size (10-100 acres) and was lightning caused. Another study in the area for the Madison Range notes that approximately 7500 acres/year should have burned historically and only 81 acres/year (average) have burned in a period 1940 through 1994 (Jones,1995). This study and the recent records for the analysis area highlights the fact that the Forest Service and the other federal wildland fire agencies have become very successful at their active fire

suppression efforts, thus the term "fire exclusion". National statistics show the fire agencies are 98% successful at initial attack, therefore 2% of the wildfires cause the most problems and most expenditure of funds (National Interagency Incident Management Study, 2005, p13).

Numerous large fires have occurred on the Gallatin National Forest in recent years. The most notable near the analysis area are Bostwick (1991, 1100 ac), Fridley (2001, 26,000 ac), Purdy Creek (2001, 5,000 ac), and Big Creek (2006, 14,000 ac). These last three fires were in close proximity to the project area. The 2006 Derby Fire near Big Timber was not near the project area, but may be indicative of the severity of wildfire in extremely hot and dry conditions.

Wildland Urban Interface (WUI)

The Hyalite Creek and Bozeman Creek drainages have been designated as wildland urban interface by Community Wildfire Protection Plan (Gallatin County, 2008). It identifies the project area as being within the designated protection plan area.

The area along the northern boundary of the project area where private land meets national forest land constitutes the wildland urban interface (WUI). There are several homes and sub-divisions in this WUI area. Many of the homes are within one half mile from the forest boundary. Wildland Urban Interface is defined as: The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (Healthy Forests Restoration Act (HFRA) of 2004).

For at-risk communities that have not yet designated their WUI areas as part of a Community Wildfire Protection Plan, 2004, the HFRA has a default definition of WUI. It is an area:

- Extending ½ mile from the boundary of an at-risk community, OR
- Extending 1½ miles from the boundary when other criteria are met such as: sustained steep slopes that create potential fire behavior that endanger the at-risk community; a geographic feature that aids in creating an effective firebreak, such as a road or ridgetop, OR
- Is in Condition Class 3, OR
- Adjacent to an evacuation route. There is no distance limitation for evacuation routes.

Bozeman's Water Supply

Bozeman and Hyalite Creeks are the primary sources of water supply for the City of Bozeman. The City has water intake diversions on both streams near the Forest boundary with pipelines to the City Water Treatment Plant near the Bozeman Creek trailhead. Approximately 80% of the City waters supply originates from the two drainages with an additional minor source in Lyman Creek in the Bridger Mountains. Water quality in both Bozeman and Hyalite Creeks is good and in compliance with water quality standards. The Montana DEQ water quality standards for both drainages are very restrictive. Bozeman Creek is designated as A-Closed

and Hyalite Creek as A-1. These are non-degradation classifications with no allowable point sources of pollution and very strict controls on turbidity and non-point sources.

The City of Bozeman water treatment plant has a treatment output capacity of 15 million gallons/day with average use of about 4-5 millions gallons/day, winter use 2-4 gallons/day, and peak summer use of about 12-14 million gallons/day. The treatment plant uses a direct filtration process, followed by filtration and chlorination. Wildfire related ash deposits and sediment in Bozeman and Hyalite Creeks due to increased erosion in wildfire areas could be a major potential source of contamination to Bozeman's water supply. A large wildfire in Hyalite and Bozeman watersheds could result in short to long term loss of water supply from a few days to several weeks. The most at risk situation would be heavy rainfall within 2 years of a major wildfire. In the event of temporary closure of the treatment plant, water could be rationed from the storage tank on the east side of Bozeman with about a 3 day drinking supply if conservatively used (City of Bozeman, Water Facility Plan 2006). In a prolonged shutdown Bozeman residents may need to use bottled water until the treatment plant resumes operation.

The City contracted with Allied Engineering for the facility plan which recommended renovations to the treatment system. The upgraded treatment plant would cost several million dollars and would not be completed for 6-8 years (City of Bozeman, 2006. Water Facility Plan).

Management Direction for Restoration and Fuels Reduction

The Forest Service has current direction from the Gallatin National Forest Plan (1987), the National Fire Plan (2000), the Cohesive Strategy ("Protecting People and Sustaining Resources in Fire-Adapted Ecosystems", 2000), the Healthy Forests Initiative (2002), and Healthy Forests Restoration Act (2004) to focus attention and effort on protecting communities including municipal watersheds.

The **Gallatin National Forest Plan, 1987** has the following goals, objectives and standards pertaining to fire management.

Goals: Use prescribed fire to accomplish vegetative management objectives. Provide a fire protection and use program which is responsive to land and resource management goals and objectives.

Objective: Prescribed fire will be used as a tool to carry out vegetative management activities.

Standards: Treatment of natural fuel accumulations to support hazard reduction and management area goals will be continued. Prescribed fire (planned or unplanned ignitions) may be utilized to support management area goals.

2001 Review and Update of the 1995 Federal Wildland Fire Management Policy:

- Protection of human life is the first priority in wildland fire management.

- Fire Exclusion efforts, combined with other land-use practices, have in many places dramatically altered fire regimes so that today's fires tend to be larger and more severe.
- Agencies must create an organizational climate that supports employees who implement a properly planned program to reintroduce wildland fires.
- Where wildland fire cannot be safely reintroduced because of hazardous fuel build-ups, some form of pretreatment must be considered, particularly in Wildland Urban Interface areas.

Managing the Impact of Wildfires on Communities and the Environment – A Report to the President In Response to the Wildfires of 2000 (a.k.a.,The National Fire Plan). *Key Point #3*: Hazardous Fuel Reduction. Invest in projects to reduce fire risk. *Operating Principle #4*: Hazardous Fuel Reduction. Assign highest priority for hazardous fuel reduction to communities at risk and municipal watersheds where conditions favor uncharacteristically intense fires.

Protecting People and Sustaining Resources in Fire-adapted Ecosystems: a Cohesive Strategy to Reduce Over-Accumulated Vegetation (a.k.a., The Cohesive Strategy). Focuses on priorities of the National Fire Plan: wildland-urban interface, municipal watersheds, threatened and endangered species habitat and maintenance of Condition Class I areas.

The Healthy Forest Initiative (2004) and **Healthy Forest Restoration Act (2004)** continue to prioritize wildland urban interface lands. Although, the project design does not utilize streamlined processes developed through those policies, the alternatives are responsive to those priorities.

The Forest Service only has jurisdiction for potential fuel reduction treatments on public lands in the WUI areas. The Forest Service does have responsibility to collaborate and cooperate with private landowners in the WUI. Through education and encouragement of private landowners to treat fuels on their property and make their homes fire safe, we can work towards a common goal.

The current fuel situation in the WUI, the terrain, prevailing winds, and long term drought are conditions that pose a concern for a potential wildfire to spread either from the Forest to private lands or from private lands onto the Forest. The WUI for this analysis area is along the northern boundary where private land meets National Forest Land in both Hyalite Creek and Bozeman Creek; and along the northwest boundary adjacent to the ridge between Hyalite Creek and Cottonwood Creek. The common goal would be to reduce fuels in the WUI. This will begin to reduce conditions for initiation and spread of crown fire, which will lessen the fire behavior potential of a fire spreading from or to National Forest System (NFS) lands and into the municipal watershed.

The Northern Region's Restoration and Protection Strategy (2005) starts with the National Forest Service Strategic goals and uses integrated objectives to prioritize and accomplish Regional ecosystem restoration and protection of social values at risk. The

Strategy is intended to be dynamic and will be continually amended as needed to address new information, changed conditions, or changes in National priorities.

This strategy seeks to develop a common vision for addressing resource conditions across geographic areas independent of National Forest administrative boundaries. It promotes integration among programs and budgets and is used for setting priorities for investments for restoration and protection projects.

The focus of the Northern Region Restoration and Protection Strategy is to:

- Restore and maintain high value watersheds in a properly functioning condition.
- Restore and maintain wildlife habitats, including restoring more resilient vegetation conditions where appropriate, to meet ecological and social goals.
- Protect people, structures and community infra-structure (roads, bridges, and power corridors,) in and associated with the wildland-urban interface (WUI).

Some of the specific resources and values that are identified by this strategy and which are influenced by natural processes and cultural treatments include community infra-structure, watersheds and fish habitat, and municipal watersheds as sources for community water supply.

Purpose and Need for Action

Project Purpose and Need

The purpose of this project is to help reduce the risk of severe and extensive wildfire on the National Forest lands within the municipal watershed to help maintain a high-quality, long term, water supply for Bozeman area residents through cooperative efforts with the City of Bozeman. Severe wildfire is characterized as an uncontrollable crown fire that burns entire stands of timber and threatens structures, wildlife habitat, and soil and water resources. Extent of wildfire refers to spread and size of the fire. Objectives for this project include the following:

1. Begin reducing the potential severity and extent of future wildland fires in the Bozeman Municipal Watershed by restoring and changing vegetative and fuel conditions in order to reduce the risk of excess sediment and ash reaching the municipal water treatment plant because of a wildfire.

Need: Wildfire related ash deposits and sediment in Bozeman and Hyalite Creeks due to increased erosion in wildfire areas would be a major potential source of contamination to Bozeman's water supply. A wildfire of large and severe extent in Hyalite and Bozeman watersheds could result in short to long term loss of water supply from a few days to several weeks. The most at risk situation would be heavy rainfall within 2 years following a major wildfire. In the event of temporary closure of the treatment plant, water could be rationed from the storage tank on the east side of Bozeman with about a 3 day drinking supply if conservatively used. In a prolonged

shutdown Bozeman residents may need to use bottled water until the treatment plant resumes operation.

2. Treat vegetation and fuel conditions along road corridors that will provide for firefighter and public safety by beginning to modify potential fire behavior.

   Need: Both the Bozeman and Hyalite Creek road systems are potential evacuation corridors for the recreating public in the area should a large fire event occur. At the same time, these roads are the access route for incoming firefighters and equipment to fight the fire. This is essentially a one-way in, one-way out situation in both drainages. The corridors are narrow and winding with few places to pull off the road or turn vehicles around. Up to 2000 vehicles per day may be entering Hyalite Canyon on a busy summer weekend day with the potential for traffic during a fire. The need is to provide more time for safe evacuation of the public at the same time that firefighters are entering the area.

3. Reduce vegetation and fuel conditions in the wildland/urban interface (WUI) to reduce potential fire spread and intensity between National Forest System lands and adjacent private lands.

   Need: The current fuel situation in the WUI, the terrain, prevailing winds and long term drought are conditions that pose a concern for a potential wildfire to spread either from the National Forest to private lands or from private lands onto the National Forest. It would be unacceptable to allow a fire spreading from the National Forest to threaten private property and conversely, a fire spreading from private land onto the National Forest. The WUI for this analysis area is along the northern boundary where private land meets National Forest Land in both Hyalite Creek and Bozeman Creek; and along the northwest boundary adjacent to the ridge between Hyalite Creek and Cottonwood Creek. The common goal would be to reduce fuels in the WUI, which will reduce conditions for initiation and spread of crown fire, which will lessen the fire behavior potential of a fire spreading from or to National Forest lands.

Proposed Action

The Proposed Action

The proposed action was presented to the public during scoping process (see Public Involvement section in this chapter). It was designed to achieve the purpose and need for action. Other alternatives to the Proposed Action are detailed in Chapter 2 and are designed as alternative ways to meet the purpose and need.

The actions proposed include:

* Partial harvesting and thinning is proposed for about 2,200 acres of mature timber stands. Ground based, skyline, and helicopter harvest systems would be used to implement this harvest and thinning.
* Mechanical cutting and piling of younger, small diameter trees would occur on about 1,150 acres. Hand piling would be used in some places.
* Prescribed burning would occur in the thinned stands after harvest or cutting.
* Approximately 850 acres of prescribed burning in less dense stands is proposed.

Project Area

The project area is at T 3S., R 5 and 6E and encompasses approximately the lower one third of the Bozeman Creek and Hyalite Creek drainages beginning just to the north of the Moser Creek Road and the Langohr Road in the Hyalite drainage. The northern part of Hyalite is drained by Hodgman Creek and Leverich Creek. The project area on the eastern side includes a portion of the Gallatin Fringe Inventoried Roadless Area. The area along the northern boundary of the project area where private land abuts National Forest land constitutes the wildland urban interface (WUI) with several homes and sub-divisions in this WUI area. Many of the homes are within one half mile from the forest boundary.

The City of Bozeman water treatment plant is located just outside the National Forest boundary on Bozeman Creek. Two water diversion dams that channel water to the treatment plant, one each on Bozeman and Hyalite Creek, are approximately one mile inside the Forest boundary adjacent to the paved Hyalite Road and the closed Bozeman Creek Road.

Detail of Treatments Being Proposed

To achieve a meaningful reduction in fire severity and extent, the proposed action would treat extensive areas of forested land within these two drainages to reduce forest density, increase crown base height and reduce existing high levels of down woody debris. The proposed treatments would be implemented over an eight to ten-year period and concentrated within the lower reaches of both drainages. In order to maintain a reduced level of fire severity and probability, future maintenance treatments would likely be necessary as the forest grows and changes.

Changes since the DEIS

Regardless of the silvicultural treatment or the harvest method, the follow up fuels treatment on all slopes <35% could be done with mechanized equipment such as an excavator. The sentence "Machine piling and burning would be done on slopes <35% whether helicopter, cable or ground based harvest" was added to each of the treatment descriptions.

Thinning and partial harvest in mature timber stands

Treatments proposed include harvesting in mature stands of timber, cutting smaller diameter trees and leaving larger ones to reduce the fuel loading and break up the vertical and horizontal composition of the fuels. Fuel treatment could be whole tree yarding, pile burning and jackpot or understory burning, or biomass removal. Machine piling and burning would be done on slopes <35% whether helicopter, cable, or ground based harvest. Overall about 30% to50% of the trees in a stand would be removed. There would be an approximate 100 foot buffer from Hyalite or Bozeman Creek with handpiling only for the fuel treatment. The actual buffer would be based on distance and topography.

Thinning in small diameter stands

Mechanical or hand cutting and piling smaller, younger trees would reduce the density of small diameter stands. These are areas with past harvest in the upper slopes and divide between Bozeman Creek and Hyalite Creek. There may be commercial products in some of the stands. Many fuel treatment options are available depending on products and market. Mechanical processing may be most efficient as far as economics and production. Cutting with chainsaws, hand pile and burning may be the most costly and labor intensive. Machine piling and burning would be done on slopes <35% whether helicopter, cable, or ground based harvest. Whole tree yarding, selling post and poles, selling chips for pulp or hog fuel are some options. Other machines are available that can chop, crush and shred otherwise un-merchantable material to reduce fuels. Follow-up burning is desirable. Limit the treatment to areas that can be reached from the existing roads.

Prescribed burning in thinned stands

Fuel treatment could include whole tree yarding to remove most of the fuels left after harvest. Where needed these activity and natural fuels would be understory burned if helicopter yarded or cable yarded, or machine piled and burned if using ground based system. Machine piling and burning would be done on slopes <35% whether helicopter, cable, or ground based harvest. Machine piles could be done by several methods during the harvest or after, such as feller-buncher, grapple piling or excavator piling. Other fuel treatment options could be incorporated such as cut and trample with the feller-buncher, or cut-to-length forwarders that also trample slash. It would still be necessary to follow up with prescribed burning.

Prescribed burning

Prescribed burning in less dense stands of trees to reduce ground cover and smaller trees in order to keep the stands in an open condition with less chance of rapid fire spread. Spring or fall burning could be used.

Combined Effect of Treatments

The combined treatments change the landscape's fuel loading and distribution of fuels to reduce the potential for large scale and severe wildfires. The goal of treatments, either a combination of mechanical and prescribed fire or prescribed fire alone, is to convert or restore sites of high or moderate fire hazard to moderate or low; and keep low fire hazard areas from becoming moderate or high. These areas would become more fire resilient and display fire behavior such as lower intensity more characteristic of the site.

Relationship To The Gallatin Forest Plan

Gallatin Forest Plan

The Gallatin Forest Plan (1987) embodies the provisions of the National Forest Management Act, its implementing regulations, and other guiding documents. The Forest Plan sets forth in detail the direction for managing the land and resources of the Gallatin National Forest. The Bozeman Municipal Watershed Project FEIS tiers to the Forest Plan FEIS, as encouraged by 40 CFR 1502.20. Chapter 3-5 includes a summary by resource of the standards and guidelines established in the Forest Plan that are pertinent to this action. The proposed action is also supported by the following Forest Plan direction:

Forest Plan Goals

- Use prescribed fire to accomplish vegetative management objectives. (p. II-2)
- Provide a fire protection and use program, which is responsive to land and resource management goals and objectives. (p. II-2)

Forest Plan Objectives

- Prescribed fire will be used as a tool to carry out vegetative management activities. (p. II-6)

Forest Plan Standards

- General Standards: Forest lands and other vegetative communities such as grassland, aspen, willow, sagebrush and whitebark pine will be managed by prescribed fire and other methods to produce and maintain the desired vegetative condition. (p. II-19)

- Fire Standards: Treatment of natural fuel accumulations to support hazard reduction and management area goals will be continued. (p. II-28)

The Forest Plan uses management areas to guide management of the National Forest lands within the Gallatin National Forest. Each management area (MA) provides for

a unique combination of activities, practices, and uses. The Bozeman Municipal Watershed project area includes six management areas. The majority of the timber harvest and thinning activities involved with this project would occur in MA5, MA8, MA12, and MA17 with some harvest areas in MA7, and MA9. The majority of prescribed burning would occur in MA12. All fuel reduction activities associated with the proposed action comply with Forest Plan guidelines for the applicable MAs.

The Forest Plan (Chapter III) contains a detailed description of each management area as it relates to significant issues. Following is a brief description of the applicable management area direction for each of the MAs affected with the proposed action:

Management Area 5 (MA 5) These areas include travel corridors that receive heavy recreational use. They are classified as suitable for timber production and should be managed to provide a diverse vegetative pattern. Acceptable harvest methods include even-aged and uneven-aged harvest systems including commercial and pre-commercial thinning if they enhance recreational values. Design, construct, reconstruct, and maintain roads consistent with management area goals and traffic demands. Prescribed burning may be used to meet management goals. Emphasize fire prevention contact.

Management Area 7 (MA 7) This management area consists of riparian zones across the forest. It will be managed to protect the soil, water, vegetation, fish and wildlife dependent on it. These areas are classified as suitable for timber production if adjacent areas contain suitable timber. Design timber harvest to meet the needs of riparian dependent species. Commercial or pre-commercial thinning may be used. Prescribed fire may be used to meet management goals. *Note: These areas often times are too narrow to be displayed on forest MA maps due to the small scale of these maps.*

Management Area 8 (MA 8) These areas consist of lands that are suitable for regulated timber harvest. They provide for productive timber stands and optimize timber growing potential for sustained timber production. Portions of these areas have been roaded and many of these roads have been closed to protect other resources. Prescribed fire may be used to meet the management area goals

Management Area 9 (MA 9) These areas consist of suitable timber lands which have high dispersed recreation value and are visually sensitive. The recreation opportunity spectrum class is roaded natural appearing. The roads in these areas are managed for dispersed recreation and the trail system is maintained to enhance dispersed use. Prescribed fire may be used to meet the management area goals.

Management Area 12 (MA 12) MA 12 provides goals and objectives to maintain and improve the vegetative condition to provide habitat for a diversity of wildlife species and a variety of dispersed recreation opportunities. Harvest of

post, pole, and other wood products can take place adjacent to existing roads. Prescribed burning can also be used on lands within this MA to meet management area goals.

Management Area 17 (MA 17)- These areas are grasslands or nonproductive forest lands on slopes less than 40 percent that are suitable for livestock grazing and contain important big game habitat and heavily used portions of range allotments. Allow for harvest of post and poles and other wood products in areas adjacent to existing roads. Prescribed fire may be used to meet management area goals.

Lands Suitable for Timber Production

Management Areas 5, 7, 8, and 9, above are MAs that have been designated in the Gallatin Forest Plan as suitable for timber production. Management Areas 12 and 17 are designated as not suitable for timber production. Timber harvest for the purpose of thinning stands to reduce the severity and extent of potential wildfire occurs in all these MAs in the municipalwatershed. The following provides the rationale for harvest on MAs designated as not suitable for timber production.

The National Forest System Land Management Planning; Final Rule at 36 CFR Part 219.12 (a) (4) states:
"(4*) Other lands where trees may be harvested for multiple use values other than timber production.* Designation of lands as not suitable for timber production does not preclude the harvest of trees on those lands for salvage, sanitation, or other multiple resource purposes. Except for lands described at paragraph (a)(2)(i)(E)of this section, timber harvest harvest may be used as a tool to assist in achieving or maintaining applicable desired conditions or objectives."

The reasons for harvest in MAs 12 and 17 fit the reasons in this paragraph.

Decision to be Made

This Final EIS is not a decision document, it does not identify the alternative to be selected by the Deciding Official. This document discloses the environmental effects of implementing the proposed action and the alternatives to that action. The Gallatin Forest Supervisor, Mary Erickson, is the Deciding Official. Based on the analysis documented in this FEIS and comments received on the DEIS, she will make a decision on the project. Her decision and rationale for that decision will be documented in the Record of Decision.

The decisions to be made are:

- The kinds of fuel treatments that would best help to reduce the severity and extent of potential wildfire in the lower reaches of the municipal watershed. This includes harvest and post-harvest treatment of fuels.
- The amount and location of the treatments to be most effective in reducing the severity and extent of potential wildfire.
- Location of temporary road construction and standards for rehabilitation of roads and skid trails.
- The short term risk and tradeoff to resources such as water quality and visuals that these activities would cause weighed against the long term risk of severe wildfire.
- Whether a project specific amendment for visual quality standards for certain units of land is appropriate.

The Forest Service has signed a Memorandum of Understanding with the City of Bozeman to "establish a framework for cooperation between the parties to maintain (in the long term) a high-quality, predictable water supply for Bozeman through cooperative efforts in implementing sustainable land management practices".

Decisions made for National Forest System lands are separate from those made by the City. Land management decisions on Federal lands within the watershed are made solely by the Forest Service. Decisions on City lands within the watershed and decisions about City water treatment and storage facilities remain outside the scope of any Forest Service decision although the cumulative impacts of any treatments on City lands in Bozeman Creek are analyzed in Chapter 3 and would be considered in the decision.

Public Involvement

Prior to the DEIS

The Notice of Intent (NOI) for the Bozeman Municipal Watershed project was published in the Federal Register on October 18, 2005. The NOI asked for public comment on the proposal. In addition, as part of the public involvement process, the agency asked that initial comments on the project be submitted by November 11, 2005.

A public scoping document was sent to agencies and interested individuals on September 19, 2005. The scoping document described the project area, laid out the purpose and need for the project, and identified some preliminary issues associated with the project. The list of individuals, agencies, and interest groups who were sent the scoping document are part of the project record.

Because the two drainages involved, Bozeman Creek and Hyalite Creek, encompass the City of Bozeman Municipal Watershed, The Forest Service worked closely with the City of Bozeman administration on the purpose and need. The City and the Forest Service signed a Memorandum of Understanding concerning our mutual goals and objectives. This MOU is a part of the public record.

The Bozeman Watershed Council, a local interest group concerned about the management of the watershed, had been meeting periodically with the Forest Service. They produced an assessment of Bozeman Creek in 2004 outlining the management needs for the drainage (Sourdough Creek Watershed Assessment. 2004. Bozeman Watershed Council, Bozeman, Montana).

Other interest groups, concerned citizens, and the local rural fire districts had collaborative discussions with the Forest Service on the specific needs of the watershed prior to the initiation of the project.

The following is a summary of the public participation that has occurred since the announcement of the project:

1. During the public comment period we received detailed letters from 18 individuals and 11 interest groups. These are part of the project record. The comments that were received in these letters were developed into the issues that are described below.
2. On May 3, 2006 we had a meeting with several individuals and groups for a briefing on the issues that had been raised during scoping and afterward.
3. We had numerous meetings with the City of Bozeman staff members to coordinate our efforts.
4. On June 12, 2006 we briefed the Bozeman City Commission on the progress of the project.

5. On August 3, 2006 we sent a letter to all those on our mailing list briefing them on progress.
6. On August 8, 2006 there was a field trip to the project area for congressional staffers and others.
7. On September 13, 2006 an open house was held to bring the public up to date on the alternatives that were being developed for the DEIS.
8. During the month of May, 2007, the District Ranger sent invitations and issued a press release that he was having four "morning coffee" meetings for people to come, visit, and get an update on the project. These were held at the Eagle Mount conference room.
9. On August 30, 2007 the Draft Environmental Impact Statement for the Bozeman Municipal Watershed fuels reduction project was released for public review and comment. A 45 day comment period was provided. See Appendix C for a summary of the public comments and the Forest Service response to the comments.

Following the release of the DEIS

1. The Forest Service and the City of Bozeman held an open house on September 25, 2007 for a public review of the project and an opportunity for people to get their questions about the project answered. Two public tours of the project area were conducted in October and reviews of the project were given to several individuals.
2. The Forest Service received seven substantive letters commenting on the DEIS from agencies and organizations. It received 36 form letters from other individuals plus numerous pre-printed cards and emails.

Issues

Using the comments from the public and other agencies the interdisciplinary team developed a list of issues to address in the environmental document. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…". The Forest Service identified the following issues:

1. Fire and Fuels – The issue is the effectiveness of reducing fuels in forested vegetation as a way to reduce fire severity in case of a wildfire.
2. Water Quality - The issue is the long term tradeoff of risking potentially severe wildfire and associated high sediment increase risk compared to the activities of

this proposal and possible short term increases in sediment to the City of Bozeman water treatment plant.

3. Fisheries – what are the fish species that could be affected by wildfire and how would they and their habitat be affected by the activities necessary to reduce the potential for severe wildfire.
4. Scenery – how will the visual quality standards of the Forest Plan be met with this proposal and what tradeoffs might need to be made for long term fire protection.
5. Inventoried Roadless Land – the issue with inventoried roadless lands is whether the activities associated with the project will diminish their wilderness character in any way.
6. Lynx - Fuel reduction treatments in lynx habitat can reduce security cover, remove coarse woody debris, which is a key component of lynx denning habitat, and alter the preferred habitat of their primary prey species, snowshoe hare (*Lepus americanus*).
7. Northern Goshawk - Commercial thinning and prescribed burning can alter goshawk nesting, post fledging and foraging habitat. Some habitat modifications resulting from such actions could have detrimental effects.
8. Forested Vegetation – what is the condition of the fire-adapted forest vegetation in these watersheds that makes it vulnerable to severe wildfire and what are the most appropriate actions to take that can help restore it to more natural conditions.
9. Recreation - Proposed fuel treatments in the Bozeman Creek and Hyalite drainages may affect recreation use during periods of operations.
10. Economics – What is the most economically efficient and effective ways to meet the purpose and need of the project.
11. Air Quality – how will the air quality be affected by the prescribed burning activities of the proposal and its alternatives.
12. Weeds - Proposed activities such as prescribed burning and removal or thinning of the forest canopy, activities that displace ground cover such as road construction, yarding of logs, and log landing construction and their use may cause new noxious weed populations to become established and existing populations to expand.
13. Soils – How will the Regional soils guidelines be met considering the proposed ground disturbing activities of the project.

14-21. Other Wildlife - what effects will this project have on wildlife species such as the black-backed woodpecker, grizzly bear, gray wolf, bald eagle, migratory birds, wolverine, marten, elk and other big game.